ABSTRACT BOOK

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PAIN IN EUROPE XIV

COMORBIDITY OF CHRONIC PAIN AND MENTAL HEALTH DISORDERS: BREAKING THE CYCLE

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TABLE OF CONTENTS

ORAL ABSTRACT COMMUNICATIONS

Too Much or too Little? An Overview of Opioid Epidemics in the World

II-B.07

TOOL FOR REDUCING INAPPROPRIATE OPIOID USE FOR PHYSICIAN, PHARMACIST AND PATIENT (TRIO-3P): FEASIBILITY IN PRIMARY CARE

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Background and aims: In Europe, opioid use has surged, largely due to prescriptions for chronic non-cancer pain (CNCP). However, evidence for long-term effectiveness of opioids in CNCP is limited and opioid use is associated with multiple risks. General practitioners (GPs) and community pharmacists (CPs) play a major role in opioid prescribing and dispensing for CNCP. This study aims to investigate the feasibility of a consensus-based opioid-reduction tool for non-cancer-related pain (TRIO-3P) in primary care.

Methods: The TRIO-3P-tool, including 6 components aimed at prescribing opioids in general and 5 components aimed at tapering chronic opioid use, was deployed over 6 months by collaborating GPs and CPs. The intervention started with a pharmaceutical therapeutic audit meeting with (prescribing and dispensing) agreements, including approaching chronic users. Component feasibility was assessed using questionnaires at baseline, and at 2, 4, and 6 months.

Results: A total of 50 GP practices and 30 pharmacies participated. Questionnaire results on components related to opioid prescribing and dispensing showed that 6 months after implementation of prescribing and dispensing agreements, 70% of pharmacists dispense a first prescription for up to 7 days, compared to 10% before the agreements. At baseline, in 22% of the GP practices, opioid prescriptions were repeated only by a physician. At 6 months, 60% of the GP practices were prescribing opioids only after a consultation. Regarding tapering, 366 patients chronically using opioids were invited, of whom 27 (7.4%) were included.

Conclusions: Implementing agreements on prescribing and dispensing opioids for non-cancer-related pain is mostly feasible. Motivating chronic users to taper off proved difficult.

Painful Diabetic Polyneuropathy from Bench to Bedside: Novel Pathophysiological Mechanisms, Diagnostic Test-Oriented Stratification, and Mechanisms-Based Therapeutic Challenges

I-C.32

PHARMACOLOGICAL MODULATION OF PERIPHERAL NERVE EXITABILITY – A NOVEL WAY TO INVESTIGATE SODIUM CHANNEL SUBTYPES

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Background and aims: Despite considerable progress in pain management, recommended systemic pharmacotherapy is often associated with a high risk of serious side effects with an impact on patients' quality of life. Hence, topical routes of drug administration are currently gaining popularity in peripheral neuropathy as the safety profile is much better compared to systemic drugs.

Voltage-gated sodium channels (Nav) are expressed in peripheral nerves and are crucial for development, modulation, and maintenance of neuropathy. Especially the subtypes Nav 1.7., 1.8 and 1.9 are preferentially expressed in nociceptors and may therefore be interesting targets for topical pharmacotherapeutics.

The aim of the study was to assess pharmacologically modulated excitability of peripheral sensory nerves with the human experimental perception threshold tracking model (PTT).

Methods: A randomized, placebo-controlled, and double-blinded study including 20 healthy subjects. A novel electrical stimulation protocol – the Sodium Channel Excitability Nociceptor Testing (SCENT) protocol – was used to identify alterations in Nav 1.7., 1.8 and 1.9 by applying three (5% Lidocaine, 10% Phenytoin and 2% Mepyramine) topical pharmacological drugs.

Results: Preliminary results showed that Phenytoin and Lidocaine modified Nav 1.7. to a higher extent than Mepyramine, whereas Mepyramine had a higher impact on Nav 1.8.

Conclusions: The SCENT protocol can be used to investigate pharmacological alterations of specific Nav-subtypes. This may lead to better insight of neurophysiological mechanisms of sensory afferents, forming the basis for more targeted drug development in the future and leading the way to a more stratified treatment regimen of peripheral pain.

Exploring the Intersection of the Lived Experience of Depression and Chronic Pain

II-C.39

CHRONIC PAIN INTENSITY PREDICTS LONG-TERM DEPRESSIVE DISORDERS IN OLDER COMMUNITY-DWELLERS

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Background and aims: Chronic pain (CP) was associated with depression in older people in numerous cross-sectional studies. However, the longitudinal association between CP characteristics and depressive symptoms in this population remains under debate. We aimed to assess the prospective link between CP intensity and long-term depressive symptoms in a population-based cohort of older participants, considering covariables linked to CP and depressive symptoms.

Methods: The study sample was selected from the PAQUID study, an ongoing cohort of older community-dwellers aged 65 years and over at baseline. Seven hundred and thirteen participants fulfilling a CP questionnaire were included. Information regarding CP characteristics was collected using a questionnaire administered at the 3-year follow-up. Depressive symptoms were assessed every 2 to 3 years during 12 years with the CES-D scale. The association between CP and the 12-year evolution of CES-D score was investigated using a multivariate latent process mixed model for curvilinear data.

Results: Compared with participants without CP, those with mild and intense CP had significantly higher CES-D levels at baseline with a dose-response relationship as a function of pain intensity (β =0.391, p=0.0224, and 0.696, p <. 0001, respectively). However, the time course was comparable in the three groups (β =-0.003, p=0.8406, and 0.001, p = 0.9617, for mild and intense CP respectively). CP intensity was associated with higher levels of depressive symptoms persisting over long follow-ups.

Conclusions: This finding reinforces the importance of active treatment of CP in older subjects, to prevent its consequences, including depressive symptoms.

Temporomandibular Disorders: Novel Insights on the Roles of the Brain, Sleep and Behaviors

II-C.09

ARTIFICIAL INTELLIGENCE FOR DETECTING TEMPOROMANDIBULAR JOINT ABNORMALITIES USING PANORAMIC IMAGES: A SCREENING TOOL FOR MRI-DETECTED PATHOLOGIES

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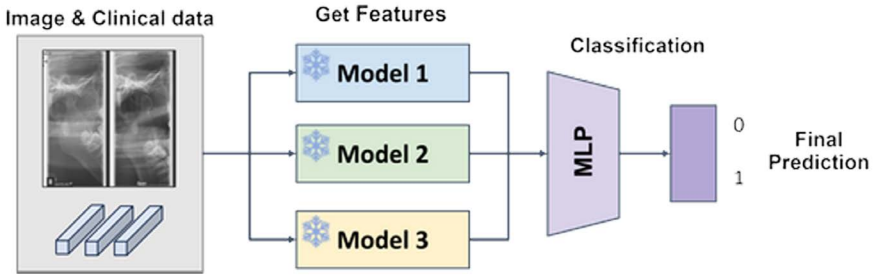
Background and aims: Temporomandibular joint (TMJ) disorders are often associated with pain, limited mouth opening, and structural changes visible on imaging. TMJ panoramic images may serve as a screening tool for detecting abnormalities seen on magnetic resonance imaging (MRI) without requiring MRI scans. This study evaluated the potential of AI-based detection using TMJ panoramic images as a screening method for MRI-detected TMJ pathologies.

Methods: We analyzed 1,356 datasets (305 normal, 1,051 abnormal) of TMJ panoramic images and MRI scans. AI models using a ResNet18 backbone were developed with three configurations:

(1) uni-modal, trained on TMJ panoramic images alone;

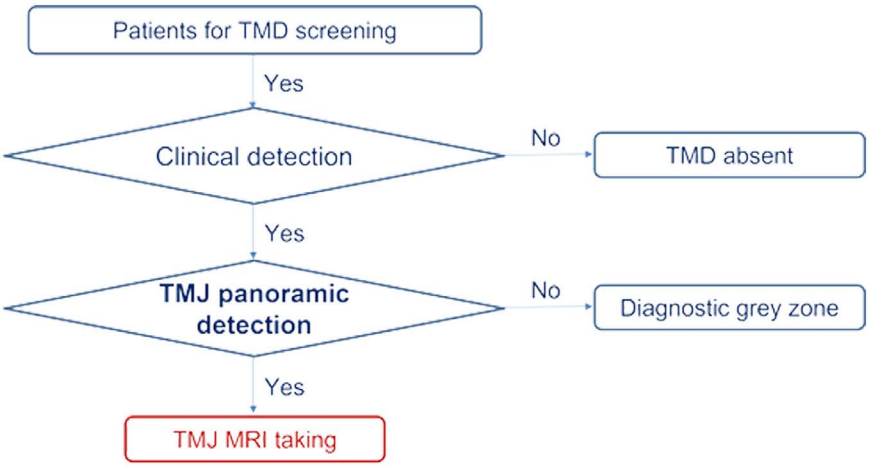
(2) multimodal, combining images with clinical features like limited mouth opening and joint sounds; and

(3) focused crop, using condyle-centered TMJ panoramic images. Predictions were finalized through soft vote (averaged probabilities), hard vote (majority voting), and train ensemble, where frozen feature extraction layers from all models were combined and fine-tuned for classification (Figure 1).



Results: The train ensemble method demonstrated superior performance, achieving an area under the receiver operating characteristic curve (AUC) of 0.840, accuracy of 0.778, Class 0 accuracy (normal) of 0.704, and Class 1 accuracy (abnormal) of 0.819.

Conclusions: AI models integrating TMJ panoramic images and clinical features provide a reliable, practical screening tool for MRI-detected TMJ abnormalities. The diagnostic workflow (Figure 2) shows how this approach facilitates the identification of high-risk patients, offering tailored interventions for pain and structural changes. This method is particularly beneficial in settings with limited MRI access. Further multicenter validation is essential for clinical application.



Translating Non-Invasive Neuromodulation into Clinical Practice in Chronic Pain (and Depression)

I-D.71

PRE-SLEEP ALPHA BRAIN ENTRAINMENT BY AUDIO OR VISUAL STIMULATION FOR PAIN AND SLEEP DISTURBANCE IN FIBROMYALGIA: A SHAM-CONTROLLED RANDOMISED CROSSOVER FEASIBILITY TRIAL

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Background and aims: Non-invasive home-based neuromodulation offers a scalable approach for chronic pain. Given the bi-directional relationship between chronic pain and sleep disturbance, applying neuromodulation pre-

sleep could enhance efficacy. Sensory alpha entrainment can be provided via a smartphone programme using 10Hz stimulation through flickering light or binaural beats. The aim was to assess feasibility and effect on sleep and pain symptoms.

Methods: In a crossover study, adults with fibromyalgia underwent two weeks of active and sham stimulation in randomised balanced sequence, with a one-week washout. Sham was non-rhythmic, perceptually similar stimulation. Pain was assessed with daily diary and weekly Brief Pain Inventory (BPI), and sleep with nightly EEG monitoring (DREEM 3 headband), actigraphy, sleep diary, and Pittsburgh Sleep Quality Index (PSQI). UK Health Research Authority gave regulatory approval.

Results: Nineteen individuals were recruited; 13 completed the study. Pain at night (0-10 scale) was better with active stimulation compared to sham: difference -0.53 (95% CI -0.81 to -0.25, P<0.001). Sleep quality (0-5 scale) was better with active stimulation compared to sham: difference +0.39 (95% CI 0.15 to 0.64, P=0.002). Total sleep time increased by 24 minutes with active stimulation compared to sham (P=0.037) measured with EEG. PSQI and BPI pain interference improved significantly from baseline with active stimulation, but the direct comparison to sham was non-significant.

Conclusions: Pre-sleep sensory neuromodulation with home-based EEG monitoring is feasible for fibromyalgia. Open-loop 10Hz sensory stimulation improved clinical outcomes over sham, though the difference was clinically small. Longer duration personalised entrainment using individual peak alpha or closed-loop feedback should be considered.

Revised Treatment Guidelines for Neuropathic Pain: Pharmacotherapy and Neuromodulation

I-D.73

SAFETY AND FEASIBILITY OF ANTERIOR CINGULATE AND THALAMUS DEEP BRAIN STIMULATION IN NEUROPATHIC PAIN

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Background and aims: Our objective was to evaluate the feasibility and safety of combined unilateral thalamic and bilateral anterior cingulate DBS (supposed to modulate the affective component of chronic pain) in patients suffering from medically-refractory chronic neuropathic pain.

Methods: We conducted a bicentric study (clinicaltrials.gov NCT03399942) to evaluate successively: sensory thalamic stimulation only, combined thalamic and anterior cingulate stimulation, cingulate “on” and “off” stimulation periods in a randomized cross-over double-blinded phase and a 1-year open phase. Safety and efficacy were evaluated by repeated neurological examination, psychiatric assessment, comprehensive assessment of cognitive and affective functioning. Changes on pain intensity (Visual Analogic Scale) and quality of life were used to evaluate DBS efficacy.

Results: Eight patients (2 women; mean age 52,1; mean pain duration 7,1 years) were included and completed the study. One patient had an intraoperative epileptic seizure but no patient developed permanent epilepsy. Several patients presented transient motor or attention disturbances, reversible after decrease of cingulate stimulation intensity. Persistent adverse effects were gait and balance disturbances (1 case) and sleep disturbances (1 case). No patient displayed significant cognitive or affective change. We observed a significant improvement of quality of life at the end of the cingulate “On” stimulation period and at the end of the study, compared to baseline, without significant concomitant pain intensity change.

Conclusions: This pilot study confirmed the safety of anterior cingulate DBS alone or in combination with thalamic stimulation. Improvement of quality of life without significant pain intensity change suggested that anterior cingulate DBS might modulate the affective component of chronic pain.

Stress-Pain Interactions: Neurobiological Mechanisms and Clinical Implications

II-A.04

STRESS-INDUCED MECHANICAL AND THERMAL PAIN SENSITISATION MEDIATED THROUGH CENTRAL NERVOUS SYSTEM CELL SIGNALLING

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Background and aims: Chronic psichosocial stress is known to play a role in both the development and exacerbation of several painful diseases (e.g. fibromyalgia), where drug therapy is not satisfactory. The role of neuroinflammation and the microglia-surface fractalkine receptor (CX3CR1) and microglia-released, NLRP3 (NOD-,LRR-and pyrin domain-containing protein 3) inflmmasome-derived interleukine-1 (IL-1) pro-inflammatory cytokine-release is involved in stress and inflammatory pain. In our unpublished results, CX3CR1 knockout (KO) and IL-1 KO mice did not develop chronic restraint stress (CRS)-induced mechanical sensitization. Here, we investigated the potential analgesic effect of the CX3CR1 antagonist AZD8797, NLRP3 inflammasome antagonist MCC950 and the IL-1R antagonist anakinra in a mouse model of stress-induced pain.

Methods: From the beginning of the 2-week long CRS protocol, AZD8797/MCC950/anakinra or vehicle was administered intraperitoneally daily. The mechanical pain threshold, and the cold tolerance of the hind paw was measured weekly.

Results: Stress protocol induced 15-20% mechanical hyperalgesia on the second, cold hyperalgesia 70-80% on the first week. Both AZD8797, MCC950 and anakinra prevented the formation of mechanical sensitisation of the hind paw compared to the vehicle treatment. In response to stress, cold hyperalgesia was similar in vehicle-, AZD8797/MCC950-treated animals, meanwhile anakinra-treated animals had a significantly smaller threshold drop on the second week of stress.

Conclusions: Based on our results, the microglia-surface fractalkine receptor activation and consequent IL-1 release play an important role in the development of chronic stress-induced pain. AZD8797, MCC950 and anakinra successfully attenuated the mechanical sensitization caused by chronic restraint stress, further strengthening the potential of CX3CR1-NLRP3-IL-1 pathway as a potential drug target.

Acknowledgements:EKÖP-24-3-II

Debate: Can Digital Interventions Benefit People Living with Chronic Pain?

I-D.10

EFFECTIVENESS OF ONLINE PAIN MANAGEMENT PROGRAMS ON IMPROVING PAIN SELF-EFFICACY AND KINESIOPHOBIA: A SYSTEMATIC REVIEW AND META-ANALYSIS

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Background and aims: Online pain management programs (OPMP) provide an alternative for providing pain management (1). Pain self-efficacy and kinesiophobia have been shown to be mediators and predictors for disability in chronic pain (2, 3). The efficacy of OPMPs has mostly been evaluated via improvements in pain intensity or psychological constructs such as depression, anxiety or pain catastrophising, with less evaluating pain self-efficacy and kinesiophobia. This systematic review and meta-analysis investigated the effectiveness of OPMPs on improving pain self-efficacy and kinesiophobia in the chronic pain population.

Methods: Five databases were searched and studies included if they were RCTs that evaluated the effectiveness of OPMPs compared to usual care or face-to-face pain management programs on improving pain self-efficacy or kinesiophobia. Risk of bias was assessed using Cochrane Collaboration's tool for assessing risk of bias. Random-effects models were used in the meta-analyses. Standard mean difference (SMD) (Hedges' g) and mean difference (MD) were used as effect measures. Certainty of evidence was assessed using the GRADE approach.

Results: Fourteen studies were eligible for inclusion, 12 studies and 7 studies with pain self-efficacy and kinesiophobia as their primary outcome respectively. Significant improvements were found post-treatment in pain self-efficacy (N=792, SMD=0.46, 95%CI=0.24 to 0.68, I2=76.1%) and kinesiophobia (N=603, SMD=-0.66, 95%CI=-1.05 to -0.26, I2= 80.1%). Effect sizes were small to moderate and did not meet their measurement tools' minimal clinically important difference.

Conclusions: OPMPs appear to be effective in improving pain self-efficacy and kinesiophobia, however their effect may not be clinically meaningful.

Connecting Emotions, Brain, and Body in Complex Regional Pain Syndrome as a Model for Pain Chronification after Trauma

I-A.30

ALTERED GUT MICROBIOME COMPOSITION AND FUNCTION IN INDIVIDUALS WITH COMPLEX REGIONAL PAIN SYNDROME

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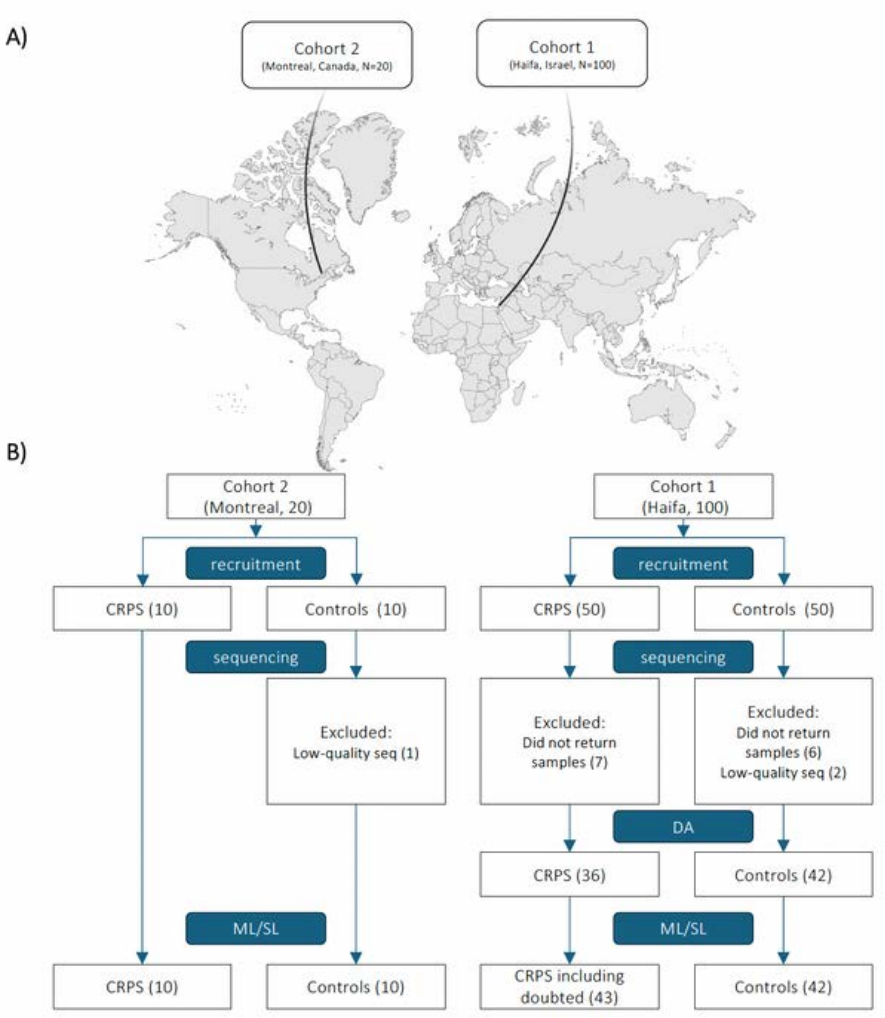
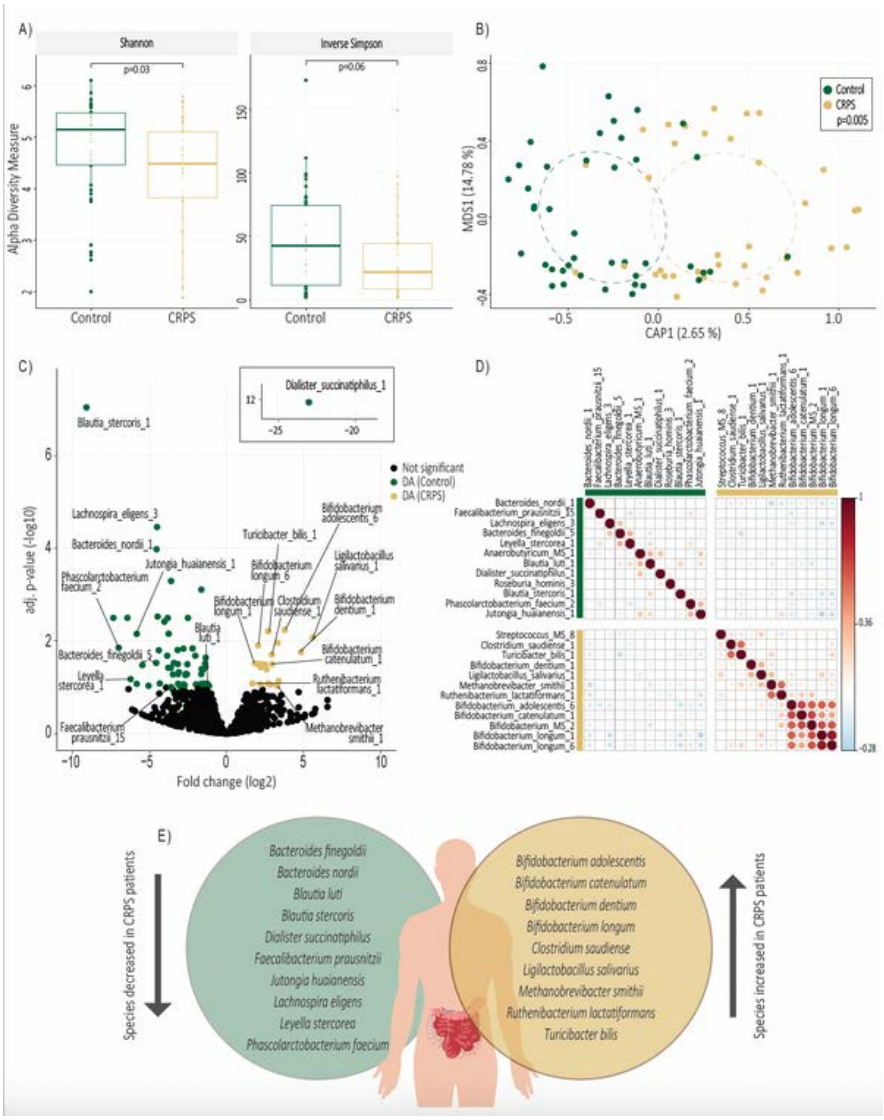
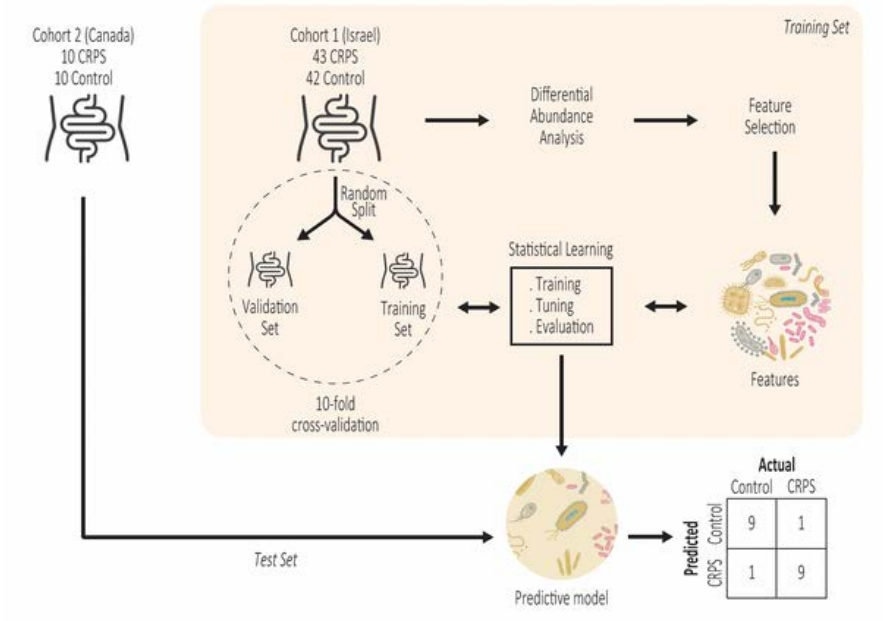
Background and aims: Complex regional pain syndrome (CRPS) is a chronic pain syndrome, typically involving a limb and characterized by severe spontaneous and evoked pain, associated with vasomotor, autonomic and motor signs and symptoms. Dysregulation in several physiologic systems has been suggested in CRPS, although the pathophysiologic mechanisms underlying the syndrome remain elusive. Here we aimed to characterize the gut microbiome composition of CRPS patients and compare it to that of pain-free controls.

Methods: CRPS and pain-free controls were recruited at two geographically discordant pain centres. 16S rRNA sequencing of stool was used to characterize the composition of the gut microbiome of all participants. Targeted metabolomic analysis of stool and plasma was used to measure the concentrations of bacterial-derived metabolites. Finally, machine learning was utilized to classify CRPS patients and pain-free controls based on the composition of their gut bacteria.



Results: The gut microbiomes of 53 individuals with CRPS and 52 pain-free control participants were compared. Significant differences were revealed in several bacterial taxa, including several short-chain fatty acid (SCFA) metabolizing species, targeted stool and plasma metabolite analysis verified differences in the fecal and plasma levels of several SCFA in CRPS patients. Machine learning algorithms allowed for the classification of patients in an independent cohort using the microbiome composition alone.





Conclusions: This study provides novel insights into unique compositional and functional changes in the gut microbiome in CRPS. These results are in line with our previous observations on gut microbiome alterations in fibromyalgia and may pave the way for further studies, elucidating the pathophysiology of CRPS.

Innovative Approaches to Pain Management in Rheumatoid Arthritis, Mapping Mechanisms to Treatments: Insights into Peripheral and Central Sensitisation

II-A.51

CENTRALISED PAIN PREDICTS WORSE PAIN OUTCOMES IN EARLY RHEUMATOID ARTHRITIS: A PROSPECTIVE COHORT STUDY WITH EMBEDDED NEUROIMAGING STUDY

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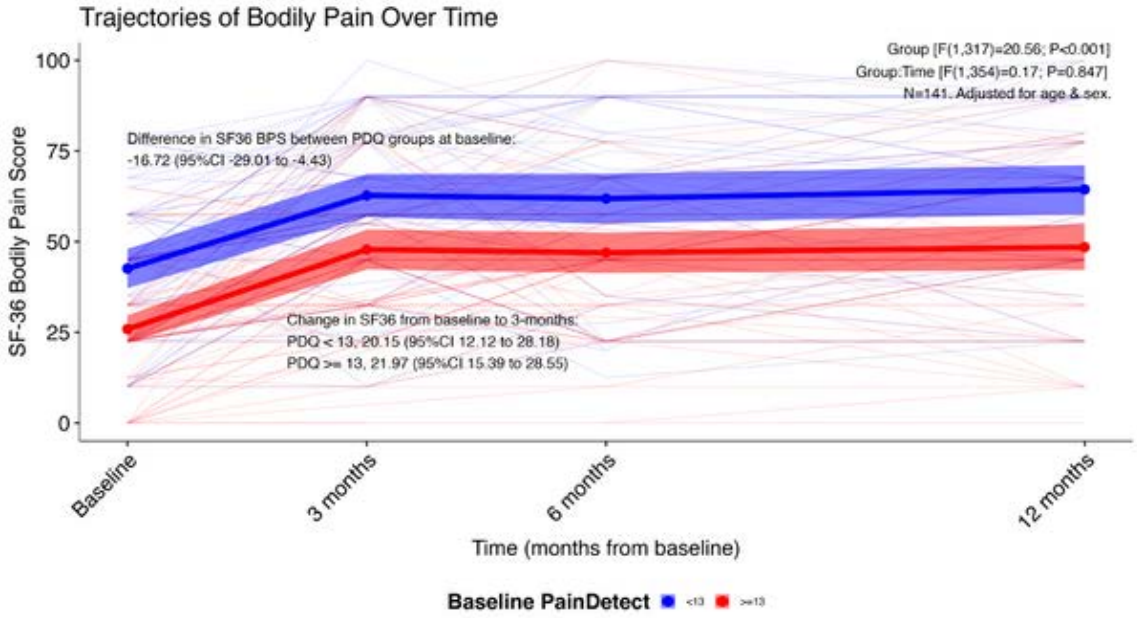
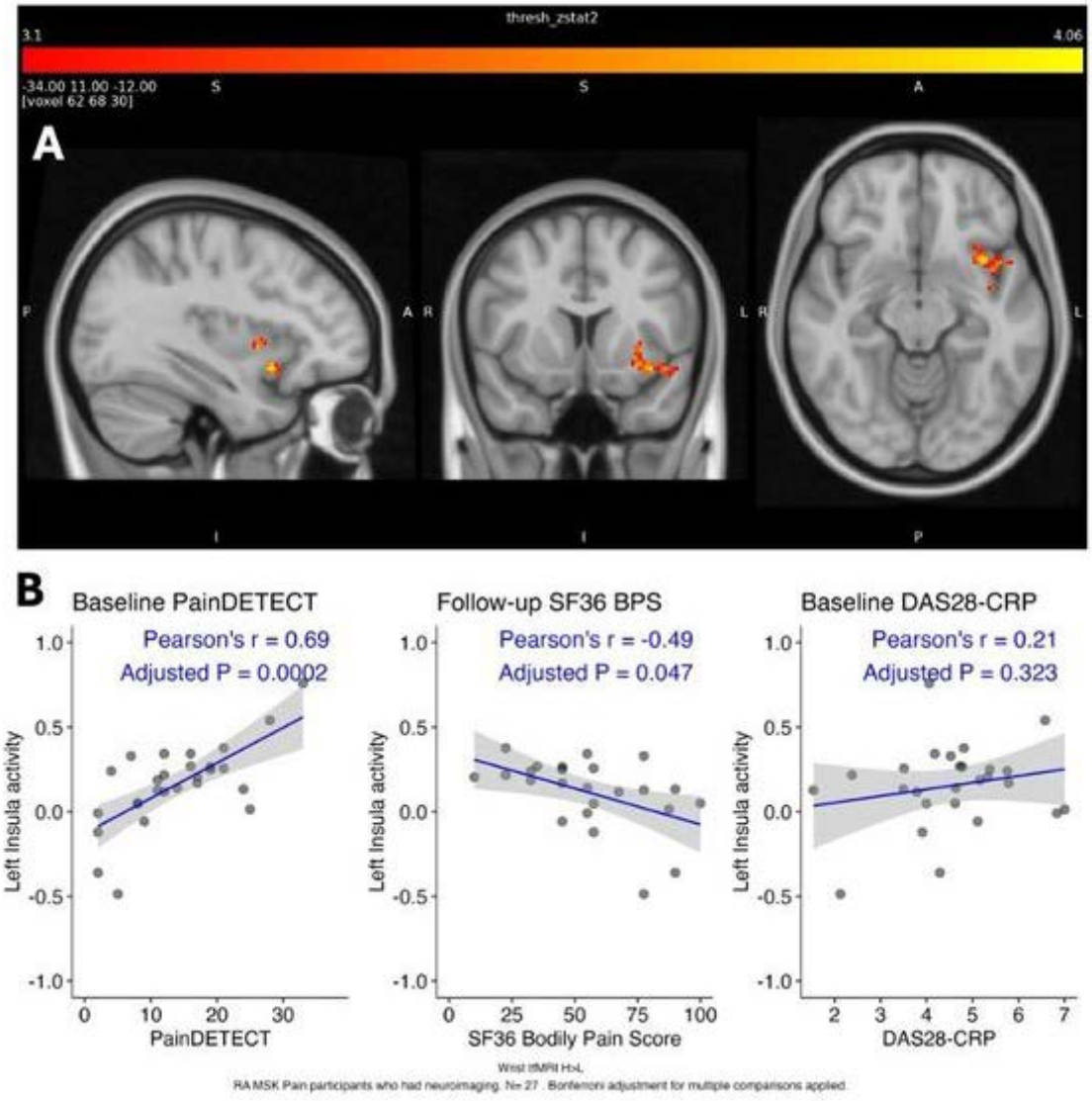
Background and aims: Centralised pain, including symptoms like hypersensitivity, fatigue, and sleep disturbance, is common in rheumatoid arthritis (RA) and may impair response to disease-modifying treatments (DMARDs). We hypothesise that centralised pain affects the response to first-line treatment in early RA.

Methods: We conducted a prospective cohort study involving adults with newly diagnosed RA in Oxfordshire. Centralised pain was measured using the PainDetect questionnaire at baseline. In a subset of 27 participants, task-based functional MRI (fMRI) assessed brain responses to evoked pressure pain stimuli at joint and non-joint sites. The primary outcome, bodily pain, was measured using the Short Form-36 Bodily Pain Scale (BPS) at baseline, 3, 6, and 12 months. CRP values were also monitored. Linear mixed-effects models were used to evaluate associations between PainDetect scores and BPS over time, adjusting for age and sex. Whole-brain analysis explored associations between baseline PainDetect scores and pain-related brain activity.

Results: Of 141 participants (median age: 58.5 years; 38% male), those with baseline PainDetect scores ≥13 reported significantly worse bodily pain at baseline and throughout 12 months' follow-up [Fig1]. In contrast, PainDetect was not associated with levels of joint inflammation (CRP or swollen joint count) at baseline. In the neuroimaging substudy, left insula activation during evoked pressure pain at the wrist correlated with higher PainDetect scores, worse bodily pain at follow-up, but not DAS28 [Fig2].





Conclusions: Centralised pain predicts persistent bodily pain, independently of joint inflammation or baseline disease severity, in early RA. Recognising and addressing centralised pain at diagnosis may help tailor treatment strategies to improve outcomes.

Debate: Migraine: Are Specific Physiotherapy Exercises Needed or not?

II-D-26

ADDITIONAL EFFECTS OF PAIN NEUROSCIENCE EDUCATION COMBINED WITH PHYSIOTHERAPY ON HEADACHE FREQUENCY

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Background and aims: Knowledge about development and perception of pain, why it becomes chronic and how to use this knowledge has been shown to help patients cope better with pain. Pain Neuroscience Education (PNE) explains the neuroscientific background of pain. The aim of this study was to investigate the additional effect of PNE on headache and migraine frequency when offered as an adjunct to physiotherapy.

Methods: In this two-arm randomized, non-blinded study, migraine patients (>4 days per month) received six sessions PT+PNE or six sessions PT alone. Primary endpoints were frequency of headaches and migraine. Secondary outcome measures included frequency of medication use, neck pain, neck pain-associated disability

(NDI), cutaneous allodynia (ASC-12), perception of health/depression symptoms (PHQ-9), impairment due to headache (MIDAS), migraine-specific quality of life (MSQoL) and acquired knowledge (NPQ-D). Data were analyzed with a linear mixed model (LMM).

Results: 82 participants were randomized. The effect of time overall was significant in headache frequency both for the PT group (p=0.04) and for the PT+PNE group (p=0.00). The overall time effect in migraine days is not significant for the PT group (p=0.08), but for the PT+PNE group (p=0.00*). The differences between the groups at the individual time points and the group differences overall are significant (p=0.00). The PT group improved by 15% in the migraine days, the PT+PNE group improved by 44% (from 6,2 to 3,6 days per month).

Conclusions: Physiotherapy combined with pain neuroscience education was significantly more effective than physiotherapy alone to reduce migraine frequency and should be considered for the treatment of migraine.

II-D-15

SEROTONERGIC TONE AND EXTRACRANIAL PRESSURE PAIN THRESHOLDS ARE SURROGATES OF RESPONSE TO PAIN EDUCATION IN CHRONIC MIGRAINE PATIENTS

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Background and aims: Pain neuroscience education (PNE) has been recently added as option for different chronic pain conditions.However, no standard methods for PNE have been developed for chronic migraine (CM). This study aims at highlight mechanisms responsible for PNE effect in CM.

Methods: We recruited 14 patients and assessment them including: headache frequency,questionnaires (CSI, HADS, PCS, HIT-6, MIDAS), neurophysiological evaluations with nociceptive blink reflex (nBR), intensity dependence of auditory evoked potentials (IDAP),clinical evaluation with pressure pain thresholds (PPTs) and wind-up ratio. PNE was administrated in ten group lessons, once a week.

Results: Headache days reduced from 18.5±5.2 to 13.4±7.5 (p=0.002) and HIT-6 from 63.1±3.3 to 56.0±6.0 (p=0.013).Serotonergic tone tended to reduce from T0 to T1 (p=0.13), while WUR significantly decreased from 3.1±1.8 at T0 to 1.8±1.6 at T1 (p=0.002) and negatively correlated with HIT-6 value at T2 (rho=-0.5, p=0.02). IDAP at midway negatively correlated with headache days' reduction at T2 (rho=-0.5, p=0.04). Values of PPT on tibialis anterior recorded midway to treatment positively correlated with ipsilateral (rho= 0.73, p=0.002) and contralateral (rho=0.6, p=0.007) nBR at the same time point but not in other time-points.

Conclusions: PNE resulted to be effective in reducing migraine days and disability in CM patients as stand-alone preventive therapy. Early determination of the serotonergic tone could represent a predictive biomarker of response since it correlated with later clinical benefit. PPT values on tibialis anterior could serve as a proxy of nNR, allowing for an intra-subject evaluation of central sensitization in CM also at clinical bed-side level.

A Sorrow Shared Is a Sorrow Halved: Novel Evidence on the Impact of Social Factors on Pain-Related Outcomes

III-A.28

THE 'CUPID' COHORT STUDY: SOCIAL AND CULTURAL IMPACT OF PAIN, DISABILITY, AND QUALITY OF LIFE IN 1,350 DUTCH PRIMARY CARE PATIENTS WITH NON-SPECIFIC MUSCULOSKELETAL PAIN

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Background and aims: The annually growing number of people with non-specific musculoskeletal pain (NSMSP) increases the need to identify those at risk for chronicity and poor outcomes. Previous research indicated that socio-cultural factors, e.g., socio-economic status (SES), migration background and education level, may explain this merely unequally distributed risk. However, the longitudinal associations and predictions of socio-cultural factors on NSMSP remain unclear. Therefore, this study aimed to 1) determine the associations between socio-cultural factors and pain intensity, disability and health-related quality of life (HRQoL) at three, six and twelve months, and 2) to determine which socio-cultural factors are predictors on short- and long term NSMSP outcomes in people visiting Dutch primary care physiotherapy.

Methods: In this prospective cohort study 1,350 NSMSP patients completed questionnaires on socio-cultural, health-related and pain-related factors, with standardized measures for outcomes pain intensity, disability, and HRQoL at baseline, three, six and twelve months follow-up. Longitudinal associations and predictions were analyzed using linear mixed modelling.

Results: Unemployment and non-native Dutch language proficiency were associated with on average poorer pain intensity, disability, and HRQoL at follow-up. Migration background was associated with higher pain intensity and disability, whereas higher education levels were associated with better NSMSP outcomes over time. After cross-validation, prediction models showed large unexplained variability.

Conclusions: These results indicate that NSMSP is unequally distributed and potentially leads to poorer NSMSP outcomes. However, within a highly diverse population, it is not possible to predict individual NSMSP outcomes based on the occurrence of specific socio-cultural factors.

Habituation and Sensitization to Noxious Stimuli: History, Mechanisms and Clinical Potential

III-D.42

COGNITIVE REAPPRAISAL OF PAIN OR PAIN-UNRELATED NEGATIVE EMOTION REDUCES PAIN INTENSITY, EMOTIONAL DISTRESS, AND CENTRAL SENSITIZATION

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Background and aims: Pain and negative emotion often co-occur. In pain treatment, psychological interventions primarily target negative emotions directly associated with pain. Yet, all negative emotions can exacerbate pain. To widen the scope of psychological pain treatment, the question arises whether targeting pain-unrelated emotional states could also successfully alleviate pain – an approach particularly relevant for pain patients with comorbid mood disorders.

Methods: We experimentally induced pain and negative emotion in 90 healthy individuals, who were subsequently trained to reappraise pain or pain-unrelated negative emotion. Participants were randomly allocated to receive either a pain-focused or (pain-unrelated) emotion-focused reappraisal training or a control training. Participants attended 3 sessions where they were engaged in a task that combined electric stimulation (painful and non-painful) with the presentation of pictures (neutral and negative valence). Reappraisal training was provided at the beginning of session 2 only. In each session, pain and emotional distress ratings were recorded throughout the task. Secondary hyperalgesia (**SH**) – an indicator of central sensitisation – was assessed after the task.

Results: In contrast to the control group, both reappraisal groups showed significant decreases in subjective pain, emotional distress, and SH in sessions 2 and 3. The reappraisal groups did not differ in their responses.

Conclusions: The findings demonstrate that reappraisal reduces pain and central sensitization, regardless of whether it is focused on pain or on pain-unrelated negative emotions. Altering pain-related or pain-unrelated thoughts and feelings when pain and negative affect co-occur offers a greater scope for optimising psychological intervention in pain treatment.

Rethinking Pain and Obesity: Transforming Treatment Beyond ‚Eat Less, Move More'

II-D-24

TAILORED PHYSICAL ACTIVITY INTERVENTIONS FOR CHRONIC PAIN PATIENTS: INSIGHTS FROM A MIXED-METHODS STUDY

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Background and aims: Chronic pain (CP) affects approximately 20% of adults worldwide, severely impacting quality of life. Physical activity (PA) can alleviate pain sensitivity and improve wellbeing in people with CP; however, sustainable PA engagement remains challenging. This study aimed to identify key barriers and facilitators to PA in adults with CP by stratifying participants according to personal and clinical characteristics (age, gender, socioeconomic status) using the COM-B behaviour change model.

Methods: Forty-two people with chronic pain were recruited from a specialist NHS pain service in Scotland. Participants completed validated questionnaires assessing pain, self-efficacy, kinesiophobia, psychological distress, and PA levels. Additionally, 36 patients participated in semi-structured interviews, providing qualitative insights into factors affecting PA engagement.

Results: We found age- and gender-specific barriers, with psychological barriers, such as pain ''catastrophising'', more common in women, while men reported physical limitations. Younger adults cited psychological barriers such as stress, whereas older adults emphasised physical constraints. Socioeconomic status also influenced PA engagement, with deprived individuals reporting more external barriers than affluent counterparts.

Conclusions: Effective pain management and social support are essential facilitators for sustained PA among people with CP. Tailored interventions addressing subgroup-specific needs (e.g., integrating psychological, physical, and social support) are critical to overcoming PA barriers. The findings of this study inform the development of the SUSSED (SUstainable Self Effective Exercise Development) tool, a clinical support tool co-designed with individuals with CP to enhance sustainable PA engagement across diverse subgroups.

Rethinking Pain and Obesity: Transforming Treatment Beyond ‚Eat Less, Move More'

III-D.72

RESISTANCE EXERCISE SHOWS PROMISING PAIN OUTCOMES IN WOMEN LIVING WITH OBESITY

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Background and aims: Pain is a common comorbidity in people living with obesity. This study aimed to explore change in secondary pain outcomes during the EXOFFIT clinical trial of exercise in women with obesity.

Methods: Participants were women aged 18–50 years, with a BMI>30kg/m2. Following ethical approval, a 12-week, 3 sessions/week, feasibility, pilot RCT compared outcomes of three time-matched interventions Aerobic Exercise (AE), Resistance Exercise (RE), Combined Aerobic and Resistance (COM) and a control group (CONTROL).

The pain measures were (i) % experiencing pain (ii) Pain severity (Brief Pain Inventory SF).

Group comparisons were made using effect sizes.

Results: Fifty-six women completed pre/post pain assessment (16 CONTROL,14 AE, 11 RE, 15 COM). Mean age was 36.3 ±9.1 years and mean BMI was 37.9 ±6.6 kg/m2.

At baseline, 52.2% reported musculoskeletal pain, including 28.4% LBP, 22.4% Neck/Shoulder, 19.4% Knee. Mean BPI-SF scores ranged from 1.4 to 2.3 across the four groups.

Following the intervention, the number of participants reporting pain decreased to 39.3% overall, mainly in AE (pre=62.5%; post=35.7%) and RE (pre=52.9%; post=36.4%) groups. The COM group was unchanged (pre=47.0%; post=46.7%), while CONTROL was (pre=47.1%; post=37.6%).

The RE group had the greatest decrease in BFI-SF mean pain severity during the intervention (-1.3±2.3) and number of pain sites (−1.9±3.9).

When compared to CONTROLS, effect sizes in favour of RE were 0.40 (pain severity) and 0.70 (number of pain sites).

Conclusions: Pain was a problem even in this young cohort of women with obesity. Exercise intervention, particularly resistance exercise shows promise for pain reduction.

Receptor Channels: From Molecular Mechanisms to Therapeutic Targets for Treating Acute and Chronic Pain

III-B.20

THE EFFECT OF PRENATAL STRESS ON DEVELOPEMENT AND FUNCTIONS OF NOCICEPTORS

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Background and aims: Nociceptors are specialized neurons located in the dorsal root ganglia (DRG), responsible for transmitting pain signals from organs to the central nervous system. They are classified into subtypes: **Non-Peptidergic** nociceptors (NP), **Peptidergic** nociceptors (PEP), and non-nociceptive neurons called **c-low-threshold mechanoreceptors** (cLTMRs). These subtypes develop from precursors between embryonic days (E) 11 and E13, achieving transcriptomic maturity by **E13 to post-birth**. As we previously demonstarated that prenatal stress (PS) induces mechanical hypersensitivity, we hypothesized that PS disrupts the transcriptomic development of nociceptors, contributing to **mechanical hypersensitivity** observed in offspring.

Methods: PS was induced in pregnant mice using restraint stress under bright light from E13 to E18. Mechanical sensitivity in 8-week-old mice was assessed using **Von Frey** tests. DRGs were isolated from control (CT) and PS mice for **bulk RNA sequencing**. **Immunohistochemistry** staining identified major nociceptor populations in 8-week-old DRGs. **Single-cell RNA sequencing** (scRNAseq) on sorted nociceptors from CT and PS offspring provided further insights on transcriptomic impacts.

Results: PS offspring showed pronounced **mechanical hypersensitivity** compared to CT offspring. RNA sequencing revealed **300 differentially expressed genes,** including Trpv1 (PEP), Th (cLTMR), and Mrgprd (NP). This **increase of cLTMRs** and decrease of PEP nociceptors in PS offspring has been confirmed by immunohistochemistry. scRNAseq indicated **cLTMRs as the primary affected population**, including genes dysregulated that are known to play a role in Austism spectrum disorders.

Conclusions: Our results show that PS impacts cLTMRs development at the transcriptomic, proteic, and single-cell levels. This impairment is associated with a mechanical hypersensitivity and behavioral disorders (results not shown here).

From Bench to Clinic: Three Novel Therapeutic Targets for Chronic Pain on the Path to Clinical Use

I-D.76

NDMC SHOWS EFFICACY IN A PHASE IIA TRIAL IN CHRONIC NEUROPATHIC PATIENTS

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Background and aims: N-desmethylclobazam (NDMC) is an allosteric modulator of the $GABA_A$ receptor with improved selectivity for the α2 GABAa receptor-subtype while sparing the α1 sub-type. It represents a first in a new class of anti hyperalgesic treatment. A phase I study in 29 healthy volunteers tested pain sensitivity to UVB irradiation and showed good tolerability and a slightly better response under NDMC compared to placebo.

Methods: This randomized controlled double blind Phase IIa study tested NDMC 40 mg, 80 mg per day and placebo during 20 days in a planned cohort of 29 patients suffering from chronic pain not responding to treatment and as an add-on to standard treatments. The primary endpoint pain was a reduction of pain evaluated on visual analogue scale (VAS). Secondary endpoints: sedation was evaluated on a VAS, concentrations of NDMC were measured in plasma and safety was recorded.

Results: Only 29 patients were recruited due to Covid epidemics. The pain reduction in the NDMC group was of -2.0 and of -1.5 in the placebo group, the difference was not statistically significant. When patients were stratified for NDMC concentrations, the dose response was significant with Rsquare of 0.93. The drug was well tolerated and sedation was not correlated with NDCM serum concentration.

Conclusions: NDMC is efficacious to reduce pain in patients with chronic pain already treated with standard of care. The pain reduction increases with plasma concentrations of NDMC. NDMC is well tolerated. A Phase IIb clinical trial is warranted to confirm these favourable results.

Chronic Pain and Comorbid Affective Disorders: Towards Mechanistic Understanding and Novel Treatments, With Consideration of Sexual Dimorphism

I-A.46

AUGMENTED CONNECTIVITY OF REWARD-RELATED AND DEFAULT MODE NETWORK REGIONS IN FIBROMYALGIA AND MAJOR DEPRESSION

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Background and aims: Pain relief is linked to appetitive reward, while incipient pain elicits a negative emotional response, suggesting an overlap between pain processing and the reward system. Despite some research on the reward system in chronic pain patients, studies on fibromyalgia patients are limited. Moreover, individuals with depression exhibit dysfunctional reward processing, with anhedonia being a core symptom. Our study aims to identify functional connectivity alterations in the reward circuity during the resting-state in patients with fibromyalgia and major depression.

Methods: We included 43 healthy females, 37 matched fibromyalgia, and 20 matched patients with major depression. Participants completed standardized clinical assessments and underwent resting-state functional magnetic resonance imaging (rs-fMRI). Seed-based functional connectivity analyses were performed using the Nucleus Accumbens as the region of interest (ROI) a core subcortical region involved in reward-related processes (Diekhof et al., 2012; Speer et al., 2023).

Results: Compared with healthy controls, we found increased functional connectivity between the Nucleus Accumbens and the posterior cingulate-precuneus cortex in fibromyalgia patients ($q_{FWE\text{-}cluster}$<0.05, whole-brain, p-voxel <0.001). We did not find significant alterations in depressive patients (not even at an uncorrected p<.01 level).

Conclusions: We found a significant increase in the connectivity of the Nucleus Accumbens to a core node of the "Default Mode Network", a key region associated with self-referential processes, internal mentation and attention shifting-flexibility. Further studies should assess to what extent this altered connectivity may be associated with core fibromyalgia symptoms. We did not find any significant results in depression.

ORAL POSTER PRESENTATIONS

A1 | INTERSECTION OF LIVED EXPERIENCES: DEPRESSION & CHRONIC PAIN

I-A1.W.01

EXAMINING CLINICALLY MEANINGFUL CHANGE IN PEDIATRIC CHRONIC PAIN TREATMENT ON OUTCOMES OF ANXIETY AND DEPRESSION

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Background and aims: Treatment for chronic pain targets functional impairment through physical and psychological therapies. Cognitive-behavioral therapy demonstrates effectiveness at reducing pain-related distress and improving functioning in youth with chronic pain. Recently, graded exposure treatment (GET) has demonstrated efficacy at improving pain-related impairment by targeting pain-related fear. Specific mechanisms (e.g., anxiety, depression) potentially targeted by CBT and GET have yet to be examined. This study examines reliable and clinically meaningful change in anxiety and depression from baseline to 6-month follow-up for adolescents in a clinical trial comparing multidisciplinary pain management (MPM; PT + CBT) to GET.

Methods: Leeds Reliable Change Indicator calculated reliable change index (RCI). Individuals were classified as meeting CMC if severity level changed in the expected direction on the Children's Depression Inventory-2; CDI-2 and Multidimensional Anxiety Scale for Children-2; MASC-2. Individuals were treatment responders if the change score from baseline to 6-month exceed the RCI value and met criteria for CMC. 33 individuals were included in the MPM arm, and 27 from the GET arm.

Results: Regarding anxiety, 18.2% of MPM and 18.5% of GET participants were classified as treatment responders. For depression, 21.2% of MPM and 14.8% of GET participants were classified as treatment responders.

Conclusions: Equivalent proportions of patients in MPM and GET reported CMC for anxiety, with a greater proportion in MPM reporting CMC for depressive symptoms. This suggests both treatments are effective in reducing anxiety, but components of MPM (e.g., cognitive restricting) may better target depression. Future work should continue to examine individual differences in treatment response.

I-A1.W.02

6-WEEK PAIN EDUCATION GROUP THERAPY HELPS TO MANAGE DEPRESSION AND ANXIETY IN CHRONIC PAIN PATIENTS IN ESTONIA

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Background and aims: Working with chronic pain patients teamwork and group therapy seem to be critical to help patients understand their pain or to change their expectations (The Lancet, 2021). The aim of our pilot study was to develop structured pain education group therapy for Estonian chronic pain patients and to assess what parts of pain education content fits this target group.

Methods: 127 chronic pain patients (male 13.40% and female 86,60%; age: 47,97±12,62) participated in a 6-week group therapy led by clinical psychologist, physiotherapist and medical doctor. Each session covered two topics and nine topics in total: 1) understanding pain, 2) use of medicines in pain treatment, 3) stress, 4) sleep hygiene, 5) relaxation techniques, 6) physical activity, 7) over/underuse, 8) thoughts, 9) setbacks. The emotional state of the participants was assessed at the beginning and at the end of the treatment using the EST-Q2 (Aluoja et al., 1999).

Results: On average the group therapy participation percentage was 77,39±22,61 and subjects participated in 4,6±1,63 sessions.

Changes in EST-Q2 subscale scores in Table 1.

Subscales	Before therapy	After therapy	Change (points)	Change %	p	Effect size
Depression	14,2	12,5	1,7	13%	0,0070	0,22
Anxiety	13,7	11,5	2,2	19%	3,6670	0,55
Agoraphobia-Panic	4,4	3,5	0,9	26%	0,0020	0,22
Social anxiety	2,9	2,7	0,1	5%	0,2990	0,05
Fatigue	11,4	10,7	0,7	6%	0,0005	0,30
Insomnia	7,5	6,8	0,7	10%	0,0034	0,20

Post-course feedback was received from 48,5% of the participants. All the nine topics were rated highly and most relevant topics in order were:

1) over/underuse,

2) relaxation techniques,

3) understanding pain and sleep hygiene.

Conclusions: The 6-week pain education group therapy leads to statistically significant decreases in depression, anxiety, agoraphobia-panic and insomnia scores measured by EST-Q2. Chronic pain patients report useful topics for modulating pain over/underactivity, relaxation techniques and simplifying the understanding of pain and how sleep affects pain.

I-A1.W.03

THE PSYCHOLOGY OF VISCERAL PAINS: EXPLORING WITH QUALITATIVE METHODS

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Background and aims: Visceral pain tends to be framed using the same psychological concepts as in musculoskeletal pain. We were not convinced this was justified, so analysed primary and secondary qualitative data to better understand applicable psychological models.

Methods: We ran systematic reviews and thematic metasyntheses of qualitative studies in endometriosis, pelvic mesh complications, inflammatory bowel disorder, and polycycstic kidney disease to elicit themes within each and across all. We also collected data on pain from 15 women and 15 men (where applicable) with each of the disorders using free-association-based methods, minimising researcher influence. Data were thematically analysed with help from experts by experience and clinicians.

Results: We have found broad themes about impact of pain and disease on life, particularly in the social domain, and about relationships with healthcare. Descriptions of meaning and management of pain better fit a sense-making model than a fear and avoidance model, despite real threats to health of some diseases. Pain was rarely interpreted as indicating damage, nor were many triggers avoidable. There was little evidence of catastrophic thinking or disabling generalized avoidance in clinical or community populations.

Conclusions: We need to understand better the psychology of visceral pains, and use unconstrained methods to investigate them. Validation by a recognised diagnosis may enable better management of chronic visceral pain.

I-A1.W.04

INCIDENCE AND PREVALENCE OF THE COMORBIDITY BETWEEN PSYCHOLOGICAL DISTRESS AND FUNCTION-LIMITING MUSCULOSKELETAL PROBLEMS

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Background and aims: Mental health disorders and musculoskeletal (MSK) problems are highly prevalent, co-exist, and cause disability. Among young adults, neck and back pain are frequently reported. Students experiencing such pain are more likely to report psychological distress compared to their peers.

To determine the prevalence at baseline and incidence at three months of the comorbidity between function-limiting MSK problems and psychological distress, stratified by gender.

Methods: Study design: A cohort study of 4,262 students, 18 years and older, from eight universities in Stockholm.

Data collection: Via web surveys about potential risk factors, MSK problems, and psychological distress at baseline and at four follow-up points during one academic year. MSK problems in nine body areas and psychological distress(moderate to extremely severe anxiety and/or moderate to extremely severe depression) were measured using the Nordic Musculoskeletal Questionnaire and the Depression Anxiety Stress Scale-21, respectively.

Comorbidity was defined as the concurrent presence of MSK problems in any body area and psychological distress.

Results: The overall prevalence was 15% (n=620, 95%CI:14%-16%), higher among females (17%, 95%CI:16%-19%) than males (10%, 95%CI:8%-11%), and with a prevalence ratio of 1.7 (95%CI:1.5-2.1).

In a population at risk of 3,642, with 737 individuals lost to follow-up, the three-month incidence was 8% (n=302, 95%CI:7%-9%), higher among females (10%, 95%CI:8%-11%) than males (6%, 95%CI:5%-8%), and with an incidence ratio of 1.6 (95%CI:1.2-1.9).

Conclusions: The significant prevalence and incidence proportions highlight the considerable comorbidity burden, especially among female university students, which can adversely impact their health, social interactions, and academic performance.

I-A1.W.05

SCREENING FOR DEPRESSION, ANXIETY, AND DISTRESS ASSOCIATED WITH LOW BACK PAIN. A SCOPING REVIEW

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Background and aims: This review will summarise the available evidence on how accurately depression, anxiety, and psychological distress can be identified by musculoskeletal (MSK) or spinal clinicians using their clinical impression alone compared to reference standard questionnaires in a LBP population.

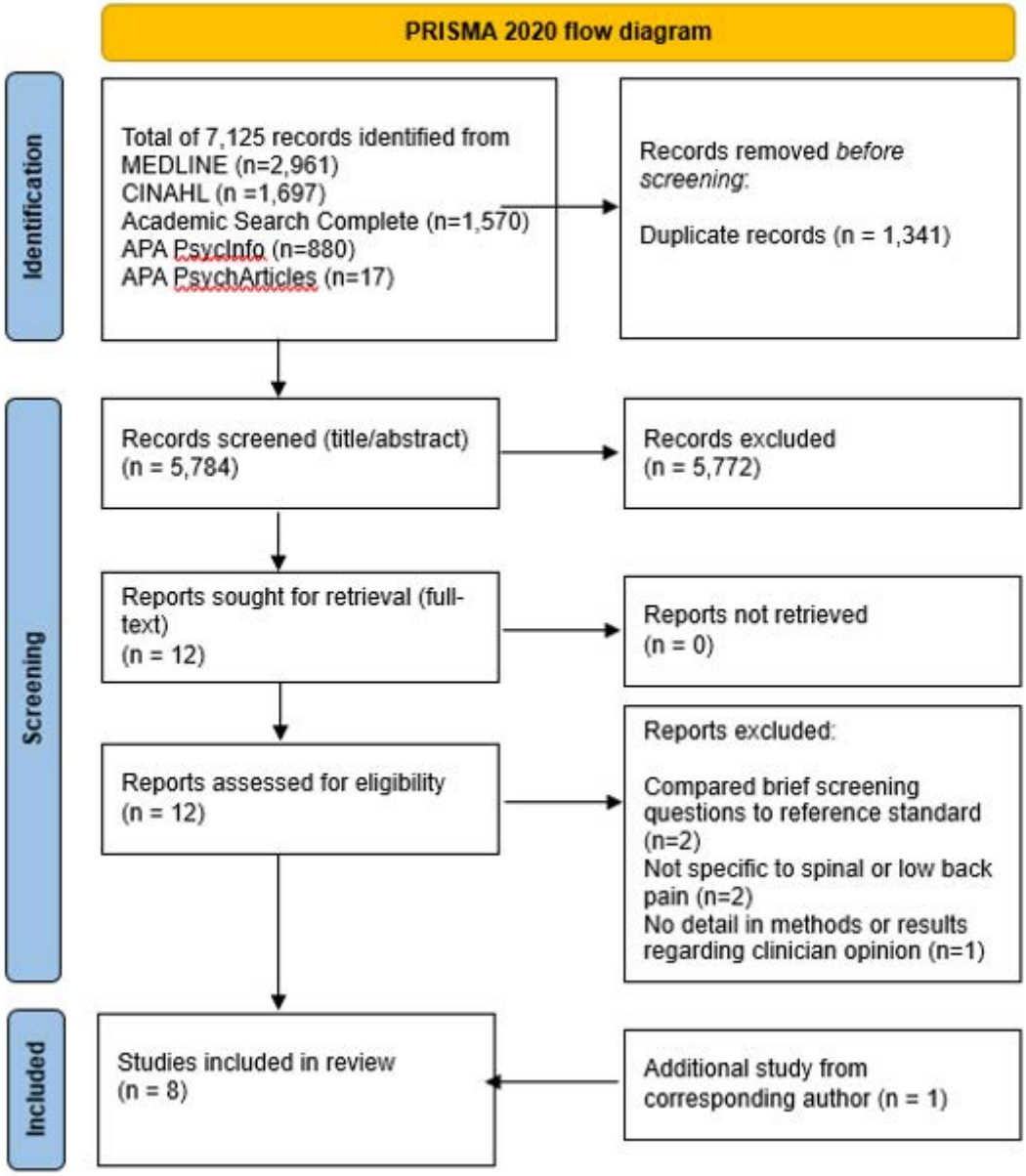
Methods: The scoping review was conducted following the JBI methodological guidance for scoping reviews and using the PRISMA-ScR checklist.

A comprehensive search strategy of MEDLINE, CINAHL, Academic Search Complete, APA PsycInfo, and APA PsycArticles was conducted on June 13th 2023 relating to three domains; (i) LBP, (ii) MSK and spinal clinicians, and (iii) depression, anxiety and psychological distress as outlined in the pre-registered OSF protocol https://osf.io/pt3a6. All relevant primary quantitative research studies published in English were included, without date restriction.

Two reviewers independently carried out the database searches, assessed titles and abstracts for relevance based on eligibility criteria, and reviewed the full texts of the studies initially selected for potential inclusion.

Results: Eight studies were included, with a total number of 1,240 patients. Sensitivity and specificity values were available across seven studies.

Figure 1. Prisma flow diagram illustrating study selection process



Sensitivity rates were consistently low, indicating a tendency to underestimate the presence of considerable depression, anxiety, or psychological distress in people with LBP. Specificity values were consistency high, indicating that clinicians were correct most of the time that they judged a person as normal across all three psychological states.

Table 1. Prevalence of anxiety and sensitivity/specificity values for accurate identification of anxiety by clinicians compared to reference standards

Reference standard for Depression and/or Anxiety	DASS-21 [Haagman et al 2004]	4DSQ [Brunner et al 2018]	HADS [Miki et al 2020]	Mean
$Sensitivity of high depression recognition	*9.1%	*33.3%	9.0%	*17.1%
$Specificity of high depression recognition	*99.0%	*85.7%	96.0%	*93.6%
$Sensitivity of high anxiety recognition	-	*0.0%	24.0%	*12.0%
$Specificity of high anxiety recognition	-	*89.1%	91.0%	*90.1%

DASS-21 = Depression Anxiety and Stress Scale-21. 4DSQ = 4Dimensional Symptom Questionnaire. HADS = Hospital Anxiety and Depression Scale.

*Calculated by authors. ^Sensitivity and specificity analysis of moderate or higher clinician impression compared to moderate or high scores using the reference standard. For depression; high clinician impression was classified as NRS 7-10, DASS-21 "severe" or "extremely severe", or 4DSQ "very high, where NRS= Numerical Rating Scale. For anxiety; high clinician impression was classified as NRS 7-10, DASS-21 "severe" or "extremely severe", or 4DSQ "very high".

Table 2. Prevalence of psychological distress and sensitivity/specificity values for accurate identification of distress by clinicians compared to reference standards

Reference standard for Psychological Distress	4DSQ [Brunner et al 2018]	DRAM [Daubs et al 2010]	DRAM [Grevitt et al 1998]	DRAM [Moon et al 2023]	Mean
$Sensitivity of high distress recognition	*71.4%	28.7%	*25.7%	*34.0%	*40.0%
$Specificity of high distress recognition	*63.1%	91.1%	*95.6%	*92.8%	*88.7%

DRAM = Distress and Risk Assessment Method. *Calculated by authors. ^Sensitivity and specificity analysis of moderate or higher clinician impression compared to moderate or high scores using the reference standard. For psychological distress; high clinician impression was classified as NRS 7-10 or DRAM category of distressed depressive or distressed somatic. These high levels of clinical impression were compared to high or very high scores on the reference standard.

Conclusions: Overall, MSK and spinal clinicians cannot accurately identify depression, anxiety or psychological distress in adults with LBP using clinical impression alone. The tendency is to underestimate prevalence, in particular the more severe states.

I-A1.W.06

PSYCHOLOGICAL PROFILES OF CHRONIC PAIN PATIENTS

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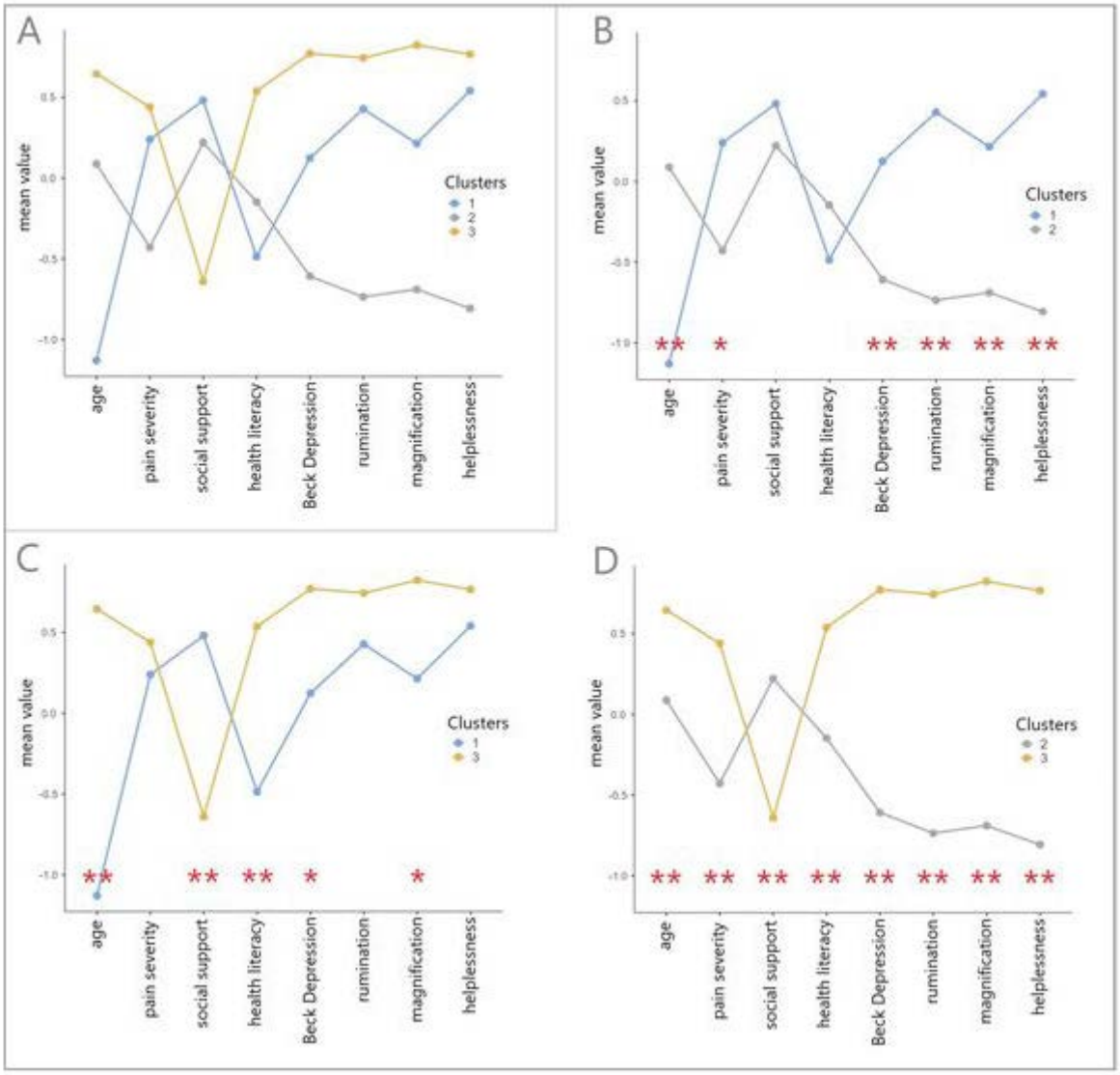
Background and aims: Chronic pain affects approximately 20% of the population, significantly deteriorating quality of life. Its complex multimodal therapy includes not only the treatment of the physical characteristics of pain but also the recognition and management of its psychological and social aspects. The aim of our current clinical study was to use cluster analysis to distinguish groups within the clinical sample and identify important risk factors from the perspective of illness behaviour.

Methods: The study was conducted at the Department of Neurology, Albert Szent-Györgyi Health Centre of the University of Szeged, Szeged, Hungary involving 136 adults diagnosed with chronic pain of various etiologies (painful neuropathy, musculoskeletal pain, headache). Data collection was performed through personal administration of selected psychological questionnaires, which examined not only the characteristics of the pain but also health literacy, social support, depressive symptoms, and the extent of pain catastrophizing.

Results: We identified three clusters in the sample that significantly differed from each other in terms of all cluster-forming variables ($p<0.001$). We named these clusters "*Conscious worriers*" (Cluster 1), "*Balanced symptom perceivers*" (Cluster 2), and "*Abandoned catastrophizers*" (Cluster 3). We considered Cluster 2 to be a protected group, while Cluster 3 was deemed a risk group.



*Differences between mean values of each cluster pair given in z-scores along the cluster-forming variables (*p<0.05; **p<0.001).*

Conclusions: The identified clusters may contribute to the application of group-specific pain management methods, as they describe characteristic combinations of risk factors. Our results support the importance of pain education both for patients and for health professionals.

I-A1.W.07

EXPLORING SELF-CONCEPT DIFFERENCES AMONG WOMEN WITH FIBROMYALGIA, MAJOR DEPRESSION AND HEALTHY WOMEN

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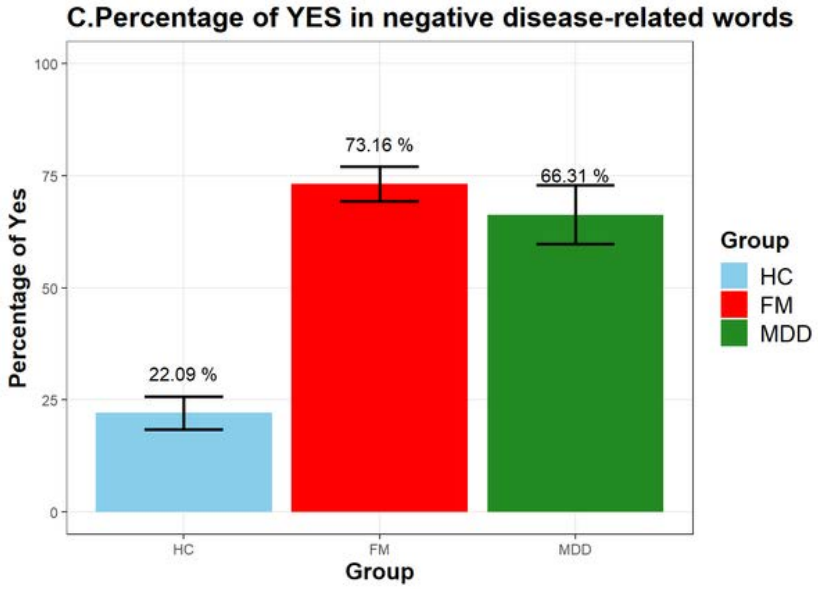
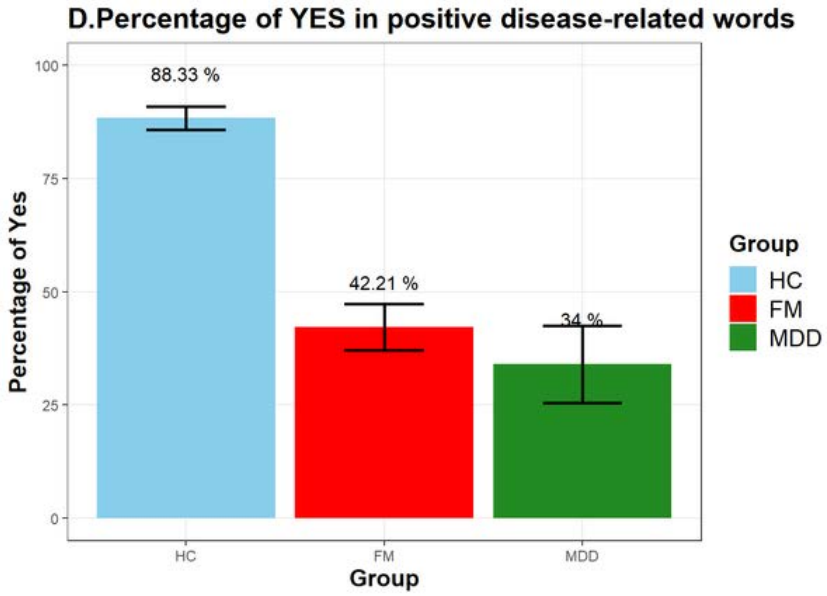
Background and aims: Fibromyalgia (FM) is a chronic pain disease affecting 2-4% of the population, predominantly women. **Major depressive disorder** (MDD) is a prevalent and pervasive affective disorder, characterized by low mood and negative self-views. Despite sharing clinical symptoms, no study has compared self-concept in FM versus MDD.

Methods: 38 women with FM, 16 with MDD, and 37 age-matched controls (age=49.68±8.86) completed the Twenty Statements Test (TST), providing 20 self-generated statements describing themselves. Four blinded researchers rated the valence and classified them into domain categories.

Participants also underwent a self-judgement task, reporting whether specific personality traits described them well (yes/no). Blocks of traits were divided into "general" (e.g., "*grateful*") and "disease-related" ("*weak"*, "*hypersensitive"*). Group differences were assessed using ANOVA and t-tests.

Results: MDD's had lower TST global valence than controls and FM, and FM lower valence than controls (p-values<0.001). Both groups scored lower than controls in "physical-aspect", "personality-traits", "skills" and "disease-related" statement categories (p-values<0.05), with MDD scoring the lowest, followed by FM. In the self-judgement task, FM and MDD endorsed less general positive traits than controls (p-values<0.01). In disease-related traits, both FM and MDD patients significantly endorsed more negative traits and less positive ones (p-values<0.001). After self-judgment, MDD felt worse than FM, and FM worse than controls (p<0.001).





Conclusions: Self-concept is impaired in FM, affecting multiple aspects of the self, albeit not as extensively as in MDD. Patients' self-image is more impaired when confronting disease-related traits. Moreover, self-judgement arose negative feelings about the self in both disorders, although more strongly in MDD.

I-A1.W.08

SLEEP, MEDICATION, AND HEALTH-RELATED QUALITY OF LIFE (HRQOL) OF CHRONIC PAIN PATIENTS IN TWO FINNISH TERTIARY PAIN CLINICS: A CROSS-SECTIONAL STUDY

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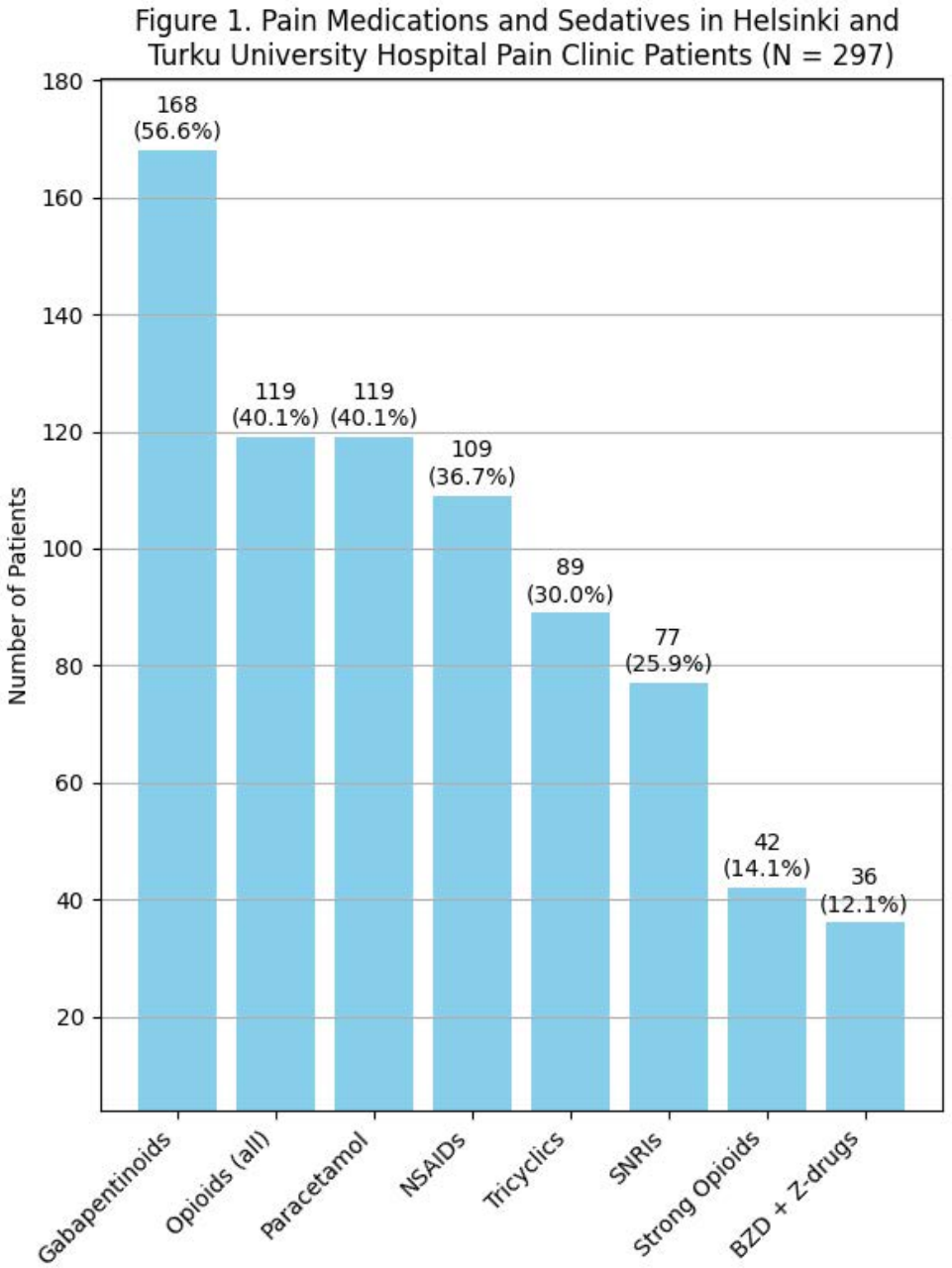
Background and aims: Sleep problems are often comorbid with chronic pain (CP). However, nightmares in CP remains understudied. The aim of this study was to analyse the association of HRQoL with sleep in CP, with special focus on medications and nightmares.

Methods: Recruitment occurred at the first pain clinic visit (Helsinki or Turku University Hospital) between 2021-2023. The data comprised sociodemographics, Brief Pain Inventory (BPI), sleep diary, medications, chronotype, nightmare frequency, Beck Depression Inventory (BDI-II), Insomnia Severity Index (ISI), Pain Catastrophising Scale (PCS), Psychological Inflexibility in Pain Scale (PIPS), and 15D HRQoL. The statistical analyses included Student's T-test, χ^2, Pearson correlation, ANOVA, and linear regression.

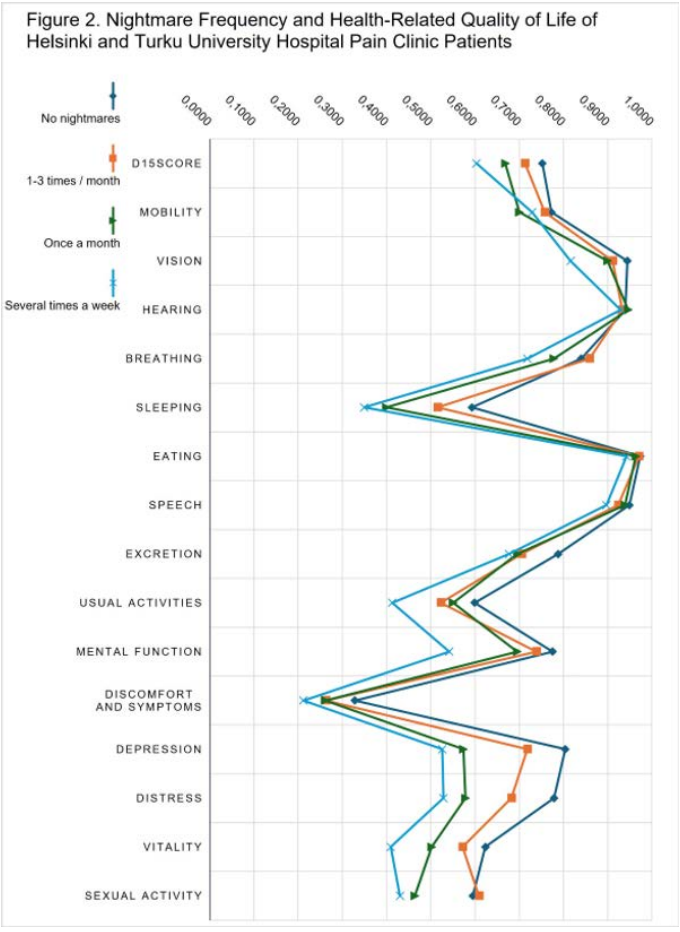
Results: These results emerge from preliminary data analyses. The number of recruited patients was 553. Sleep diary was available from 238 and medication data from 297 patients. Gabapentinoids (56.6 %), paracetamol (40.1 %), and opioids (40.1 %) were the commonest medications (Figure 1).



Compared to patients without opioid use, those on strong opioids (14.1 %) had a lower 15D dimension “sexual activity” (mean 15D difference: 0.16, p<0.001), and those on any opioids had shorter sleep duration (mean difference 0.54 hours, p=0.045). Frequent (≥weekly) nightmares (25.3 % of patients), associated with poorer overall HRQoL (mean 15D: frequent (0.64) vs infrequent (0.73) nightmares, p<0.001) (ANOVA, Table 1). In a linear regression model, this association remained after adjusting for BDI, sex, and sociodemographics. Nightmares and medications lacked association. Nightmare frequency and 15D dimensions are shown in Figure 2.

Table 1: Pain, sleep, and HRQoL of the study population. All patients, and according to nightmare frequencies.	All patients Mean (SD)	No nightmares Mean (SD)	Nightmares 1-3 times a week Mean (SD)	Nightmares once a week Mean (SD)	Nightmares several times a week Mean (SD)	p-value
ISI	15.17 (6.54)	13.21 (6.87)	15.77 (6.07)	18.00 (4.81)	19.72 (4.89)	**< 0.001**
Sleep Duration (hh:mm)	6:32 (1:40)	6:28 (1:32)	6:47 (1:47)	6:26 (1:28)	6:33 (1:40)	0.458
Nocturnal awakenings	2.85 (1.96)	2.63 (1.90)	2.80 (2.11)	3.28 (1.84)	3.19 (1.72)	0.401
Sleep quality	5.82 (1.88)	6.11 (2.06)	5.94 (1.80)	5.33 (1.27)	5.09 (1.26)	**0.042**
PIPS	75.08 (15.84)	71.27 (17.28)	74.96 (14.39)	79.22 (12.90)	83.28 (14.80)	**<0.001**
BPI (interference)	6.28 (1.94)	5.65 (2.09)	6.38 (1.62)	6.70 (1.93)	7.59 (1.52)	**<0.001**
BDI II	18.46 (10.14)	14.04 (8.10)	18.46 (9.69)	25.31 (10.21)	25.65 (9.83)	**<0.001**
PCS	21.82 (10.95)	18.51 (11.14)	22.53 (10.14)	23.74 (9.69)	28.59 (10.62)	**<0.001**
D15 Score	0.71 (0.11)	0.75 (0.11)	0.71 (0.10)	0.67 (0.10)	0.60 (0.08)	**<0.001**

Figure 2. Nightmare Frequency and Health-Related Quality of Life of Helsinki and Turku University Hospital Pain Clinic Patients



Conclusions: Opioids and frequent nightmares associated with decreased HRQoL, perhaps reflecting underlying psychological distress.

I-A1.W.09

WHAT IS THE RELATIONSHIP BETWEEN PAIN AND ANXIETY/DEPRESSION IN YOUNG PEOPLE? A PROTOCOL FOR A SYSTEMATIC REVIEW AND META-ANALYSIS OF LONGITUDINAL PROSPECTIVE STUDIES.

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Background and aims: The co-occurrences of pain and anxiety/depression in children, adolescents, and young adults are common, with up to 34.6% experiencing both pain and anxiety, and 23.9% experiencing both pain and depression. Despite these co-occurrences, the direction and strength of their long-term relationships remain unclear. A systematic review and meta-analysis will be conducted to review the evidence for the longitudinal associations between pain symptoms and anxiety/depression in childhood, adolescence, and young adulthood (0-24 years old). Through evidence synthesis, we will elucidate whether the relationship is unidirectional or bidirectional and to what extent.

Methods: Published and unpublished studies will be identified through systematically searching electronic databases (PubMed, PsycINFO, Web of Science, and Scopus) and additional databases (OSF preprints, Proquest Dissertations, Google Scholar, and Open Grey). Further studies will also be identified via (1) backward and forward citation searching of the final study sample, following TARCiS recommendations, (2) reference lists of relevant reviews, and (3) contacting authors of the included studies.

Eligible studies: reported original results on temporal associations between pain and anxiety/depression; used longitudinal design; prospectively measured pain and anxiety/depression at a minimum of two time points within or across childhood, adolescence, and/or young adulthood; used validated measures; and written in English or had English translations.

Search terms included terms for pain and pain conditions, sub-clinical anxiety and depression symptoms and their DSM-V or ICD-11 disorders , longitudinal design, and developmental stages. Titles and abstracts will be screened by the first author with a random 10% being reviewed by the second author for validation purposes. All full texts of eligible studies will be screened independently by both reviewers. At each stage, any disagreements will be resolved through discussions between two reviewers. Another expert reviewer will be involved to resolve any remaining discrepancies. Both reviewers will also independently extract relevant study characteristics of the included studies, evaluate, and score the included studies' quality and risk of bias using a pre-defined quality assessment tool.

Among the eligible studies, those that reported any form of effect sizes on the associations between pain symptoms and anxiety/depression in childhood, adolescence, and/or young adulthood will be included in the meta-analysis. If enough comparable studies are retrieved, a meta-analysis will be conducted using a random effects model.

Results: The search strategy and eligibility criteria have been developed. Screening and synthesising processes will be conducted from early December until end of March.

Conclusions: This systematic review and meta-analysis will extend current knowledge on the long-term associations between pain symptoms and anxiety/depression from childhood to young adulthood. The study's results will help inform more effective identification of individuals at risk and treatment of the co-occurrences.

I-A1.W.10

THE ROLE OF SELF-COMPASSION IN CHRONIC PAIN AND MENTAL HEALTH OUTCOMES

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Background and aims: This study highlights prospective relationships (12-months) between self-compassion and chronic pain; specifically exploring links with pain and mental health outcomes in a UK community sample. Stress, mental defeat, pain catastrophizing, pain self-efficacy, anxiety, depression, and suicidal behaviour are modelled as outcomes in an extensive exploration of the predictive relationships for self-compassion and compassionate/uncompassionate self-responding (CSR & UCSR). This research aims to go beyond conventional associates and predictors of mental health outcomes in pain and evidence long-term relationships.

Methods: A prospective questionnaire design (12-month follow-up) with a total of N=137 patients with chronic pain. Univariate and multivariate regression models were conducted. Model 1 included total self-compassion score as the predictor, Model 2 included CSR as the predictor and Model 3 included UCSR as the predictor. Outcomes were: stress, mental defeat, pain catastrophizing, pain self-efficacy, anxiety, depression, and suicidal behaviour.

Results: Hierarchical multivariate regression analyses revealed total self-compassion, CSR and UCSR all predicted: stress, mental defeat, pain self-efficacy, anxiety and depression 12-months later univariately and in multivariate models. Self-compassion and UCSR predicted suicidal behaviour individually, but overall model summary statistics were not significant. Pain catastrophizing was not significantly predicted in any model. Regression coefficients showed self-compassion (β value range: 0.18-0.49), CSR (β value range: 0.33-0.46) and UCSR (β value range: 0.19-0.45) exerted strong influence in some, but not all, of the multivariate models.

Conclusions: Self-compassion, CSR and UCSR consistently predict stress, mental defeat, pain self-efficacy, anxiety and depression 12-months later. Suicidal behaviour may be more strongly associated with self-compassion through UCSR in people with pain.

A2 | SMALL FIBER NEUROPATHY

I-A2.W.01

COMPARISON OF THE FEMORAL NERVE RESPONSE AFTER NERVE STIMULATION IN DIABETIC AND NON-DIABETIC PATIENTS: A PILOT STUDY

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Background and aims: The nerve stimulation technique for carrying out peripheral nerve blocks is considered effective, despite the recent prevalence of ultrasound. In diabetic patients, it has been reported that the response of peripheral nerves to stimulation is unpredictable, thus making nerve localization difficult and increasing the risk of nerve injury. This study aims to investigate the reliability of the nerve stimulation technique for locating the femoral nerve in diabetic patients compared to non-diabetic patients.

Methods: In this prospective blinded pilot study forty-eight (n=48) patients undergoing lower limb surgery were divided into diabetic (n=21) and non-diabetic (n=27) groups. Postoperatively, ultrasound guided femoral nerve block was performed. Before the injection of the local anesthetic and with the tip of the needle in contact with the inferior part of the femoral nerve, a nerve stimulator was connected and stimuli of variable currents (starting from 1mA) were administered. The minimum current required to produce visible quadriceps muscle contractions was recorded.

Results: Quadriceps muscle contractions were successfully elicited in all patients following the femoral nerve stimulation. In the diabetic group the mean stimulation threshold was higher (0,53 ± 0,13 mA) than in the non-diabetic group (0,41 ± 0,08 mA).

Conclusions: This pilot study presents an interesting finding regarding the femoral nerve stimulation threshold in diabetic patients and underlines the necessity of the use of ultrasound for its safety. Further investigation in a larger scale study is needed to better predict the response to nerve stimulation in diabetic patients and its clinical significance.

I-A2.W.02

AGE-RELATED SOMATOSENSORY MODIFICATIONS: EVALUATION OF A-BETA, A-DELTA, AND C-FIBERS INTEGRITY THROUGH QUANTITATIVE SENSORIAL TESTING AND EVOKED POTENTIALS

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Background and aims: Quantitative Sensorial Testing (QST) and Event Related Potentials (ERP) are non-invasive techniques used to assess the integrity of peripheral and central somatosensory fibers in humans. These

fibers include C, Aδ, and Aβ fibers, which can be activated by warm, cold, and tactile stimuli, respectively. To date, simultaneous QST and ERP studies on these fibers in aging individuals are lacking. This study aims to explore age-related changes in somatosensory fibers using QST and ERP methods.

Methods: To compare changes in cutaneous sensibility, we evaluated a young group (N = 33; 23.4 ± 2.68 years old) and an older group (N = 23; 68 ± 5.58 years old). The QST methods included mechanical detection thresholds (MDT), cold detection thresholds (CDT) using the staircase method, and warm detection thresholds (WDT) using the limits method. Additionally, ERP were recorded in response to warm (43°C, 1000 ms), cold (10°C, 500 ms), and tactile (600 mN) stimulations applied to the hand.

Results: Our findings revealed that MDT and WDT significantly increased with aging, while CDT showed no significant change. The ERP results demonstrated prolonged N2P2 latencies without significant amplitude changes in Aβ and Aδ fiber activity among older adults. No significant differences were observed in C-fiber activity between the groups.

Conclusions: The observed changes in conduction velocity of Aδ and Aβ fibers suggest an age-related decline in myelination. QST highlighted deficits in warm and mechanical sensibility, indicating that QST and ERP are complementary methods for revealing the different effects of aging on peripheral and central somatosensory pathways.

I-A2.W.03

RELATIONSHIP BETWEEN CUTANEOUS VASODILATION AND HEAT PAIN TOLERANCE IN AGED TYPE 2 DIABETICS

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Background and aims: Previous studies have shown a link between altered cutaneous vasodilation and reduced tolerance to thermal pain in elderly subjects, suggesting that cutaneous vasodilation may contribute, in addition to nociceptor activation, to the perception of pain. Since people with type 2 diabetes exhibit impaired cutaneous vasodilation, testing heat pain tolerance in these subjects may help elucidate the role of vasodilation in tolerance to thermal pain.

Methods: This study included elderly adults with type 2 diabetes without neuropathy, healthy elderly adults and young adults. Subjects underwent a 15-minute hot pain tolerance test. They continuously reported pain intensity using an electronic Visual Analog Scale during the test. In addition, we performed a local thermal hyperemia protocol for 30 minutes, while we recorded cutaneous blood flow using laser Doppler flowmetry. To control for the integrity of small nerve fibers in our diabetic subjects, we assessed thermal sensitivity and thermal pain thresholds. All measures were taken on participants' foot.

Results: Type 2 diabetic subjects exhibited compromised pain tolerance compared to healthy elderly and young adults. Young adults exhibited significantly lower thermal sensitivity and thermal pain thresholds and superior cutaneous vasodilation responses compared to both elderly groups. However, no significant differences were found in thermal or pain thresholds or cutaneous vasodilation responses between healthy elderly and diabetic elderly subjects.

Conclusions: While the precise relationship between diminished local vascular responses and hot pain tolerance warrants additional investigation, our findings suggest that heat pain tolerance is severly impaired in type 2 diabetes, even without the presence of pathology related complications.

I-A2.W.04

BLUE POO PROJECT: HIGHLIGHTING GASTROINTESTINAL SYMPTOMS AS A POTENTIAL INDICATOR OF AUTONOMIC INVOLVEMENT IN PAINFUL, IDIOPATHIC SMALL FIBER NEUROPATHIES

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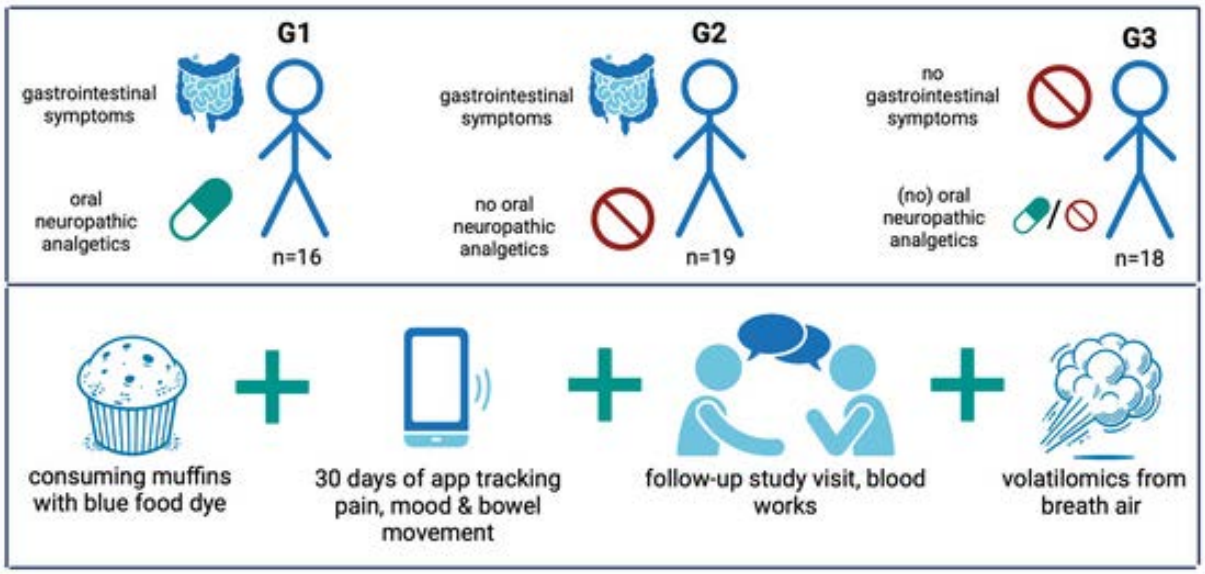
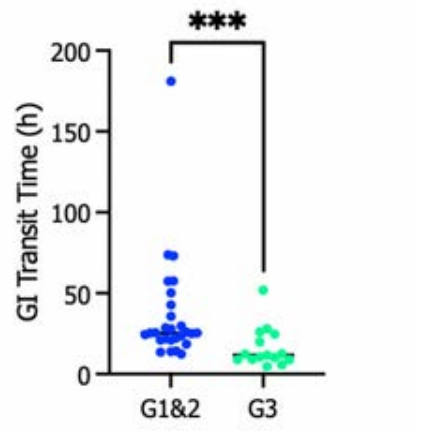
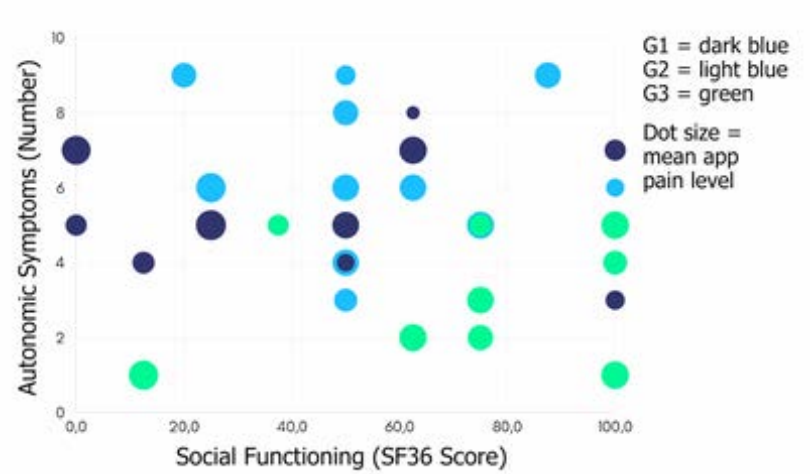
Background and aims: In our patient registry for idiopathic small fiber neuropathies (SFN, n = 210), 48% reported constipation and/or diarrhea. To explore gastrointestinal (GI) involvement, we measured transit times and assessed correlations with symptom patterns and disease progression.

Methods: SFN patients with GI symptoms (Groups 1 and 2), either taking neuropathic pain medication (G1, n = 16, median age 44) or not (G2, n = 19, 44), were compared to a third group without GI symptoms (G3, n = 18, 45). Assessments included patient history, clinical exams, quantitative sensory testing (QST), Sudoscan, breath volatilomics, and blood work. GI transit was tracked using blue food dye (1.5g), and patients recorded stool characteristics, diet, pain, and mood via smartphone app over 30 days.



Results: Median GI transit times were significantly longer in G1 and G2 (≈ 25.5 hours) than in G3 (≈ 12.4 hours). In contrast, pain levels were similar across groups, however, G1 and G2 had higher depression scores (MADRS: G1 ≈ 15; G2 ≈ 12; G3 ≈ 7; BDI-II: G1 ≈ 19; G2 ≈ 11; G3 ≈ 10) and lower quality of life in 4 of 9 SF-36 questionnaire areas. No correlation was found between disease duration and autonomic symptoms or pain levels. Additional analyses on lifestyle factors, QST, and breath markers will be presented.





Conclusions: Despite similar pain levels, SFN patients with GI symptoms show significantly prolonged GI transit, higher depression levels, and lower quality of life, underscoring the need to address GI dysfunction in SFN care.

I-A2.W.05

TREATMENT OF PERIPHERAL NEUROPATHIC PAIN WITH CAPSAICIN (179 MG) PATCH: A RETROSPECTIVE COHORT STUDY EVALUATING TREATMENT RESPONSE AND TOLERABILITY ACROSS INDICATIONS

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Background and aims: High concentration (179 mg) capsaicin patch (HCCP) is indicated for treatment of peripheral neuropathic pain (PNP) in adults. Repeated treatment leads to better efficacy. This study aimed to confirm increased effectiveness of repeated HCCP treatment in clinical practice across PNP etiologies. Decreases of ≥30%, ≥50% or ≥20 mm in average pain intensity (API) as measured by a 0-100 mm Visual Analogue Scale (VAS) are considered clinically important and used in this analysis.

Methods: Data of PNP patients treated 1-4 times with (HCCP) and followed up for 12 months, were extracted from the German pain e-registry. We evaluated the impact of HCCP treatment with change in responder rates (i.e. decrease of ≥30%, ≥50% and ≥20 mm in API (VAS, 0-100 mm)) across etiologies. Etiologies were grouped as follows: post-herpetic neuralgia (PHN), painful diabetic peripheral neuropathy (pDPN), peripheral nerve injury (PNI) and others.

Results: Data of 2574 PNP patients were included, 961 PHN, 826 pDPN, 499 PNI and 288 others. Patients were mostly female, with mean age of 57.1-66.8 years and pain duration of 3.3-5 years [Table 1].

Irrespective of pain etiology, responder rates were higher for patients receiving repeat treatment [Figures 1, 2 and 3 (PHN, PDPN, PNI respectively)]. Most common adverse events were application site reactions.

Table 1: Demographic data at baseline

	PHN n=961	pDPN n=826	PNI n=499	Other n=288
Age in years: mean (SD)	63.8 (14.3)	66.8 (13.6)	57.1 (13.1)	60.8 (14.2)
Females (%)	69.7	51.0	62.5	52.1
Pain duration in years: mean (SD) [min;max]	3.3 (3.5) [0;12]	5.0 (3.6) [0;12]	4.7 (3.6) [0;12]	3.4 (3.6) [0;12]
24-hour pain intensity on 0-100 mm VAS: mean (SD) [min;max]	61.8 (17.5) [28;100]	57.5 (18.2) [24;99]	53.8 (16.4) [19;96]	57.9 (19.1) [19;100]
Concomitant pain treatments at baseline: mean number (SD) [min;max]	4.0 (1.7) [1; 9]	4.0 (1.6) [1;10]	4.1 (1.7) [1;10]	4.0 (1.6) [1;8]

Proportion of patients who responded after 1, 2, 3, 4 HCCP treatments; PHN

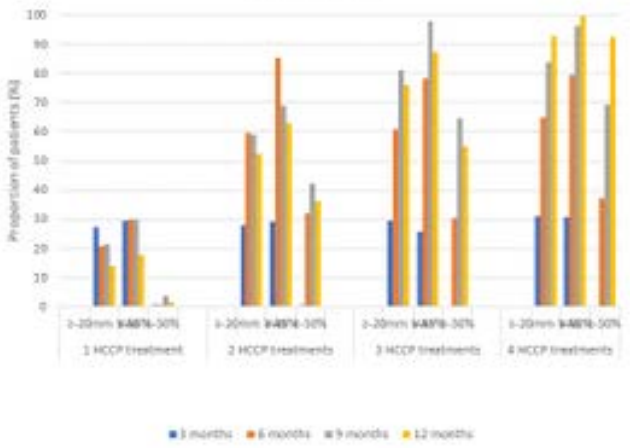


Figure 2 : Proportion of patients who responded after 1,2,3 and 4 HCCP treatments ; PDPN

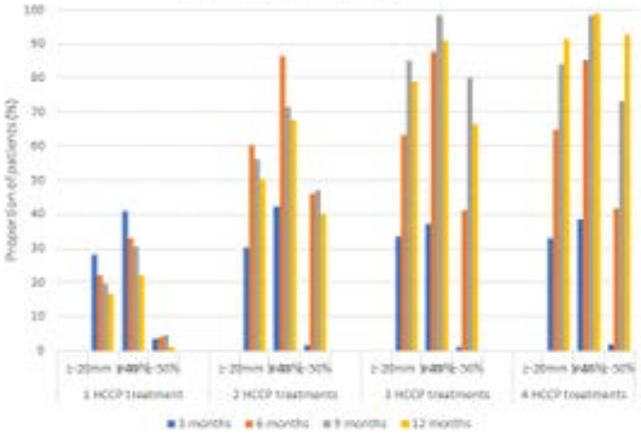
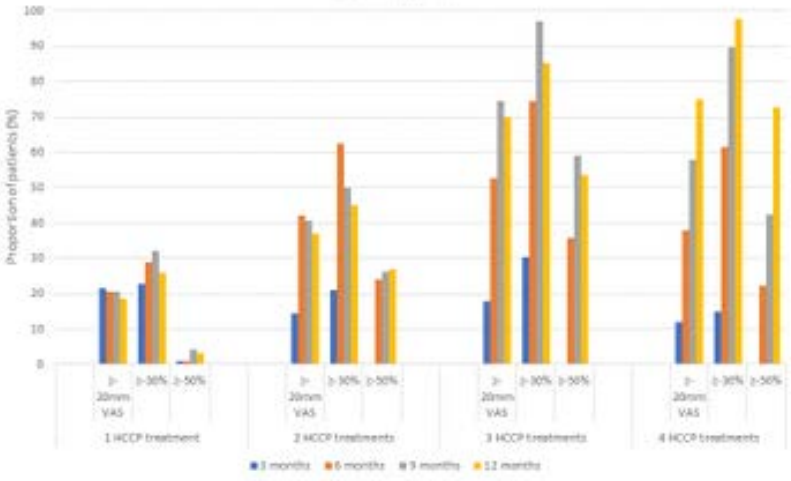


Figure 3 : Proportion of patients who responded after 1,2,3 and 4 HCCP treatments; PNI



Conclusions: Irrespective of PNP etiology, optimal treatment response (≥30% and ≥20 mm VAS decrease from baseline) was achieved after 3 HCCP treatments and further treatments resulted in higher ≥50% responder rates. It is recommended to assess efficacy after 3 treatments.

I-A2.W.06

CANNABIS AEROSOL FOR THE TREATMENT OF DIABETIC PERIPHERAL NEUROPATHIC PAIN VIA FIXED-DOSE INHALER – A PHASE II RANDOMIZED, DOUBLE-BLIND, PLACEBO-CONTROLLED, PARALLEL DESIGN CLINICAL TRIAL PROTOCOL

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Background and aims: Diabetic peripheral neuropathic pain (DPNP) is a common and debilitating complication of diabetes which remains challenging to appropriately manage. Inhaled medical cannabis (MC) is being investigated as a treatment for DPNP; however, standardized, precise methods to deliver aerosol MC have yet to be established. Here, a novel thermal fixed-dose inhaler, delivering predefined doses of Δ^9-tetrahydrocannabinol (THC) in an MC aerosol, is evaluated for efficacy, safety, and pharmacokinetics.

Methods: This double-blind, randomized, placebo-controlled, multinational Phase II study is conducted in patients aged 18-75 years, with stable diabetes mellitus and moderate-to-severe DPNP, taking one or two of: duloxetine, gabapentin or pregabalin. Patients are randomized evenly to placebo, 0.25, 0.5, or 1.0 mg THC T.I.D for 12 weeks after 3-weeks up-titration. The primary endpoint is change from baseline in average weekly pain intensity (0-10 scale), compared to placebo, at week 15. Secondary outcomes include the Neuropathic Pain Symptom Inventory, the Pain and Sleep Questionnaire 3-item index, and Patient-Reported Outcomes Measurement Information

System-29, among others. Safety assessments include adverse events, electrocardiogram (ECG), spirometry, clinical laboratory tests, and psychiatric clinical outcome assessments. Plasma pharmacokinetics of the major phytocannabinoids are assessed at multiple timepoints.

Results: Recruitment was initiated in July 2024. EUCT:2023-508932-68-00; Clinicaltrials.gov NCT06490445. Study results are expected at the end of 2025.

Conclusions: This protocol describes a trial design that will evaluate the efficacy, safety, and pharmacokinetics of MC aerosol administered with a precise regimen via a fixed-dose inhaler, in patients with DPNP.

I-A2.W.07

EARLY NEUROPATHIC CHANGES IN METABOLIC SYNDROME: CHARACTERIZING C-FIBER DYSFUNCTION AND SKIN MARKERS

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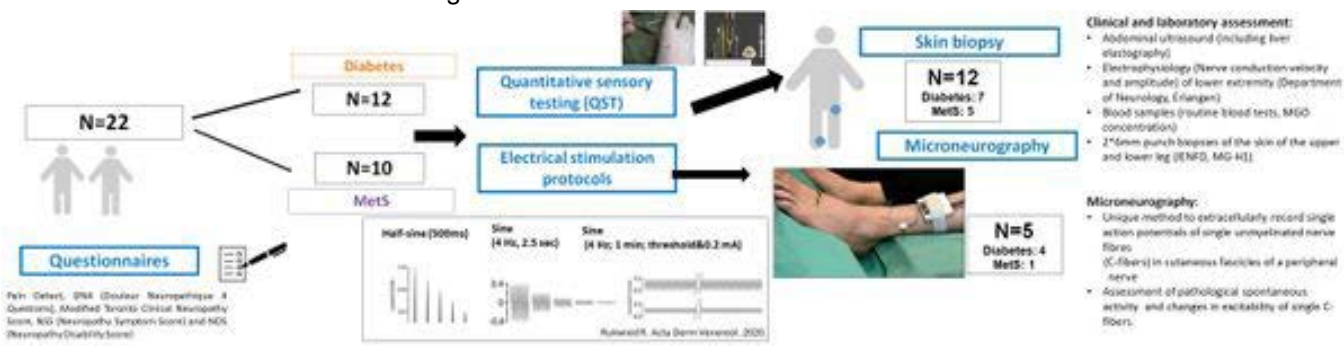
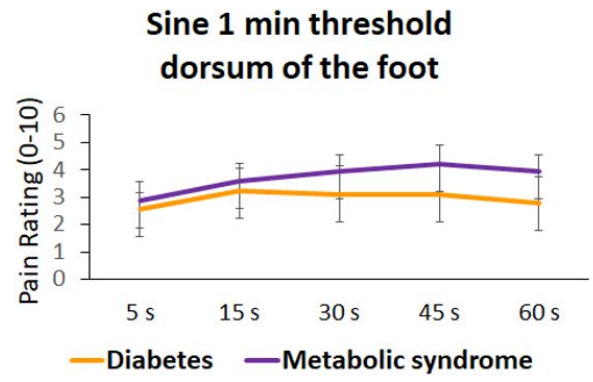
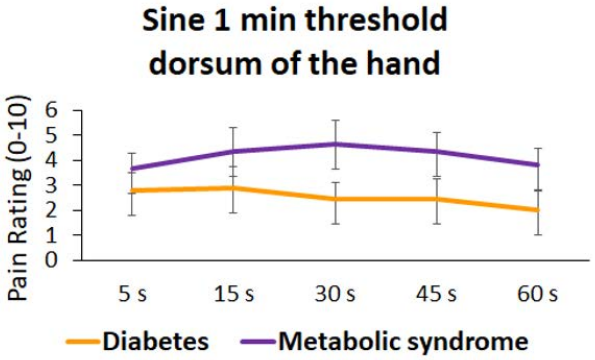
Background and aims: In patients with Type 2 Diabetes Mellitus (T2DM), distal sensory polyneuropathy with painful symptoms is common. However, it remains unclear how early neuropathic changes occur in the context of Metabolic Syndrome (MetS). Reactive carbonyl species (RCS) are implicated as potential mediators of neuropathy in T2DM, given their modification of nociceptor-relevant ion channels such as TRPA1 and Na_v channels. This project aims to characterize C-fiber functionality in MetS and T2DM patients and correlate these findings with RCS levels and skin neuroanatomical changes.



Methods: This study includes so far 22 patients (12 T2DM, 10 MetS) with clinical assessments (electrophysiological exams, abdominal ultrasound), laboratory tests (including systemic MGO measurement), validated pain and neuropathy questionnaires, non-invasive functional tests encompass Quantitative Sensory Testing (QST) and selective C-fiber electrostimulation using half-sinusoidal and sinusoidal stimuli. Skin biopsies (upper and lower leg) are analyzed for intraepidermal nerve fiber density (IENFD) and MG-H1 levels, an MGO-derived glycation end product. A subgroup of patients undergo microneurography for recording individual C-nerve fiber activity.

Results: Electrostimulation induced dose-dependent pain in both groups, with no clear adaptation to pain during a 1-minute sinusoidal wave stimulation, more pronounced in MetS patients. Women reported overall higher pain ratings than men. The MetS group exhibited significant changes in QST compared to healthy controls, despite the absence of clinically evident neuropathy. In preliminary individual results reduced IEFND was associated with higher MG-H1 and MGO levels and lower pain ratings.





	Patient with normal IENFD	Patient with diminished IENFD (distal + proximal) + diagnosed neuropathy
MG-H1 skin biopsy (pmol/mg)	1.50	2.92
MGO systemically (nM)	18.50	35.00
AUC half sine pain rating	40.50	9.00
AUC sine pain rating	32.00	7.50

Conclusions: Preliminary data indicate altered C-fiber function in MetS patients without clinical neuropathy, suggesting early damage to small nerve fibers.

I-A2.W.08

ANTINOCICEPTIVE EFFECTS OF NOVEL CAPSAICIN-BASED INJECTABLE HYDROGELS IN A RAT MODEL OF OSTEOARTHRITIS PAIN

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Background and aims: Osteoarthritis (OA) is a prevalent condition characterised by pain from peripheral joint structures and involving central neurological mechanisms. The complex interplay of nociceptive and neuropathic components complicates effective pain management. Hyperinnervation of joint structures by TRPV1-positive nociceptive terminals is a key pathological feature. Capsaicin has drawn particular attention for inducing desensitisation and nerve terminal ablation via TRPV1 activation, but its clinical use is limited by acute burning pain.

This study evaluated slow-release capsaicin-based hydrogels designed for intra-articular injection, hypothesising reduced acute nociception and prolonged antinociceptive effects in the monoiodoacetate (MIA)-induced OA model.

Methods: Female Sprague-Dawley rats (n=6–11/group, 8–9 weeks old) received intra-articular MIA (2mg/50µL) or saline (Day 0). On Day 18, treatments (vehicle, free capsaicin, or capsaicin-based hydrogels) were administered intra-articularly. Acute nociceptive responses were monitored for 20min post-injection. Weight-bearing asymmetry and hindpaw mechanical hypersensitivity were assessed up to 10 weeks post-treatment.

Results: MIA rats developed weight-bearing asymmetry and increased ipsilateral mechanical hypersensitivity by Day 7, compared to shams. Free capsaicin (10µg) reduced weight-bearing asymmetry for 14 days, not ameliorating mechanical hypersensitivity, and inducing acute nociceptive behaviours post-injection. Conversely, capsaicin-based hydrogels (10-50µg) produced dose-dependent, long-term antinociception without increasing acute nociceptive behaviour. Two prototypes showed prolonged weight-bearing asymmetry reduction (up to 28 days) compared to free capsaicin. Additionally, the slower-release prototype attenuated mechanical hypersensitivity in MIA rats for 14 days.

Conclusions: These results support the contention that innovative slow-release capsaicin-based hydrogels may be promising for long-lasting OA pain relief without inducing acute pain.

I-A2.W.09

SEX AND PHARMACOGENETIC MARKERS IN NEUROPATHIC PAIN MANAGEMENT: PRELIMINARY RESULTS

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Background and aims: Neuropathic pain (NP) severely impacts quality of life. This study evaluates the role of sex, pharmacogenetic markers, and treatment failures in the efficacy and safety of therapies for NP.

Methods: A prospective observational study was conducted at the Hospital de La Princesa in Madrid, Spain. Patients with NP initiated treatment with first-line therapies (pregabalin, gabapentin, duloxetine, amitriptyline, 8% capsaicin, tramadol) or alternative options (e.g., intravenous lidocaine cycles). Clinical data (VAS, DN4, HADS, EQ-5D), quantitative sensory testing (QST), and pharmacogenetic profiling (CYP450, COMT, ABCB1, OPRM1) were collected. Variables associated with responses (≥2-point VAS reduction) were analyzed using Chi-square tests and univariate logistic regression.

Results: One hundred one patients were included (66.3% women and 33.7% men), with a mean age of 60.2 years. Fifty-five responded, 46 either did not respond (12) or discontinued treatment (34). Lidocaine IV was the most effective treatment, with a response rate of 26.0% and a failure rate of 73.9%. Genetic analysis revealed significant associations for CYP2C19 rs12248560 ($p = 0.016$) and CYP2A6 rs28399433 ($p = 0.022$) with overall response, as well as ABCB1 rs1128503 and ABCB1 rs2032582 with gabapentin response ($p = 0.018$). Logistic regression identified Higher scores on the HADS depression subscale as a predictor of non-response (OR: 0.888, $p = 0.009$). No significant association was found between response and age or sex.

Conclusions: Lidocaine IV demonstrated superior efficacy, Genetic markers, particularly CYP2C19 and ABCB1, and clinical predictors such as depression scores, may optimize treatment strategies.

I-A2.W.10

THERAPEUTIC POTENTIAL OF ASTAXANTHIN IN ALLEVIATING HYPERSENSITIVITY-BEHAVIORAL STUDIES IN MICE WITH DIABETIC NEUROPATHIC PAIN

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Background and aims: Diabetic neuropathy is a common and debilitating complication of diabetes mellitus, characterized by chronic pain arising from nerve damage due to prolonged hyperglycaemia. Available analgesics do not provide sufficient pain relief in patients with diabetic neuropathy, therefore it is necessary to search for new therapeutic opportunities. The aim of this study was to determine if astaxanthin, a powerful carotenoid antioxidant with neuroprotective properties, affect hypersensitivity in diabetes.

Methods: The studies were performed using streptozotocin-induced diabetic neuropathic pain model. Single intrathecal and intraperitoneal administrations of astaxanthin at various doses were conducted in male and female mice. Additionally, repeated treatment with astaxanthin and morphine were performed. Hypersensitivity was evaluated with von Frey and cold plate tests.

Results: This study indicated that in a mouse model of diabetic neuropathy, single injections of astaxanthin reduce tactile and thermal hypersensitivity in a similar way in both male and female mice. Importantly, repeated administration of astaxanthin slightly delays the development of morphine tolerance and significantly suppresses the occurrence of opioid-induced hyperalgesia, although it does not affect blood glucose levels, body weight or motor coordination. Unexpectedly, astaxanthin injected repeatedly produces a better analgesic effect when administered alone than in combination with morphine.

Conclusions: Astaxanthin is an approved as a dietary supplement and our results provide a basis for further research on its efficacy as a potential treatment for diabetic neuropathy.

Acknowledgments: This research was funded by National Science Centre, Poland grant OPUS 22 2021/43/B/NZ7/00230 and statutory funds from the Maj Institute of Pharmacology PAS

B1 | MECHANISMS LINKING CHRONIC PAIN AND ITS COMORBIDITIES

I-B1.W.01

SPINAL IL-1B SIGNALLING MEDIATES CHRONIC STRESS-INDUCED POTENTIATION OF POST-SURGICAL SOMATOSENSORY HYPERSENSITIVITY AND PAIN-RELATED AVERSION IN MALE RATS

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Background and aims: Pre-surgical stress is recognised as a risk factor for persistent post-surgical pain with neuroimmune signalling identified as a key mediator of this interaction. This study investigated the impact of repeated restraint stress (RRS) on sensory and affective responses following surgery, with a focus on the role of spinal IL-1β signalling.

Methods: Male Sprague-Dawley rats (n=12-16) underwent either 21 days of RRS (6 hours/day) or standard handling. Following the stress protocol, fecal corticosterone levels and despair-like behaviour (Forced Swim Test) were assessed before they underwent either paw incision or sham surgery. We evaluated mechanical (eVon Frey test) and thermal hypersensitivity (Hargreaves test) before and for 17 days post-surgery. Affective behaviours were assessed using Place Escape/Avoidance Paradigm, Open Field Test, Elevated Plus Maze and Light Dark Box . 3'RNAseq and RT-qPCR were conducted on day 5 dorsal horn. Moreover, IL-1Ra (1µg/µl) or, MCC950 (NLRP3 inflammasome inhibitor 0.67 µg/µl) were intrathecally administered on days 2 and 5 post surgery, followed by PEAP and eVon Frey respectively.

Results: RRS increased fecal corticosterone levels and immobility time in the FST, without affecting pre-surgical mechanical or thermal sensitivity. RRS prolonged post-surgical mechanical and thermal hypersensitivity, increased pain-related aversion and anxiety-like behaviour . RRS upregulated IL-1β and NLRP3 pathways and increased *Iba1*, *Itgam*, *IL-1β*, and *NLRP3* expression in the ipsilateral dorsal horn on day 5 post-surgery. Intrathecal IL-1Ra or MCC950 prevented RRS-induced pain aversion, and IL-1Ra also attenuated RRS-induced increase of mechanical hypersensitivity.

Conclusions: These data suggest that spinal IL-1β-NLRP3 signalling mediates chronic stress-induced exacerbation of sensory and affective post-surgical pain.

I-B1.W.02

ANHEDONIA AS A TRANSDIAGNOSTIC LINK AND TREATMENT TARGET FOR COMORBID CHRONIC PAIN, DEPRESSION, AND FATIGUE

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Background and aims: About half of patients with chronic pain (CP) also suffer from depression and fatigue. This comorbidity has been associated with increased suffering and poor treatment outcomes. CP, depression, and fatigue share core features of anhedonia, such as decreased motivation and a lack of positive affect. Correspondingly, all three have been associated with the brain's reward system dysfunction. However, whether anhedonia mirrors a common underlying pathomechanism and might thus be a potential treatment target for this burdensome comorbidity remains to be elucidated.

Methods: To investigate the potential of anhedonia as a transdiagnostic link and treatment target for this comorbidity, we aim to recruit 150 CP patients to be evaluated before and after interdisciplinary multimodal pain therapy (IMPT). Well-established questionnaires are used to assess potential (causal) relationships between chronic pain characteristics, different aspects of anhedonia (DARS), depression, fatigue, and other potentially relevant comorbidities, including anxiety and sleep disturbances (NIH PROMIS-29 Profile) cross-sectionally and longitudinally.

Results: The first preliminary regression analyses on cross-sectional data from 50 CP patients show that motivational aspects of anhedonia are particularly related to pain unpleasantness ($p=0.007$) but not to pain intensity ($p=0.17$).

Conclusions: This points towards a potential role of anhedonia in understanding the pathomechanisms underlying affective-motivational pain aspects in CP. This might open new alleys for targeted screening, monitoring, and treatment approaches in line with the NIMH Research Domain Criteria initiative.

I-B1.W.04

CHRONIC PAIN INDUCED DEPRESSION IN A SEX-SPECIFIC FASHION: ROLE OF THE ANTERIOR CINGULATE CORTEX

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Background and aims: Chronic and uncontrolled pain is a leading cause of disability, significantly impairing quality of life and frequently co-occurring with anxiety and depression. Over the past decade, our group developed and validated models to study this comorbidity in male mice, revealing critical roles for the anterior cingulate cortex (ACC) in pain and emotional processing. Rodent studies demonstrated that ACC disruption mitigates anxiodepressive-like effects of neuropathic pain. Given the higher prevalence of chronic pain and mood disorders in women, this project focuses on sex-specific differences in chronic pain-induced depression (CPID). We aim to characterize behavioral manifestations and identify transcriptomic and epigenetic adaptations in the ACC that contribute to CPID in a sex-specific manner.

Methods: Neuropathic pain was induced by implanting a polyethylene cuff around the sciatic nerve in C57BL/6J mice. Behavioral tests, including quantitative sensory testing (von Frey filaments), ongoing pain unpleasantness (conditioned place preference), and anxiety/depression-like tests (novelty-suppressed feeding, splash, forced swim, elevated plus maze, open-field, light-dark box), were tested in females. Plasma corticosterone was evaluated via ELISA, and RNA and EM sequencing were conducted to study transcriptomic and epigenetic changes in the ACC.

Results: Female mice exhibited prolonged mechanical and thermal hyperalgesia compared to males but showed no anxiety-like behaviors. However, depressive-like behaviors were observed. Plasma corticosterone levels remained unchanged post-injury. Transcriptomic and epigenetic analyses of the ACC identified hub genes associated with chronic pain-induced depression.

Conclusions: These findings reveal distinct behavioral and molecular responses in females, highlighting the ACC's role in sex-specific mechanisms underlying CPID, advancing targeted therapeutic strategies.

I-B1.W.05

NEURAL AND PSYCHOSOCIAL SIGNATURES OF THE COMORBIDITY BETWEEN PAIN AND AFFECTIVE SYMPTOMS: A CROSS-SECTIONAL STUDY IN YOUNG ADULTS FROM THE GENERAL POPULATION

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Background and aims: The relationship between chronic pain and affective disorders is bidirectional, suggesting shared underlying mechanisms. Neurophysiological changes and psychosocial factors, including maladaptive instrumental learning, are likely involved in these comorbidities. Our aim was to find markers of the comorbidity between pain and depressive symptoms and between pain and anxiety symptoms.

Methods: BOLD responses to a monetary incentive delay (MID) task along with psychosocial factors were used as indicators of comorbidity in a sample of 19-year-old adults with pain and affective symptoms drawn from the general population (IMAGEN EU project; *n* = 689/624 for neuroimaging/psychosocial analyses). Outcome variables were the scores for pain intensity, depression, and anxiety from self-reported questionnaires. A novel multitask learning approach was used to assess the importance of these indicators and identify brain-functional and psychosocial patterns linked to the comorbidity of pain and depression, as well as pain and anxiety. Models were tested using leave-one-center-out cross-validation and validated on hold-out centers through 10,000 one-sided permutation tests.

Results: A specific pattern of BOLD responses during reward feedback was significantly associated with the comorbidity between pain and depressive symptoms. This signature included regions such as the striatum and substantia nigra. Particularly important psychosocial markers for both comorbidities (pain-depression and pain-anxiety) were non-painful somatic symptoms and rumination.

Conclusions: Our results point to common mechanisms behind pain and affective symptoms, involving the neurophysiological response to reward feedback and specific psychosocial factors. These mechanisms may represent promising targets for future treatments.

I-B1.W.06

THE ROLE OF SYSTEM XC^- IN ANXIETY AS A COMORBIDITY OR PREDISPOSING FACTOR IN NEUROPATHIC PAIN

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Background and aims: Anxiety and stress are comorbidities of chronic pain but are also proposed to predispose for pain chronification. We have documented the role of the cystine/glutamate exchanger (system xc^-) in the pathophysiology of neuropathic pain. As the activity of system xc^- also influences anxiety and depressive-like behaviors in rodents, we have examined the implication of system xc^- in the modulation of anxiety as a pain predisposing factor.

Methods: We have used wild-type mice (xCT+/+) and mice lacking xCT (xCT-/-), the specific subunit of system xc^-. These were subjected to a social defeat stress by confronting them for 10 days to CD1 mice selected for their aggressive behavior. After anxiety priming, mice were subjected to partial sciatic nerve ligation, a validated model of neuropathic pain. Their behavior were examined throughout the entire experiment before sacrifice and tissue collection for further analyses.

Results: After anxiety priming, xCT-/- mice developed less anxiety than xCT+/+ littermates. When testing the influence of anxiety priming on constitutive pain sensitivity before nerve lesion, we observed that only xCT+/+ mice showed an increased response to mechanical and thermal stimulation. However, anxiety priming did not exacerbate pain hypersensitivity triggered by partial sciatic nerve ligation in either $xCT^{-/-}$ or $xCT^{+/+}$ mice.

Conclusions: Our results suggest that xCT-/- mice show resistance to the development of anxiety-related behaviors in response to social stress. Nevertheless, while system xc^- plays a significant role in modulating anxiety, this anxiety does not seem to promote chronification of neuropathic pain in this model of peripheral nerve lesion.

I-B1.W.07

CANNABINOID CB_1 RECEPTOR INVOLVEMENT IN THE BENEFICIAL EFFECTS OF ENRICHED ENVIRONMENT IN A RAT MODEL OF NEUROPATHIC PAIN?

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Background and aims: An enriched environment (EE) can positively impact pain and related states, though the mechanisms remain unclear. The endocannabinoid system plays an important role in regulation of nociception and pain. This study aimed to evaluate the involvement of CB_1 receptors in the beneficial effects of EE on pain and anxio-depressive behaviour.

Methods: Adult, male Wistar Han rats (n=8/group) were randomly assigned to either EE (PhenoWorld; PhW) or standard housing (STD2, paired housed rats). Animals received AM251 (CB_1 receptor antagonist/inverse agonist) or vehicle, from the start of EE. One week after living in different environments, animals underwent spared nerve injury (SNI) or sham surgery. Mechanical hypersensitivity was assessed using von Frey monofilaments, and 2 weeks after SNI induction, anxiety-like and depression-like behaviours were evaluated.

Results: Animals living in the PhW showed significantly higher nociceptive thresholds, lower anxiety-like behaviour in elevated plus maze test (EPM) and lower depressive-like behaviour in sucrose splash and forced swim tests (FST), compared to STD2 housed rats. AM251 increased mechanical hypersensitivity and anxiety-like behaviour in the EPM of SNI animals in the PhW compared to vehicle-treated counterparts. Regarding depressive-like behaviour, AM251 decreased preference for sweet pellets in SNI animals living in the PhW in the sweet drive test. Furthermore, AM251 increased depressive-like behavior in sucrose splash and FST in sham, but not SNI, animals living in the PhW.

Conclusions: These findings suggest that the CB_1 receptor may contribute to the beneficial effects of EE on pain and related affective comorbidities.

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I-B1.W.08

A NEUROPSYCHOBIOLOGICAL STRESS-TRIGGERED SIGNATURE OF PAIN AND COMORBIDITY USING DATA FROM LARGE LONGITUDINAL AND CLINICAL SAMPLES

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Background and aims: Psychological distress stemming from adverse life experiences (ALEs) or major life events, such as cancer diagnoses, significantly impacts pain and its comorbidities, including depression and anxiety. ALEs disrupt neurodevelopment, altering brain structures essential for emotional and sensory processing. Similarly, life-threatening diagnoses trigger distress-related emotional responses influencing post-treatment recovery.

Methods: This project integrates data from the European IMAGEN cohort (Study 1, N=1,700; ages 14–24) and the DOLORisk clinical cancer cohort (Study 2, N=279).

Study 1 examines ALEs, pain, depression, and anxiety through repeated questionnaires and structural MRI from adolescence to early-adulthood. Latent class growth analysis (LCGA) identifies symptom trajectories, regression

tests correlations, while mediation assesses insular volume as a structural mediator linking ALEs to pain and comorbidities. Study 2 evaluates pain outcomes and demographic, societal, psychological, and well-being information pre- and post-surgery. Machine learning models (LASSO-RF-GB-SVM) predict chronic postoperative pain, distinguishing the contributions of specific distress markers from general psychological factors.

Results: Study 1 revealed three distinct symptom trajectories (low-moderate-high), with ALEs varying by timing, quality, and quantity strongly associated with high-symptom trajectories and females disproportionately affected. Insular volume reductions mediated the link between deprivation and comorbid pain-anxiety. Study 2 showed that 32% of cancer patients reported chronic surgical pain at one-year follow-up. Age, preoperative pain, and specific distress items, such as overwhelming worries, predicted pain more accurately than general scores.

Conclusions: This research identifies a shared pathway through which distress influences pain and comorbidities across different populations, advocating for tailored, biopsychosocial preventive interventions targeting distress early, either prior to adversity or surgery.

I-B1.W.09

IDENTIFICATION OF SUSCEPTIBILITY AND RESILIENCE FACTORS RELATED TO THE IMMUNE SYSTEM FOR CHRONIC PAIN AND ITS COMORBIDITY: EVIDENCE FROM ANIMAL AND HUMAN STUDIES

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Background and aims: Pain processing and susceptibility to chronic pain vary across individuals. While numerous factors have been suggested to account for this variability, the immune system's involvement in (chronic) pain susceptibility remains unclear. This study aimed to investigate the role of the immune system by modulating its response against nerve injury in rats. Additionally, we examined how genetic variations in this system relate to human pain complaints

Methods: Dimethyl fumarate (DMF), an immunomodulator, was pre-emptively used to modulate the immune response in rat spared nerve injury model of chronic neuropathic pain. Mechanical and cold allodynia as well as depression-, anxiety- and cognitive-like behaviors, were assessed. In humans, data from a longitudinal adolescent cohort (IMAGEN) was utilized. The effects of single nucleotide polymorphisms, including *IL-18 RAP* locus rs917997 and *PLA2G4A*/*PTGS2* locus rs4140564, on the relationship of affective symptoms, brain-related indicators, and pain symptoms were tested

Results: DMF pretreatment reduced SNI-induced allodynia and anxiety- and cognitive dysfunction-like behaviors. The pretreatment diminished ATF-3 protein at day 3 and even at day 49 after treatment. Trigonelline, a Nrf2 inhibitor, largely abolished DMF effects. In humans, the TC genotype of rs917997 moderated the pathway of anxiety/cortex volume into pain symptoms. Carriers of this genotype also showed fewer pain complaints than CC- and TT-allele carriers

Conclusions: We show evidence for the involvement of the immune system in (chronic) pain susceptibility and that early modulating this system can change pain trajectories. Future studies could further examine how Nrf2 contributes to the susceptibility and target the immune system for identifying other relevant factors

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I-B1.W.10

EXPLORING SEX DIFFERENCES IN EEG ACTIVITY AND BEHAVIOR IN A MURINE MODEL OF NEUROPATHIC PAIN: THE ANALGESIC AND ANTIDEPRESSANT EFFECTS OF NITROUS OXIDE

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Background and aims: Evidence suggests a bidirectional link between chronic pain and depression. This comorbidity likely arises from dysfunctions in shared neural circuits. Research highlights altered sensory perception

and cortical EEG activity, and sex differences in pain perception and emotional processing. Nitrous oxide (N_2O) traditionally used as an analgesic, has recently been proposed as an effective antidepressant. Thus, we investigated the behavioral and electrophysiological alterations induced by chronic neuropathic pain, and tested the effects of N_2O for its potential to target both pain and depression-related symptoms.

Methods: Adult male and female mice were subjected to the Chronic Constriction Injury (CCI) model to study behavioral effects on thermal hypersensitivity (acetone test) and depressive-like phenotype (tail suspension test), along with EEG activity. EEG recordings were conducted in freely-moving animals 1-hour after treatment and during the acetone test. The treatment entailed 1-hour inhalation of 50% N_2O.

Results: The model induced pain in both sexes but elicited depressive-like behavior only in males. N_2O appeared to have a mild analgesic effect in males but, surprisingly, showed the opposite effect in females. Additionally, it mildly reduced depressive-like behavior only in CCI-males.

Chronic and acute pain appear to increase low-frequency bands power in CCI-males, with no clear EEG alterations observed in females. In the acetone test, N_2O seems to prevent this power increase in males, but enhance it in CCI-females.

Conclusions: These findings reveal sex-specific behavioral and electrophysiological differences in a neuropathic pain model, and distinct responses to N_2O, highlighting the need for tailored treatments for comorbid pain and depression.

B2 | HEALTH INEQUALITIES IN PAIN CARE

I-B2.W.01

GLOBAL PERSPECTIVES ON CHRONIC PAIN DISPARITIES: A MULTI-COHORT ANALYSIS

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Background and aims: Chronic pain affects populations worldwide, yet understanding of its distribution across equity deserving groups remains fragmented and geographically limited. This study aims to examine chronic pain prevalence across racial/ethnic groups in five globally diverse cohorts: the UK Biobank, the National Health and Nutrition Examination Study (NHANES; North America), the Brazilian Longitudinal Study of Ageing (ELSI; South America), the Malaysian Ageing and Retirement Survey (MARS; Asia), and the South African National Demographic Survey.

Methods: The prevalence of chronic pain was computed within each demographic segment of each cohort. Chi-square tests evaluated the statistical significance of variations across groups. Data harmonization accounted for cohort-specific pain assessments. Analyses were stratified by sex where sample sizes provided adequate statistical power.

Results: Initial analyses from the UK Biobank revealed significant ethnic disparities in chronic pain prevalence. Black and Asian females reported higher rates of chronic pain (52.3% and 54.3%, respectively) compared to White females (45.5%, $p<0.001$). Widespread chronic pain showed similar disparities, with higher prevalence in Black and Asian participants (Females: 4.0% and 4.5%; Males: 1.7% and 2.5%) compared to White participants (Females: 1.4%, Males: 1.0%; $p<0.001$ and $p<0.05$ respectively). Analyses of NHANES, ELSI Brasil, MARS, and South African cohorts are ongoing.

Conclusions: Preliminary findings from the UK demonstrate substantial ethnic disparities in chronic pain burden, particularly among females. Completion of analyses across all five cohorts will provide unprecedented insight into global patterns of pain disparities, informing targeted interventions and health equity initiatives. This multi-cohort approach promises to illuminate both universal and context-specific determinants of pain disparities.

I-B2.W.02

THE EFFECT OF SEX/GENDER AND SOCIAL CONTEXT ON THE FACIAL RECOGNITION OF PAIN

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Background and aims: Pain and facial expressions are a key way in which pain is communicated. Yet the recognition of expressions, including pain, is complex and there is variation in how successful this is. Previous research suggests the sex/gender and social context impact on pain, yet little is known about these effects on how pain is recognised. The current study therefore explored how the wider interpersonal context of a scene influences the recognition of painful facial expressions compared to neutral expressions.

Methods: Participants (n = 111, 37 males, 71 females, 3 not provided) were shown images from everyday scenes which differed in their social context (social vs non-social) and valence (positive vs negative). A facial expression appeared within the scenes and participants were asked to identify whether it depicted a neutral or pain facial expression. The time it took for them to recognise the facial expression was recorded.

Results: ANOVA revealed that participants were faster at recognising pain facial expressions compared to neutral facial expressions when presented by female actors. Male participants were slower to react to pain expressions when the actor was female and in a social background.

Conclusions: This study suggests that social contextual factors are relevant to how we detect and recognise facial expressions of pain. Whilst previous studies tend to present facial expressions in isolation, in real world settings images, they occur within an environment and social context. Future research should consider social contextual factors in the design of studies.

I-B2.W.03

BREAKING BARRIERS: CANCER PAIN MANAGEMENT AND HEALTHCARE ACCESS FOR IMMIGRANTS AND AND ETHNIC MINORITIES -- A SCOPING REVIEW

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Background and aims: Cancer pain management remains suboptimal, especially for immigrants who face healthcare access disparities. With 281 million people living outside their birth country, addressing these gaps is crucial. This study explores access to cancer pain management for immigrant populations.

Methods: We conducted a scoping review following the PRISMA guidelines. A comprehensive search was performed across Medline, CINAHL, Web of Science, PsycINFO, and EMBASE, including literature published from 1990 to October 2024. Data were analyzed using Levesque et al.'s framework for healthcare access to identify key patterns and barriers.

Results: Out of 3,759 articles identified, 21 studies met the inclusion criteria. Notably, none explicitly referred to participants as immigrants but rather as ethnic minorities abroad. Six studies presented interventions aimed at increasing education on cancer pain to improve health literacy, which is essential for patients to understand medical information and make informed decisions. Additionally, our review identified 15 studies that highlighted barriers—including cultural, social, structural, and financial challenges—that hinder access to effective cancer pain management for immigrant and ethnic minority patients.

Conclusions: Our findings reveal a persistent "immigrant-blind" approach in healthcare and research. Immigration is a significant social determinant of health, yet it remains overlooked in the context of cancer pain management. While interventions focus on education, research must expand to other healthcare access dimensions. Lastly, this study sheds light on the barriers that sustain chronic disparities in health outcomes for minority populations—particularly in a world where migration continues to be a major social phenomenon.

I-B2.W.04

THE STIGMA SCALE FOR CHRONIC ILLNESSES 8-ITEM VERSION (SSCI-8): A LONGITUDINAL STUDY ASSESSING ITS DIMENSIONALITY, RELIABILITY AND CORRELATES IN A SPANISH SAMPLE WITH CHRONIC PAIN

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Background and aims: Chronic pain affects a substantial portion of the European population (approximately 20%), imposing not only physical challenges but also significant stigma. This psychometric study aims to validate the 8-item version of the Stigma Scale for Chronic Illnesses (SSCI-8) in a Spanish sample experiencing non-malignant chronic pain—defined as pain persisting for at least 3 months occurring at least twice weekly—focusing on its psychometric properties including dimensionality, reliability, and construct validity.

Methods: Psychometric analysis embedded within a longitudinal observational study. An online survey (Qualtrics) was circulated among several patient asociations to recruit adult participants with chronic pain.

Results: The final sample comprised around 500 individuals aged 18 to 70 years, predominantly women (> 90%). Half of the sample completed the survey again one month later. A confirmatory factor analysis supported a one-factor model with correlated errors as optimal for the SSCI-8. The instrument showed normal distribution, good internal consistency, and adequate test-retest reliability. Positive correlations were found between perceived stigma and variables such as age, pain intensity, pain interference, anxiety, depression, and disability, while negative correlations were observed with pain acceptance and psychological flexibility. Furthermore, the SSCI-8 was found to enhance predictive capacity compared to the Injustice Experience Questionnaire for the aforementioned variables.

Conclusions: In conclusion, the Spanish adaptation of the SSCI-8 exhibits robust reliability and validity in assessing perceived stigma associated with chronic pain.

I-B2.W.05

EXPLORING POTENTIAL BIAS TOWARD BLACK PAIN PATIENTS WITH HIV AMONG MALE AND FEMALE OBSERVERS

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Background and aims: While pain is common in HIV, people with HIV may face stigma reflected in pain care. Black individuals are disproportionately affected by HIV. This study examined whether pain/pain attribution ratings were affected by HIV diagnosis.

Methods: Participants were randomly assigned to watch 3 videos of Black male or female back pain patients performing standardized tasks, paired with a vignette that described comorbid heart disease (HD), HIV, or no comorbidities (Control). Patient videos were matched for demographics and pain behaviors. Participants rated patients' pain, attributions for pain, and patient impressions.

Results: Female but not male participants rated HIV patients' pain as lower in comparison to HD or Control. No differences were observed in attribution of medical factors, but HIV patients' pain was rated as more attributable to psychological and lifestyle factors. Ratings for female patients' pain were more attributed to lifestyle. Female participants reported higher overall sympathy than males but endorsed less positive impressions of female patients with HIV in comparison to HD. Males perceived higher exaggeration across patients. Sympathy for individuals with HIV was positively correlated with ratings of pain and medical attribution and negatively associated with perceived exaggeration. HIV Stigma Scale scores were positively associated with attribution to lifestyle and psychological factors.

Conclusions: Patients with HIV were rated more critically than patients with HD, suggesting biases towards individuals with HIV in the context of pain treatment. Future studies should specifically examine the potential intersection of both race and HIV status on provider responses.

I-B2.W.06

PAIN CAFES - A SOCIAL AND COMMUNITY MODEL OF HEALTH TO MANAGE CHRONIC PAIN

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Background and aims: A review of participant experience of managing chronic pain and explore ways in which people have connected to their local communities and peer groups to offer a more robust approach to pain management.

a developed narrative of the social element of Engels' 'Biopsychosocial' approach.

focus on social interactions and relationships initiated through the cafes and developed through other community projects

Methods: Data has been gathered through benchmark and progress surveys from 20 cafes running in Cornwall, UK. The data includes information on participant's confidence, well being, self efficacy and skills and knowledge to better self manage their pain. Working University of Plymouth using Realist evaluation to explore how, why, for whom, and under what circumstances pain cafes create the expected outcomes for people living with chronic pain

Results: Early results have shown that

- **70%** had **decreased** their medication, **24% staying on the same levels**.
- **59%** of respondents reported **seeing a GP less** and **35%** about the **same**
- **100%** felt more able to **manage pain**
- **88%** felt more in **control of their lives.**
- **76%** reported being more able to cope and in control (self-efficacy)
- **68%** reported having an **improved quality of life**.

and presented to the Royal Society of Medicine, College of Medicine, NHS England, Health Innovation and others. The initial findings have been conducted with participants using questionnaires and interviews.

Conclusions: Critical success factors are identified to define the circumstances and mechanisms that work best for, when, and where for people to manage their persistent pain; a develop programme theory will be offered

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I-B2.W.07

BREAKING THE CYCLE OF LOW BACK PAIN AND INEQUALITIES: A UK COHORT STUDY OF COGNITIVE FUNCTIONAL THERAPY

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Background and aims: Low back pain (LBP) disproportionately affects socioeconomically disadvantaged individuals, ethnic communities, and those with multimorbidity. Cognitive Functional Therapy (CFT) is a physiotherapist-led intervention targeting the biopsychosocial complexity of LBP, not previously evaluated in people affected by health inequalities. This study aimed to determine the clinical and cost benefits of CFT in people with LBP living in the most deprived areas of a multi-ethnic UK city.

Methods: Single cohort study.

Participants: Adults aged >18 years with LBP (>3 months), reduced work ability due to LBP, multimorbidity and living in the 20% most deprived areas of Coventry, UK.

Intervention: Cognitive Functional Therapy.

Data Collection: Healthcare resource use data were collected for 13 weeks pre-intervention, and at 13 and 26 weeks. Measures of self-reported pain intensity and disability were collected at baseline, 13, and 26 weeks. Descriptive analysis (mean ± SD) identified changes in self-reported outcomes. Cost-benefit analysis used NHS tariffs.

Results: 61 people participated (64% female, mean age 51 years, LBP duration 6.8 years, 4.6 comorbidities). Baseline disability (RMDQ) was 17.2 (4.5) and pain intensity 7.6 (1.4). At 26 weeks, mean disability reduced to

11.7 (mean reduction 5.5, 95% CI 3-8) and pain to 4.4 (2) (mean reduction 2, 95% CI 1.1-2.9). Healthcare contacts for LBP reduced from 2.1 to 0.3 at 26 weeks. Opioid prescriptions reduced by 32%. 5.3 CFT appointments were attended at a cost of £334 per participant.

Conclusions: Pain, disability, and healthcare utilisation costs reduced following CFT for people with LBP living in deprived areas with multimorbidity.

I-B2.W.08

PAIN CATASTROPHISING, MENTAL HEALTH LITERACY AND STIGMA AMONG FORMAL CAREGIVERS OF CHILDREN AND OLDER ADULTS

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Background and aims: Formal caregivers supporting children and elderly adults experience chronic pain and mental health issues. This study explores chronic pain, mental health literacy, and mental illness-associated stigma among formal caregivers, offering insights to enhance support.

Methods: A cross-sectional study was conducted using a self-report translated and validated Portuguese version of the Pain Catastrophizing Scale (PCS), 13 items of the Mental Health Literacy Scale (MLHS-PT), and assessments of the stigma associated with mental illnesses. Data were collected from 12 formal caregivers of older adults and children at a daycare center in Portugal, with analysis performed using SPSS 25 Edition.

Results: The total score of the PCS was 14,80, and the MLHS-PT had mean scores ranging from 3.09±1.30 to 4.66±0.88. Additionally, mean scores of 3.75±1.42 for disbelief in mental disorders, and 4.25±1.14 for considering professional help-seeking as a weakness. 5(41.7%) participants have lived with, 7(58.3%) have worked with, 3(25.0%) had a neighbor, and 4(33.3%) had a close friend with a mental health problem. 5(45.5%) participants expressed willingness to live, work, or live near someone with a mental health problem, while 8(66.7%) were open to maintaining a friendship with someone facing such challenges.

Conclusions: The findings reveal a low to moderate level of catastrophization among participants. This also correlates with the results of the mental health scale and the stigma towards people with mental health problems fostering a more supportive environment for those impacted by mental health conditions.

I-B2.W.09

PAIN SITUATIONS SURROUNDING COMMUNITY-DWELLING OLDER ADULTS: CAN WE DO SOMETHING?

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Background and aims: The prevalence of chronic non-cancer pain is as high as 37% among community-dwelling older adults. Pain is associated with significant physical and psychosocial incapacities. Older adults with pain reported to experience more depression, anxiety, physically inactive and less mobile, reduced social interaction, and became very lonely.

The majority of existing services focus on offering pain management education and programs to older adults/clients only, instead of to both older adults and their caregivers. Family members are important sources of interpersonal influence that can increase or decrease an individual's commitment to engaging in health-promoting behavior. Therefore, pain management programs should pair an older adult with his/her caregiver as a "dyad."

Methods: We had implemented a dyadic pain management program (DPM). The DPM is an 8-week group-based program. The DPM comprises 4 weeks of center-based, face-to-face activities and 4 weeks digital-based activities delivered via a WhatsApp group.

Results: There were 150 dyads (75 in experimental group with DPM, and 75 in the control group with pain education pamphlet). Upon the completion of DPM, pain intensity and pain interference was significantly lower in the intervention group as compared to the control group. While physical function showed significant improvement and lower depression scores in the intervention group.

Conclusions: The study highlights the potential benefits of involving caregivers in the management of chronic pain for older adults.

I-B2.W.10

SOCIAL SUPPORT IN LOW-INCOME WOMEN WITH FIBROMYALGIA SYNDROME IN SUBURBAN AND PERI-URBAN AREAS OF TENERIFE: A MIXED-METHODS STUDY

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Background and aims: This study aimed to analyze the perception of social support in women diagnosed with Fibromyalgia Syndrome (FMS) with low income and at risk of social exclusion, residing in suburban and peri-urban areas of Tenerife, Canary Islands, Spain.

Methods: An exploratory qualitative study with a sequential mixed-methods design was conducted from January 20, 2023, to June 10, 2024, in Tenerife Association for Fibromyalgia and Chronic Fatigue Syndrome. From an initial cohort of 83 women interviewed, 49 met the inclusion criteria and were selected using non-probabilistic convenience sampling. Ethical approval was granted by the Hospital Universitario de Canarias Ethics Committee (CHUC_2024_27). The MOS-SSS survey and Duke-UNC-11 questionnaire were employed to assess perceived and received social support. Semi-structured interviews provided qualitative insights into sources of social support and participants' satisfaction levels.

Results: The mean age of participants was 57.8 years (SD = 13.25). Mean scores on the MOS-SSS and Duke-UNC-11 were 68.6 (SD = 16.3) and 38.0 (SD = 9.74), respectively, indicating low levels of support, particularly in positive social interactions and perceived affective support. Qualitative analysis identified partners and children as the primary sources of support, with 73.33% and 66.67% reporting high satisfaction, respectively. However, considerable variability in satisfaction highlighted disparities in the quality of support received.

Conclusions: Women with FMS at risk of social exclusion in suburban and peri-urban Tenerife exhibit insufficient social support, particularly in affective and confidential dimensions. Targeted interventions are essential to address these gaps and reduce inequalities in access to and quality of social support for this vulnerable population.

C1 | CHILDHOOD PAIN: ASSESSMENT, MANAGEMENT & IMPACT

I-C1.W.01

TRAJECTORIES OF SCHOOL ABSENTEEISM: LONGITUDINAL ASSOCIATIONS WITH PAIN AND STRESS IN CHILDHOOD AND WITH SICK LEAVE AND DISABILITY PENSION IN ADULTHOOD

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Background and aims: Pain and stress often co-occur in adolescence and together constitute a risk factor for school absenteeism. In turn, school absenteeism is a risk for adult work disability. However, little research has considered lifelong associations among these factors simultaneously, ranging from childhood to late adulthood. The current study aims to identify trajectories of school absenteeism and their associations with pain and stress during childhood, and with sick leave and disability pension in adulthood.

Methods: A longitudinal cohort spanning from age 10 (1965) to age 68 (2023) is used (Individual Development and Adaptation (IDA) program, Örebro, Sweden; n=1,025 in 1965). Data on sick leave and disability pension between age 35 to 67 are retrieved from the Statistics Sweden register. The measurement waves of age 10, 13, and 15 are used as a basis for latent class growth analysis (LCGA) to estimate trajectories of school absenteeism and to explore associations with childhood pain and stress and adult sick leave and disability pension outcomes.

Results: Any absenteeism was reported by 91.9% of children at age 10, 87% at age 13, and 97.2% at age 15. Pain and stress were interrelated and positively associated with absenteeism. The LCGA results and their associations with childhood predictors and adult outcomes will be presented at the conference.

Conclusions: The study provides insight into lifelong associations between school absenteeism, pain and stress in childhood, and pain and stress-related work disability later in life. The results are important for early life prevention of pain- and stress-related sick leave and disability pension.

I-C1.W.02

RELIABILITY AND VALIDITY OF THE PEDIATRIC PAINSCAN©: A SCREENING TOOL FOR PEDIATRIC NEUROPATHIC PAIN AND COMPLEX REGIONAL PAIN SYNDROME

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Background and aims: The Pediatric PainSCAN© is the first screening tool for neuropathic pain (NP) and complex regional pain syndrome (CRPS) designed for pediatrics. Prior research developed the tool and established content validity. The tool has 3 parts, Part A is unscored (pain location, severity, duration), Part B discriminates NP or CRPS from other pain conditions, and Part C discriminates CRPS from NP. This study aimed to evaluate the tool's reliability and validity.

Methods: A multi-centre cross-sectional survey was administered to participants with NP, CRPS and other pain conditions in pediatric chronic pain clinics. Test-retest reliability was evaluated by re-administering the tool after 7-days. Criterion validity (sensitivity [SE] and specificity [SP]) was evaluated by comparing participant scores to a clinician diagnosis (billing codes). Convergent validity was evaluated by comparing participant scores on the tool to existing NP screening tools.

Results: Participants (N=221; 56 with NP, 57 with CRPS, 108 with other pain) were aged 9 – 18 years and 81% female. Test-retest reliability (intraclass correlation coefficients Part B=0.76 and Part C=0.82) was sufficient (>0.70). Criterion validity (Part B: SE 76%, SP 63%; Part C: SE 83%, SP 77%) was sufficient (>70%) except for Part B SP. Convergent validity was sufficient (correlation coefficients aligned with hypotheses: painDETECT [0.73], s-LANSS [0.73], and PROMIS Neuropathic Pain Quality [0.59]).

Conclusions: The Pediatric PainSCAN© demonstrated sufficient reliability and validity for screening for NP and CRPS in pediatric chronic pain clinics. Future research is needed to evaluate the tool in other settings and determine utility of implementing the tool in clinical practice.

I-C1.W.03

PAIN AND DEPRESSIVE SYMPTOMS AMONG ADOLESCENTS: PREVALENCE AND ASSOCIATIONS WITH ACHIEVEMENT PRESSURE AND COPING IN THE NORWEGIAN UNGDATA STUDY

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Background and aims: This study investigated the prevalence of pain, depressive symptoms, and their co-occurrence in Norwegian adolescents. Additionally, we investigated if perceived achievement pressure and coping with pressure were associated with pain, depressive symptoms and co-occurrent pain and depressive symptoms.

Methods: Cross-sectional data from the Norwegian Ungdata Survey (2017-2019) were analysed. Adolescents from across Norway completed an electronic questionnaire including questions on perceived achievement pressure, coping with pressure, pain, and depressive symptoms. Descriptive statistics presented prevalence rates, and multinominal regression reported in relative risk ratios (RR) was employed to estimate associations, adjusted for gender (boys/girls), school level, and socioeconomic status.

Results: The analyses included 209,826 adolescents. The prevalence of pain was 33%, 3% for depressive symptoms, and 14% reported co-occurring pain and depressive symptoms. The prevalence of co-occurring symptoms was higher in girls (22%) than boys (6%). Significant associations were found between perceived achievement pressure and pain (RR 1.11, 95% CI 1.10-1.11), depressive symptoms (RR 1.27, 95% CI 1.27-1.28), and co-occurring symptoms (RR 1.34, 95% CI 1.33-1.34). Struggling to cope with pressure was associated with pain (RR 2.67 95% CI 2.53-2.81), depressive symptoms (RR 16.68, 95% CI 15.60-17.83), and co-occurring symptoms (RR 27.95, 95% CI 26.64-29.33).

Conclusions: The prevalence of co-occurring pain and depressive symptoms is high among Norwegian adolescents. Perceived achievement pressure and struggling to cope with pressure were associated with isolated and, more strongly, co-occurring pain and depressive symptoms. Enhancing adolescents' ability to cope with pressure could be a crucial target in treating pain and depressive symptoms.

I-C1.W.04

PAIN IS THE MOST ELUSIVE OF FACIAL EXPRESSIONS

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Background and aims: Humans convey internal states through a set of facial movements that have been shaped by biological and evolutionary constraints. While real-life social interactions involve continuously changing dynamic signals, most existing research on decoding facial expressions of emotion (FEEs) primarily uses static facial images. Additionally, research focusing on pain and the basic FEEs has often been conducted separately, which hinders their direct comparison. To address both shortcomings, we directly compared the fine-grained recognition of static and dynamic facial expressions of pain alongside the six basic FEEs.

Methods: We parametrically manipulated the phase signal content in static and dynamic FEEs while ensuring consistent luminance and contrast across frames. A large sample of healthy participants undertook a threshold-seeking task to identify the minimum amount of signal necessary for effectively achieving a 57% recognition accuracy of all the FEEs.

Results: The facial expression of pain required significantly more signals than all the other FEEs in both conditions. Dynamic FEEs required less signal, underscoring the importance of motion cues in decoding FEEs.

Conclusions: Our data show that pain is the most challenging signal to decode among all FEEs, regardless of the stimulus modality. The complexity of the facial signal of pain might principally lie on both the higher variability on its production, as well as its unique overlap with features seen in various other emotional expressions (i.e. disgust, anger, fear and sadness). Our innovative psychophysical method could be coupled in the future with questionnaires of cognitive and affective abilities to elucidate the difficulty in pain decoding further.

I-C1.W.05

MOBILE PAIN TEAM FOR PATIENTS WITH INTELLECTUAL DISABILITIES AGED 0-25 YEARS: AN INNOVATIVE APPROACH

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Background and aims: Pain in children with intellectual disability is underdiagnosed and undertreated because of difficulties communicating pain. Assessment is more difficult outside the usual environment. Treatment are subject to expert opinion. The usual absence of follow-up is an obstacle to the adaptation of treatments and the improvement of knowledge.

We have built a dedicated regional mobile team to improve diagnosis and treatment of pain in children, adolescents and young adults with moderate or severe intellectual disabilities.

Methods: Our team offers:

- Consultation of patients at their places of life: institution or home, with both their parents and professionals. An initial assessment of pain leads to recommendations and prescriptions

- Teleconsultation follow-up with family and professionals, to assess the relevance and effectiveness of recommendations and prescriptions

- Training in pain assessment for professionals

- Seminars for parents to better assess their child's pain

Results: From january 2023 to june 2024, we consulted 63 patients, with multiple disabilities or severe autism, 7 times at home. Follow up was142 teleconsultations, and 14 on site. 50 situations were identified as pain. The specific assessment tools were used 50 times. We asked for additional tests for 15 patients, and for specialized medical advice for 21. All patients had non-drug treatment, 41 had drug prescriptions. Etiological origins are often digestive, but also : period pain, osteoporosis, headache, dental, urinary, or muscular pains.

Conclusions: Our team meets a need for families and institutions hosting young people with intellectual disabilities. The dissemination of this practice seems necessary at a national level.

I-C1.W.06

BEHAVIORAL AND ELECTROPHYSIOLOGICAL INVESTIGATION OF PAIN THRESHOLDS AND AFFECTIVE PAIN PROCESSING IN ADULTS BORN PRETERM

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Background and aims: The first moments of life of very premature (VP) infants are highly stressful: in addition to their health problems related to immaturity, they are subjected to a set of external stressors including isolation and painful medical procedures. These factors may impact pain processing, including its biological, psychological and social aspects. The present study aims to investigate long-term consequences (i.e. in adulthood) of very preterm birth (< 32 weeks of gestation) on different aspects of pain.

Methods: Full-term (FT) and VP adults participated in the study. Warm and cold detection and heat and cool pain thresholds were assessed through quantitative sensory testing. Empathy to pain was assessed by showing neutral and pain-related pictures and by contrasting the cortical responses they evoked. Fear of pain, pain catastrophizing and pain coping strategies were assessed through self-reported questionnaires.

Results: Recruitment is still ongoing. So far, preliminary results suggest that event-related brain potentials evoked by pain/neutral pictures are not different between the two groups. However, VP adults have slightly lower warm nociceptive thresholds. They also show higher scores than FT adults for personal distress, difficulty describing feelings and catastrophizing. No significant difference between the two groups are evidenced so far for other parameters.

Conclusions: Capturing the impact of VP birth on pain processing is challenging due to its constant evolution and the large numbers of factors influencing it. Refinement of study parameters and instructions as well as a larger sample size are needed to pursue similar studies.

I-C1.W.07

PERCEPTION OF PAIN EXPRESSED BY BABY CRIES: FROM ACOUSTICS TO NEURAL CORRELATES IN ADULT LISTENERS

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Background and aims: What in the acoustics of human babies' cries makes them so evocative to caregivers when expressing pain? Acoustic irregularities, known as "nonlinear phenomena" are strong candidates, associated with high levels of pain. Here, we aim to describe the nonlinear phenomena in baby cries, and to investigate how they drive pain perception by adult experts in babies care, from behavior to neural correlates.

Methods: Sixty participants (mothers, fathers, childless women working in pediatric care) took part in an fMRI study, each listening to 64 different cries (in which nonlinear phenomena were labelled), recorded during the baby's bath ("discomfort cries") and during routine vaccination ("pain cries"). They had to determine whether each cry was due to discomfort or pain.

Results: Pain cries were characterized by a higher presence of nonlinear phenomena, such as chaos, which are responsible for perceptual acoustic roughness. Rougher cries were more likely to be classified as pain cries by all the participants. Pain recognition was associated with increased BOLD activity in the left inferior frontal gyrus, and, as well as acoustic roughness, was negatively correlated with activity in bilateral primary auditory area, with no effect of sex (mothers vs fathers) nor type of expertise (parental vs professional).

Conclusions: Brain processing of pain information involves high-level cognitive processing but disengages primary auditory network, reflecting cries being integrated as complex vocal communicative signals. Our neuroimaging study help to understand how parental and professional experience shape brain activity and make adults experts at pain identification in cries.

I-C1.W.09

PREVALENCE OF AUTISM SPECTRUM DISORDER IN THE CHILDREN OF FIBROMYALGIA SYNDROME PATIENTS IS INCREASED RELATIVE TO OTHER TYPES OF CHRONIC PAIN

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Background and aims: Previous research has suggested that the primary chronic pain condition, fibromyalgia syndrome (FMS) is autoimmune in nature. Independent of this, Maternal Autoantibody Related Autism Spectrum Disorder (MAR-ASD) has emerged as a subtype of autism spectrum disorder (ASD) in which pathogenic maternal autoantibodies are theorised to cross the placenta and cause neurodevelopmental alterations to the exposed offspring. We carried out an investigation aiming to establish the prevalence of ASD in the children of a sample population of chronic pain patients and to see what maternal factors were associated with the outcome of having an autistic child.

Methods: 590 chronic pain patients who attended a tertiary care outpatient pain clinic at the Walton Centre, a UK neurological centre, between 26/10/2020 – 10/05/2023 were invited to participate in an online questionnaire.

Results: The results indicate an increased prevalence of ASD diagnosis in the children of FMS patients (39%) compared with patients with other chronic pain conditions (5%). FMS in mothers was significantly associated with an increased likelihood of having a child with ASD (p= .016).

Conclusions: These results indicate that ASD is more prevalent in children with a mother who has FMS, as compared to mothers with "other chronic pain" and that of the general population. Amongst other theories, the significant difference between these two groups of chronic pain patients could suggest the involvement of pathogenic antibodies during pregnancy in the pathogenesis of ASD in the children of mothers with FMS.

I-C1.W.10

PAIN AND FEAR IN PERIPHERAL VENOUS CANNULATION IN CHILDREN

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Background and aims: Management of pain in Intensive care unit (ICU) during peripheral venous catheter insertion may be related to children's mental health.

Methods: This is a prospective controlled randomized trial. It aimed to determine whether the use of a local transdermally applied anesthetic (cream Emla®) in children aged 8 to 18 years undergoing peripheral venous catheter insertion is more effective than visual distraction in reducing pain and fear. The Visual Analogue Scale (VAS) was used to measure pain and the Children's Fear Scale (CFS) was used to measure fear. The study included n = 90 pediatric patients (N = 45 in each group), with a predominance of girls (58.4%) and mean age M = 13.9 years.

Results: Both groups experienced a significant reduction in pain intensity and fear of pain. The difference in the decrease of both VAS and CFA before and after the intervention (quantile range of medians) was significant (p = 0.0278, p = 0.0488) in favor of the EMLA® group (VAS Md 2, CFS Md 0) vs. the visual distraction group (VAS Md 3, CFS Md 1). In the EMLA® group, the following significant predictors were found for moderate and high procedural pain (VAS ≥4): age (OR = 0.73), fear of pain (OR = 4.26) and pain before the procedure (OR = 1.51). For the visual distraction group, age was only one of the significant predictor (OR = 0.73).

Conclusions: Results show higher reduction of pain and fear in the EMLA® group.

C2 | SPINAL CORD STIMULATION

I-C2.W.01

LONG-TERM FOLLOW-UP OF BURST SPINAL CORD STIMULATION IN PATIENTS WITH PAINFUL DIABETIC NEUROPATHY

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Background and aims: In many countries today, spinal cord stimulation (SCS) is a reimbursed therapy for the treatment of painful diabetic neuropathy (PDN).

Initially, the short- and long-term efficacy of tonic SCS for the treatment of PDN was demonstrated in two clinical trials. Subsequently, high frequency SCS was also demonstrated to be a very effective treatment. However, for burst SCS, only one report on short-term effects in patients with PDN has been published.

This study explores the long-term effects of burst SCS in patients with painful diabetic neuropathy.

Methods: Twenty-five patients who received burst stimulation for their painful diabetic neuropathy have been followed for a minimum of one year.

Clinical data is collected retrospectively, including: patient characteristics, pain characteristics, quality of life, medical history, neuromodulation treatment, and stimulation parameters.

Results: Average follow-up time of the 25 patients is 5 years (range 1-12 years).

At 1 year follow-up, 80% of the patients reported pain reduction of >50% .

At 5 year follow-up, 75% of the patients still reported pain reduction of >50%, but most patients also have other Diabetes related health issues. Still, both at 1 and 5 years follow-up, patients report improved quality of life compared to before SCS and are satisfied with burst SCS.

In the majority of patients, burst stimulation settings have been adjusted during follow-up. Given the choice between tonic and burst, the majority of patients opt for burst SCS.

Conclusions: Burst spinal cord stimulation can offer an effective long term treatment for painful diabetic neuropathy.

I-C2.W.02

CONSISTENT NEURAL ACTIVATION USING PRECISION, DOSE-CONTROL CLOSED-LOOP SCS LEADS TO DURABLE 3-YEAR OUTCOMES

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Background and aims: A spinal cord stimulation (SCS) delivering ECAP-controlled, closed-loop therapy (CL-SCS) ensures consistent neural activation with every stimulus. EVOKE RCT (NCT02924129) evaluated its safety and efficacy for chronic pain. Here, we present 36-month results from CL-SCS cohort, highlighting long-term therapy durability and neurophysiological dose-response.

Methods: This analysis includes patients randomized to CL-SCS who completed 36-month follow-up. Pain relief was assessed as ≥50% and ≥80% reduction in the overall back and leg pain (VAS). Neurophysiological data,

including ECAP dose and dose ratio, were evaluated (figure 1). The dose ratio normalizes activation levels across patients by comparing stimulation current at specific dose and threshold levels. Differences between 3- and 36-month outcomes were assessed.

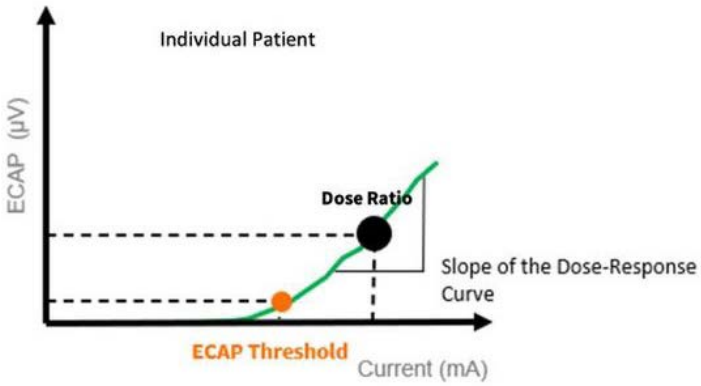

Figure 1: Graphical representation of dose ratio

Results: Forty-one patients in the CL-SCS group were followed for 36 months. Pain relief was achieved in 83% (≥50% reduction) and 59% (≥80% reduction), with no significant differences between 3 and 36 months. Among patients with ≥50% relief at 3 months, 90% maintained response through 36 months. Therapy accuracy remained within 4µV of the target ECAP, utilization exceeded 80%, and stimulation stayed above threshold >95% of the time. ECAP dose was ≥19.3µV, and the average dose ratio was >1.3 (Figure 2). Dose-response curves for perception, comfort, and maximum thresholds shifted leftward from 3 to 36 months (Figure 3), while spinal cord sensitivity (µV/µC) and the clinical benefits remained stable.

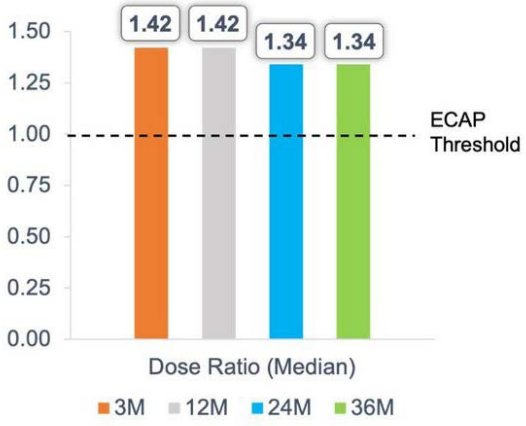

Figure 2. Dose Ratio was ≥1.34 at all timepoints

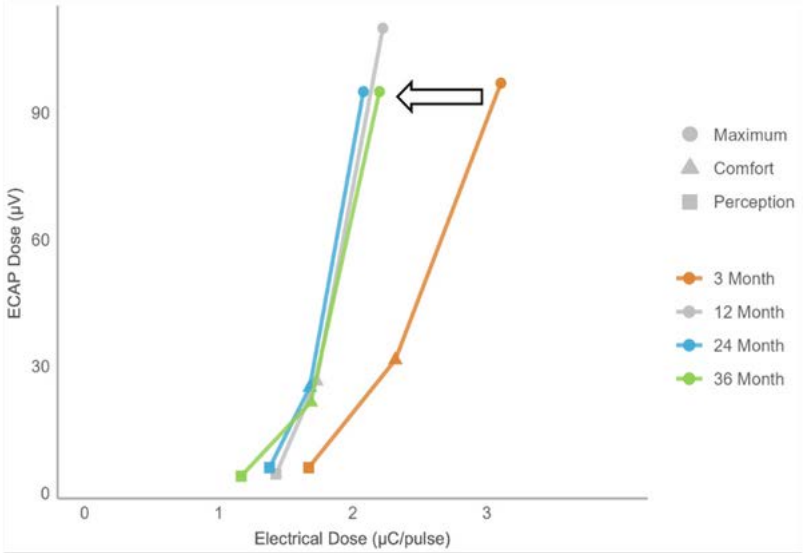

Figure 3. Dose-Response Curves for CL-SCS through 36 months, showing a significant left-shift from the 3-month to 36-month visit.

Conclusions: Consistent neural activation with CL-SCS provided sustained, durable pain relief over 36 months without evidence of tolerance or reduced therapeutic effect. Reduced dose requirements could indicate remittance of chronic pain.

I-C2.W.03

DOSE-DEPENDENT DORSAL COLUMN ACTIVATION AND ITS ESSENTIAL ROLE IN SPINAL CORD STIMULATION-INDUCED ANALGESIA IN AN EXPERIMENTAL MODEL OF NEUROPATHIC PAIN IN RATS

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Background and aims: The evoked compound action potential threshold (ECAPT) provides an objective marker of dorsal column activation during spinal cord stimulation (SCS) and has been shown to successfully guide SCS dosing in patients. This study aimed to strengthen the evidence supporting ECAPT as a reliable marker for determining stimulation dose also in preclinical models. Thus, using a rat model of neuropathic pain, we evaluated the analgesic efficacy of ECAP-based SCS doses delivered both above and below the ECAPT.

Methods: Adult male Sprague-Dawley rats with spared nerve injury (SNI)–induced neuropathic pain (n=7) were implanted epidurally with an eight-contact lead. SCS (50 Hz, 100 µs) was delivered at individualized doses of 0×ECAPT, 0.5×ECAPT (open-loop; OL), or 1.2×ECAPT (closed-loop; CL). Additional groups included SNI and sham controls (n=6 each) without lead implantation. Paw withdrawal responses to mechanical (von Frey filaments) and cold (acetone) stimuli were measured to assess neuropathic pain hypersensitivity and the analgesic effects of SCS.

Results: CL-SCS at 1.2×ECAPT ensured consistent activation of dorsal column fibers and significantly reduced both mechanical and cold hypersensitivity in SNI rats compared to controls (*Fig. 1A,B*). Mechanical hypersensitivity relief persisted for 60 minutes post-stimulation, while cold hypersensitivity returned to baseline within 30 minutes. In contrast, OL-SCS at 0×ECAPT and 0.5×ECAPT failed to produce analgesia (*Fig. 1C-F*).

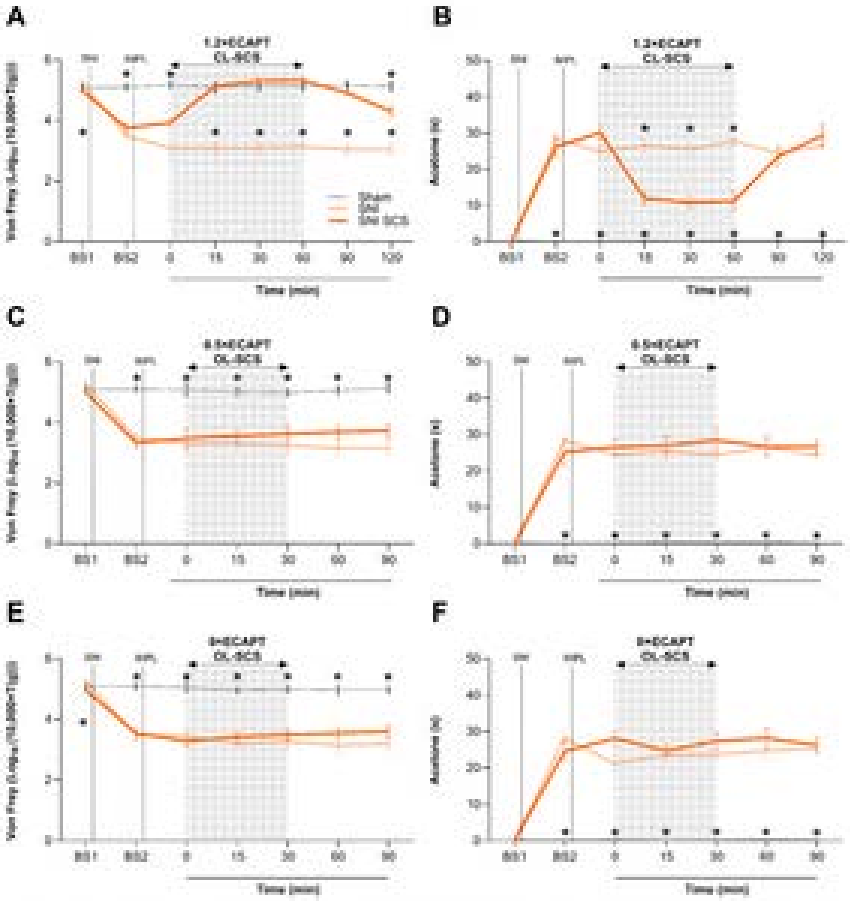

Figure 1. CL-SCS at 1.2×ECAPT effectively alleviated neuropathic pain hypersensitivity, whereas OL-SCS at 0×ECAPT and 0.5×ECAPT failed to produce pain relief. The effect of SCS at different doses (1.2×ECAPT, 0.5×ECAPT and 0×ECAPT) on mechanical (**A, C, E**) and cold (**B, D, F**) hypersensitivity was assessed using the von Frey and acetone tests. (**A**) Mean log10 thresholds (T, in grams) and (**B**) paw withdrawal latencies before SNI surgery (BS1), before lead implantation (BS2), and at 0, 15, 30, 60, 90 and 120 min after the onset of CL-SCS delivery at 1.2×ECAPT. (**C**) Mean log10 thresholds (T, in grams) and (**D**) paw withdrawal latencies before SNI surgery (BS1), before lead implantation (BS2), and at 0, 15, 30, 60 and 90 min after the onset of OL-SCS delivery at 0.5×ECAPT. (**E**) Mean log10 thresholds (T, in grams) and (**F**) paw withdrawal latencies before SNI surgery (BS1), before lead implantation (BS2), and at 0, 15, 30, 60 and 90 min after the onset of OL-SCS delivery at 0×ECAPT. CL-SCS at a dose corresponding to 1.2×ECAPT provided a significant reduction of mechanical (**A**, 15-60 min: $p<0.001$) and cold (**B**, 15-30 min: $p<0.001$, 60 min: $p=0.002$) hypersensitivity in the SNI SCS animals. The dotted lines represent SNI surgery and lead implantation. The pattern in the background represents the time that SCS was delivered. Data are presented as mean±SEM, n=5–7. $p<0.05$ (corrected) was used as the significance level (two-way ANOVA, *t*-test). *denotes significance compared to SNI SCS. Sham: animals received no SNI surgery and no lead implantation (sham); SNI: animals received SNI surgery and no lead implantation (SNI) or were subjected to SCS (SNI SCS); **CL-SCS**: closed-loop spinal cord stimulation; **ECAPT**: evoked compound action potential threshold; **IMPL**: implantation; **OL-SCS**: open-loop spinal cord stimulation; **SNI**: spared nerve injury

Conclusions: Our findings emphasize the importance of dorsal column activation in SCS-induced analgesia. Implementation of ECAP-based dosing in preclinical models may allow establishing an objective and clinically translatable framework for investigating SCS mechanisms and optimizing SCS outcomes.

I-C2.W.04

THE IMPACT OF FREQUENCY AND PULSE WIDTH ON ECAP MORPHOLOGY AND DORSAL COLUMN ACTIVATION: INSIGHTS FROM A PRECLINICAL INVESTIGATION

K. Ladner[1], E. Versantvoort[1], B. Dietz[2,1], Q. Vuong[1], D. Mugan[2,1], A. Hu[3], M. Thijssen[2], R. Gorman[3], E. Petersen[4], I. Obara[1]

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Background and aims: Electrically evoked compound action potentials (ECAPs) have shown how spinal cord stimulation (SCS) parameters, specifically high-frequency at 1000Hz, affect dorsal column (DC) activation. Given the implications of these findings for understanding SCS mechanisms, we investigated how varying stimulation frequencies and pulse widths (PWs) affect DC axon activation by analysing ECAP morphology in preclinical models.

Methods: Naïve adult male Sprague-Dawley rats (200-400g) were implanted with an 8-contact epidural lead. Stimulation was applied at 1.5×ECAP threshold and a PW of 40µs. To investigate SCS frequency effects, baseline recordings were taken at 2Hz, followed by stimulation at 50, 200, 500 and 1000Hz, with 2Hz recovery intervals. SCS at 200Hz was also tested in a pig implanted with an epidural paddle lead. PW effects were assessed at 50Hz by increasing PWs from 50 to 1000µs (50µs/min).

Results: In contrast to 50Hz, 200 and 500Hz significantly reduced ECAP amplitude, with increases in peak latencies and ECAP width (*Fig.1A,B*). At 500Hz, conduction velocity decreased antidromically (*Fig.1C*). ECAP morphology parameters gradually returned to baseline values during recovery intervals. Similar frequency effects were observed in the pig model (*Fig.1D*). Increasing PW prolonged peak latencies, with ECAP amplitudes peaking at 200-250µs before declining (*Fig.2*).

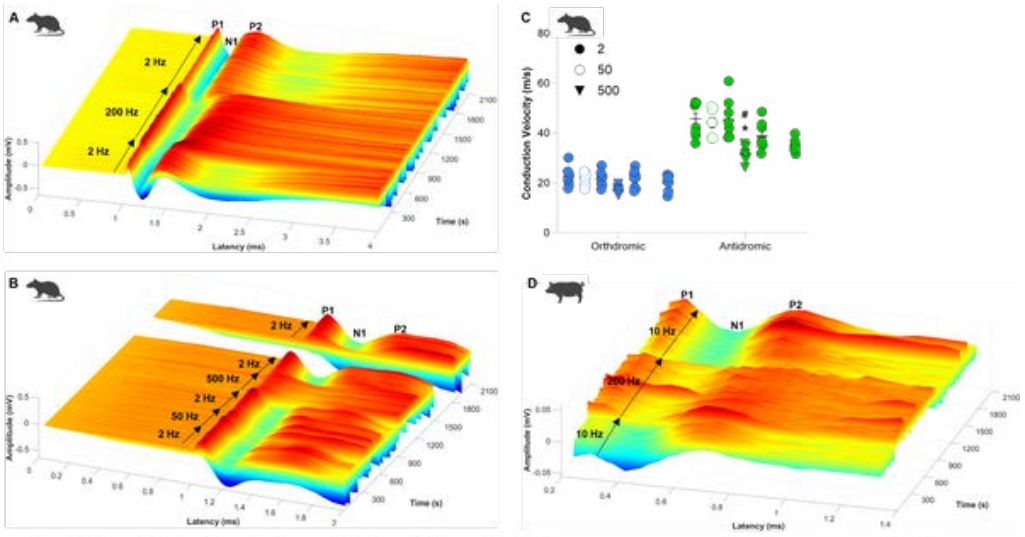

Fig. 1 The effect of spinal cord stimulation (SCS) frequency on evoked compound action potentials (ECAP) in a rat and pig model of SCS. SCS was applied at a fixed pulse width of 40µs and an intensity of 1.5× ECAP threshold in both species. **(A)** An example of ECAPs recorded over the course of stimulation at 2Hz (5 minutes), 200Hz (15 minutes) and then 2Hz again (15 minutes) in a naïve, anesthetized rat. **(B)** An example of ECAPs recorded over the course of stimulation at 2Hz (5 minutes), 50Hz (5 minutes) and 500Hz (5 minutes) in a naïve, anesthetized rat, in the orthodromic direction. Data could not be analyzed at 1000Hz and is represented by an empty gap in the graph. **(C)** Mean conduction velocities (CV; m/s) at 2, 50 and 500Hz, in the orthodromic and antidromic direction recorded in rats. The mean CV of the individual rats are represented by the individual markers. Baseline was identified from the final 30 seconds of recordings at 2Hz stimulation prior to 50Hz. *p<0.05 when compared to baseline (2Hz) recording. #p<0.05 when compared to 50Hz recording. All error bars represent ± SEM. Pairwise comparisons were made for the rats using Bonferroni correction for multiple comparisons. **(D)** An example of ECAPs recorded over the course of stimulation at 10Hz (5 minutes), 200Hz (15 minutes) and then 10Hz again (15 minutes) in a naïve, anesthetized pig, in the orthodromic direction.

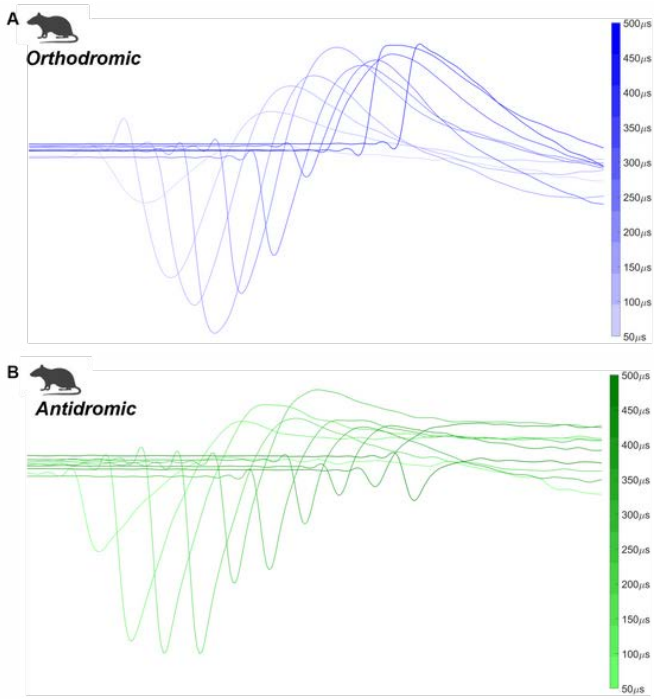

Fig. 2 The effect of spinal cord stimulation (SCS) pulse width (PW; µs) on evoked compound action potential (ECAP) recordings in a rat model of SCS. Examples of ECAPs recorded in a naïve, anaesthetized rat during SCS at increasing PW (µs). SCS was applied at a fixed frequency of 50Hz and an intensity of 1.5× ECAPT. The PW was increased every minute in increments of 50µs. ECAPs are shown from a PW of 50µs up to 500µs. ECAPs were recorded from the channels directly next to the stimulation channel (CH4) in the orthodromic (**A**; CH5), and antidromic (**B**; CH3) direction. Arrows indicate the PW at which the maximum ECAP amplitude was reached.

Conclusions: SCS at higher frequencies and increasing PWs significantly alters ECAP morphology and propagation speed. Desynchronization of DC axon activity may explain these findings, although additional mechanisms cannot be excluded. Our observations may provide insights that could be critical for optimizing SCS therapy and clarifying the mechanisms underlying SCS-induced pain relief.

I-C2.W.06

EFFICACY OF SPINAL CORD STIMULATION (SCS) ON QUALITY OF LIFE (QOL): A RETROSPECTIVE STUDY

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Background and aims: Pain is a multifaceted condition influenced by biological, psychological, social, and cultural factors, significantly affecting quality of life (QoL). Effective treatment requires addressing the patient as a complex "system." Spinal cord stimulation (SCS) is a proven therapy for refractory pain, with evidence showing better outcomes with early intervention. This study examines the long-term impact of SCS on QoL using standardized questionnaires administered pre- and post-treatment.

Methods: Adults with persistent pain from failed spinal surgery (PSPS2) or CRPS undergoing SCS were included. QoL was assessed via SF-12, QUID, NRS, and PCS questionnaires before electrode implantation and 1 year post-SCS. Statistical analysis was performed using JASP 0.19.1 for Mac, with paired T-tests (Shapiro-Wilk, Bonferroni correction) applied ($p<0.05$).

Results: Thirty-seven patients (21 women, 16 men; mean age 66.86 ± 13.38 years) were analyzed. After 1 year of SCS, all measures showed statistically significant improvements in pain intensity, functional capacity, and psychological well-being.

Figure 1: box and whiskers for NRS, SF-12 PCS & MCS, QUID and PCS

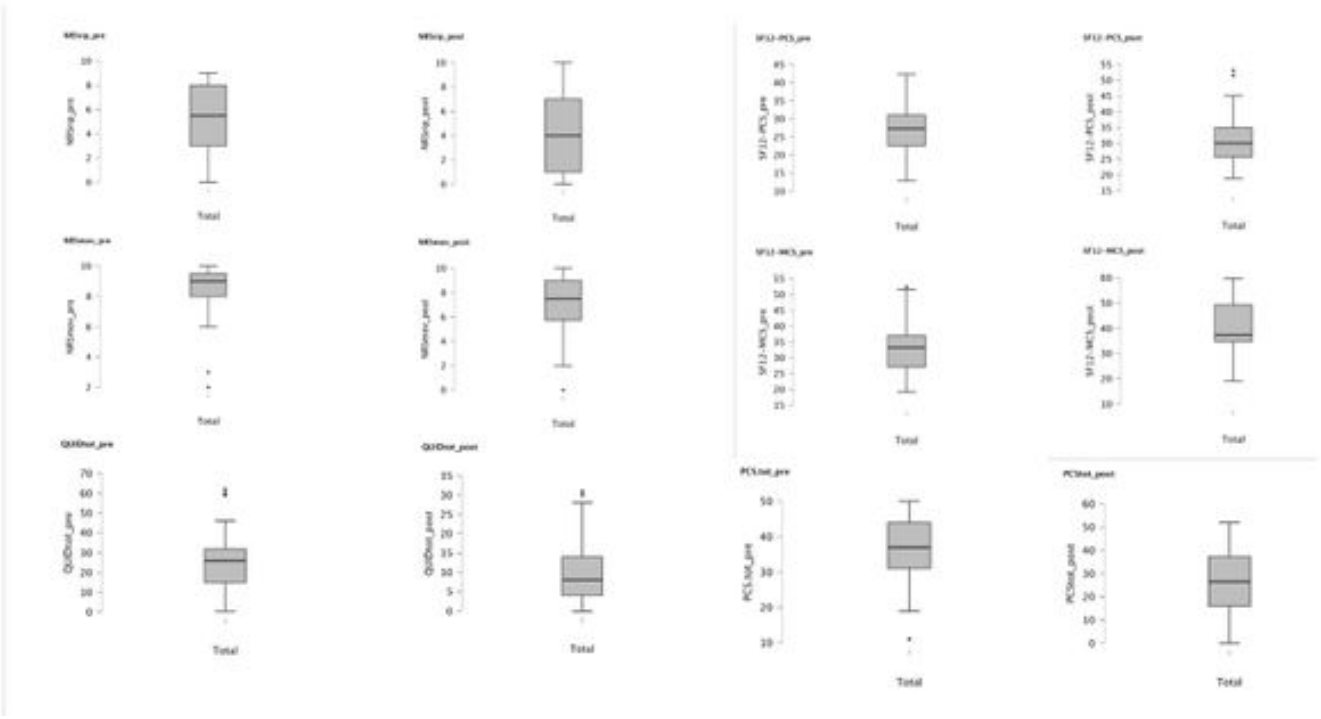

Table 1: measurements pre- and post-SCS (mean and standard deviation)

	PRE		POST		t	p
Variables	mean	sd	mean	sd		
SF-12 PCS	*27.090*	*6.039*	*31.244*	*8.389*	*-2.853*	0.007
SF-12 MCS	*33.639*	*7.570*	*40.298*	*9.466*	*-3.570*	0.001
PCS tot	*36.514*	*8.896*	*25.861*	*13.920*	*4.159*	<0.001
QUID tot	*25.215*	*14.834*	*10.486*	*8.517*	*5.881*	<0.001
NRS rest	*5.417*	*2.802*	*4.194*	*3.241*	*2.137*	0.040
NRS mov	*8.343*	*1.862*	*6.917*	*2.842*	*2.875*	0.007

Conclusions: Despite a small sample size, this study highlights substantial QoL improvements 1 year post-SCS. Results underscore the importance of multidimensional QoL assessments and timely patient selection to optimize outcomes. As prior research suggests, earlier SCS use may further enhance treatment effectiveness and patient quality of life.

I-C2.W.07

THE PREDICTIVE FORMULA TO CHOOSE SPINAL CORD STIMULATION VERSUS TARGETED DRUG DELIVERY IN TREATING CHRONIC PAIN MAY IMPROVE OUTCOMES AND REDUCE EXPLANT: CLEVELAND CLINIC EXPERIENCE

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Background and aims: Mekhail et al. developed a formula to predict the potential success of Spinal Cord Stimulation (SCS) and Targeted Drug Delivery (TDD) for chronic pain, based on retrospective data. This formula

was validated in a multicenter prospective study of real-world practice. This study evaluates Cleveland Clinic's success for SCS and TDD implants (2018–2022) compared to predicted outcomes using the formula.

Methods: After IRB approval, a retrospective EMR review was conducted for chronic pain patients treated with SCS or TDD at Cleveland Clinic between 2018 and 2022. Patients requiring revisions or replacements before the 6-month success assessment were excluded. Data collected included demographics, pain diagnoses, and NRS pain scores at baseline and 6 months post-implant (Figure 1). The predictive formula was applied in a blinded manner using the specific factors included in (Table1). Subjects with a predictive score (P) above 0.88 are considered SCS candidates, while those < 0.88 are considered TDD candidates.

Figure 1: CCF outcomes in period from 2018 to 2022.

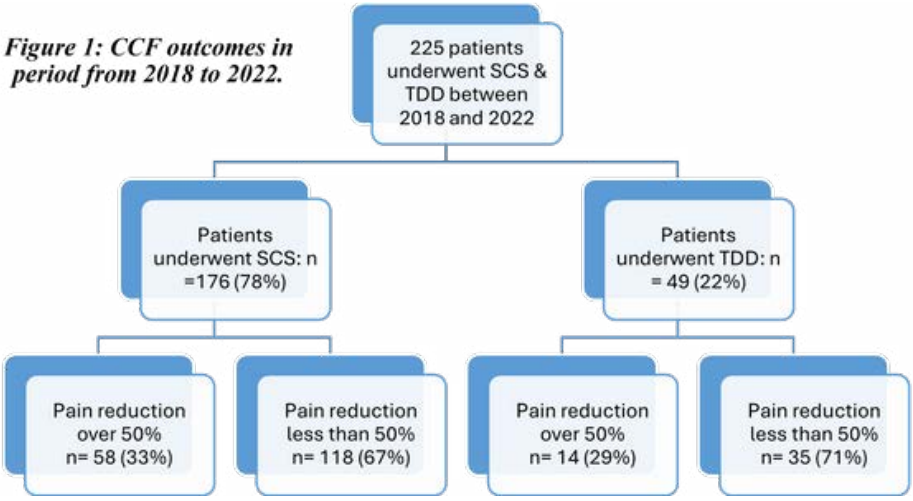


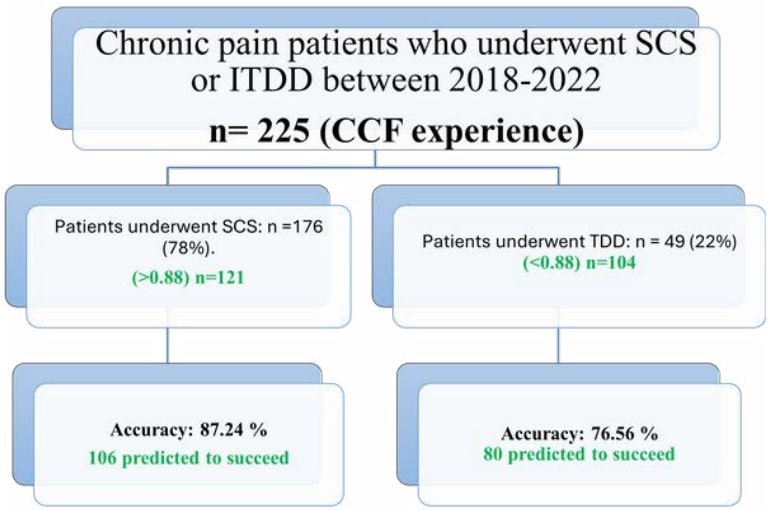
Table 1 Predictive formula

Predictors	X calculation	Formula
1A. Age: years	–0.064 × age	$p = \frac{e^X}{1+e^X}$ (e is Euler's number, approximately equal to 2.718)
1B. Gender: subtract if male	–0.743	
1C. Depression: add if present	+0.486	
1D. Neuropathic pain: add if present	+0.681	
1E. Post-Laminectomy Syndrome: add if present	+0.468	
1F. Spine-related pain: subtract if present	–0.678	
Add intercept value of 5.138	X value	

Table 1: Predictive formula with demographic and clinical factors for calculating the predictive value.

Results: Among 225 patients (176 SCS, 49 TDD), 33% of SCS and 29% of TDD patients achieved >50% pain reduction at 6 months. Retrospective application of the predictive formula identified 121 patients as suitable for SCS and 104 for TDD. The formula projected 186 patients achieving >50% pain relief (87.24% for SCS, 76.56% for TDD), compared to 72 in actual practice (Figure 2).

Figure 2:Projected success rates based on the predictive formula



Conclusions: Incorporating a predictive formula into the care path could significantly optimize chronic pain patients' outcomes, save huge health care costs burden due to inappropriate use of SCS or TDD, early explants and enhance advancing evidence-based care.

I-C2.W.08

THERAPISTS' PERSPECTIVES ON A PERSONALIZED BIOPSYCHOSOCIAL REHABILITATION POST SPINAL CORD STIMULATION IMPLANTATION

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Background and aims: Chronic pain is a common problem. Patients with Persistent Spinal Pain Syndrome Type 2 may receive spinal cord stimulation implantation to reduce this pain. Recent evidence shows that only a limited number of these patients return to work. A biopsychosocial rehabilitation programme was established to improve the work ability of these patients, but how do therapists experience guiding such a programme?

Methods: The study was conducted using the hermeneutic phenomenological method. Data were collected using semi-structured interviews. The following steps were performed during the analysis: formulating a naïve understanding, structural analysis and formulating a comprehensive understanding.

Results: A total of 10 physiotherapists, occupational therapists and psychologists were interviewed from November 2023 until February 2024. In the structural analysis we identified five themes: i) The challenge of personalizing the rehabilitation process, ii) The pursuit of interdisciplinarity, iii) Importance of biopsychosocial rehabilitation, iv) Value of long term implementation strategies and v) Employment as end result.

Conclusions: Personalization was experienced to be paramount in biopsychosocial rehabilitation but was complicated by a standardized protocol. Patient-centered care could only be established by multiple disciplines working together in an interdisciplinary team. Finally, employment was identified as the main goal in rehabilitation.

I-C2.W.09

CLINICAL HOLISTIC RESPONDERS IN PATIENTS WITH PERSISTENT SPINAL PAIN SYNDROME TYPE II TREATED BY SUBTHRESHOLD SPINAL CORD STIMULATION COMPARED TO BEST MEDICAL TREATMENT: A RCT

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Background and aims: Integrating information on bodily functions, pain intensity and quality of life into one composite measure of a holistic responder has recently been proposed as a useful method to evaluate treatment efficacy of Spinal Cord Stimulation (SCS) in patients with Persistent Spinal Pain Syndrome Type II (PSPS-T2). The current objective is to examine whether subthreshold SCS, compared to BMT, provided to patients with PSPS-T2 results in a different proportion of clinical holistic responders (as composite measure) at 6 months.

Methods: A two-arm multicentre randomised controlled trial is conducted whereby 114 patients are randomised to (a) BMT or (b) paresthesia-free SCS. The primary outcome is the proportion of clinical holistic responders at 6 months (i.e. a composite measure of pain intensity, medication, disability, health-related quality of life and patient satisfaction). The secondary outcomes are work status, self-management, anxiety, depression and healthcare expenditure.

Results: In the BMT group, mean pain intensity scores of 67(SD:21) were revealed at baseline, 67(SD:18) at 1 month and 69(SD:20) after 6 months. In the SCS group, scores of 75(SD:17) were revealed at baseline, 43(SD:25) at 1 month and 53(SD:26) at 6 months. For the ODI, mean scores of 48 and 41 were revealed after 1 month of BMT and SCS, respectively. After 6 months, ODI score in BMT group was 49(SD:17) and 45(SD:16) in SCS.

Conclusions: We propose to shift the focus from a unidimensional towards a composite measure as primary outcome. The lack of methodologically rigorous trials exploring the clinical efficacy and socioeconomic consequences of subthreshold SCS paradigms is pressing.

I-C2.W.10

EVALUATION OF A SINGLE-TIME E-HEALTH TOOL TO PREDICT EFFICACY OF SPINAL CORD STIMULATION IMPLANTATION IN CHRONIC PAIN PATIENTS

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Background and aims: Chronic pain severely impacts quality of life, often requiring interventions like Spinal Cord Stimulation (SCS). This study evaluates the efficacy of SCS-e-health tool in single-time SCS implantation, identifying key factors that influence patient response.

Methods: A prospective registry was conducted at the Hospital Universitario de La Princesa in Madrid and the Hospital Universitario de Ourense. Responders were defined as patients achieving a pain reduction of at least 50% compared to baseline VAS scores at any follow-up visit. Logistic regression assessed the influence of demographic, clinical, and psychological factors on response

Results: Study included 42 patients, with 66.7% men and 33.3% women. Mean age was 55.2 ± 11.1 years. 45% of the cohort were responders. Significant pain reduction was observed over time, with mean VAS scores decreasing from 8.3 ± 1.2 (baseline) to 4.8 ± 1.5 at 1 month ($p<0.001$) and further to 3.8 ± 1.4 at 6 months ($p<0.001$). No significant differences were found between 6 and 12 months. Quality of life, as measured by EQ-5D Global Score, improved significantly from 42.9 ± 10.8 (baseline) to 70.1 ± 12.5 at 6 months ($p<0.001$), with no significant change at 12 months. Significant predictors of response included height (Beta = 0.213, p = 0.026), employment status (Housewives, Beta = 0.817, p = 0.0054, and Unemployed, Beta = -0.508, p = 0.0009,), and diagnosis (Failed Back Surgery Syndrome [FBSS], Beta = 0.581, p = 0.024).

Conclusions: Single-time SCS implantation is effective in chronic pain patients whit positive response to SCS-e-health tool. Height, diagnosis of FBSS, and employment status significantly affect treatment outcomes.

D1 | OPIOID USE

I-D1.W.01

QUALITY OF PERIOPERATIVE SURGICAL AND ANESTHESIOLOGIC MEASURES FOR PAIN REDUCTION AFTER HYSTERECTOMY: EVALUATION OF THE INTERNATIONAL PAIN REGISTRY PAIN-OUT

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Background and aims: Hysterectomy (HE) is one of the most common surgical procedures in gynecology. However, data on the influence of perioperative and surgical care measures on the pain experience of these patients are scarce. This study is the first international register-based evaluation of perioperative standards for the various surgical approaches to hysterectomy (abdominal, vaginal, laparoscopic). The study aims to evaluate risk factors for the development of severe postoperative pain after hysterectomy.

Methods: In this descriptive cross-sectional study, data between January 2014 and January 2024 from 47 centers of 17 countries from the Pain Out Register were evaluated. Data were collected and entered according to the standard of the PainOut database. Pain intensity, pain medication requirements and pain-related impairments after HE were examined.

Results: A total of 2155 women after hysterectomy were included.

On the 11-point numering rate scale (NRS), the mean maximum pain after abdominal HE was 5.65 (+2.9), after vaginal HE 5.32 (+2.78) and after laparoscopic HE 4.18 (+2.5) ($p<0.05$). Regarding severe pain 34.7 % of women reported pain of $\geq$7 NRS.

Open abdominal access, intraoperative and postoperative opioid requirements and the presence of comorbidities were found to be risk factors for the development of severe postoperative pain. Preoperative use of dexamethasone, non-opioids intraoperative and a laparoscopic approach had a protective effect.

Conclusions: This study shows that the surgical approach is an important risk factor for the development of postoperative pain. Analgesia after abdominal HE remains insufficient and need to be improved. Tailored postoperative analgesia increases patient satisfaction and improves faster recovery.

I-D1.W.02

INCIDENCE AND PREVALENCE OF PAIN MEDICATION PRESCRIPTIONS IN PATHOLOGIES WITH A POTENTIAL FOR CHRONIC PAIN

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Background and aims: Heightened risks of dependence due to long-term use of pain medication have increased awareness about extended pain medication use in chronic pain populations. The goal of this study was to evaluate the incidence and prevalence of pain medication prescriptions in common pathologies with a potential for chronic pain.

Methods: A retrospective cohort study was conducted using electronic health records from TriNetX. For 10 distinct cohorts (total n=9,357,584 patients), pain medication prescriptions were extracted for five classes, namely NSAIDs and acetaminophen, opioids, gabapentinoids, neuropathic mood agents, and muscle relaxants. Annual incidence and prevalence of each class of medication were evaluated for the past 11 yr.

Results: From 2012 to 2022, there was a significant increase in prescriptions of NSAIDs, except for patients with fibromyalgia, and persistent spinal pain syndrome (PSPS) type 2. Interestingly, over time, prescriptions of opioids in patients with complex regional pain syndrome, endometriosis, osteoarthritis, and PSPS type 2 increased, as did prescriptions of muscle relaxants for all cohorts except those with fibromyalgia. Incidence of prescriptions of neuropathic mood agents is high for patients with complex regional pain syndrome (both types) and PSPS type 2. Only for benzodiazepines did there seem to be a decline over the years, with a significantly decreased time trend in patients with complex regional pain syndrome type 1, fibromyalgia, and PSPS type 2.

Conclusions: During the last 11 yr, an increase in incidence of NSAIDs and acetaminophen, opioids, neuropathic agents, and muscle relaxants was observed. Only prescriptions of benzodiazepines significantly decreased over time in specific cohorts.

I-D1.W.03

INFORMATION RECEIVED BY PEOPLE PRESCRIBED OPIOIDS IN PRIMARY CARE AND THE ROLE OF COMMUNITY PHARMACIES: FINDINGS FROM A CROSS-SECTIONAL SURVEY FROM ENGLAND, UK

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Background and aims: Providing information to people when opioids are prescribed is essential, due to the high incidence of side effects and potential for harm from inappropriate use. The aim of this study was to investigate the information received from healthcare professionals when opioids are prescribed, and perspectives on information and support from community pharmacies.

Methods: A cross-sectional postal survey of adults prescribed an opioid medicine for non-cancer pain over a period of ≥3 months from ten primary care general practices located within the East Midlands region of England, UK. Data collection occurred between October 2021 and July 2022. Ethical approval was received from the UK Health Research Authority (ref 21/SC/0105).

Results: Survey responses were received from 619 patients (20.1% response rate), median age 64 years, 59.8% female. The most frequently reported information received was how to use the medicine (63.3%) and the common side effects (53.0%). The least frequently reported was how long the medicine was intended to be used for (14.8%) and the risk of dependence (20.8%). Two in five patients (38.8%) reported that it would have been useful to have more information at the start of treatment. The majority (82.3%) were happy to receive information about a medicine or health condition from a community pharmacist, and 76.0% thought a community pharmacy service providing information and support to people newly prescribed opioids could be useful.

Conclusions: These findings suggest the information provided to patients prescribed opioids may be insufficient and could potentially be improved using community pharmacies.

I-D1.W.04

OPIOID PRESCRIPTION IN A TERTIARY PAIN CENTER IN SWEDEN FOLLOWING THE COVID-19 PANDEMIC

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Background and aims: To prevent opioid crisis, many countries practice regular follow up of opioid prescription. The aim of this project is to study the number and costs of opioid prescription during five years in a tertiary pain center in Sweden during and after COVID-19 pandemic.

Methods: Data were extracted between 2019-2023 from the E-health agency in Sweden through SAS Visual Analytics. Variables: DDD (defined daily doses) of the drugs, total costs of expedited drugs without VAT. The number of patients receiving opioid prescription is also mentioned.

Results: The number of DDD opioids prescribed reduced by about forty percent. Costs of opioids decreased by more than forty percent, totally with 1,21 million Swedish Crowns (SEK). There was a dramatical decrease in prescribing of most opioid agonists (morphine, oxycodone, fentanyl, codein, ketobemidon, tapentadol), up to fifty procent to both DDD and cost. It was observed a minor decline of prescribing of methadone and tramadol. Despite the total decrease in DDD and general cost of prescribed opioids, there was a slight increase in buprenorphine, at about eleven procent. It is worth mentioning that the total number of new patients at the clinic per year has increased fifty-two percent since 2020.

Conclusions: Despite the increasing of total number of patients receiving care from our clinic, the prescription of opioids was significantly decreased. As a consequence of the reduced prescription of opioids, the costs of expenses for opioids have dramatically decreased. There is a tendency of prescribing fewer opioid agonists in favor of buprenorphine after the pandemic.

I-D1.W.05

PROPORTION OF TRUE ALLERGIC REACTIONS TO OPIOIDS IN DANISH HOSPITALS: A REGISTER-BASED STUDY WITH JOURNAL AUDIT

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Background and aims: Accurate allergy registration in electronic medical records is essential to prevent re-exposure to harmful drugs or unnecessary avoidance of safe treatments. This study aimed to describe the practice of opioid allergy registration in six Danish hospitals.

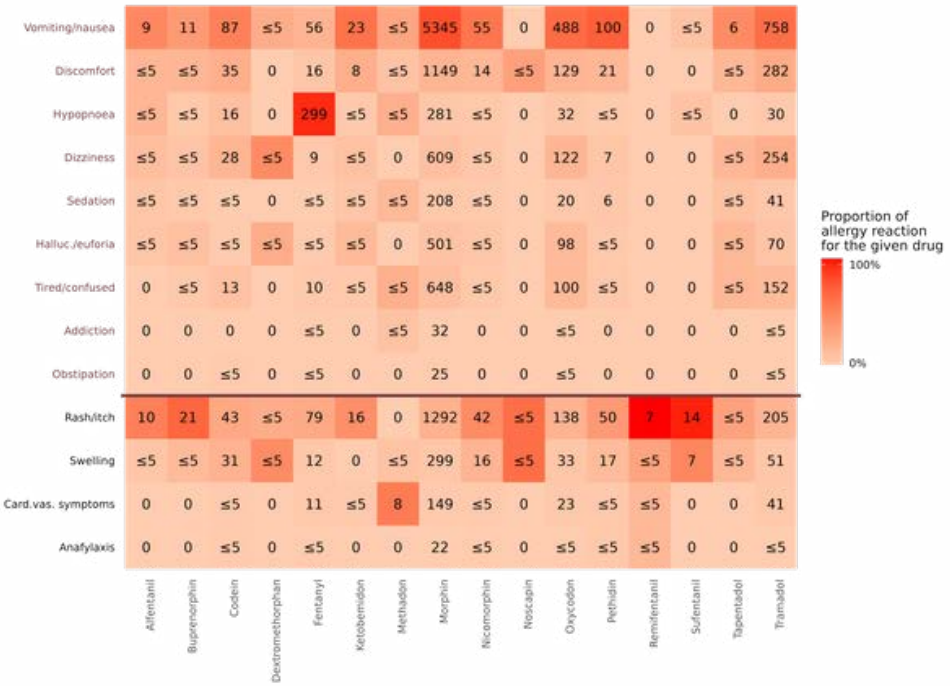
Methods: All allergy registrations related to opioids at six large hospitals in Central Denmark Region between 2020 and 2023 were included. Using text mining, allergy registrations were categorised as true or false based on predefined keywords prioritising high sensitivity. See Figure 1. Plots and tables were produced to describe trends in allergy registrations for each opioid. The algorithm was validated and qualitative details were extracted by four physicians auditing a random sample of 1% of the registrations.

Results: Of 14,661 allergy registrations, 16% were categorised as true allergies of which 68% were based only on the keywords “rash” or “itch” (Figure 1).

Registrations on morphine and tramadol each made up a larger proportion of allergy registrations than expected and were the least likely to be a true allergy (probability of 13%, Figure 2). The opposite was the case for alfentanil, fentanyl and remifentanil that made up a smaller proportion of allergy registrations than expected.

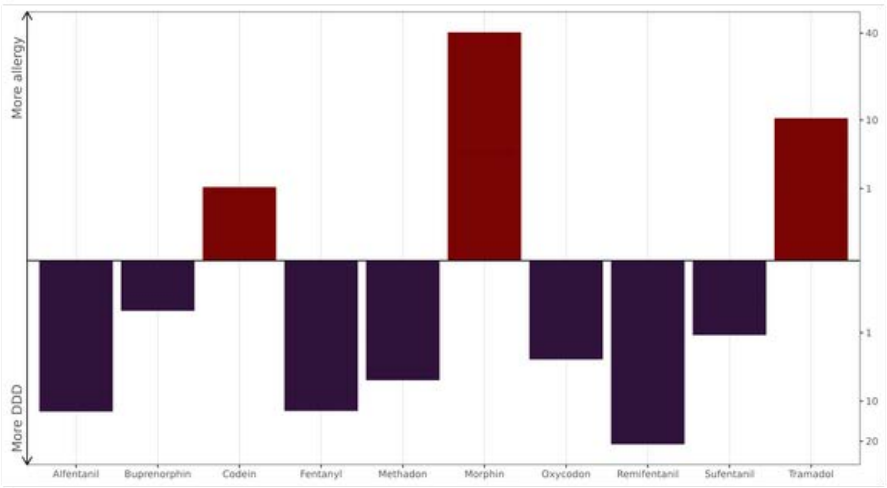
Of the 211 allergy registrations audited, 19% were true allergies.

Figure 1: Allergy description keywords for each opioid



The colour scale indicates the proportion of allergy descriptions that include the given reaction stratified by opioid. Numbers indicate the number of observations for each opioid/reaction combination. Reactions are non-exclusive. The latter four symptoms were considered indicators of a "true" allergy registration. Abbreviations: 'Halluc.', 'hallucination'; 'Card.vas', 'cardiovascular'; '/', 'and/or'.

Figure 2: Relative proportion of allergy registrations and DDD of opioids



The relative contribution to the total allergy registrations versus the total DDD for opioids in the study period. Downwards pointing bars indicate a larger proportion of the total DDD relative to the proportion of allergy registrations for all opioids.

Conclusions: A significant proportion of opioid allergy registrations may not justify the deterrence of that or other opioids, particularly when such registration is for a common orally administered opioid as opposed to opioids often administered in more specialised settings. Healthcare providers must distinguish between true allergy and (expected) adverse effects and register accordingly.

I-D1.W.06

DRUG INTERACTIONS IN PATIENTS VISITING THE CHRONIC PAIN CLINIC OF A UNIVERSITY GENERAL HOSPITAL: A RETROSPECTIVE STUDY

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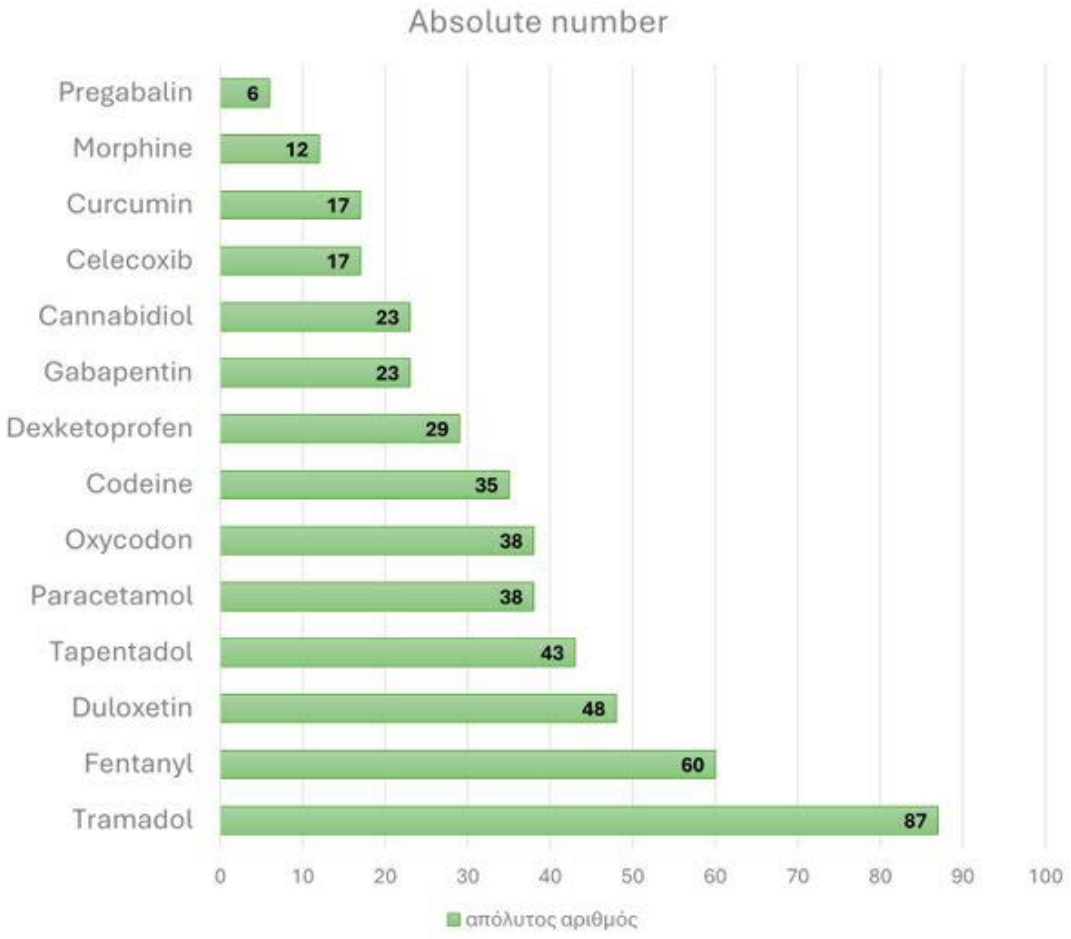
Background and aims: A substantial proportion of chronic pain patients are already prescribed multiple medications upon their initial visit to the Pain Clinic. However, managing chronic pain often necessitates the introduction of new medications, potentially heightening the likelihood of adverse effects resulting from drug interactions. The primary objective of this retrospective investigation was to analyze drug interactions among newly enrolled patients who visited the Univeristy Hospital Pain Clinic in the year 2023.

Methods: Data was collected from patient files at the pain clinic, providing a comprehensive understanding of each case. We employed Galen's interaction check tool, a reliable and widely used resource, to analyze drug interactions. Our review encompassed a comprehensive analysis of interactions between the prescribed pain relief substances, associated symptoms, and the patients' medications.

Results: In 2023, the Pain Clinic admitted 295 new patients (104 men and 191 women). All patients received medication, with a total of 419 different medicinal substances prescribed, averaging about 14 medications per patient (±6.68). We identified 984 unique drug interactions, with tramadol showing the highest occurrence of diverse interactions at 87(Figure 1 and table 1). Data analysis revealed 3606 interactions across all observed patients, averaging about 12.2 interactions per patient (±11.1). The vast majority (92.8%) of these interactions were categorized as "major," while a smaller proportion (1.58%) were identified as "contraindications to co-administration."



Drug 1	Drug 2	Percentage %
Pregabalin	Tramadol	**101** (2,8%)
Pregabalin	Tapentadol	63 (1,7%)
Codeine	Tramadol	53 (1,4%)
Pregabalin	Fentanyl	50 (1,3%)
Tramadol	Tapentadol	**47** (1,3%)
Fentanyl	Tramadol	44 (1,2%)
Fentanyl	Tapentadol	39 (1%)
Tramadol	Ντουλοξετίνη	**36** (0,9%)
Codeine	Fentanyl	36 (0,9%)
Codeine	Tapentadol	36 (0,9%)
Tramadol	Γκαμπαπεντίνη	34 (0,9%)
Duloxetine	Tapentadol	**20** (0,5%)

Conclusions: Patients seeking treatment at the Pain Clinic often display a high rate of polypharmacy. When selecting an appropriate analgesic pharmaceutical agent, it is crucial to consider potential interactions with all concurrently administered medications.

I-D1.W.07

THE SHIFT TO OXYCODONE AS PHYSICIANS' FIRST CHOICE OF OPIOIDS – TRENDS IN INCIDENCE AND PREVALENCE IN SWEDEN 2007–2022

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Background and aims: It is important to monitor how opioids are prescribed. Aggregated nationwide sales data are publicly available in Sweden, wherefrom one-year prevalence data can be retrieved. The one-year prevalence is a crude measure since it depends on prescribing habits over time for all patients currently treated. If the goal is to monitor the dynamics of prescribing habits, the incidence (ie, "new cases") is potentially of more value. The aim of the study was to describe changes over time on the use of opioids in Sweden through defined daily doses (DDD), prevalence proportion, and incidence proportion.

Methods: We applied to National Board of Health and Welfare for targeted nationwide statistics on an aggregated level by defining a suitable script. We received national quarterly statistics 2006-2022 expressed as: DDD; period prevalence; and period incidence with a run-in of 12 months.

Results: The choice of metric influences the interpretation of the dynamics of opioid prescription. During 2006-2022, DDD/1000 individuals per day decreased with 50 %, whereas the corresponding percentages for prevalence and incidence were 19 % and 13 %, respectively. There has been a dramatic shift in opioid choice; most strikingly a shift between oxycodone and tramadol. The first choice of physicians was oxycodone in 4 % of patients in 2007, increasing to 61 % in 2022.

Conclusions: DDD is not a helpful metric when analyzing shifts between opioids over time. Incidence data added little information to prevalence data. The results highlight the potential importance of monitoring prescription trends at regular intervals.

I-D1.W.08

EFFECTS OF IATROGENIC OPIOID WITHDRAWAL NESTED IN A COGNITIVE BEHAVIORAL TREATMENT FOR CHRONIC PAIN

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Background and aims: Due to concerns about long term negative effects of iatrogenic opioid use, awareness has emerged that long term use in chronic pain should be prevented. Hyperalgesia is one of main negative side effects,

causing more pain. Purpose of this study was to investigate the effects of a program for withdrawal of iatrogenic opioids nested in a cognitive-behavioral treatment (CBT) for patients with long-term opioid use for chronic pain.

Methods: In a transdisciplinairy setting a opioid withdrawal program nested in CBT pain was developed. This contained a bio-psycho-social matched care assessment, pain education including the explanation of central sensitization (CS), the negative effects of opioids on CS, a personal shared decision making withdrawal program combined with CBT-pain focussing on new coping strategies. A clinical mixed method pre- and post-measurements was conducted on opiate use, health-related quality of life (RAND-36) and a qualitative analysis using interviews on patients' experiences.

Results: A total of 29 patients were included, 23 (79 %) were no longer using opioids. Some of the rest group continued withdrawal with their GP. Quality of life increased in every domain including pain (see Table), none of the patients experienced more pain, significant less side effects where reported, the qualitative and quantitative outcome showed high satisfaction after treatment and no long term negative effects of withdrawal.

	Intake (n = 24)	After treatment (n = 16)
SF36 General health	36,75 %	36,88 %
SF36 Health changes	41,07 %	75,00 %
SF36 Physical functioning	35,00 %	45,94 %
SF36 Social functioning	41,45 %	61,72 %
SF36 Role limitations due to physical problems	50,00 %	82,14 %
SF36 Role limitations due to emotional problems	76,19 %	90,00 %
SF36 Mental health	58,00 %	65,75 %
SF36 Vitality	34,75 %	43,75 %
SF36 Pain	26,17 %	42,59 %
Satisfaction score with results of treatment (0-10)**	n.a.	8,83

Conclusions: Given the results of this study, withdrawal of opioid use nested in CBT in patients with chronic pain seems effective. There are good arguments for implementation and further research of the described treatment.

I-D1.W.09

OPIOID USE AFTER SURGICAL TREATMENT IN THE DANISH POPULATION - A REGISTER-BASED COHORT STUDY

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Background and aims: Over the past 25 years, global opioid consumption has surged, with Denmark ranking fifth worldwide. Post-surgical pain remains a key driver of opioid prescriptions, yet patterns following discharge are poorly understood. This study investigates postoperative opioid prescription patterns over one year for patients undergoing the ten most common non-cancer surgeries in Denmark.

Methods: Using Danish governmental databases from 2018, this register-based cohort study tracked postoperative opioid prescriptions redeemed at retail pharmacies quarterly. Subgroup analyses examined variations by pre-surgery opioid use, sex, age, and education. Surgical procedures and opioids were identified using NOMESCO, ICD-10, and ATC codes, with doses expressed as Oral Morphine Equivalents and percent.

Results: Our findings show a marked increase in opioid use during the first quarter post-surgery, followed by a gradual decline in subsequent quarters. Preoperative opioid users displayed higher and more prolonged postoperative use than non-users. Additionally, three surgical specialties showed no decline in opioid use over time. Female sex, older age, and lower education levels were associated with sustained opioid use.

Conclusions: These findings underscore the need for tailored interventions to reduce unnecessary opioid exposure and improve outcomes. Strategies should address prolonged use among pre-surgical opioid users and persistent use in specific surgeries while targeting sociodemographic disparities. This research aims to inform healthcare providers and policymakers about opportunities to improve pain management practices, reduce opioid dependence, and mitigate the opioid crisis effectively. The study highlights the critical role of identifying and supporting at-risk populations to promote safer, evidence-based pain management strategies.

I-D1.W.10

OPIOID STEWARDSHIP INTERVENTIONS IN ENGLISH PRIMARY AND SECONDARY HEALTHCARE: A NATIONAL CROSS-SECTIONAL SURVEY STUDY

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Background and aims: Inappropriate opioid use may cause serious patient harm such as addiction; it is therefore important to provide effective pain relief while ensuring patient safety. Opioid stewardship (OS) is a strategy that includes different interventions to support safe opioid use in pain management. Studies exploring current status of OS in Europe are limited. Therefore, this study aimed to explore OS interventions in primary and secondary healthcare settings in one European country.

Methods: A cross-sectional multicentre survey was validated and piloted, then distributed via social media, email or post to chief pharmacists at acute and foundation hospital trusts and pharmacists working at GP practices in England. Data were analysed descriptively.

Results: Overall, 89 of 423 (21%) potential participants responded. Forty-nine responses represented acute or foundation hospital trusts; 15 were from GP practices and 25 were unknown. Eight participants reported that their organisation had implemented a formal OS program with a further 50 reporting implementation of individual interventions. Thirty reported no interventions or a formal OS program were in place, and one was unsure. The top two interventions considered most important for future implementation were “providing a discharge letter” and “local policies”.

Conclusions: This study suggests the absence of formal OS programs in most surveyed primary and secondary healthcare settings in England. Although the low response rate is a potential limitation, this study provides important insight into implementation of OS and associated interventions. This may help clinicians and policy makers to assess and improve current clinical practices for safe opioid use in pain management.

D2 | NON-INVASIVE BRAIN STIMULATION FOR CHRONIC PAIN

I-D2.W.01

REPETITIVE TRANSCRANIAL MAGNETIC STIMULATION HINDERS FUNCTIONAL RECOVERY IN A SUBGROUP OF PATIENTS WITH CHRONIC LOW BACK PAIN AND CLINICAL FEATURES OF CENTRAL SENSITIZATION

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Background and aims: Exercises are recommended for chronic low back pain (CLBP) management, but its effects remain modest. This may be due because exercises may not influence brain alteration, potentially involved in chronicity. Repetitive transcranial stimulation (rTMS) can influence brain alteration, but its effects in CLBP is unsure. Considering CLBP is heterogenous, exercises and rTMS can be more effective in subgroups of patients

with specific clinical profile. The aim of this study is to determine if subgroups of patients with CLBP can best respond to exercise and rTMS.

Methods: Participants with CLBP were recruited and randomized into four groups (rTMS; sham rTMS; rTMS+exercise; sham rTMS+exercise). Participants received 10 intervention sessions over 8 weeks. Outcomes were pain intensity and disability measured at 8 weeks. Potential moderators were pain self-efficacy, kinesiophobia, "central sensitization" symptoms, "spine instability" and expectations. Potential moderators were dichotomized based on cut-off if available or median split. Exercises and rTMS were analysed separately. Linear mixed models using fixed factors Predictors (Low vs. High) and Intervention (exercise: Yes vs. No; rTMS: active vs. sham) were computed on outcomes.

Results: Participants with high "central sensitization" symptoms and receiving rTMS had higher disability compared to participants with low score and receiving rTMS (5.66[95%CI, 0.11,11.21]), and compared to participants with high score and receiving sham rTMS (-7.28[95%CI, -12.06,-2.50]).

Conclusions: Repetitive TMS prevented disability improvement in patients with CLBP and "clinical central sensitization". If confirmed, it will be imperative to strongly recommend against rTMS use in this subgroup since it may hinder recovery. No moderator for exercise was found.

I-D2.W.02

ANALGESIC EFFECTS OF REPEATED TRANSCRANIAL MAGNETIC STIMULATION IN FIBROMYALGIA PATIENTS

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Background and aims: Fibromyalgia (FM) is an idiopathic, chronic, nonarticular pain syndrome defined by widespread musculoskeletal pain and generalized tender points without a well-defined underlying organic disease. Repeated Transcranial Magnetic Stimulation is used for the treatment of psychiatric diseases The aim of the study was to investigate the beneficial effects of low frequency rTMS on pain and whether it is mediated through modulation of opioids in FM patients utilizing sucrose challenge test.

Methods: Female Fibromyalgia (FM) patients (n=86) having regular menstrual cycle were recruited from the Rheumatology Clinic; Department of Medicine, AIIMS, New Delhi, India after taking written informed consent. Age and sex matched controls were recruited from either the relatives or friends of the patients or AIIMS staff. FM patients were divided into sham rTMS and real rTMS groups randomly. Real rTMS group patients received rTMS treatment at right dorsolateral prefrontal cortex by Transcranial Magnetic Simulator (Magstim Company, UK) while Sham rTMS group received sham rTMS treatment only. Following this, 4 serial blood samples were taken at an interval of 5 minute. The results were compared between controls and Sham rTMS and Real rTMS groups patients as well pre and post treatment.

Results: The LH concentration in rTMS group decreased significantly at 10 minutes through 20 minutes post sucrose ingestion (at 10, 15 and 20 minutes respectively showing changes after rTMS).

Conclusions: The sucrose challenge test indicates that rTMS relives the pain in FM patients by the modulation of opioid system as shown in the result after rTMS treatment real rTMS treated groups of patients.

I-D2.W.03

HOW CAN INDIVIDUALIZED TRANSCRANIAL ALTERNATING CURRENT STIMULATION (TACS) MODULATE PAIN PERCEPTION?

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Background and aims: The mechanisms through which pain arises from human brain activity have not yet been unraveled. Changes in alpha oscillations, particularly an increase in low-alpha activity, have been consistently reported in those suffering from chronic pain. The main goal of this study is to assess whether there is a causal link between ongoing neural oscillations and pain perception using transcranial alternating current stimulation (tACS) neuromodulation.

Methods: We used tACS to modulate ongoing oscillatory activities measured using scalp electroencephalography (EEG). We used sustained and periodic 0.2 Hz thermonociceptive stimuli. The stimulation targeted M1 area of the contralateral dominant hand. The exact frequency of stimulation was set to the individual peak alpha frequency (PAF). A sham stimulation was used as a control condition.

Results: Data was acquired from 38 healthy volunteers. Statistical tests were performed using linear mixed models using "time" (pre vs post) and "condition" (active vs sham) as factors. In the "post" phase, we observed a significant reduction in heat pain thresholds (HPTs) compared to the "pre" phase, regardless of condition ($p<0.01$). The HPT reduction was greater for the sham condition compared to the active condition, although not significantly. Furthermore, both local and global average PAF values decreased significantly ($p<0.01$) in the two conditions, with a slightly greater reduction in the sham condition.

Conclusions: Despite no significant effect of tACS on pain perception, trends of reduced pain and smaller PAF changes in the active condition suggest lower sensitization, indicating potential for further exploration with improved experimental designs.

I-D2.W.04

DELVING INTO THE EFFECTIVENESS AND PAIN PROCESSING MECHANISMS OF AT-HOME TRANSCRANIAL ELECTRICAL STIMULATION IN CANCER PAIN—A SHAM-CONTROLLED TRIPLE-BLINDED RANDOMISED MULTICENTRE CLINICAL TRIAL

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Background and aims: Cancer pain remains a significant clinical challenge. Repeated transcranial electrical stimulation (tES)—transcranial direct current stimulation (tDCS) and transcranial alternating stimulation (tACS)—represents a promising approach for treating cancer-related pain, however with limited evidence. Our triple-blinded sham-controlled randomised multicentre study aims to evaluate the efficacy of home-based tDCS and tACS in cancer pain and explore the potential mechanisms underlying pain processing using quantitative sensory testing (QST).

Methods: 450 patients with pain due to breast, lung, pancreas, or colon cancer will be randomised to receive 15 days of at-home anodal tDCS of the left primary motor cortex at 2 mA (n=180), 10 Hz tACS of the dorsolateral prefrontal cortex (n=180), or sham tES (n=90). Pain intensity self-rated daily on a numerical rating scale is the primary outcome. Different aspects of pain (unpleasantness, catastrophising, and interference), quality of life, sleep quality, and psychological impairment will be assessed using a battery of questionnaire. Temporal summation of pain, conditioned pain modulation, and offset analgesia will be implemented via QST to determine potential pain-related biomarkers. Measurements will be conducted at baseline, immediately and three months after the intervention.

Results: We hypothesise that both tES modalities will reduce clinical pain and associated symptoms and enhance patients' quality of life, with a stronger impact of tDCS on sensory-descriptive pain dimensions while a larger effect of tACS on affective-motivational pain and psychological outcomes.

Conclusions: The methodical prospective evaluation of the treatment response and identification of biomarkers for pain processing will advance the individualisation and optimisation of tES in pain disorders.

I-D2.W.05

MODULATION OF EVENT-RELATED POTENTIALS IN FIBROMYALGIA PATIENTS THROUGH 10HZ TRANSCRANIAL ALTERNATING CURRENT STIMULATION (TACS)

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Background and aims: Fibromyalgia syndrome (FMS) is characterized by chronic widespread pain and may involve emotional dysregulation, with differences observed in event-related potentials (ERPs) during emotional

content observation. Recent studies suggest transcranial alternating current stimulation (tACS) can reduce pain symptoms and modulate brain oscillations. However, the effectiveness of these techniques is still debated due to the largely unknown neurophysiological mechanisms. This study analyzed whether ERPs triggered by affective stimuli change after tACS sessions in FMS patients.

Methods: ERPs were recorded in 40 FMS patients while they had to name the frame color of pictures displaying facial expressions (angry, painful, happy, neutral) before and after being randomly assigned to a tACS (sham or active) stimulation over the parietal lobe/right supraorbital area at 10Hz, with a 0.4mA intensity for twenty minutes while the patients remained at rest.

Results: Patients exhibited greater N170, P200, P300, and late positive potential (LPP) amplitudes after active tACS than simulated stimulation ($p<0.05$). The main significant differences were observed during the observation of neutral emotions.

Conclusions: The study demonstrates that tACS at 10Hz can significantly modulate ERPs in patients with FMS, particularly enhancing N170, P200, P300, and late positive potential (LPP) amplitudes. These changes were more pronounced during the observation of neutral emotional expressions. Additionally, active tACS significantly reduced affective pain perception and intensity, highlighting its potential therapeutic benefits. These findings suggest that tACS could be a promising intervention for FMS, though further research is needed to understand the underlying neurophysiological mechanisms and fully optimize treatment protocols.

I-D2.W.06

CAN A SINGLE 2MA TRANSCRANIAL DIRECT CURRENT STIMULATION (TDCS) SESSION ENHANCE EXERCISE-INDUCED HYPOALGESIA (EIH) COMPARED TO SHAM IN INDIVIDUALS WITH KNEE OSTEOARTHRITIS (OA)?

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Background and aims: A recent study found that a single session of anodal tDCS, a form on non-invasive brain stimulation, can enhance exercise induced hypoalgesia (EIH) during experimentally induced pain, compared to a sham condition. The effects of of such an intervention have not yet been examined in an osteoarthritis (OA) population, who exhibit more variable EIH that can lead to flares in pain, adversely affect exercise adherence and limit exercise related pain relief.

This study examined whether a single session of 2mA active tDCS over the primary motor cortex could enhance EIH compared to sham tDCS in individuals with knee OA.

Methods: A double-blind randomised controlled crossover trial was conducted with 27 participants. Each participant completed two sessions (active tDCS, sham tDCS) in random order, separated by at least seven days. Following tDCS, participants performed a standardised isometric resistance exercise. Pre-post exercise changes in pressure pain thresholds (PPT), resting knee pain, and pain during stepping were measured. Participants, intervention administrators, and outcome assessors were blinded to treatment allocation. Linear mixed regression analysis assessed between-session differences in outcomes.

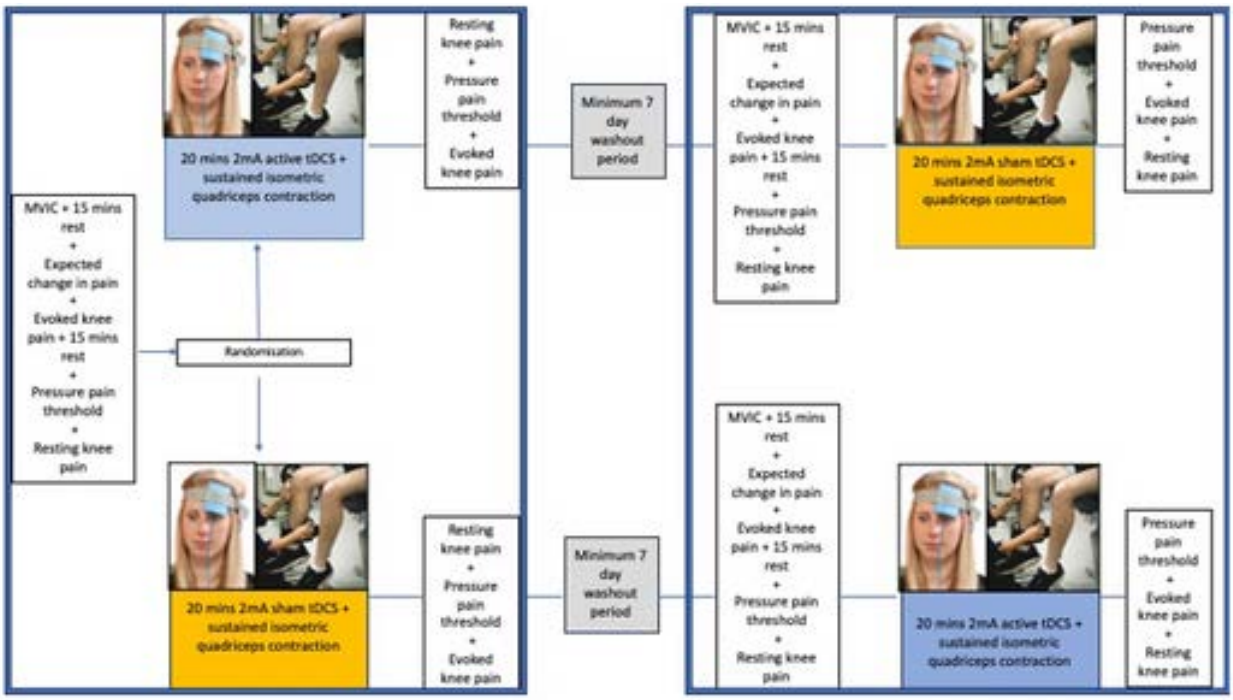

Figure 1. Experimental procedures. Following baseline measurements, participants were randomised to receive active tDCS (intervention) or sham tDCS (control). Each tDCS session for both visits lasted 20 minutes. Following the tDCS session, EIH was quantified by measuring the participant's PPTs, evoked knee pain and resting knee pain before and after performing a sustained isometric quadriceps contraction at 25% of their MVIC for five minutes, or until failure. After a minimum 7-day washout period, participants returned and performed an identical testing session but with the alternative tDCS protocol (active/sham) depending on their initial allocation. Abbreviations: PPT, pressure pain threshold; RPE, rating of perceived exertion; tDCS, transcranial direct current stimulation; MVIC, maximum voluntary contraction.

Results: All participants completed both sessions. Pre-post exercise changes in PPT, resting pain, and stepping pain were not significantly different between active and sham tDCS (all $p > 0.40$).

Conclusions: A single session of 2mA active tDCS over the primary motor cortex does not enhance EIH compared to sham tDCS in individuals with knee OA. Future studies should explore multiple tDCS sessions and investigate targeting tDCS in individuals with absent or impaired EIH.

I-D2.W.07

USING TRANSCRANIAL DIRECT CURRENT STIUMULATION TO REDUCE CHRONIC PAIN IN CLINICAL SETTING – CENTRAL SENSITIZATION AS A PREDICTOR?

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Background and aims: Transcranial direct current stimulation (tDCS) is a treatment approach used in research setting to reduce chronic pain. Although tDCS is effective on several individuals and pain conditions, it does not reduce pain in the same way for all individuals. The aim of the present study was to evaluate the effect of tDCS in a clinical setting, and to determine whether central sensitization is a predictive factor for treatment efficacy.

Methods: Ninety-one chronic pain patients (mean age 47 ± 12; range 18-72; 75 women) were recruited from the regional Pain Management Clinic of the Abitibi-Témiscamingue CISSS to receive anodal tDCS (2 mA, 20 min)

over the contralateral motor cortex. Sessions were delivered in clinic by a physiotherapist for 5 consecutive days. Pain intensity, and quality were assessed before, after and 1 month after the tDCS sessions using visual analog scales, the McGill pain questionnaire, respectively. The impact of pain on central sensitization was assessed with the Central Sensitization Inventory (CSI) before the tDCS sessions.

Results: The tDCS interventions reduced pain intensity and its qualitative aspect up to 1 month after the end of the tDCS treatments (all $p < 0.001$). Correlational analyses revealed that baseline CSI score was associated with the improvement in both pain measures post-tDCS (all $p \leq 0.03$).

Conclusions: These results suggest that tDCS can be used successfully to reduce chronic pain in clinical settings, and that the CSI could help identify the individuals most likely to benefit from this type of intervention.

I-D2.W.08

EFFECTS OF TDCS ON AFFECTIVE AND COGNITIVE PROCESSING IN HEALTHY INDIVIDUALS: PRELIMINARY RESULTS

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Background and aims: Transcranial direct current stimulation (tDCS) is a non-invasive brain modulation technique that alters neuronal excitability, showing promise in enhancing cognitive and emotional functions. However, its specific effects on distinct cognitive and emotional domains in healthy individuals remain underexplored. This study aims to investigate the neurophysiological and behavioral effects of tDCS on emotional and cognitive functions in healthy individuals, focusing on task-related changes in brain activity and performance.

Methods: A double-blind, within-subject design is being employed with 40 healthy adults (ages 18–44), with preliminary data from 8 participants analyzed. Participants undergo real and sham tDCS stimulation in randomized order, with 1.5 mA applied for 20 minutes in the real condition or briefly simulated in the sham condition. Neurophysiological data are recorded by EEG system before and after stimulation. Behavioral and ERP changes are assessed during a task requiring identification of frame colors around emotional facial expressions. With limited observations, repeated measures ANOVA was inconclusive; thus, paired samples t-tests were applied to analyze data from 8 participants.

Results: Preliminary results indicate that tDCS enhances the P1 parietal ERP component for happy facial expressions compared to both baseline (T1) and sham conditions ($p < 0.01$). P2 parietal amplitudes increase compared to baseline but not sham, with no significant N170 effects observed.

Conclusions: Preliminary findings suggest tDCS may selectively enhance cortical responses to positive emotional stimuli, particularly happiness, highlighting its potential for modulating emotional states. Ongoing data collection will clarify these effects.

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I-D2.W.09

BRAIN OSCILLATIONS EVOKED BY DEEP TRANSCRANIAL MAGNETIC STIMULATION: TARGETING THE ANTERIOR CINGULATE AND POSTERIOR INSULAR CORTICES

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Background and aims: Transcranial magnetic stimulation (TMS) combined with electroencephalography (EEG) has been used to investigate neurological conditions. Most TMS-EEG studies target superficial cortical areas using figure-of-eight coils, whereas double-cone coils allow for stimulating deeper brain structures noninvasively. This study explores TMS-evoked EEG potentials (TEPs) by a double-cone coil targeting the anterior cingulate cortex (ACC) and posterior superior insula (PSI), both implicated in pain mechanisms. The goal is to characterize responses from these regions and test their reproducibility.

Methods: Seventeen healthy participants underwent two neuro-navigated TMS-EEG sessions targeting the left ACC (ACC) and PSI (PSI) scalp projections using a double-cone coil at 90% of the minimum TMS intensity required to elicit a visual right leg contraction when stimulating motor cortex. Coil positioning: 4cm anterior to right leg cortical representation for ACC; fast-psi method for PSI. 200 stimuli with jittered intervals (2–2.5s) were delivered per target. Data quality was monitored in real time and auditory masking was applied. Data was analyzed using global mean field power, event-related spectral perturbation, and group task-related component analysis (gTRCA).

Results: Deep TEPs were recorded for both targets without adverse effects. When investigating responses from the electrodes closest to the coil position, ACC stimulation elicited stronger high-beta activity than PSI ($p<0.03$), while PSI showed higher low-beta activity than ACC ($p<0.001$). Reproducible TEP components were identified for each target using gTRCA.

Conclusions: TEPs from deep brain regions may be acquired using a double-cone coil, offering new insights into brain oscillations involving structures relevant to pain processing.

I-D2.W.10

A RANDOMIZED, SHAM-CONTROLLED TRIAL OF NAVIGATED REPETITIVE TRANSCRANIAL MAGNETIC STIMULATION (RTMS) TARGETING PARIETAL OPERCULUM IN DEEP-PHENOTYPED PATIENTS WITH COMPLEX REGIONAL PAIN SYNDROME

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Background and aims: Noninvasive brain stimulation is actively studied in Complex Regional Pain Syndrome (CRPS) when traditional methods have not provided sufficient improvement. We performed a sham-controlled, randomized, single-blind, parallel group 3-month follow-up study on the efficacy of 10-day navigated rTMS targeted to the right parietal operculum overlying the secondary somatosensory cortex (“S2”).

Methods: We performed a comprehensive assessment of 43 patients with CRPS 1 and 15 with CRPS 2 of the upper limb.

The primary outcome measure was change in the 15D Health-Related Quality of Life (HRQoL) score from baseline to one month after the end of the rTMS treatment series. Secondary outcomes were change in pain intensity and interference (Brief Pain Inventory) from baseline to 1, 2**,** and 3 month-follow-up.

Results: The 15D HRQoL total scores at baseline were clinically relevantly reduced, particularly the 15D dimensions sleep, usual activities, and discomfort. Only the dimension “usual activities” improved from baseline to the one-month control in both groups, the improvement being greater in the “S2” group ($p= 0.017$). Pain intensity decreased with time from baseline to the one-month follow-up ($p < 0.001$) similarly in both groups and stayed at the lower level for the following two months. Other parameters also improved significantly from baseline to the follow-ups, but without difference between the groups.

Conclusions: rTMS efficiently improved all outcome measures during 3-month-follow-up in all CRPS patients, slightly in favor of active “S2”

A1 | RHEUMATOID ARTHRITIS AND OSTEOARTHRITIS

II-A1.W.01

PRE- AND EARLY POSTOPERATIVE PROGNOSTIC FACTORS FOR PAIN INTENSITY AFTER TOTAL HIP ARTHROPLASTY: PRELIMINARY RESULTS OF THE HIPPROCLIPS-TRIAL

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Background and aims: This study explored pre- and early postoperative prognostic factors across biopsychosocial domains influencing pain intensity after total hip arthroplasty (THA) in individuals with hip osteoarthritis (OA).

Methods: A longitudinal prospective cohort study was conducted in individuals with hip OA undergoing THA. Measurements were taken preoperatively and at four postoperative timepoints. Candidate prognostic factors included sociodemographic and biomedical data, pain-related cognitions and emotions, traumatic experiences, mental health, social support, self-efficacy, and quantitative sensory testing. Postoperative pain intensity and changes in pre- to postoperative pain intensity (Numeric Pain Rating Scale) over a one-year follow-up were used as outcome. Multivariable regression analyses with stepwise backward selection were performed.

Results: One hundred thirty participants (median age 66.5 years; 62 females) were included. Higher levels of preoperative pain intensity, anxiety, and perceived injustice, and early postoperative fear-avoidance were associated with a higher postoperative pain intensity. Higher preoperative levels of social support and early postoperative levels of perceived injustice were associated with lower pain intensity after THA (adjusted R^2=0.17-0.25). Higher preoperative levels of fear-avoidance and social support, and lower preoperative levels of perceived stress were associated with larger reductions in pain intensity after THA. On the other hand, male gender, and higher age and preoperative cold detection thresholds at the painful hip were associated with smaller reductions in pain intensity after THA (adjusted R^2=0.18-0.28).

Conclusions: Prognostic factors for pain intensity after THA span biopsychosocial domains. While preoperative factors predict both absolute pain intensity and changes in pre- to postoperative pain intensity, early postoperative factors primarily influence absolute pain intensity.

II-A1.W.02

INSOMNIA PREVALENCE AND ASSOCIATED CHRACTERISTICS IN PATIENTS WITH OSTEOARTHRITIS: DATA FROM THE GOOD LIFE WITH OSTEOARTHRITIS IN DENMARK (GLA:D®) REGISTRY

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Background and aims: Knowledge on prevalence of insomnia and associated characteristics in patients with osteoarthritis (OA) is sparse. We assessed insomnia prevalence and associated characteristics in a large cohort of primary care patients with knee and hip OA.

Methods: We used baseline data from 8,162 knee and hip OA patients enrolled in supervised exercise therapy and patient education through the Good Life with osteoArthritis in Denmark (GLA:D®) initiative. Presence of sleep problems during the last 2 weeks ('Yes'/'No') was assessed with an entry question. Among those reporting sleep problems ('Yes'), insomnia was assessed using the Insomnia Severity Index 3-item (ISI-3) questionnaire. We categorized patients as: 'No sleep problems' ('No'); 'Sleep problems' ('Yes' + ISI-3 score <7); and 'Insomnia' ('Yes' + ISI-3 score ≥7). In addition, we compared patient characteristics stratified by sleep status.

Results: In total, 65% of patients reported sleep problems or insomnia, with 47.5% (95% CI: 46.3 to 48.6) having sleep problems and 18.0% (95% CI: 17.2 to 18.9) having insomnia, respectively. The prevalence of insomnia was 20% and 17% among hip OA and knee OA patients, respectively. Patients with insomnia were more likely to be younger, female, being obese, have lower physical activity level, have more comorbidities, have higher analgesic use and report greater pain intensity.

Conclusions: Sleep problems and insomnia are highly prevalent among primary care patients with knee and hip OA. Several patient characteristics were associated with insomnia, in particular analgesic use, higher pain intensity and comorbidities.

II-A1.W.03

TRANSCRIPTOMIC ANALYSIS OF PERIPHERAL BLOOD MONONUCLEAR CELLS REVEALS PAIN- AND INFLAMMATION-SPECIFIC GENES IN DIFFICULT-TO-TREAT RHEUMATOID ARTHRITIS PATIENTS

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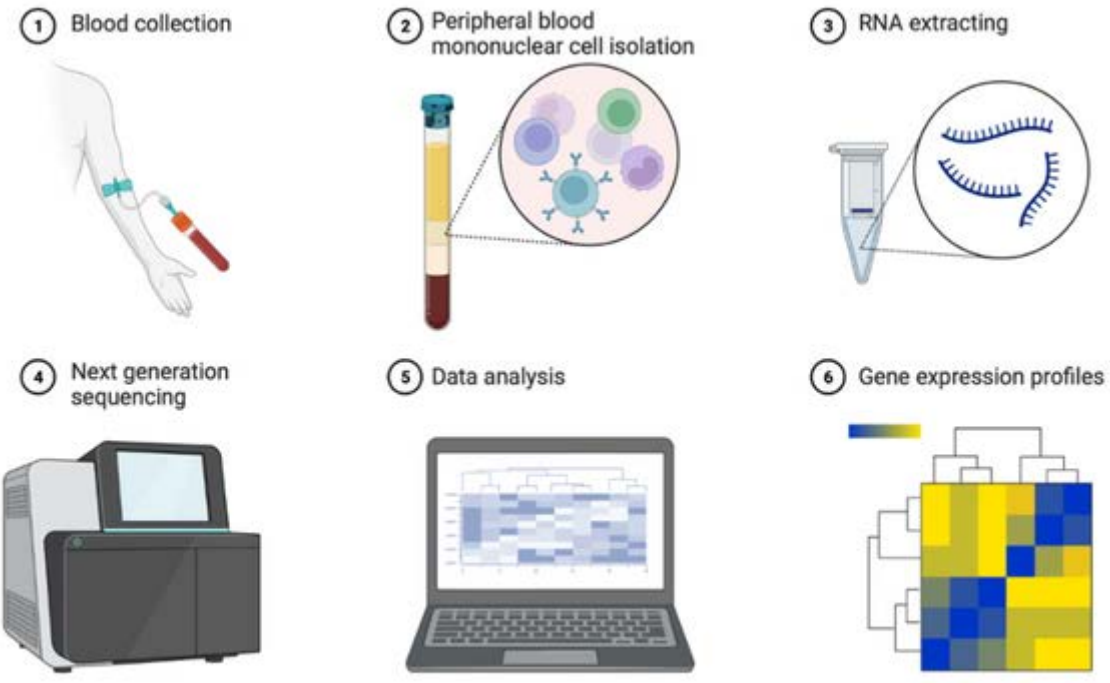
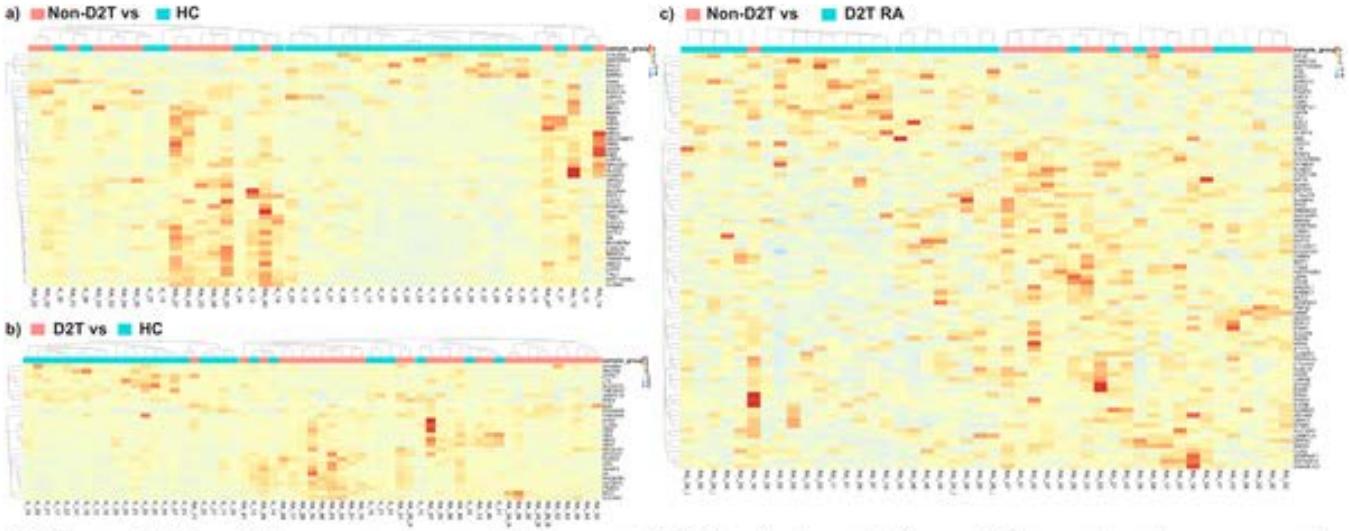
Background and aims: Several factors contribute to ongoing inflammation and/or pain in therapy-resistant, difficult-to-treat rheumatoid arthritis (D2TRA), such as structural damage, altered immune and pain processing, psycho-social and other comorbidities. Peripheral blood mononuclear cells (PBMC) reflect pathophysiological alterations in the central nervous system. Here we analyzed the PBMC transcriptomic profiles of RA patients to identify therapy resistance mechanisms and links between pain and inflammation.

Methods: Total RNA was isolated from the PBMC of clinically well-characterized 30 D2T, 18 non-D2TRA patients and 31 HCs for next-generation sequencing and bioinformatic analysis (Fig.1).

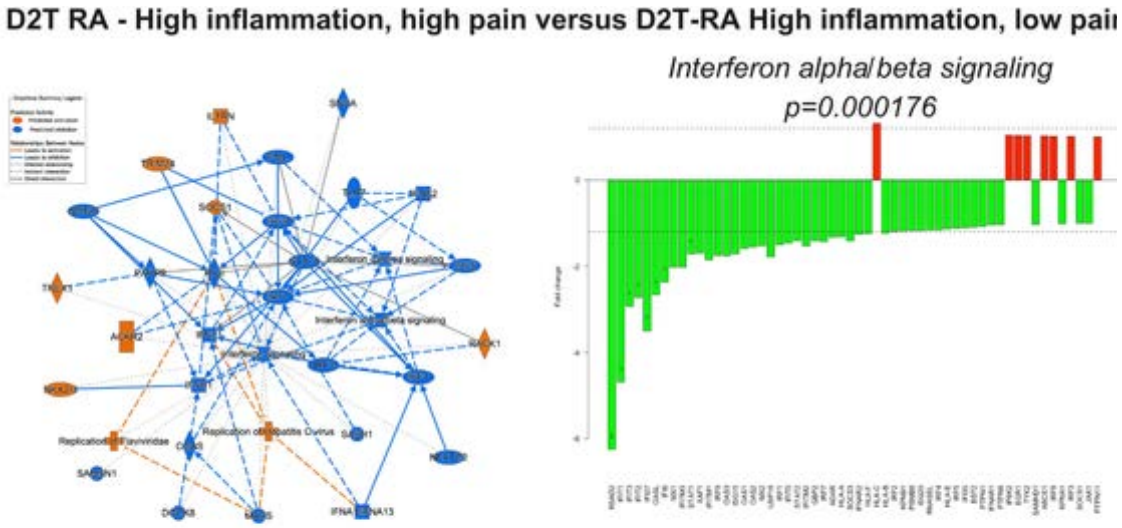


1. Figure Study design (Created with biorender.com)

Results: All RA patients exhibited significantly different transcriptomic profiles compared to HCs. In comparison with HCs non-D2TRA patients showed 8 up- and 40 down-regulated genes mainly connected to inflammation (e.g. ITGA1, CXCL5), while D2TRA expressed 8 down- and 20 up-regulated genes linked to neuroinflammation, microglial activation and pain processing besides inflammation. Comparing D2TRA and non-D2TRA, 16 up- and 66 down-regulated genes were associated with neuronal differentiation and altered synaptic signaling (e.g. NRG1 and S100B via ErbB4-signaling) (Fig.2). In D2TRA patients with high inflammation and pain, most altered genes were involved in Type-I interferon signaling (e.g. RSAD2, IFIT1, IFIT2), which were downregulated compared to high inflammation and low pain (Fig.3).



2. Figure a) Differentially expressed genes between non-D2TRA patients and HC populations, each column represents an individual patient, red rectangles represent patients and blue rectangles represent HCs. b) Differentially expressed genes between D2TRA patients and HCs, each column represents an individual patient, red rectangles represent patients and blue rectangles represent HCs. c) Differentially expressed genes between D2TRA patients and HCs, each column represents an individual patient, red rectangles represent non-D2TRA and blue rectangles represent D2TRA patients. *RA rheumatoid arthritis, HC healthy controls, D2T difficult-to-treat*



3. Figure Differences in the Type-1 Interferon signaling between high inflammation ar high pain and high inflammation low pain patient subgroups. Each bar (green – negativ red-positive) represents the difference in gene expression between the compared group *RA rheumatoid arthritis, D2T difficult-to-treat*

Conclusions: Characteristic transcriptomic alterations (e.g. ErbB4-signaling, NERG1, OXTR) suggest the involvement of neuronal hyperactivation and sensitization in D2TRA. Type-I interferon signaling seems to be connected to inflammatory pain mechanisms.

Acknowledgments: HUN-REN–PTE Chronic Pain Research Group (14017), OTKA K138046 and K131479, TKP2021-EGA-29, National Brain Research Program, Richter Gedeon PhD Scholarship (LGT)

II-A1.W.04

FUNCTIONAL MRI IDENTIFIES ALTERED PAIN-RELATED BRAIN ACTIVATION AND CONNECTIVITY PATTERNS IN DIFFICULT-TO-TREAT RHEUMATOID ARTHRITIS

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Background and aims: Despite proper inflammation and immune control, symptoms, particularly pain, often persist in rheumatoid arthritis (RA). Abnormal central nociceptive processing and stress/depression-pain interactions can cause ongoing pain in difficult-to-treat (D2T) RA. Our goal was to identify specific patterns in the pain matrix of D2TRA with functional magnetic resonance imaging (fMRI).

Methods: Two resting state fMRI measurements with standardized painful heat stimulation in between were conducted on 34 RA patients (21 D2T, 13 non-D2T) and 27 healthy controls (HCs; Siemens 3T Magnetom Prisma).

Results: Activity and functional connectivity of several pain-processing brain regions were significantly altered: the connection strength between the postcentral gyrus (PCG), middle temporal gyrus (MTG), amygdala, hippocampus, and central and parietal operculum were reduced significantly, whereas between the PCG and frontal operculum were enhanced significantly in all RA patients vs HCs. Connection strengths of several areas involved in pain processing, emotional regulation, and motivation (e.g., PCG, angular gyrus, frontal lobe (FL), and MTG) were increased in D2TRA patients. D2TRA patients with high inflammatory activity exhibited stronger connections between the PCG and other brain areas, such as FL and MTG, involved in sensory integration and depression.

Conclusions: Specific activity and functional connectivity alterations were detected in several brain areas involved in pain processing, stress coping and mood regulation, which is likely to be involved in central sensitization and therapy resistance in D2TRA.

Acknowledgments: *HUN-REN–PTE Chronic Pain Research Group (14017), OTKA K138046 and K131479, TKP2021-EGA-29, National Brain Research Program, Richter Gedeon PhD Scholarship for LGT.*

II-A1.W.05

CAN A TARGETED PRE-EXERCISE EDUCATION INTERVENTION ENHANCE THE EXERCISE INDUCED HYPOALGESIA (EIH) RESPONSE IN INDIVIDUALS WITH KNEE OSTEOARTHRITIS (OA)?

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Background and aims: Exercise-induced hypoalgesia (EIH) is inconsistent in individuals with knee osteoarthritis (OA), potentially leading to pain flares, poor adherence, and reduced exercise-related pain relief. Recent findings suggest that education about exercise's pain-relieving effects can enhance EIH in healthy populations, but this has not been tested in OA. This study investigated whether a positive pre-exercise education intervention improves the EIH response in people with knee OA compared to a neutral education intervention.

Methods: A double-blind randomised controlled trial was undertaken with a parallel design involving 42 participants, allocated into two groups - positive pre-exercise education (n=21) and neutral pre-exercise education (n=21). Each group received two 1-on-1 education sessions by a postgraduate physiotherapist, 24-72hrs apart. OA-related and exercise-related beliefs were evaluated pre and post-education. Following this, a standardised bout of isometric resistance exercise was performed and pre-post exercise change in pressure pain thresholds, resting knee pain and knee pain during stepping were measured by a blinded assessor. Two step ANCOVAs using linear regression assessed between-group differences in outcomes.

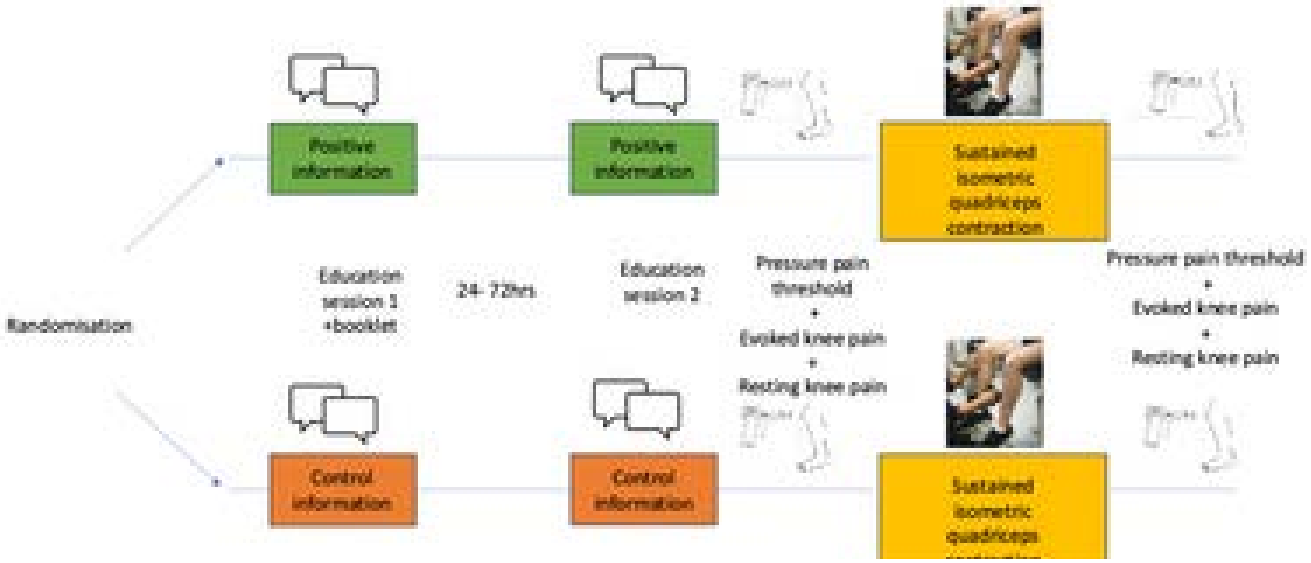

Figure 1. Experimental procedures. Participants were randomised to receive positive education about knee OA and EIH (intervention) or education about knee OA, exercise and pain (control). Each education session for both groups lasted approximately 30 minutes and participants were given a booklet to take home and read after the 1st visit. At the second visit, following the second education session, EIH was quantified by measuring the participant's PPTs, evoked knee pain and resting knee pain before and after performing a sustained isometric quadriceps contraction at 25% of their MVIC for five minutes, or until failure.

Results: There was a significant difference in the change in exercise-related (p =0.001) but not OA-related beliefs (p=0.34) post intervention, in favour of the positive education group. However, the pre-post exercise change in PPT, resting pain and pain during stepping were not different between groups (all p>0.561).

Table 3

Pre- to post-education intervention change scores in single item exercise induced hypoalgesia (EIH) beliefs and Knee Osteoarthritis Knowledge Scale (KOAKS). Values are displayed as estimated marginal means (standard error) unless otherwise stated.

Measure	Intervention Group	Control Group	Between Group Difference (95% CI)	*t*	(df)	*p*-value
EIH beliefs (0-7)	2.1 (0.3)*	0.8 (0.3)*	1.3 (0.5, 2.1)	3.49	(36)	0.001
KOAKS (11-55)	0.9 (0.7)	-0.1 (0.7)	1 (-1, 3)	0.97	(35)	0.34

Abbreviations: CI, Confidence Interval; EIH, Exercise Induced Hypoalgesia; KOAKS, Knee Osteoarthritis Knowledge Scale; SE, Standard Error. *represents significant within group change from pre-to post-intervention p<0.05.

Table 3

Primary and secondary outcome measures across the intervention and control group. Pre- and post-intervention values are displayed as mean (standard deviation) or median (interquartile range), while change scores are estimated marginal means (standard error) or median (interquartile range).

Measure	Intervention group	Control group	Between group Difference [95% CI]	*t* (df)	*p*-value
Knee PPT					
Pre-intervention (kPa)	317 (231)	241 (177)			
Post-intervention (kPa)	370 (266)*	291(167)*			
Absolute change (kPa)	60 (20)	40 (20)	10 [-40, 60]	0.57 (35)	0.57
Relative change (ratio)	1.24 (0.07)	1.24 (0.07)	0 [-0.2, 0.19]	-0.04 (35)	0.97
Forearm PPT					
Pre-intervention (kPa)	281 (103)	315 (140)			
Post-intervention (kPa)	309 (205)	319 (152)			
Absolute change (kPa)	10 (10)	20 (10)	-10 [-50, 30]	-0.60 (35)	0.56
Relative change (ratio)	1.07 (0.08)	1.09 (0.08)	0 [-0.3, 0.2]	-0.13 (35)	0.90
Resting Pain (0-100 NPRS)					
Pre-intervention	11.48 (13.32)	8.05 (11.07)			
Post-intervention	9.95 (14.71)	12.95 (18.62)			
Change	-2 (3)	6 (3)	-8 [-18, 2]	-1.65 (35)	0.11
Evoked Pain (0-100 NRPS)					
Pre-intervention	15.14 (17.69)	12.19 (11.87)			
Post-intervention	11.67 (21.05)	9.00 (11.32)			
Change	-3 (3)	-4 (3)	1 [-7,8]	0.13 (35)	0.90

Abbreviations: CI, Confidence Interval; kPa, Kilopascals; NPRS, Numeric Pain Rating Scale; PPT, Pressure Pain Threshold.*represents significant within session change from pre-to post-intervention p<0.05

Conclusions: Despite successfully modifying exercise related beliefs compared to neutral pre-exercise education, positive pre-exercise education did not enhance the EIH response in people with knee OA. Higher dose interventions may be required to successfully modify OA-related beliefs.

II-A1.W.06

WHAT KEY CLINICAL, PSYCHOLOGICAL AND NEUROPHYSIOLOGICAL FACTORS ARE ASSOCIATED WITH THE MAGNITUDE OF EXERCISE INDUCED HYPOALGESIA (EIH) IN INDIVIDUALS WITH KNEE OSTEOARTHRITIS (OA)?

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Background and aims: Exercise-induced hypoalgesia (EIH) responses in individuals with knee osteoarthritis (OA) are highly variable, potentially exacerbating pain flares, limiting adherence, and reducing pain relief. This study aimed to identify clinical, psychological, and neurophysiological factors associated with EIH magnitude in individuals with knee OA.

Methods: This cross-sectional study included 119 participants (mean age 67.5±9.5) with knee OA who underwent baseline clinical tests, psychological assessments (e.g., anxiety, depression, catastrophizing, expectations), and pain sensitization measurements using quantitative sensory testing. Pressure pain thresholds (PPT) at the knee (local EIH) and contralateral forearm (remote EIH) were assessed before and after isometric resistance exercise. Linear regression and mixed regression models were used to identify predictors and evaluate variance components in EIH.

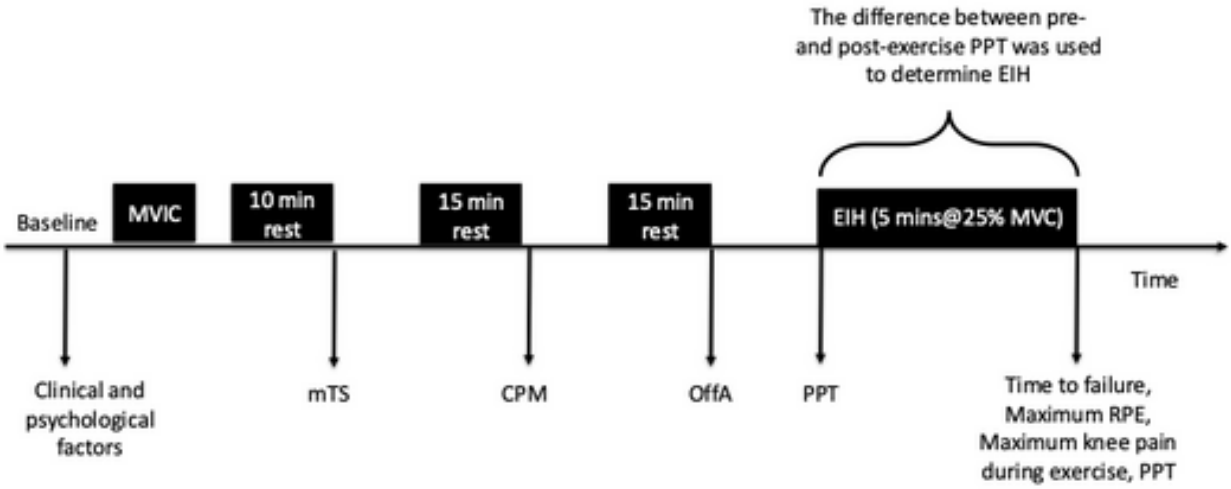
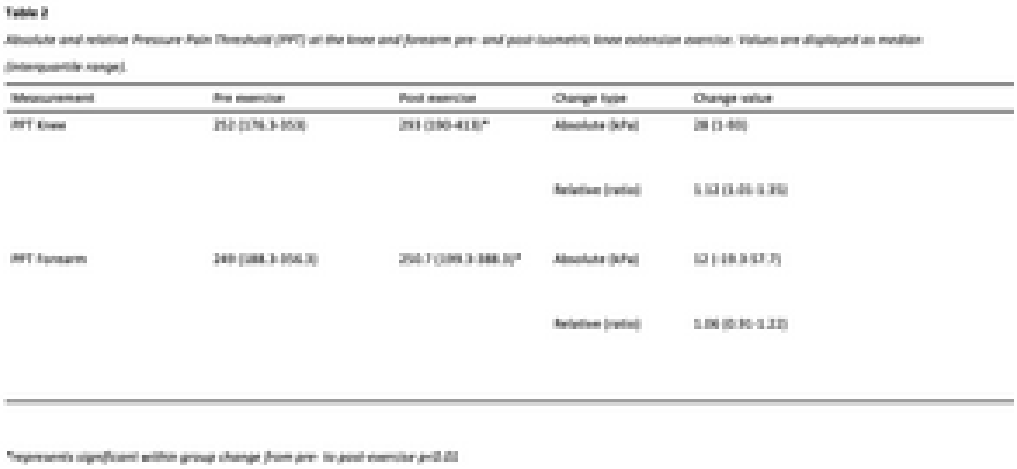


Figure 1. Experimental protocol. Abbreviations: CPM, conditioned pain modulation; CSI; Central Sensitisation Inventory; EIH, exercise induced hypoalgesia ExBelief, Beliefs About Exercise and Pain; HADS, Hospital Anxiety and Depression Scale; OffA; Offset Analgesia; PCS, Pain Catastrophizing Scale; TSK, Tampa Scale for Kinesiophobia; mTS, mechanical temporal summation; MVIC, maximum voluntary isometric contraction; PPT, pain pressure threshold; RPE, rating of perceived exertion.

Results: EIH magnitude was significantly greater at the knee than at the forearm ($p < 0.01$), with substantial individual variability. No change or hyperalgesic responses were observed in 23% (knee) and 40% (forearm) of participants. Older age, lower anxiety, and lower expected increases in knee pain were associated with greater EIH (all $p < 0.05$) but explained < 20% of the variance. Unobserved participant-level factors accounted for the largest proportion of variance (45-47%), leaving substantial residual variance (36-40%).



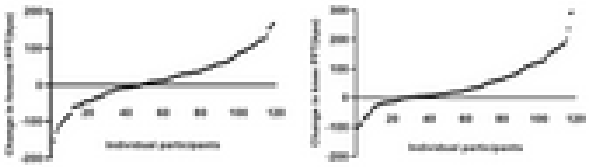


Figure 2. Distribution of the absolute change in knee pressure pain thresholds from pre- to post-isometric exercise of the quadriceps (i.e. the EIH response) for individual participants at the forearm (remote site, n=113; left plot) and at the knee (local site, n=113; right plot), ordered from the most hypoalgesic (left) to the most hypoalgesic (right) response. The pre- to post-isometric exercise change in pressure pain thresholds ranged from -248 kPa to 164 kPa at the forearm (remote site), with no change or a hyperalgesic response in 48/113 (42.5%) individuals. Similarly, the pre- to post-isometric exercise change in pressure pain thresholds ranged from -104 kPa to 388 kPa at the knee (local site), with no change or a hyperalgesic response in 25/113 (22.6%) individuals.

Conclusions: Older age, lower anxiety, and reduced pain expectations are linked to greater EIH, suggesting that addressing anxiety and expectations may enhance EIH in knee OA. However, unexplained variance highlights the need for further research on individual differences in EIH across exercise paradigms.

II-A1.W.07

EFFECTS OF EXERCISE AND PAIN NEUROSCIENCE EDUCATION ON SENSITIZATION IN PATIENTS WITH CHRONIC PAIN AFTER TOTAL KNEE ARTHROPLASTY. SECONDARY ANALYSIS FROM A RANDOMIZED CONTROLLED TRIAL

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Background and aims: Chronic pain after total knee arthroplasty (TKA) is affecting approx. 15-20% of patients after surgery. Evidence-based treatments are lacking and the mechanisms behind chronic pain after TKA are largely unknown. The aim of this study was to evaluate the impact of neuromuscular exercises and/or pain neuroscience education (PNE) on pain mechanisms in patients with chronic pain after TKA.

Methods: A secondary analysis of a randomized controlled trial was conducted. Patients with chronic pain for more than 1-year after TKA were allocated to receive either neuromuscular exercise and PNE or PNE alone. Outcomes reported were pressure pain thresholds, temporal summation of pain and conditioned pain modulation. Assessments were conducted at baseline, 3, 6, and 12 months. An intention-to-treat analysis using a mixed linear regression model was conducted.

Results: Sixty-nine patients (40 females, mean age 67.2 years) with chronic pain for approx. 3-years were included. A significant between-group difference in change from baseline to 12-months for temporal summation of pain in favor of the neuromuscular exercise and PNE group (-1.45, 95% CI -2.48 to -0.42, P= 0.006) was observed. Hence, lower pain intensity during the assessment of temporal summation of pain was experienced in the neuromuscular exercise and PNE group. No other significant between-group differences were observed.

Conclusions: Temporal summation of pain was significantly improved in the neuromuscular exercise and PNE group, illustrating a reduction of the central amplification of pain.

II-A1.W.09

INVOLVEMENT OF IL-16 IN TNF-A-INDUCED INFLAMMATORY PAIN

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Background and aims: Besides their outstanding role in the immune response, different cytokines exert important effects in the modulation of nociception. We have recently described the functional role of IL-16 in inflammatory

hypernociception, suggesting its interest as a potential target to counteract inflammatory pain. Now we are studying pain mechanisms in which IL-16 could be involved. Among the several implications of TNFα, the association to hyperalgesic responses is well-known. TNFα is an important mediator of cell recruitment and activation, potentially driving local tissue damage. Our aim is to investigate the possible role of IL-16 in the hyperalgesic effect evoked by TNFα.

Methods: We used intraplantar injections of TNFα in Swiss CD-1 male mice, either with subcutaneous administration of an antagonist of TNFα (R7050) or an antibody against IL-16. Unilateral hot plate (UHP) and Von-Frey test were used to study thermal hyperalgesia and mechanical allodynia respectively. ELISA and qRT-PCR were used within treated paws.

Results: After injecting TNFα (100 ng) we observed thermal hyperalgesia detected by UHP. As well, we noticed that both R7050 and the antibody against IL-16 prevented the hyperalgesic effect. Moreover, TNFα produced mechanical allodynia that was reverted using the antibody against IL-16. We also found that IL-16 protein was increased in the TNFα-treated paws, although 2h of TNFα treatment was not enough to observe an increase in IL-16 mRNA.

Conclusions: IL-16 is involved in the hyperalgesia and allodynia observed after TNFα injection. New experimental settings upstream IL-16 are being carried out to further study this pathway.

Funding: IUOPA; PI22/00559 Instituto de Salud CarlosIII.

II-A1.W.10

EXPLAINING PAIN VARIANCE IN RHEUMATOID ARTHRITIS: CENTRAL ASPECTS OF PAIN (CAP) AND CENTRAL SENSITISATION INVENTORY SHORT FORM (CSI-9) QUESTIONNAIRES COMPARED, TOGETHER WITH INFLAMMATION AND QST

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Background and aims: The Central Aspects of Pain (CAP) and Central Sensitization Inventory short form (CSI-9) capture sensory and emotional experiences as proxy measures for central pain hypersensitivity. Although designed differently, the questionnaires overlap. We aimed to assess CAP and CSI-9 ability to explain self-reported pain, combined with inflammation and other measures of central pain hypersensitivity in adults with Rheumatoid Arthritis (RA).

Methods: Adults with RA and pain completed CAP, CSI-9, and questionnaires addressing pain severity. They also underwent quantitative sensory testing (QST; Pressure Pain detection Thresholds (PPT), Temporal Summation (TSP), and Conditioned Pain Modulation (CPM)), and swollen joint count (SJC) and C-reactive protein (CRP) inflammation assessments. Pain now, average pain and strongest pain over the past 4 weeks, were summated and used as the primary outcome. Bivariate and multivariable linear regression modelled contributions to pain from CAP/CSI-9, QST and inflammation indices.

Results: 380 people were from Nottinghamshire, London, Cardiff (73% female, median age: 63y, CAP: 9/16, CSI-9: 21/100, pain: 18/30. CAP correlated with CSI-9 (rho=0.66). CAP and CSI-9 were significantly associated with pain but not QST. Pain variance was explained by CAP (32%), CSI-9 (31%), inflammation (SJC and CRP: 7%), or QST (5%; Table 1). CAP or CSI-9 plus inflammation, QST, age, sex and BMI explained 47% (CAP) or 32% (CSI-9) of pain (Table 2).

Table 1. Univariable linear regression models of associations between Central Aspects of Pain (CAP) or Central Sensitization Inventory short form (CSI-9) scores and pain.

	B	**SE**	**p-value**	**R^2**
CRP	0.19	0.08	0.019	0.06
SJC	0.20	0.08	0.012	0.07
CAP	0.57	0.05	<0.001	0.32
CSI-9	0.49	0.05	<0.001	0.31
PPT TA	-0.14	0.08	0.070	0.04
TSP	0.17	0.08	0.027	0.05
CPM	-0.17	0.08	0.030	0.05

B: Standardised beta coefficient; **CAP**: Central Aspects of Pain; **CPM**: Conditioned Pain Modulation; **CRP**: C-reactive protein; **CSI**: Central Sensitization Inventory short form; **PPT TA**: Pressure Pain detection Threshold at the Tibialis Anterior; **TSP**: Temporal Summation of Pain; **QST**: Quantitative Sensory Testing; **SE**: Standard Error

Table 2. Multivariable linear regression models of associations between Central Aspects of Pain (CAP) or Central Sensitization Inventory short form (CSI-9) scores and pain.

	CAP (n=343 R^2=0.47 P<0.001)			**CSI-9 (n=92, R^2=0.32 P<0.001)**		
	B	**SE**	**p-value**	**B**	**SE**	**p-value**
CRP	0.01	0.7	0.842	0.076	0.07	0.336
SJC	0.03	0.7	0.623	0.13	0.08	0.091
CAP or CSI-9	0.49	0.8	<0.001	0.32	0.08	<0.001
PPT TA	-0.07	0.7	0.347	-0.06	0.08	0.483
TSP	0.09	0.7	0.176	0.07	0.08	0.347
CPM	-0.14	0.7	0.036	-0.14	0.08	0.071

Full models include CAP or CSI-9, inflammation (SJC and CRP), QST (PPT tibialis anterior, TSP, CPM), age, sex and BMI. Sex was also significant for CAP (β (SE) = 0.14 (0.07), p=0.048) and CSI-9 (β (SE) = 0.16 (0.08), p=0.045). Age and BMI were not significantly associated with CAP or CSI-9.
B: Standardised beta coefficient; **CAP**: Central Aspects of Pain; **CPM**: Conditioned Pain Modulation; **CRP**: C-reactive protein; **CSI**: Central Sensitization Inventory short form; **PPT TA**: Pressure Pain detection Threshold at the Tibialis Anterior; **TSP**: Temporal Summation of Pain; **QST**: Quantitative Sensory Testing; **SE**: Standard Error

Conclusions: CAP and CSI-9 explain some pain variance, but neither is associated with QST evidence of pain hypersensitivity in people with RA. Both questionnaires may reflect central nervous system contributions not captured by QST.

A2 | HEADACHE AND OROFACIAL PAIN

II-A2.W.01

RESTING-STATE FUNCTIONAL CONNECTIVITY ALONE IS NOT A REPRODUCIBLE BIOMARKER FOR PREDICTING THE EFFICACY OF CGRP-ANTIBODY THERAPY IN MIGRAINE PATIENTS WHEN USING A RIGOROUS METHODOLOGICAL APPROACH

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Background and aims: CGRP-mAbs are migraine-specific preventive medications with good tolerability and efficacy. Clinical studies have shown, one fourth of people with migraine experience more than 75% reduction in headache days (excellent responders), while another 25% do not respond (less than 25% reduction). BIOMIGA is a European multicentre trial aimed at identifying predictors of response to CGRP-mAbs. Here we focus on neuroimaging data, which were acquired among other clinical biomarkers. Data stem from 144 patients from three sites before and under treatment with Erenumab compared to 62 controls.

Methods: We used resting-state fMRI data from one of the three sites (55 patients, 17 controls) to generate hypotheses for MR-specific preregistration (clinicaltrials.org: NCT06633484) aiming to validate results with data from the two other sites (89 patients, 45 controls). Several measures of functional connectivity, e.g. local (within a brain region) and global (between regions) connectivity were estimated with the CONN toolbox. Primary outcome was prediction of headache reduction by local connectivity in temporal fusiform and occipital cortex. Secondary outcomes evaluated the alterations before and under treatment and the comparison to controls.

Results: We found no reproducible predictors of headache reduction. However, we validated an alteration of local connectivity between subjects with migraine and controls in the bilateral Lingual Gyrus and left Postcentral Gyrus (both cluster-size FDR-corrected $p<0.05$).

Conclusions: Functional connectivity changes alone cannot serve as a biomarker for Erenumab treatment efficacy prediction, as results are not reproducible. The alterations between subjects with migraine and healthy controls deserve further investigation with different methodological approaches such as graph theoretical analysis.

II-A2.W.02

ROLE OF INTERLEUKIN-6 IN MIGRAINE CHRONIFICATION AND SUGGESTED TH17/ REGULATORY T CELL IMBALANCE IN MIGRAINE PATHOPHYSIOLOGY

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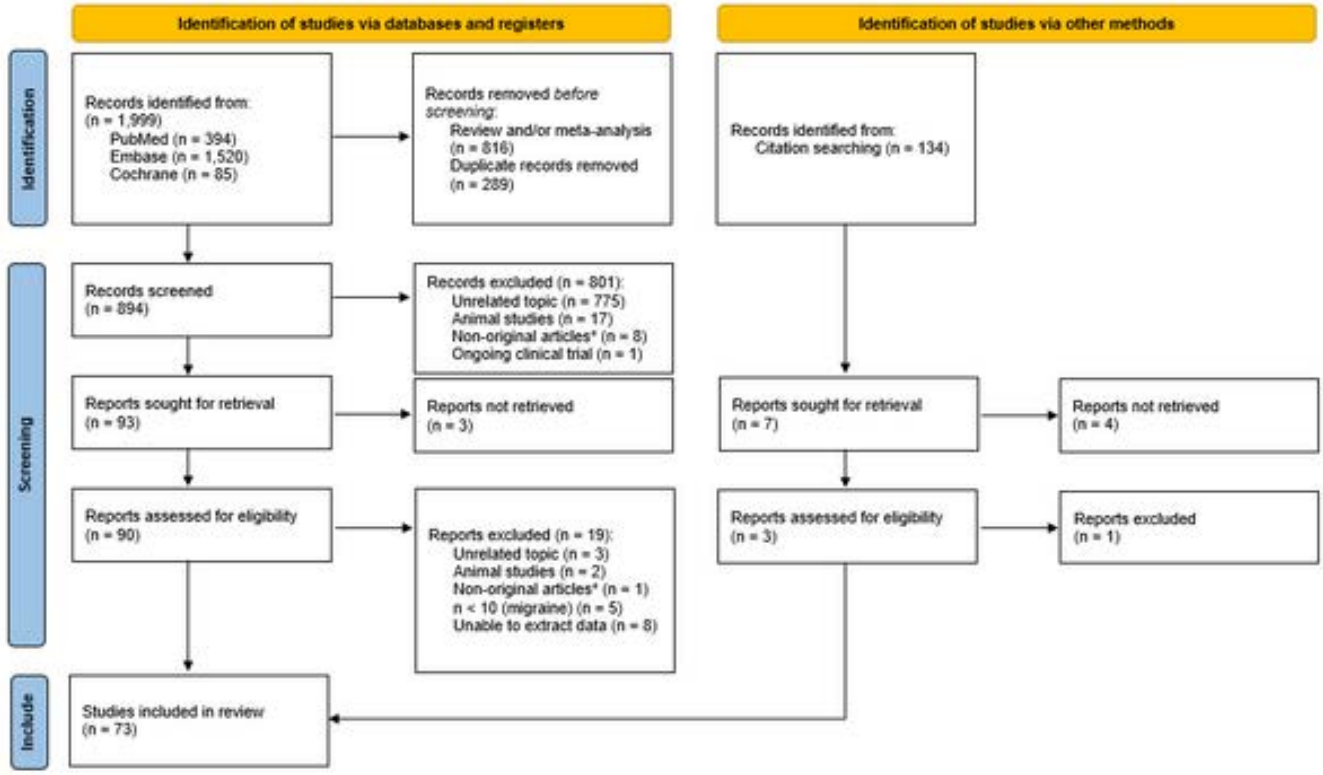
Background and aims: The pathogenesis of migraine remains unclear; however, substantial evidence supports the hypothesis that neuroinflammation plays a key role. Several studies have analysed the levels of peripheral cytokines in migraine patients; however, they are heterogeneous and provide conflicting results. Therefore, we aim to clarify the current state of knowledge regarding the role of cytokines in migraine and its chronification.

Methods: We performed a systematic literature review in PubMed, Embase and Cochrane using systematic search algorithms. Animal studies, publications with less than 10 migraine subjects, reviews, letters, case reports, and publications written in other than English or French were not included in our analysis. Reviews and references were screened for extra publications.

Results: We identified 1,999 publications, of which 71 were selected. Two extra publications were added *via* citation screening. A total of 73 publications were included in our review for qualitative and meta-analysis (**Fig. 1**). IL-6 levels were significantly increased in the peripheral blood of adults with chronic *versus* episodic migraine

and in the peripheral blood and saliva of adults during *versus* outside an attack (qualitative and meta-analysis). Peripheral blood levels of Transforming Growth Factor-beta (TGF-b) were also increased in adults with migraine *versus* controls (qualitative analysis); so were the levels of chemokines such as ADP, C-C motif Ligand (CCL) 2 and CCL3 (meta-analysis) (**Fig. 2 and 3**).



*Reviews, meta-analyses, letters, conference papers, case reports or books

Figure 1: Preferred Reporting Item for Systematic reviews and Meta-Analyses (PRISMA) flow diagram of study selection.

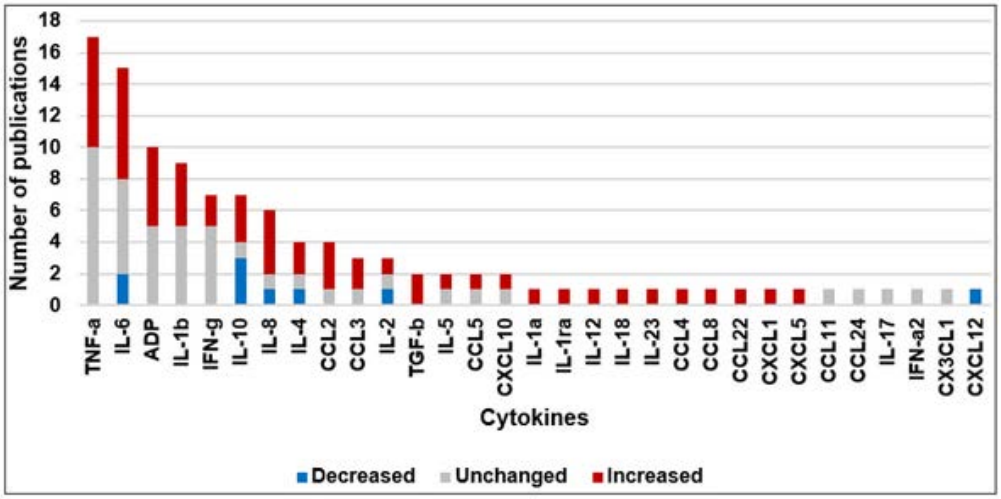


Figure 2: Qualitative analysis of cytokine levels in migraine patients and control participants. This figure displays the relative cytokine levels (*x* axis) in the peripheral blood of adult patients with spontaneous migraine compared to non-migraine control participants, and the number of publications involved for each cytokine (*y* axis). Publications showing decreased, unchanged and increased cytokine levels are represented in blue, grey and red, respectively. ADP: adiponectin, CCL: C-C motif Ligand, CXCL: C-X-C motif Ligand, CX3CL: C-X3-C motif Ligand, IFN: interferon, IL: interleukin, TGF-b: Transforming Growth Factor-beta, TNF-a: Tumor Necrosis Factor-alpha

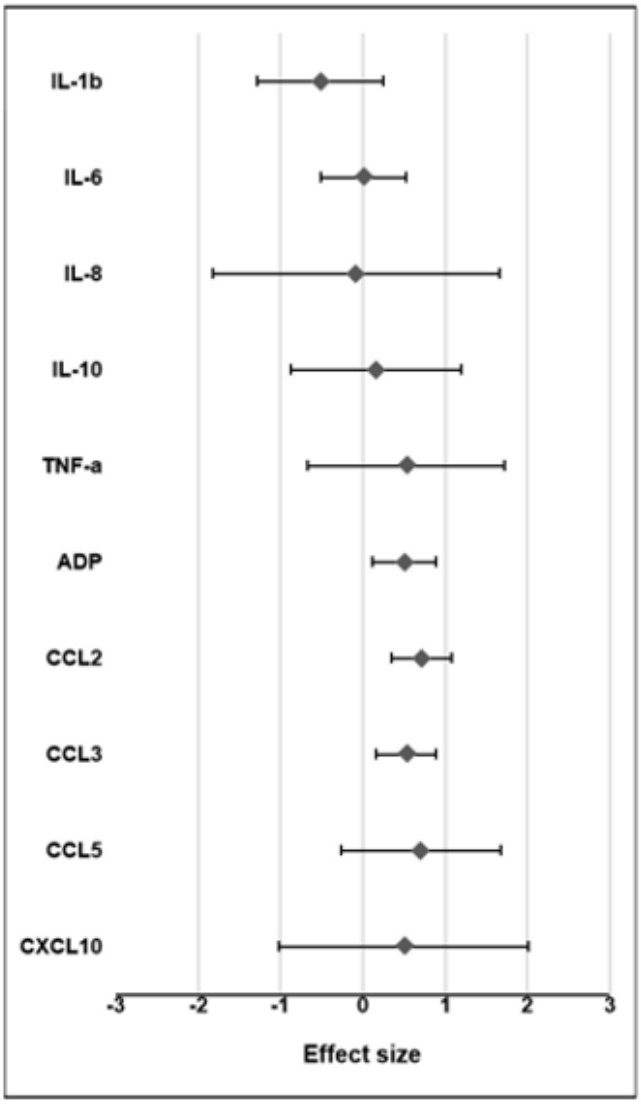


Figure 3: meta-analysis of cytokine levels in migraine patients and control participants. This figure represents the meta-analysis of the cytokine levels in the peripheral blood of adult patients with spontaneous migraine compared to non-migraine control participants (*x* axis), and the effect size for each cytokine (*y* axis). Values are represented as mean (diamond) and 95% confidence interval. ADP: adiponectin, CCL: C-C motif Ligand, CXCL: C-X-C motif Ligand, IL: interleukin, TNF: Tumor Necrosis Factor

Conclusions: Our literature review suggests that IL-6 may be involved in the chronification of migraine rather than its triggering. Increased levels of IL-6 and TGF-b also suggest a Th17/Regulatory T cell imbalance in migraine pathophysiology.

II-A2.W.03

CONTRIBUTION OF THE SATELLITE GLIAL CELLS IN PACAP-INDUCED MIGRAINE-LIKE SYMPTOMS

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Background and aims: PACAP (pituitary adenylate cyclase-activating polypeptide) has emerged as a key mediator in migraine, but its mechanism remains unknown. The aim of this study is to assess the contribution of the trigeminal satellite glial cells (SGCs) in PACAP-induced migraine.

Methods: Using behavioral testing and measurement of intracellular cyclic adenosine monophosphate (cAMP)

concentration in living cells of female rats, we investigated the effects of repeated systemic administration of PACAP38 on changes in cephalic cutaneous mechanical sensitivity and the potential impact of PACAP38 on cAMP levels in cultured SGCs derived from rat trigeminal ganglion.

Results: Repeated injection of PACAP38 induces a persistent cephalic mechanical hypersensitivity, a reliable model for headache. Interestingly, incubation of cultured rat SGCs with graded concentrations of PACAP38 provokes a dose-dependent increase of intracellular cAMP levels. Pre-treatment with M65 or PACAP6-38, antagonists of PACAP receptor type 1 (PAC1) and PAC1/vasoactive intestinal polypeptide (VIP)/PACAP receptor type 2 (VPAC2) respectively, inhibits the PACAP38-induced elevation of cAMP in a concentration-dependent manner. In contrast, blocking VIP/PACAP receptor type 1 (VPAC1) with PG97-269 does not affect the PACAP38-induced cAMP production.

Conclusions: PACAP triggers migraine-like symptoms by increasing intracellular cAMP levels in trigeminal SGCs.

II-A2.W.04

DECREASED INTRACORTICAL INHIBITION IN PATIENTS WITH HEMIPLEGIC MIGRAINE – A TRANSCRANIAL MAGNETIC STIMULATION (TMS) STUDY

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Background and aims: Neuronal hyperexcitability might have a pivotal role in hemiplegic migraine (HM) pathogenesis. Cortical excitability of the motor cortex can be assessed by transcranial magnetic stimulation (TMS). The aim of this study was to investigate intracortical inhibitory and facilitatory networks in HM patients using single- and paired-pulse TMS applied to the motor cortex.

Methods: Single- and paired-pulse TMS paradigms were used to assess MP, CSP, short-interval intracortical inhibition (SICI), long-interval intracortical inhibition (LICI), and intracortical facilitation (ICF). 12 HM patients including four patients with a ATP1A2 mutation (FM2), three patients with a SCN1A mutation (FHM3) and five patients with no identified mutation, and 26 healthy volunteers participated in this study.

Results: Between attacks, patients exhibited shorter cortical silent period duration, decreased SICI and LICI which indicate a decrease of inhibitory mechanisms. The altered cortical inhibition predominated on the hemisphere usually affected by attacks regarding SICI. Intracortical facilitation was normal in HM patients. Two patients were also examined during a migraine attack that had begun 24 hours before. No motor evoked potential could be elicited by stimulation of the affected hemisphere in both patients.

Conclusions: Our study suggests that a dysfunction of cortical inhibition, involving both GABA-A and GABA-B receptors, may play a crucial role in the pathogenesis of HM. In contrast, our results do not support the hypothesis of an increased glutamatergic neurotransmission. The ictally unexcitable motor cortex may be consistent with the slower phase of electrical silence of cortical cells of an underlying cortical spreading depression (CSD).

II-A2.W.05

CLINICAL CASE OF REFRACTORY CHRONIC MIGRAINE TO BOTULINUM TOXIN TYPE A AND MONOCLONAL ANTIBODIES

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Background and aims: Despite the available migraine prophylactic medications, some patients remain resistant. Here, we present a case of a patient with chronic migraine unresponsive to botulinum toxin type A and monoclonal antibodies therapy.

Methods: A 30-year-old male without comorbidities reported dull headaches in the forehead area (VAS 5) and insomnia since 2017. Headaches occurred 13-16 times a month, lasting several hours without treatment. He reported no nausea, vomiting, phonophobia, photophobia, or eye redness. Initially diagnosed with tension-type

headache, he was prescribed mirtazapine, but the pain persisted, leading to a referral to a headache specialist.

Results: In January 2021, he presented to our center, taking mirtazapine 45mg. Diagnosed with tension-type headache with insomnia, he was prescribed gabapentin (total daily dose: 1500mg). Pain intensity decreased (VAS 3) within months, and cognitive-behavioral therapy was recommended. By August 2021, pain worsened (VAS 6), and chronic migraine with insomnia was suspected; mirtazapine and gabapentin were discontinued. Various treatment options were discussed, and the patient chose to proceed with botulinum toxin type A injections (PREEMPT protocol), performed three times with no relief. Subsequent treatments with 5 injections each of fremanezumab and erenumab also proved ineffective. In September 2022, still experiencing pain (VAS 4), he was prescribed metoprolol (total daily dose: 125mg). This treatment finally resulted in complete pain relief.

Conclusions: This case underscores the complexity of treating refractory headaches and highlights the importance of first-line medications for patients with chronic migraine.

II-A2.W.06

PURPLE CORN ANTHOCYANINS PREVENT THE PROGRESSION OF MULTIPLE SCLEROSIS-ASSOCIATED TRIGEMINAL PAIN: ROLE OF GLIAL CELLS

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Background and aims: Dietary components, including anthocyanins (ACNs), prevent chronic diseases through antioxidant, anti-inflammatory and neuroprotective effects. We demonstrated the anti-allodynic effect of purple corn ACNs in an animal model of trigeminal sensitization, through the inhibition of microglia activation and of pro-inflammatory mediators.

Our aim was to verify whether ACN-enriched purple corn exerts beneficial effects on multiple sclerosis (MS)-associated trigeminal pain and on the onset and progression of the disease.

Methods: Experimental autoimmune encephalomyelitis (EAE) was induced in male Dark Agouti rats with MOG_{1-125} myelin peptide. Eleven days before, rats were assigned to drink water, yellow corn as control, or purple corn extracts as a preventive approach. Another group of animals began drinking purple corn extract from the onset of EAE motor symptoms, as a therapeutic strategy. From day post-immunization 1 to 21 we evaluated EAE development by a scale of ascending paralysis, and spontaneous trigeminal pain by von Frey test. After sacrifice, CNS tissues were collected for subsequent analyses.

Results: Preventive purple corn positively influences the progression of EAE motor symptoms and protects from associated trigeminal pain, through the modulation of glial cell activation, of pro-/anti-inflammatory mediators and of autophagy. Therapeutic purple corn does not affect EAE motor symptoms, but partially reduces trigeminal pain development and blunts neuroinflammation.

Conclusions: Our findings suggest a possible application of purple corn as a preventive or adjuvant approach to MS-associated trigeminal pain to reduce drug dosage and related side effects.

II-A2.W.07

MIGRAINE: THE EFFECT OF COLD PRESSOR ON PAIN INTENSITY OF MIGRAINE – WHETHER COLD COULD RELIEVE MIGRAINE OR NOT?

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Background and aims: Migraine is a prevalent headache that could severely affect daily living for more than 1 billion sufferers worldwide. The need to explore and identify potential remedies that could alleviate migraine attacks in a quick and easy manner is strongly desired. The purpose of this research is to test whether a cold pressor on hand could be used as an abortive therapy in migraine attacks.

Methods: Survey distributions and in-person/virtual experiments on humans using cold pressor test (CPT) were performed in this research. The research was conducted in five stages lasting 6 months.

Results: 118 responses were received with 37 participants screened out as migraine patients. Results from the

Wilcoxon t-test suggest that there is significance when comparing numbers and the duration of migraine attacks before and after the CPT, while the difference is not significant for the pain intensity reported. For CPT, results show that participants reported no pain right after they withdrew their hands from cold.

Conclusions: Results of this research suggest that migraine could be relieved during the CPT, and it would also be reduced in terms of its pain intensity level after rest. Thus, cold pressor is a possible remedy that patients could utilize to mitigate their migraine easily and effectively. Results also illustrate that the influence of cold pressor is both long-term and short-term. This suggests that cold pressor is not only a short-term remedy for immediate migraine attacks but also a potential long-term treatment to reduce the future occurrence of migraines.

II-A2.W.08

THE BAYESIAN BRAIN HYPOTHESIS AND MIGRAINE PAIN

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Background and aims: According to the Bayesian Brain Hypothesis (BBH), the interplay between certainty in the priors (e.g., conditioning) and sensory signals produces pain perception. Migraine often progresses in severity over time, and biased reliance on prior experiences (e.g., clinical experience) may explain this progression into chronicity. The Focused Analgesia Selection Test (FAST), proposed to measure the likelihood certainty associated with an experimental-placebo-paradigm, could provide valuable insights. We aimed to measure the certainty of the sensory signals, the placebo response, and associations with clinical characteristics.

Methods: This abstract presents preliminary findings from an ongoing study. Migraine patients (MG) and healthy volunteers (H) attended two study visits, one with a physician to collect clinical characteristics and a second visit where the participants completed the FAST and an experimental-placebo-paradigm (conditioning + verbal suggestion). Primary outcomes included FAST-R2, FAST-ICC, expectations (E1, E2, E3), conditioning strength (CondSTR) and placebo response (PlacRes), years with symptoms (YS), and crisis duration (CD).

Results: Up to date, 25 Migraine patients (MG) and 15 healthy controls (H) were enrolled. PlacRes did not differ between groups (p=0.872). In MG, ICC negatively correlated with PlacRes (rs=-0.430, p=0.046). YS and CD were negatively associated with CondSTR (YS: rs=-0.503, p=0.024; CD: rs=-0.561, p=0.010) and trended towards PlacRes (YS: rs=-0.438, p=0.054).

Conclusions: These findings partially support the relevance of the BBH in understanding migraine pain. Migraine patients with greater sensory certainty show reduced placebo responses, and prolonged time with symptoms reinforces certainty/biased perception towards painful somatosensory memories.

II-A2.W.09

THE EFFECTIVENESS OF CONNECTIVE TISSUE MANIPULATION IN ADOLESCENTS WITH TENSION-TYPE HEADACHE: A PILOT, RANDOMIZED, CONTROLLED STUDY

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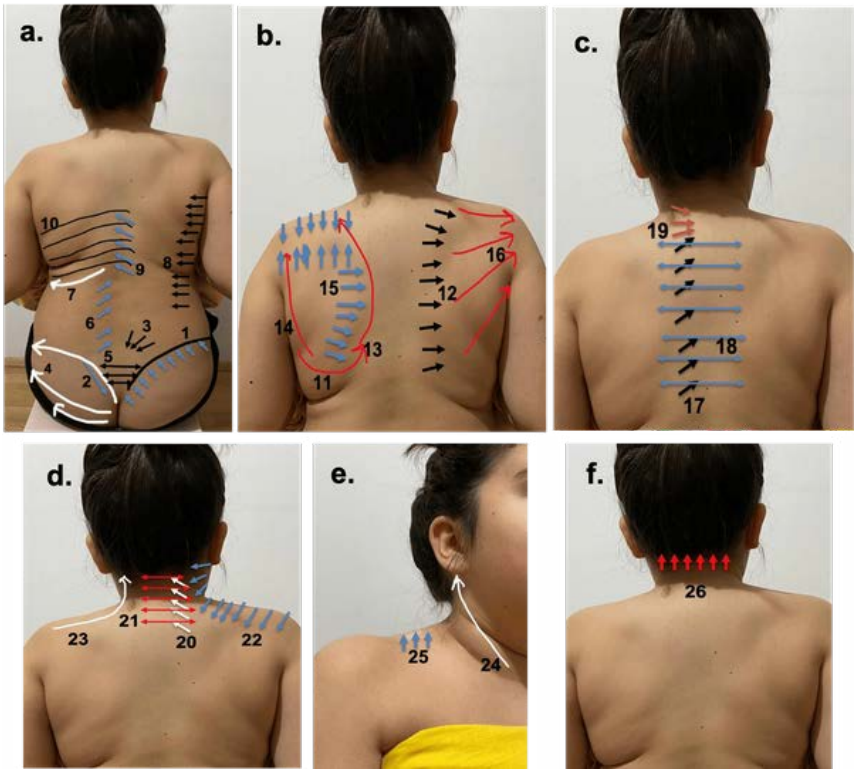
Background and aims: Tension-type headache (TTH) is common in adolescents, yet most treatment data comes from studies on adults. While the effectiveness of connective tissue manipulation (CTM) is well-documented in adults with TTH, its impact on adolescents remains unclear. This study aimed to evaluate the effectiveness of CTM in adolescents with TTH.

Methods: Nineteen adolescents (11 females, 8 males; mean age 13.1±1.3 years; BMI 22.4±1.1 kg/m²) were randomly assigned to a control group (n=9) or a CTM group (n=10). Both groups received recommendations for headache management, while the CTM group underwent 20 sessions of CTM over four weeks. Outcomes included headache severity (VAS), pain frequency and duration, analgesic use, pain threshold and tolerance (pressure algometer), trapezius muscle spasms (Likert scale), and quality of life (PedsQL). Statistical analyses included Chi-square, Mann-Whitney U, and Wilcoxon tests ($p<0.05$).



Results: The CTM group showed significant improvements in headache severity, pain frequency and duration, analgesic use, pain threshold, tolerance, trapezius muscle spasms, and PedsQL scores ($p<0.05$). In the control group, only pain frequency and duration improved ($p<0.05$). Compliance with recommendations was similar between groups ($p>0.05$), and 70% of the CTM group reported significant relief.

Conclusions: CTM demonstrated short-term effectiveness in improving headache-related symptoms and quality of life in adolescents with TTH. Further research with long-term follow-up is necessary to validate these findings and explore broader applications of CTM in this population.

II-A2.W.10

THE SELF-REPORT FREQUENCY AND IMPACT OF TINNITUS IS SIMILAR IN MIGRAINE SUBGROUPS AND ITS IMPACT IS EXPLAINED BY FEAR OF FALLING, NECK DISABILITY AND KINESIOPHOBIA

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Background and aims: Migraine is a highly prevalent and disabling primary headache that presents not just musculoskeletal dysfunctions or vestibular symptoms, but also auricular disorders, like tinnitus.

Aims: To analyze the self-reported frequency and the impact of tinnitus on migraine subgroups, and the factors that contribute to the impact of tinnitus on quality of life, measured by Tinnitus Handicap Inventory (THI) questionnaire.

Methods: Design: Cross-sectional study.

Study sample: 66 migraine women with migraine without aura (MoA; n=22), migraine with aura (MA; n=22) and chronic migraine (CM; n=22) answered questions regarding self-report frequency of tinnitus, migraine characteristics and questionnaires related to the impact of tinnitus, neck disability, central sensitization, dizziness, falls, depression and kinesiophobia. Mean, standard deviation and frequency of the evaluated data were analyzed. The comparison of the self-reported tinnitus and the THI score was made using chi-square and ANOVA, respectively. Multiple Linear Regression analysis was used to estimate the impact of tinnitus. P-values were considered < 0.05.

Results: All migraine subgroups had a high self-report tinnitus frequency (>60%), in which MA had 72.7%, followed by MoA (68.2%) and CM group (60.9%), but no differences among them ($X^2=0.955$, $p=0.620$). All subgroups had a mild impact considering the classification, $p=0.305$. Multiple linear regression [R^2adjusted= 0.534, $p<0.001$;] showed that fear of falling, neck disability and Kinesiophobia explain 53.4% of the impact of tinnitus in the quality of life.

Conclusions: There was no difference, considering migraine subgroups, on the self-reported frequency and impact of tinnitus. Fear of falling, neck disability and kinesiophobia explained the impact of tinnitus.

B1 | STRESS-PAIN INTERACTIONS

II-B1.W.01

ALTERATIONS OF PERIPHERAL BLOOD MONONUCLEAR CELL AND DORSAL ROOT GANGLIA TRANSCRIPTOMICS AND PLASMA METABOLITE PROFILE IN THE CHRONIC RESTRAINT STRESS-INDUCED PAIN MODEL OF MICE

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Background and aims: Chronic psychosocial distress is an etiological and/or aggravating factor of several pain conditions including fibromyalgia, a widespread musculoskeletal pain condition. The current treatments are inadequate, making it an “unmet medical need”. Here we demonstrate an unbiased approach in the chronic restraint stress (CRS)-induced pain model of mice to investigate fibromyalgia-like pathophysiological mechanisms.

Methods: Adult female and male C57BL/6 mice were exposed to CRS and compared to non-stressed controls. Paw mechanonociceptive threshold was determinded by dynamic plantar aesthesiometry, cold sensitivity by withdrawal latency from icy water before and weekly during the 2-week protocol. Next generation sequencing was performed on the RNA isolated from peripheral blood mononuclear cells (PBMCs) and L3-L5 dorsal root ganglia (DRGs). Plasma metabolomic profile was determined by mass spectrometry and analysed by bioinformatic tools.

Results: PBMC transcriptomics identified 336 and 333 differentially expressed genes in male and female animals, with 63 shared. Hemostasis pathways are most affected (Reactome), alongside cell binding, wound healing, and platelet activation (Gene Onthology). DRG analysis showed 51 and 101 differentially expressed genes, highlighting muscle contraction in females and amino acid import and collagen metabolism in males. Targeted metabolomic analysis showed few differences, with significant changes in ceramides, kynurenine, putrescine, and 3-IPA levels.

Conclusions: This study reveals molecular changes in the fibromyalgia-like pain model induced by chronic restraint stress. PBMC and DRG transcriptomics identified pathways like hemostasis, muscle contraction, and amino acid transport, while metabolomics showed changes in lipid metabolism, which were previously also implied in fibromyalgia patients. The findings highlight potential targets for specific therapies.

II-B1.W.02

EVALUATING THE EFFICACY OF HEART RATE VARIABILITY BIOFEEDBACK TRAINING ON EXPERIMENTAL PAIN: A POTENTIAL NON-INVASIVE APPROACH FOR PAIN MANAGEMENT

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Background and aims: Heart rate variability (HRV) biofeedback is a non-invasive technique that enhances autonomic nervous system regulation through controlled breathing exercises designed to maximize respiratory sinus arrhythmia. It has been shown to improve cardiovascular health, reduce stress and enhance well-being. This study evaluates the impact of HRV-biofeedback training (three 5-minutes sessions/day) on experimental pain.

Methods: Over a 3-week period, 32 healthy young adults engaged in a daily regimen of respiration exercises, application-guided at 0.1Hz rate (UrgoFeel) for experimental group (n=20), and respiration counting for control (n=12). Pain sensitivity and tolerance were assessed pre- and post-intervention using a numerical pain scale, pain score (mA), withdrawal latency (sec) and recording physiological parameters (skin conductance, heart and

respiration rates). Cold pressor task (hand in 10°C) and electrical stimulation via TENS (5-nocive stimulations) respectively evaluated tonic and phasic pain.

Results: After training, HRV-group demonstrated a controlled slower respiration rate during both TENS (19.4±4.5 to 15.1±4.8 bmp; p=0.007) and CPT (73.4±13.3 vs. 85.2±12.4 in controls; p=0.008). Additionally, HRV but not control group showed an increase in pain threshold (4.4±1.2 to 5.1±1.3 mA; p<0.001) during TENS. Similarly, while control-group experienced a reduction in withdrawal latency (71.2±30 to 53.5±21.24 sec; p=0.002) during CPT, experimental group showed a prolonged latency to pain threshold (29.5±18.5 to 34.5±20.6 sec; p=0.012) and withdrawal latency (p=0.02), accompanied by a slight decrease in skin conductance.

Conclusions: These findings support HRV-biofeedback as a promising adjunct therapy for pain management, particularly for individuals with autonomic dysfunction or pediatric populations.

II-B1.W.03

POST-TRAUMATIC STRESS DISORDER SYMPTOM PREVALENCE IN FIBROMYALGIA VERSUS NON-FIBROMYALGIA REFERRALS TO AN INTERDISCIPLINARY CHRONIC PAIN CLINIC IN THE UNITED KINGDOM'S NATIONAL HEALTH SERVICE

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Background and aims: Post-Traumatic Stress Disorder (PTSD) and chronic pain often co-occur, with meta-analytic evidence indicating PTSD comorbidity of 11.7% in clinical chronic pain populations worldwide. However, the prevalence of PTSD symptoms in chronic pain, and specifically fibromyalgia, populations has not been assessed within the United Kingdom's National Health Service (NHS). This study aimed to evaluate this within a London based interdisciplinary pain clinic.

Methods: New referrals were screened for PTSD via an online PC-PTSD-5 questionnaire prior to their first appointment (N = 280). A threshold of 3/5 on the PC-PTSD-5 identified patients with clinically significant PTSD symptoms. Of the 263 patients with data eligible for analysis, 37 had fibromyalgia and 226 had a non-fibromyalgia pain condition indicated in their health records.

Results: Comorbid PTSD symptoms were present in 31.2% of all patients. Fibromyalgia was significantly associated with endorsement of PTSD symptoms, X^2 (1, N = 263) = 6.12, p < .05, with 48.7% of fibromyalgia patients meeting the threshold for PTSD symptoms compared to 28.3% of non-fibromyalgia patients. Additionally, fibromyalgia was associated with reporting a traumatic life experience X^2 (1, N = 263) = 6.96, p < .05, with 64.9% of fibromyalgia patients reporting trauma exposure compared to 41.6% of non-fibromyalgia patients.

Conclusions: Patients referred to an NHS interdisciplinary pain clinic reported considerably higher rates of comorbid PTSD symptoms and chronic pain compared to previous literature. Notably, fibromyalgia diagnosis was associated with PTSD symptoms and traumatic life experiences. These insights may support NHS pain clinics to plan appropriate care pathways for patients with such comorbidity.

II-B1.W.04

THE RELATIONSHIP BETWEEN EMOTIONAL DISTRESS AND PAIN SEVERITY IN CHRONIC PAIN – A ROLE FOR INTEROCEPTION?

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Background and aims: The relationship between emotional distress and pain severity is well documented, yet the mediating mechanism remains unclear. Interoception, sensing the body's internal physiological state, is linked to both mental-health and chronic pain (CP) conditions. Findings indicate differences in interoception between CP and pain-free controls (PFC). We aimed to investigate whether interoception mediated the link between pain severity and emotional distress.

Methods: CP (n=239) and PFC (n=170; see Tabel 1) participants completed online questionnaires assessing pain intensity, emotional distress (depression, anxiety, anger), and interoception (MAIA-2), as per pre-registration (OSF; Nov, 2023). Assessments were compared between groups, and correlations computed within groups. A

bootstrap-based mediation model tested whether interoception mediated the link between emotional distress and pain intensity.

	Chronic Pain	Pain Free Controls	p value
N	239	170	
Age (M±SD)	45.14±14.44	48.11±15.32	0.05
Sex (N female, %)	155 (64.85)	115 (67.65)	0.36
Pain Intensity (M±SD)	6.088±1.73	0.99±0.93	<0.001
Emotional Distress (M±SD)	21.22±6.92	13.35±3.55	<0.001

Results: CP had higher pain and emotional distress compared to PFC (Table 1). Group differences emerged in 5 of 8 MAIA-2 subscales were noted: *Noticing*, *Attention-Regulation*, and *Trusting* were higher, while *Self-Regulation* and *Body-Listening*were lower in CP compared to PFC (Table 2; controlling for age). Pain correlated with emotional distress (CP=0.26, PFC=0.31; p's<0.001) and Trusting (CP=-0.18, p=0.005; PFC=ns). Emotional distress correlated with Trusting (CP=-0.43, p<0.001; PFC=ns). In CP, a model with Trusting as a mediator between emotional distress and pain was non-significant.

MAIA-2 (M±SD)	Chronic Pain	Pain Free Controls	p value
Noticing	14.41±4.29	9.05±2.17	<0.001
Not Distracting	11.97±5.65	13.30±4.92	0.01, uncorrected
Not Worrying	10.35±4.79	11.12±2.21	0.05
Attention Regulation	23.17±6.43	18.64±4.07	<0.001
Emotional awareness	17.66±5.29	16.55±4.65	0.03, uncorrected
Self Regulation	10.36±4.61	13.34±4.29	<0.001
Body Listening	7.56±3.69	8.55±3.16	0.005
Trusting	9.08±3.92	7.03±3.71	<0.001

Conclusions: As hypothesized, individuals with CP demonstrated greater pain, emotional distress, and a differential pattern of interoception compared to PFCs. Unlike hypothesis, interoception does not seem to mediate the link between emotional distress and pain intensity. These preliminary findings are informative regarding interoception's manifestation in chronic pain, yet require further scrutiny.

II-B1.W.05

ROLE OF HEMOKININ-1 IN STRESS-INDUCED PAIN MOUSE MODELS

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Background and aims: Hemokinin-1 (HK-1) shares several (structural and immunological) similarities with Substance P (SP) and it is present in stress- and pain-related brain regions as well as in hypothalamic-pituitary-adrenal axis. It activates the NK1 receptor, but other targets and mechanisms have also been proposed. We investigated its involvement in chronic stress-induced pain conditions with C57Bl/6 wildtype (WT) and HK-1 deficient (KO) male and female mice.

Methods: Pain was investigated in murine chronic restraint and cold stress models. Mechanical thresholds of stressed and non-stressed WT and KO mice (N=8-15/group) were measured by aesthesiometry, cold sensitivity by withdrawal latency from icy water. Anxiety and depression-like behavior was assessed by open field (OFT), light-dark box (LDB) and tail suspension tests (TST). Thymus and adrenal glands were weighed at the end of the experiment.

Results: In Tac4 KO mice restraint stress-induced mechanical, but not cold hyperalgesia was significantly alleviated, while in cold-stress induced pain sensation was increased compared to WTs. In both models stressed Tac4 KO mice spent less time in the center/with moving in OFT, made more transitions in LDB, and showed

decreased immobility in TST. Non-stressed Tac4 KO animals had significantly higher adrenal and smaller thymus weights compared to the WTs, but significant changes were not observed in restrained animals.

Conclusions: We demonstrated here the first evidence for the involvement of HK-1 in chronic stress-induced pain. Unravelling of its molecular targets might open new perspectives for the pharmacotherapy of stress-induced pain states.

II-B1.W.06

THE ASSOCIATION BETWEEN PHYSIOLOGICAL MARKERS OF STRESS RESPONSE SYSTEMS AND EXPERIMENTALLY INDUCED PAIN ASSESSMENTS IN CHRONIC PRIMARY PAIN: A SYSTEMATIC REVIEW AND META-ANALYSIS

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Background and aims: Besides psychological distress, (dys)functioning of stress systems, i.e. the autonomic nervous system (ANS) and hypothalamus-pituitary-adrenal (HPA-)axis, has been implicated in pain. However, the exact interplay between (re)activity of stress and pain systems in chronic pain remains unclear. This study will synthesize the evidence regarding their interactions in chronic pain.

Methods: A systematic review and meta-analysis was pre-registered on PROSPERO (CRD42024495934). Six databases were searched to identify studies examining at least one physiological stress marker of ANS or HPA-axis reflecting basal levels, reactivity and/or recovery, and one experimental outcome measure of pain in adults with chronic primary pain. Risk of bias (RoB) was evaluated with the Newcastle-Ottawa Scale, and certainty of evidence (CoE) with GRADE.

Results: Forty-six studies (3 cross-sectional, 43 case-control; n=2407) were included and scored averagely 9/12 (5-11) on RoB. Overall CoE was (very) low. At baseline, qualitative analyses showed significant correlations between lower mean arterial pressure and higher pain sensitivity in patients with chronic pain which was confirmed in the meta-analyses (r=.301-.373, p=.013-.033). Furthermore, meta-analyses showed that higher cortisol levels were associated with lower pressure pain thresholds (PPTs) at baseline. Higher heart rate was associated with lower PPTs, and lower high-frequency heart rate variability with lower cold pain tolerance when stress markers were measured both during and after a stressor (r=.218-.429, p=.009-.050).

Conclusions: Dysregulation of baroreceptor and HPA-axis functioning seems to be related to higher pain sensitivity at baseline, and autonomic dysfunction might be related to higher pain sensitivity under acute stress in patients. However, the evidence is low and limited.

II-B1.W.07

PAIN-STRESS INTERACTIONS IN MUSCULOSKELETAL PAIN: STUDY PROTOCOL OF THE 'STRESS IN PAIN' (STRAIN) STUDY

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Background and aims: Stress and pain systems are known to interact. However, extensive research on the (dys) function of the stress system and its relationship with pain is lacking. Therefore, this study aimed to comprehensively characterize this relationship and to elucidate whether and how their interaction confers increased vulnerability for pain chronification.

Methods: A study with a cross-sectional and a longitudinal arm will be performed to compare stress system (dys) functioning and its interaction with pain processing between musculoskeletal pain groups with varying pain duration and extent: chronic widespread pain (fibromyalgia), chronic localized pain (low back pain), subacute localized pain (low back pain) and pain-free controls (n=35/group). Localized pain groups will be reassessed after 6 months to characterize pain trajectory. Self-reported and (psycho)physiological assessments of pain (quantitative sensory testing [QST]) and stress will be conducted. To characterize neural responses, fMRI will be performed during heat pain stimulation combined with anticipatory cues and during a temporal summation protocol. Correlations between

pattern expressions of the neurological pain signature (NPS) and stress markers will be analysed, and how this relationship differs between groups and over time will be examined.

Results: The study is funded by the Research Foundation – Flanders (FWO) (G072323N) and awaiting ethical approval. Participant recruitment and data collection are anticipated to start in January 2025.

Conclusions: The study will provide fundamental insights into neurophysiological mechanisms underlying the stress-pain relationship. We expect altered NPS pattern expressions and QST outcomes in pain groups compared to controls, which correlate with stress system (dys)functioning and can help characterize pain trajectories.

II-B1.W.08

EXPLORING THE IMPACT OF ADVERSE CHILDHOOD EXPERIENCES, ATTACHMENT INSECURITY, AND PAIN-RESILIENCE PROCESSES ON CHRONIC PAIN OUTCOMES: FINDINGS FROM THE ESPOIR-DOULEUR STUDY

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Background and aims: Adverse childhood experiences (ACEs) increase the risk of chronic pain (CP) by 53% and are linked to poorer pain outcomes and reduced quality of life (QoL). However, the pathways linking ACEs to CP remain poorly understood. This study investigated attachment insecurity and pain resilience as mediators in these relationships and their influence on CP over 12 months.

Methods: Individuals with CP (n=101) were recruited from a pain management centre in France and completed self-report measures assessing psychosocial factors (ACEs, attachment insecurity, pain resilience processes) and pain outcomes (pain intensity and affect, pain interference, QoL, and pain beliefs). Predicted relationships were tested using Structural Equation Modeling (SEM).

Results: SEM demonstrated excellent model fit (CFI, TLI, RNI, GFI > .95; RMSEA = .039; SRMR = .039). Resilience processes, including cognitive positivity and behavioural perseverance, were associated with reduced pain affect and interference and improved QoL. However, only attachment anxiety emerged as a significant mediator in the relationships between the “child maltreatment” subdimension and pain outcomes (Table 1).

Table 1. Indirect effects of child maltreatment on pain-related outcomes through attachment anxiety.

Outcome	β	*p*
Pain Affect	0.102	0.015
QoL-Physical	0.080	0.035
Pain Interference	0.044	0.013
Pain Mystery	0.080	0.035

Note. Significance determined at $p < .05$.

Conclusions: Findings underscore the role of attachment anxiety and resilience processes in CP research and management. Full longitudinal results will be presented at the conference.

Acknowledgment: This research was supported by the Region of Grand Est, France, for the project “Understanding and Fighting Pain Together”.

II-B1.W.09

CHRONIC STRESS-INDUCED PROLONGATION OF POST-SURGICAL PAIN-RELATED BEHAVIOUR IS ASSOCIATED WITH TRANSCRIPTOMIC CHANGES IN THE ANTERIOR CINGULATE CORTEX OF MALE RATS

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Background and aims: Pre-surgical stress is a risk factor for the prolongation and chronification of post-surgical pain. The anterior cingulate cortex (ACC) integrates stress-related information and plays a key role in the sensory and emotional component of pain. This study examined the effect of chronic stress on post-surgical mechanical hypersensitivity and associated transcriptomic changes in the ACC.

Methods: Male Sprague-Dawley rats were exposed to repeated restraint stress (RRS; 6h/day, 21days) or handled followed by hind paw-incision (PI) or sham-surgery resulting in 4 groups: noRRS (NRRS)-Sham, RRS-Sham, NRRS-PI and RRS-PI. Mechanical withdrawal thresholds (MWT) were assessed prior to, and following, PI and the ACC was harvested on day 5 post-surgery for transcriptomic analysis using bulk 3'RNA-seq.

Results: RRS did not alter MWT in the absence of injury but prolonged mechanical hypersensitivity post-PI. RRS was associated with upregulation of glutamatergic genes, (e.g. *grm7, grin3b)* and behaviour-regulating genes (e.g. *oxtr, tacr1*), and downregulation of genes linked to RNA processing (e.g. d*dx3x, rpl27*/*24*) and cell activation and immune response regulation (e.g. c*asp3, cd38, tnfrsf14*) (RRS-Sham vs NRRS-sham). However following PI, RRS was associated upregulation of with angiogenesis genes (e.g. v*egfc, pdgfrb*) and immune response genes (g*ata3, Il6, nfkbiz*) and downregulation of cytoskeletal organization and chromatid segregation genes (e.g. *Rasa1, Tsc1, Gas2l2, Smc1a*) (RRS-PI vs NRRS-PI).

Conclusions: Chronic stress induces distinct molecular changes in the ACC in the absence and presence of PI. These data may advance understanding of the molecular mechanisms underlying chronic stress-induced prolongation of post-surgical pain.

II-B1.W.10

AUTONOMIC DYSFUNCTION AND PAIN - INTERPLAY IN POLINEUROPATHIES IN CANCER PATIENTS: A LITERATURE REVIEW

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Background and aims: Pain is one of the most frequent symptoms in cancer patients. Neuropathic pain as part of polineuropathies in cancer patients poses issues of management. Polineuropathies are frequent in cancer patients as a result of the disease itself or its treatment. The autonomic dysfunction is an underdiagnosed syndrome in these patients.

The aim of this paper is to identify possible links between pain and autonomic dysfunction in cancer polineuropathies, which could improve symptom control and quality of life.

Methods: We performed a literature review regarding autonomic dysfunction and pain in cancer patients. Full text articles written in English, published between 2010 and 2024, relevant to the topic were selected from Pubmed, Web of Science and Google scholar and analyzed by two independent investigators.

Results: The role of the sympathetic system in postsurgical pain of cancer patients has long been acknowledged; in cancer polyneuropathy, the sympathetically maintained pain appears more frequently and is associated also with paraneoplastic syndromes. Some areas of the central nervous system control both pain and sympathetic response; the endocannabinoid system can positively influence neuropathic pain and autonomic dysfunction, holding promise for future therapeutical options. On the other hand, the parasympathetic dysfunction in cancer neuropathies is correlated with increased sensitivity to pain.

Conclusions: In conclusion, one of the approaches for a better management of polineuropathies and an improved quality of life in cancer patients is the screening for autonomic dysfunction in these patients. Moreover, a better understanding of the relationship between dysautonomia and pain can open the road to new therapeutical developments.

B2 | EMOTIONS, BRAIN AND BODY IN CRPS

II-B2.W.01

INVESTIGATING THE ROLE OF AFFECTIVE TOUCH BY ROMANTIC PARTNERS IN MODULATING SECONDARY HYPERALGESIA

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Background and aims: Affective interpersonal touch, conveyed by C-Tactile low threshold mechanoreceptors, plays a crucial role in modulating pain perception and providing emotional comfort. This study aimed to evaluate the effects of interpersonal touch (i.e. applied by romantic partners), at a velocity that activates C-Tactile receptors, during the induction of Secondary hyperalgesia (SH) using high-frequency electrical stimulation. SH refers to increased sensitivity to pain in areas surrounding an injury, reflecting central nervous system changes related to pain sensitization.

Methods: Twenty-eight couples (56 participants) underwent SH induction two sessions. In both sessions, participants received mechanical pinpricks in their left arm before the electrical stimulation and in the SH area after the stimulation. In session A the romantic partner stroked the participant's arm, while in session B the participant was alone, while receiving painful stimulation.

Results: Results demonstrated a significant reduction in pain levels during the electrical stimulation when participants were accompanied. However, no significant differences were observed in pinprick-evoked pain levels in pre- and post-SH induction and in the pre-post pinprick-evoked pain increase. Additionally, we did not observe differences in the SH area when comparing the two sessions.

Conclusions: These findings suggest that the presence of a romantic partner may help reduce the perception of pain in individuals experiencing acute pain. However, there was no support for the hypothesis that the presence of a romantic partner affects sensitivity to mechanical pain stimuli. This study highlights the complex nature of pain modulation and the potential role of interpersonal touch in acute pain relief, but not in pain sensitization.

II-B2.W.02

SENSORY PHENOTYPES OF 612 PATIENTS WITH COMPLEX REGIONAL PAIN SYNDROME

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Background and aims: The exact underlying pathophysiological mechanisms of Complex Regional Pain Syndrome (CRPS) have been under debate in recent years. Previous works identified mechanistic CRPS subtypes, which were characterized as "cold" and "warm" (Bruehl et al., 2016) or peripheral and central phenotypes (Dimova et al., 2020). Our aim was to examine CRPS patients via a comprehensive somatosensory testing and identify potential subgroups using unbiased statistics.

Methods: In total, 612 patients (age: 51.8 [±13.5], female: 441) with CRPS underwent Quantitative Sensory Testing according to the DFNS protocol (German Research Network on Neuropathic Pain). Thereby, 13 parameters including thermal and mechanical detection and pain thresholds were generated - indicating one distinct sensory profile for each participant. We conducted two separate hypothesis-free cluster analyses: in a training set (A, n=386) and a distinct validation set (B, n=226) to account for possible overfitting to the data.

Results: We identified three distinct sensory phenotypes in the training set, which were confirmed in the validation set. The largest group was characterized by hyperalgesia (n=387), a second group was characterized by loss of sensation (n=203). A third, small, but consistent group exhibited strong allodynia and hyperalgesia (n=22).

Conclusions: Here, we report a new way of stratifying patients with CRPS based on sensory phenotypes. The therapeutical implications for each subtype are unknown but still may add to a personalized pain treatment of CRPS in the future.

II-B2.W.04

EPIGENETIC SIGNATURES IN CRPS PATIENTS: METHYLOME AND TRANSCRIPTOME ANALYSIS OF SKIN BIOPSIES

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Background and aims: Complex regional pain syndrome (CRPS) is characterized by persistent, disproportionate pain, accompanied by changes in skin color, temperature, edema, and motor function following trauma. While its etiology remains unclear and biomarkers are lacking, distinct leukocyte methylation profiles differentiate CRPS patients from fracture controls. This study investigates DNA methylation in skin biopsies from CRPS patients, focusing on epigenetic modifications as potential predictors of pain outcomes.

Methods: We performed a methylome and transcriptome analysis on skin biopsies from 23 early CRPS patients, grouped by pain resolution (pain reduction ≥ 2 numeric rating scale points) or persistence after 12 months. DNA methylation and RNA expression were analyzed using the HumanMethylationEPICv2 array and NextSeq2000 sequencing. Statistical significance was determined using a t-test corrected for false discovery rate, with raw $p \leq 0.05$ considered statistically significant.

Results: Comparative analysis between the resolution and persistence groups revealed 315,372 significantly differentially methylated CpGs. Candidate prognostic markers included CpGs associated with pain-related genes, e.g. Metabotropic-Glutamate-Receptor-5 (*GRM5)*, and inflammation-related genes, e.g. Sphingosine-1-Phosphate-Receptor-5 (*S1PR5)*. Negative correlation with associated RNA indicated biological relevance (Fig. 1). Interim findings suggest that methylation patterns correlate with clinical and inflammatory serum markers.

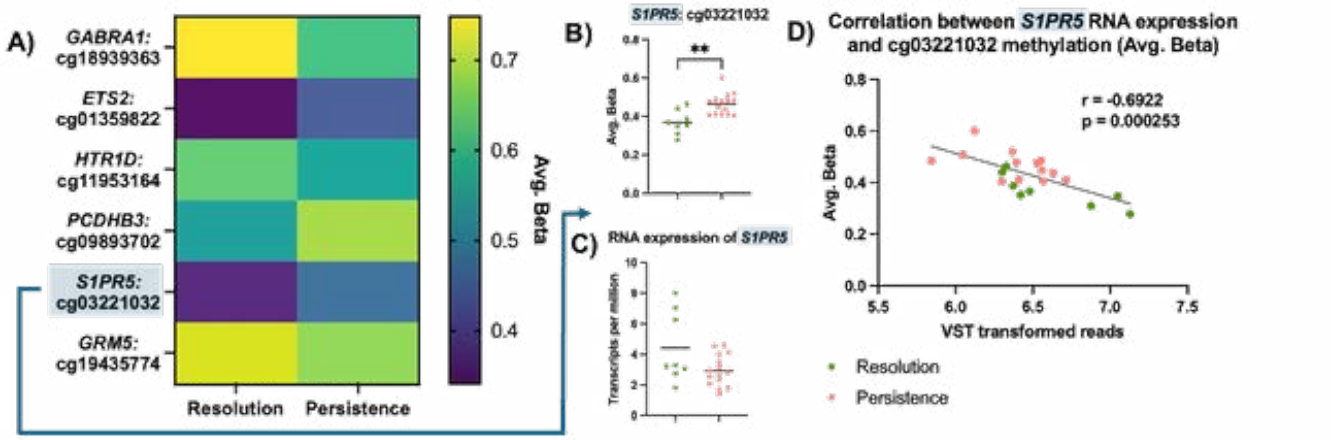

Fig. 1 Identification of candidate prognostic markers through methylation differences. A) Heatmap of CpGs with $p \leq 0.005$ and a methylation difference ≥ ±8% between groups, indicating high (yellow) and low (blue) methylation. **B)** Average methylation levels (Avg. Beta) of the CpG associated with Sphingosine-1-Phosphate Receptor 5 (*S1PR5*) . **C)** Transcript levels of *S1PR5* from RNA transcriptomics. **D)** Pearson correlation between *S1PR5* RNA expression and CpG methylation levels. t-test, ** $p \leq 0.01$. *GABRA1* = Gamma-Aminobutyric Acid Type A Receptor Subunit Alpha1, *ETS2* = ETS Proto-Oncogene 2, *HTR1D* = 5-Hydroxytryptamine Receptor 1D, *PCDHB3* = Protocadherin Beta 3, *GRM5* = Metabotropic Glutamate Receptor 5, VST = Variance Stabilizing Transformation.

Conclusions: This is the first study to investigate the methylome and transcriptome in the skin of CRPS patients, a tissue directly affected by the initiating trauma and the location of key symptoms. Epigenetic modifications in inflammation and pain signaling pathways may predispose to disease progression. These results highlight the potential of epigenetics for identifying prognostic markers, understanding pathophysiology, and paving the way for epigenetic therapies in personalized medicine.

II-B2.W.05

EARLY INTERDISCIPLINARY CARE OF COMPLEX REGIONAL PAIN SYNDROME (CRPS) - A STANDARDIZED PATHWAY

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Background and aims: CRPS is a severe complication of trauma. It is assumed that the biggest improvements take place during the first months. Early, standardized diagnosis is essential to remove barriers to rapid treatment and optimal outcomes. We investigated if the introduction of a standardized pathway leads to a more rapid diagnosis and referral.

Methods: Development / Implementation of a CRPS «fast track»:

• Proposal for the first therapeutic steps in Hand Surgery and Orthopedics

• Decision criteria for rapid referral to multimodal care to a specialized pain center for therapy-resistant cases.

Retrospective analysis of two cohorts before and after introduction of the pathway in January 2020. Primary outcome: Time interval between injury and consultation for multimodal treatment. Secondary outcomes: Time intervals between injury, first symptoms, first signs, diagnosis, initiation of treatment.

Results: Cohort: 36 patients between 2015 - 2018 before introduction of the pathway (group pre «fast track»); 54 patients from 2020 - 2022 (group post «fast track»).

Median time interval injury to consultation «Pre»: 551 days, «Post Fast Track» : 140 days.

	Pre Fast Track	Post Fast Track
Age	44.7±15.8	45.3±13.9
Female	27 (75.0)	40 (74.1)
Upper extr.	24 (66.7)	31 (57.4)
CRPS Type I	75 (75.0)	50 (92.6)
CRPS Type II	9 (25.0)	4 (7.4)

Table 1: Mean±SD, n (%)

Conclusions: Our study describes the feasibility and utility of a multidisciplinary, rapid treatment pathway for diagnosis and treatment of CRPS. The temporal latency between injury and admission was reduced by >70%. The CRPS «fast track» is an easily applicable measure to standardize diagnostics and treatment of CRPS. It leads to a pronounced reduction in latency periods and carries the potential to improve patients' outcomes. The latter aspect will be investigated in an upcoming study.

II-B2.W.06

LOCAL HUMORAL FACTORS IN EARLY STAGES OF COMPLEX REGIONAL PAIN SYNDROME I

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Background and aims: Kallikrein-kinin system activation could explain the most prominent CRPS I clinical signs but the state of that system was not fully investigated.

To investigate the markers of kallikrein-kinin system in CRPS I patients.

Methods: We investigated level of prekallikrein (PK), activity of fast-reacting (FRI) and time-dependent (TDI) inhibitors of plasma kallikrein, and blood plasma proteolytic activity (BPPA) in 30 patients with early stage of CRPS

I (developed after fracture of the distal radius in typical site). The indexes were measured in blood of affected extremity, undamaged extremity and in 15 healthy volunteers.

Results: In bloodstream from affected hand a significant decrease in PK (42.1±9.2 arginine µmol/min/L), FRI (6.9±1.6 arginine µmol/min/L) and TDI (0.66±0.2 arginine µmol/min/L) levels and increase in BPPA (77.23±3.12 arginine µmol/min/L) - compared to the control group (123.9±6.4; 14.4±1.2; 1.7±0.3, accordingly) and to the levels in blood from the contralateral extremity – 144.4±5.3; 18.6±2.2; 1.9±0.6 accordingly). Decreased levels of PK, FRI and TDI together with increased BPPA can be the basis for kallikrein synthesis increase and accumulation in the affected hand. The difference between contralateral hand of CRPS patients and control group was not significant. During treatment course (local glucocorticoids, NSAID, physical therapy) the levels of PK, FRI, TDI had tendency to normalization not earlier then after 3 weeks, which emphasizes on need for long period of treatment and rehabilitation.

Conclusions: Local humoral factors such as the components of kallikrein-kinin system play an important role in CRPS I pathophysiologic mechanisms.

II-B2.W.07

DISCOMFORT DURING MIRROR THERAPY AND TACTILE ACUITY ARE ASSOCIATED WITH MIRRORED LIMB PERCEPTION IN PATIENTS WITH COMPLEX REGIONAL PAIN SYNDROME

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Background and aims: Some patients with complex regional pain syndrome (CRPS) cannot perceive a mirrored limb as being their own limb during mirror therapy. This study investigated factors associated with mirrored limb perception (MLP) in patients with CRPS.

Methods: This study recruited 12 patients with upper-limb CRPS, 11 with hand osteoarthritis, and 10 healthy individuals. MLP was assessed on a four-point Likert scale based on whether the mirrored limb felt like the individual's own limb while: observing the unaffected (non-dominant [UL/NDL]) limb in the mirror at rest; the limb was being touched; the limb was being moved; moving the limb on their own; and imagining movement of the affected (dominant) limb while moving the UL/NDL. Pain and discomfort intensities during the tasks, body perception, kinesiophobia, and tactile acuity (two-point discrimination threshold [TPD]) were also assessed. All parameters were compared among the three groups and correlation analyses were performed of the MLP scores and other parameters for each group.

Results: Pain and discomfort intensities were significantly higher in the CRPS than the other two groups, but MLP scores did not differ significantly among them. MLP score was significantly correlated with discomfort intensity and TPD in the CRPS group only (rho = −0.64 and −0.62, respectively).

Conclusions: Discomfort of the mirrored limb and tactile acuity of the affected limb may affect MLP specific to CRPS, although the presence of pain does not affect MLP.

II-B2.W.08

EARLY PROGNOSTIC FACTORS IN COMPLEX REGIONAL PAIN SYNDROME: A 1-YEAR BELGIAN PROSPECTIVE LONGITUDINAL OBSERVATIONAL STUDY (NCT05337501)

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Background and aims: Complex regional pain syndrome (CRPS) is an internationally recognized cause of pain and disability but remains a poorly understood condition. Regarding its prognosis, some old research led us to think to a great natural evolution of early CRPS. Recent prospective studies and systematic reviews contrasted this affirmation, with rare complete remissions and poor return to work rate. Several drastically different clinical courses are observed while, at 8 years, the outcomes seem to be similar to 1 year, suggesting the absence of

resolution after this duration. Therefore, it is mandatory to explore early factors influencing the evolution, and thus the risk of chronification in CRPS.

Methods: Early CRPS patients (<6 months) were included in a prospective longitudinal observational study and assessed at 4 time-points during 1 year. Each session included anamnesis, clinical examination, quantitative sensory testing, visuospatial attentional abilities and questionnaires covering the biopsychosocial model. Statistical method: multivariate mixed-effect models.

Results: 113 participants were recruited, and 94% performed the last follow-up. At 1year, 33% still meet the clinical Budapest criteria and only 70% have returned to work. Recently identified early CRPS profiles appear to be important predictive factors of the disability, pain, and quality of life. Their prognostic value is probably mediated by the psychosocial severity and the presence of allodynia.

Conclusions: This is the largest prospective cohort evaluating the evolution of an early CRPS cohort in the biopsychosocial model.The identification of modifiable factors to predict the course of CRPS is promising and would enable patients to be stratified according to their risk of progression.

II-B2.W.09

SLEEP DISORDERS IN PATIENTS WITH COMPLEX REGIONAL PAIN SYNDROME

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Background and aims: Numerous studies have reported a bidirectional relationship between sleep disturbance and chronic pain. Patients with CRPS often report impaired sleep, but objective sleep measurements in CRPS patients are scarce. The main aim of the study was to assess the prevalence and impact of sleep disorders on the intensity of pain and prognosis in patients with CRPS referred for rehabilitation.

Methods: Clinical data were analyzed for 16 participants with CRPS and 10 participants with other chronic non-cancer pain (CP). The following data were collected: sex, age, CRPS type, location of CRPS, years of CRPS beginning, average pain level, worst pain and the influence of pain on aspects of everyday life (all numerical rating scale [NRS]), assessment of sleep quality (Pittsburgh Sleep Quality Index [PSQI], Epworth Sleepiness Scale [ESS]).

Results: Data from 26 patients were collected. 76,9 % reported poor sleep quality, poor sleep satisfaction and daytime sleepiness when symptoms were assessed. 80,8 % of all patients had a PSQI higher than 5. PSQI differ significantly between groups (9.2 (4.9) vs 7,4(3,8) in CRPS and CP groups accordingly). ESS higher than 10 was found in 13 patients with CRPS and 7 patients with CP. No significant differences were found between groups for ESS. At the bivariate level, pain intensity and disease duration correlated significantly with poorer sleep quality (PSQI) in patients with CRPS.

Conclusions: Patients with CRPS exhibited more severe sleep disturbances. A significant correlation was identified between the intensity of pain, the duration of the disease, and decreased sleep quality as assessed by PSQI.

II-B2.W.10

AMPUTATION DESIRE IS RESOLVED FOLLOWING INTERDISCIPLINARY REHABILITATION IN LONGSTANDING COMPLEX REGIONAL PAIN SYNDROME: A CASE STUDY

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Background and aims: Body perception disturbance (BPD) is a common feature of Complex Regional Pain Syndrome (CRPS) that adversely influences how patients feel about and engage with their painful limb. Patients often report a desire to amputate the affected limb despite the prospect of further pain, loss of function, and the risks associated with the procedure. Despite the recommendation that BPD is important to treat, evidence on how to treat it remains limited and conventional treatments have limited success. Importantly, it is unknown how amputation desire changes in response to treatment. We present a clinical case to illustrate how amputation desire resolved following specialist interdisciplinary treatment.

Methods: A 44-year-old female with long-standing Type-I CRPS (symptom duration=12 months) attended a two-week therapy-led interdisciplinary treatment at the CRPS Service in May 2024. Interdisciplinary treatment is delivered by Occupational Therapy, Physiotherapy, and Psychology professionals with input from Nursing and Pain Medicine. Treatment approaches are selected based on the individual's needs. Strategies to target body scheme, such as Cognitive Multisensory Rehabilitation, are used as part of the interdisciplinary treatment. Body Perception Disturbance Scale (BPDS) was used to measure amputation desire change pre and post-treatment.

Results: Following the interdisciplinary treatment, the patient experienced a complete cessation in amputation desire (from 5/10 to 0/10) and disownership (from 5/10 to 0/10), and a marked reduction in negative feelings associated with her painful limb (from 10/10 to 6/10) assessed using the BPDS.

Conclusions: Interdisciplinary treatment may reduce amputation desire in people with long-standing CRPS by normalising body scheme disruption.

C1 | NEUROIMAGING & NEUROPHYSIOLOGY-BASED BIOMARKERS OF PAIN

II-C1.W.01

UNCOVERING THE FUNCTIONAL RELATIONSHIP BETWEEN PAIN PERCEPTION AND THE MODULATION OF ONGOING OSCILLATIONS IN THE HUMAN POSTERIOR INSULA USING INTRACEREBRAL EEG

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Background and aims: Intracerebral electroencephalography (iEEG) recordings from the posterior insula have shown that ongoing neural oscillations (OO) are preferentially modulated by sustained periodic nociceptive stimuli in the theta and alpha frequency bands (Liberati et al. 2019). To investigate a possible relationship between pain perception and OO, we assessed the effect of an arithmetic distraction task on both perceived pain intensity and the modulation of OO in the insula measured using iEEG.

Methods: 7 patients (34 ± 8 years old, 2 female) who had depth electrodes implanted in the anterior (n=28) or posterior (n=16) insula as part of their pre-surgical evaluation for refractory epilepsy were recruited. Slow periodic sustained thermonociceptive and vibrotactile stimuli were used. The arithmetic task consisted of continuously subtracting 7 from a 3-digit starting number throughout the stimulation. After each stimulus, patients provided a rating of the perceived stimulus intensity. Linear mixed models assessed the impact of condition, modality, and electrode contact location on perceived intensity and modulation of OO.

Results: During the arithmetic task, perceived stimulation intensity was significantly decreased in both modalities (*thermonociceptive*: p=0.013, *vibrotactile*: p=0.0002). Moreover, the arithmetic task led to a significant reduction in the modulation of OO at the frequency of stimulation for thermonociceptive stimuli in the posterior insula (p=0.006), which was not the case following vibrotactile stimulation.

Conclusions: The concomitant decrease in modulation of OO and perceived stimulation intensity during thermonociceptive stimulation and the lack of such a relationship during vibrotactile stimulation might illustrate the potential functional relationship between OO and pain perception within the posterior insula.

II-C1.W.02

NEURAL CORRELATES OF AFFECTIVE SYMPTOMS IN JUVENILE FIBROMYALGIA: A MULTISENSORY FMRI STUDY

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Background and aims: Juvenile fibromyalgia (JFM) is a chronic pain syndrome characterized by widespread musculoskeletal pain and often accompanied by physical fatigue, nonrestorative sleep, headaches, anxiety, and depression. Previous studies found that adolescents with fibromyalgia report reduced tolerance to non-painful multisensory stimuly. Also, previous studies found that depresive patients showed altered neural processing of sensory stimulation. Here, we investigated whether non-painful multisensory sensitivities were linked to affective symptoms in juvenile fibromyalgia patients and whether brain responses to multisensory stimulation were significantly associated with affective symptoms in patients.

Methods: Forty-six adolescent girls (16.56 ± 1.01 years) diagnosed with JFM and forty-four healthy girls (16.09 ± 1.06 years) completed validated measures of multisensory hypersensitivities in daily life and affective symptoms and a multisensory task functional magnetic resonance imaging examination.

Results: Compared to healthy participants, JFM patients reported higher levels of multisensory hypersensitivities (Adult/Adolescent Sensory Profile t=7.67, P<0.0001) which positively correlated with affective symptoms in patients (Child Depression Inventory (CDI) r=0.44, p=0.002). JFM patients with higher scores on the CDI showed augmented activation in the posterior cingulate cortex (PCC) during the multisensory task ($qFWE_{cluster\text{-}level}$<0.05, whole brain corrected, p-voxel<0.001).

Conclusions: The findings strengthen the association between augmented nonpainful multisensory hypersensitivities and affective symptoms in juvenile patients with fibromyalgia. Moreover, JFM patients with enhanced depressive symptoms showed amplified cortical responses in a region that is crucial for self-referential processes and attention shifting (the posterior cingulate cortex) during the multisensory task. This study highlights the potential role of sensory processing alterations when studying, diagnosing, and treating JFM.

II-C1.W.03

ELECTROENCEPHALOGRAPHIC PEAK ALPHA FREQUENCY AS A PREDICTOR OF SECONDARY HYPERALGESIA

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Background and aims: Peak alpha frequency (PAF) recorded with electroencephalography has emerged as a promising neurophysiological marker in pain research. PAF, typically occurring between 8-13 Hz, reflects the dominant oscillatory activity in the alpha band and has been related to experimental pain sensitivity and chronic pain conditions. However, there is little evidence of the relationship between alpha frequency and central pain sensitization processes, such as secondary hyperalgesia (SH).

Methods: In this study, electroencephalography was recorded in forty healthy participants before the induction of SH using high-frequency electrical stimulation. SH was quantified through two measures: the area where participants reported allodynia to mechanical stimuli and the increase in reported pain upon pinprick application. Spearman correlations were employed to analyze the relationship between PAF and both pain indices across all EEG electrodes.

Results: Our results revealed no significant correlations between PAF and SH area, nor between PAF and pain increase after pinprick stimulation.

Conclusions: These findings suggest that while PAF has shown associations with various pain phenomena, it may not be a reliable predictor of secondary hyperalgesia in healthy individuals. This study contributes to our understanding of the complex relationship between neurophysiological markers and pain sensitization, highlighting the need for further research to identify robust predictors of this process.

II-C1.W.04

STRUCTURAL AND FUNCTIONAL BRAIN SIGNAL COUPLING IN YOUTH WITH CHRONIC MUSCULOSKELETAL PAIN

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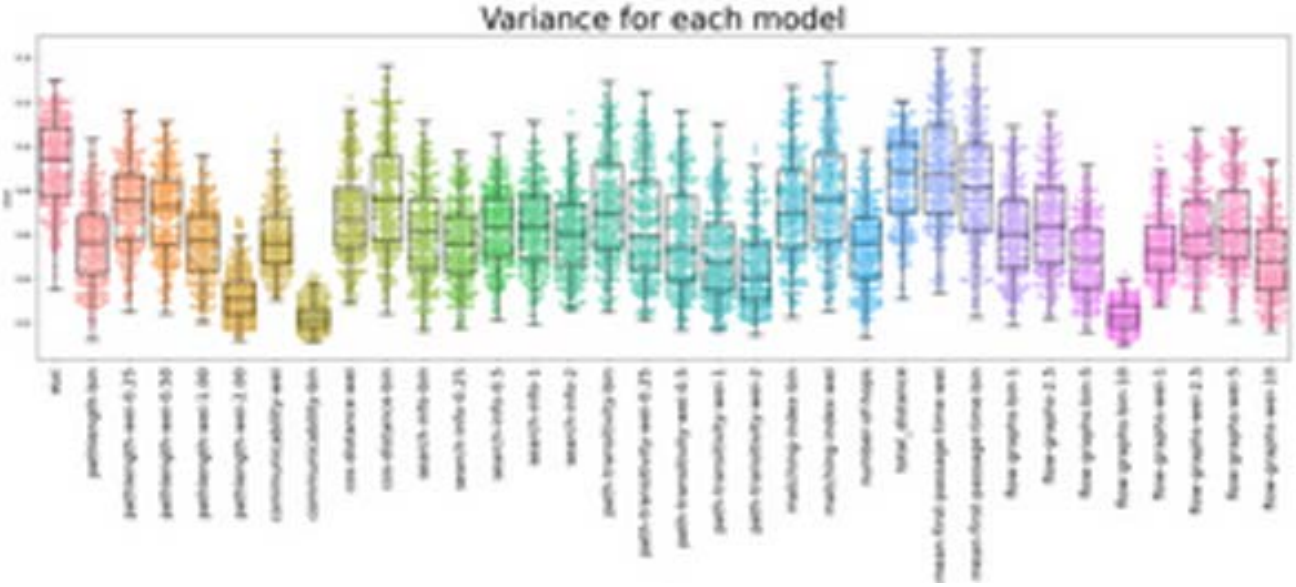
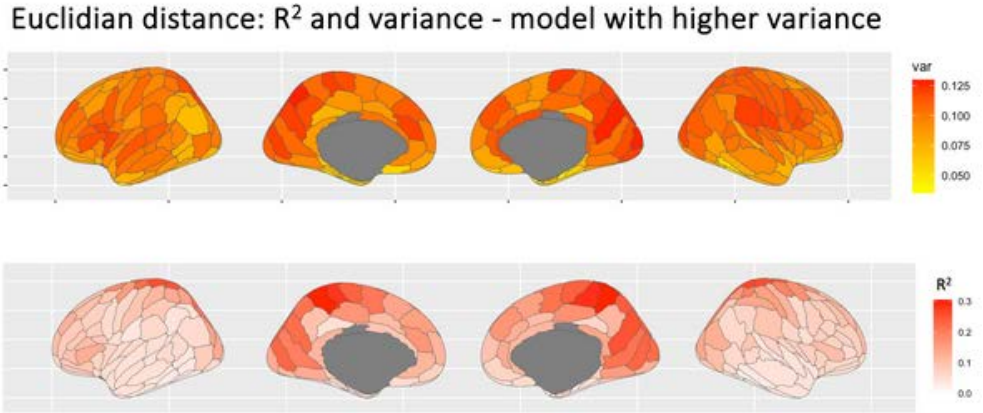
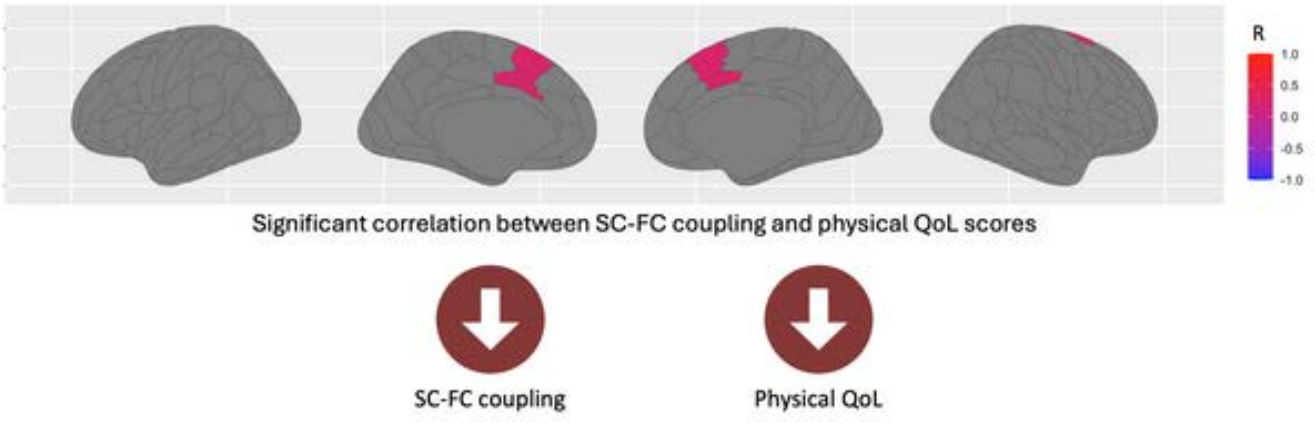
Background and aims: Multisensory hypersensitivity causes discomfort and heightened responses to everyday sensory stimuli, impacting quality of life (QoL). Studies in adult patients with chronic pain show an association between sensory hypersensitivity, clinical severity, and disability. This study aims to investigate how QoL is influenced by the degree of structural and functional (SC-FC) brain region coupling in adolescents with chronic musculoskeletal (MSK) pain.

Methods: We included 74 adolescents (15.64 ± 1.55 yo) with chronic MSK pain from Stanford University and SickKids Hospital in Toronto, as part of the SPRINT study. We used structural diffusion-weighted imaging, a multisensory fMRI task, and self-reported measures on physical QoL (PedsQL). We calculated functional and structural connectivity matrices and computed SC-FC coupling. For the functional matrices, we regressed out task-related variance. We constructed 34 different communicability models to correlate functional and structural data. The model with the highest explained variance was selected, and we correlated physical QoL scores with SC-FC coupling measures. All analyses were harmonized using ComBat.

Results: We found a significant correlation between SC-FC coupling and physical QoL scores in the anterior cingulate cortex (ACC) and dorsomedial prefrontal cortex (dmPFC). Specifically, lower SC-FC coupling in these regions was associated with lower physical QoL scores (r = 0.272, p = 0.020).







Conclusions: Adolescents with chronic MSK pain and lower QoL show connectivity reconfiguration in regions involved in cognitive-affective regulation, specifically in the ACC and the dmPFC. This suggests that reduced SC-FC coupling may reflect brain function reconfiguration in specific cognitive-affective brain regions, which negatively impacts the QoL in youth with pain.

II-C1.W.05

FUNCTIONAL BRAIN CONNECTIVITY IN CHRONIC BACK PAIN AND ITS PLASTICITY THROUGH INTERDISCIPLINARY MULTIMODAL PAIN THERAPY

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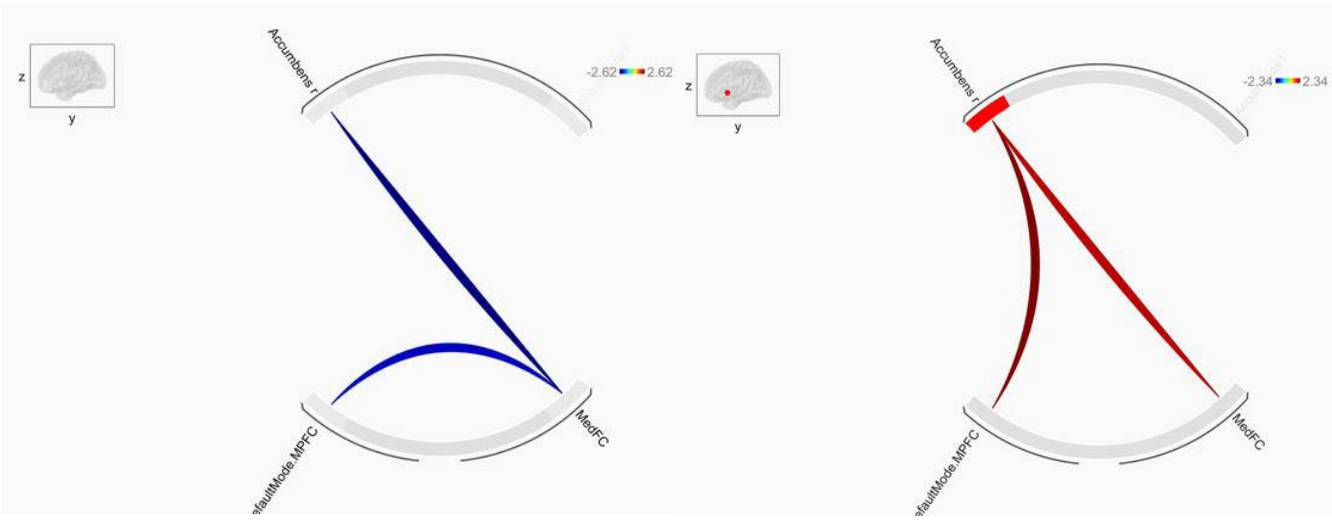
Background and aims: Chronic back pain is a prevalent disorder with adverse consequences for mental health, everyday functioning and the ability to work. Recent study showed that enhanced functional connectivity between nucleus accumbens and medial prefrontal cortex can be a biomarker for chronification of back pain. This project attempts to replicate this biomarker and examines whether the nowadays most effective treatment for chronic back pain —interdisciplinary multimodal pain therapy — resolves this abnormality in brain function.

Methods: We analyzed structural and task based MRI in 18 chronic back pain patients before and after treatment and compared the data before treatment to those of 15 healthy controls.

Results: Before therapy, patients exhibited a lower connectivity than controls between right-sided nucleus accumbens and frontal cortex. This difference was not significant for the medial prefrontal cortex ($t(31) = -1.94$, $p = 0.061$), but for a neighboring area, the medial frontal cortex ($t(31) = -2.62$, $p < 0.05$, FWE corrected).



Conclusions: Results from before therapy failed to replicate an earlier study. However, they support a recent animal study that found selected inhibition of the pathway from prefrontal cortex to nucleus accumbens to increase pain related aversive behaviors in rats. Interdisciplinary multimodal pain therapy shifted altered functional connectivity in patients with chronic back pain towards that of healthy controls. This is in line with previous findings showing increased functional connectivity between the reward system and frontal brain regions after acupuncture therapy.

II-C1.W.06

IDENTIFICATION OF NEUROBIOLOGICAL SUBTYPES IN FIBROMYALGIA USING DESCENDING PAIN MODULATION SYSTEM FUNCTIONAL CONNECTIVITY: IMPLICATIONS FOR PERSONALISED CHRONIC PAIN MEDICINE

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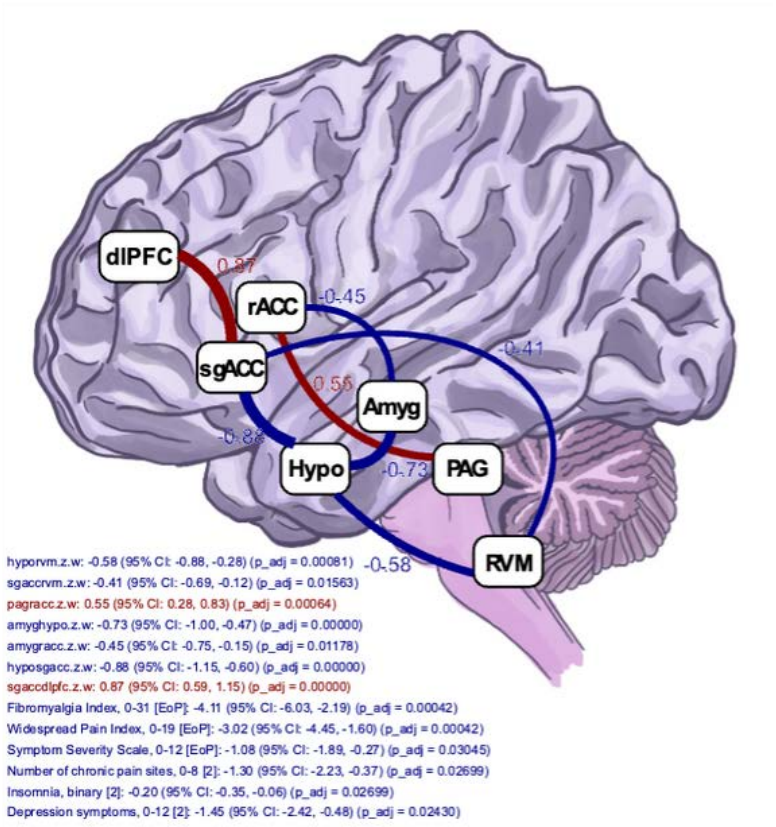
Background and aims: Fibromyalgia is a common and heterogeneous chronic pain condition requiring a personalised medicine approach. Current treatment strategies often use a trial-and-error approach due to a lack of evidence-based methods for phenotyping and management. This study aimed to identify fibromyalgia subtypes using resting-state functional connectivity (RSFC) within the descending pain modulation system (DPMS), and compare clinical measures between identified clusters.

Methods: We analysed data from 205 UK Biobank participants with self-reported fibromyalgia who underwent brain MRI. RSFC was estimated using partial correlations between predefined ROIs in the DPMS with FSL tools. We used hierarchical clustering with Ward's method to identify clusters based on RSFC patterns. A Euclidean distance matrix linked subjects iteratively, forming a hierarchical tree. This minimised the sum of squared errors, creating clusters with similar connectivity patterns. Clinical measures were then compared between these fibromyalgia clusters.

Results: We identified two fibromyalgia clusters: Cluster 1 (N=57) and Cluster 2 (N=148). Significant differences in RSFC and clinical measures were observed between clusters. Cluster 1 showed more severe fibromyalgia symptoms and widespread pain compared to Cluster 2. The amygdala-hypothalamus, rostral ventromedial medulla (RVM)-hypothalamus, and subgenual anterior cingulate cortex (sgACC)-hypothalamus connections were significantly stronger in Cluster 1 compared to Cluster 2, while the dorsolateral prefrontal cortex (DLPFC)-sgACC and periaqueductal grey (PAG)-rostral ACC connections were weaker (**figure**).



Conclusions: We identified two fibromyalgia clusters with differing neurobiological and clinical profiles, suggesting potential subtypes within the condition. These[as1] [EK2] findings support the need for personalised treatment approaches and further research to validate these clusters and explore their clinical relevance.

II-C1.W.07

DIFFERENTIAL PAIN EMPATHY IN FIBROMYALGIA AND MAJOR DEPRESSIVE DISORDER: A VICARIOUS PAIN FMRI STUDY

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Background and aims: Fibromyalgia (FM) and major depressive disorder (MDD) are etiologically associated and frequently comorbid. Our study assesses a potential psychological differentiator: empathy for pain; emotional response to observing/imagining a loved one experiencing pain. FM patients, with a chronic pain history, pain hypervigilance, and increased dispositional affective empathy, may show heightened pain empathy, while MDD patients, with a blunted affect, may exhibit reduced pain empathy.

Methods: 37 women with FM, 19 with MDD, and 41 healthy women, matched demographically (mean age: 47.6), completed a vicarious pain fMRI task, viewing images of hands/feet in painful situations, imagining the injury happening to a loved one, and rating associated unpleasantness. Behavioral group differences were assessed with repeated measures ANOVA and post-hoc t-tests in R. Whole-brain activation differences during vicarious pain were assessed using general linear models, and ANOVA/t-tests in SPM12.

Results: FM patients had higher pain empathy than both MDD and controls ($F=3.96, p=.022$; $T's>5.6, p's<.001$). MDD patients had lower pain empathy than controls ($T=-2.01$, $p=.045$). Compared to controls, FM had activation reductions in the right dlPFC and left fusiform gyrus (qFDR<.043), and MDD had reductions in the bilateral dlPFC, SMA, superior frontal gyri, right S1 and left thalamus (qFDR<.045).

Conclusions: FM patients had heightened empathy and reduced activation in cognitive control and visual processing brain areas. MDD patients had reduced empathy and broader activation decreases in cognitive control, emotional regulation, social cognition, and sensory processing regions. This underscores the importance of understanding emotional differences in FM and MDD beyond primary symptoms and their impact on interpersonal dynamics.

II-C1.W.08

THE FORECAST STUDY: LONGITUDINAL RESULTS FROM BASELINE TO 3 MONTH FOLLOW UP

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Background and aims: FORECAST is a prospective longitudinal cohort study exploring mechanism-based prognostic factors for pain persistence in sciatica. Longitudinal follow up to twelve months is ongoing, completing in summer 2025. Here, we share an update on the largest deeply-phenotyped primary care sciatica cohort to date, describing the cohort at baseline and at 3 months.

Methods: Our cohort includes 201 people with sciatica, aged 18-85, recruited within 3 months of symptom onset. Psychosocial factors (including mood, illness perception, and stigma), self-reported sensory profiling, clinical examination, quantitative sensory testing (QST), biological samples (blood and skin samples), and Magnetic Resonance Neurography of lumbar nerve roots were collected at baseline (n=100). Pain persistence was determined at three and twelve months with the Sciatica Bothersomeness Index (SBI) and a numeric pain rating scale (NRS) as primary outcomes.

Results: Overall, 59.2% of our cohort are female (mean age 54.5 years (SD 15.92). SBI at baseline was 13 [10-17] (median [IQR]), improving at 3 months to 7 [3-12]. Baseline average pain intensity was 6 [3-7] for leg pain, and 4 [2-6] for low back pain (LBP). Pain scores decreased at 3 months (leg pain 2 [1-4], LBP 2 [1-4]). Pain-related worrying (Pain Catastrophising Score) reduced from 13 [7-23] at baseline to 6 [2-14] at 3 months. However, 53-82% people reported persistent pain.

Conclusions: Leg pain severity was moderate and higher than LBP at baseline. At the group level, all primary outcome measures demonstrate improvement at 3 months, however 53-82% of patients report persistent pain at 3 months. Prognostic modelling is currently ongoing.

II-C1.W.09

ICTAL AND INTERICTAL CLUSTER HEADACHE NEUROIMAGING: A PET/MR STUDY USING THE NEW AGONIST 5-HT1A RADIOPHARMACEUTICAL [18F]F13640

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Background and aims: Cluster headache (CH) pathophysiology remains poorly understood. Neuroimaging studies help in understanding pathological process and propose new therapeutics opportunities.

This study uses hybrid PET/MR imaging technique to simultaneously investigate in episodic CH patients the modifications of functional 5-HT_{1A} receptor coupling, using positron emission tomography (PET) with [^{18}F]F13640, and changes of fMRI patterns with MRI , during a attack-free period, and during a CH attack.

Methods: Episodic CH patients performed two PET/MR sessions, one during in-bout period at the usual time of an attack, and one during a remission period. PET/MR sessions lasted 4 hours alternating acquisitions and rest periods as depicted in figure 1. Pain and anxiety were monitored using visual analog scale. Preliminary analysis focused on patients who completed the whole study (n=3). Patient in-bout vs. out-bout PET standardized uptake value ratio (SUVR) at time-interval 70-90min; 150-170min and 200-220min were compared with eight healthy subjects (HS) *(Courault P et al. EJNMMI. 2023)*. For patient 2, who underwent a severe CH attack, $SUVR_{50-70}$ during attack, and $SUVR_{70-90}$ post CH attack, were compared with $SUVR_{70-90}$ of HS and patient's out-bout session.

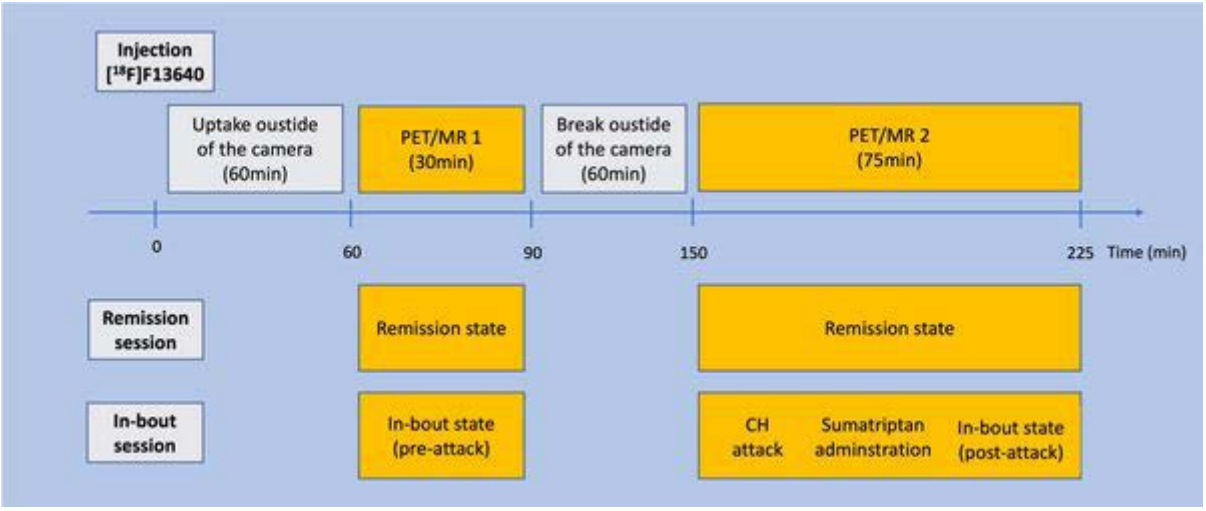

Figure1

Results: SUVR showed no differences between patients and HS, or between in-bout and out-bout sessions for all SUVR time-intervals (figure 2A/B/C). For patient 2, significant increase were showed compared to HS in three regions : brainstem, cingulate and median raphe nucleus (figure 2D).

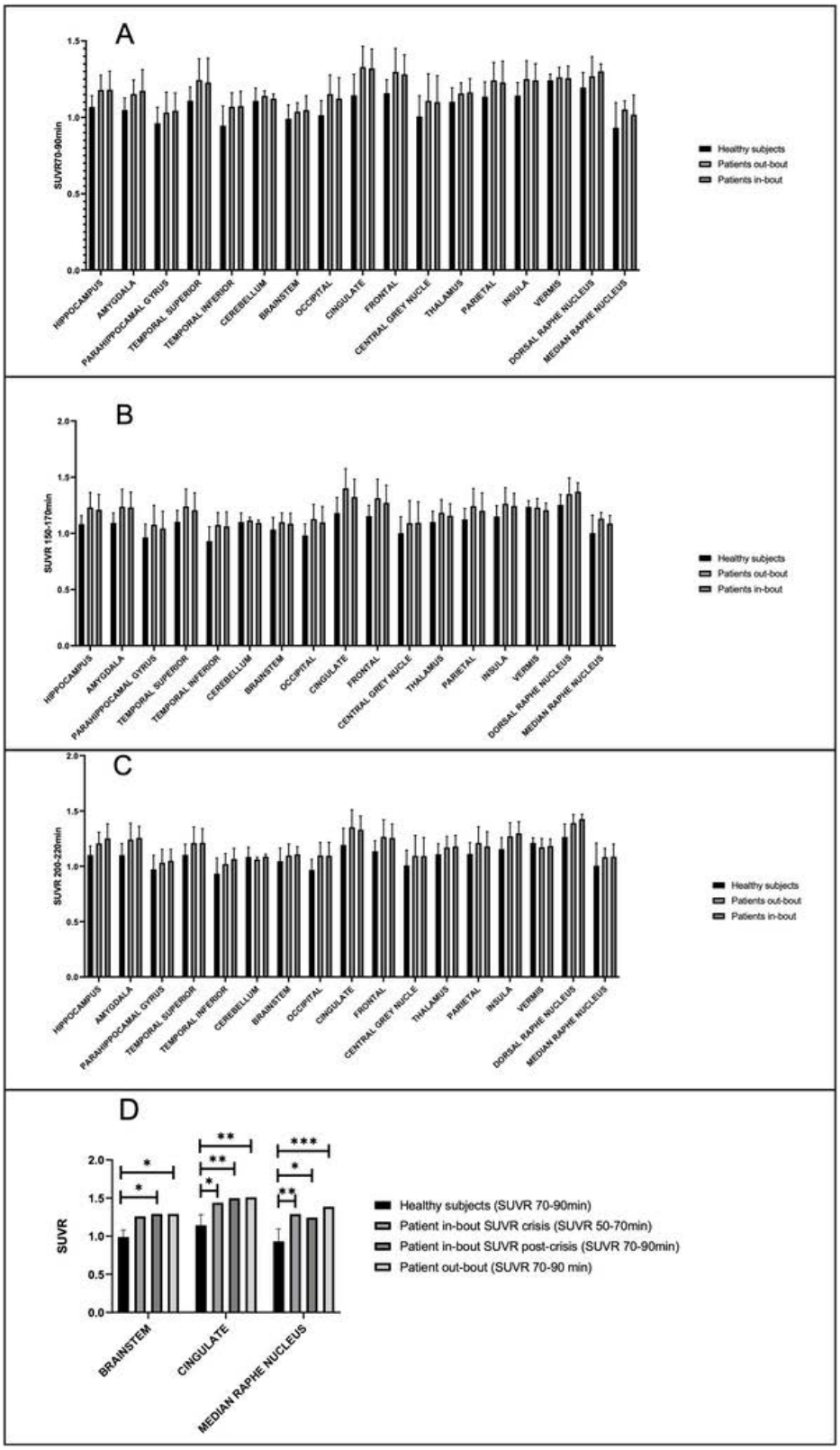

Figure2

Conclusions: Preliminary result showed promising findings. Clinical study is still ongoing, and further analysis with fMRI and voxels-based analysis on PET images are pending final processing.

II-C1.W.10

COGNITIVE FATIGABILITY AND NEURONAL CORRELATES IN CHRONIC PAIN – A CROSS SECTIONAL FMRI STUDY

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Background and aims: Fatigue is common in patients with chronic pain. However, there are knowledge gaps concerning performance fatigue – not least cognitive fatigability (CF) and its neural correlates in this patient group. In this study we therefore aimed to investigate the presence of CF and its neural correlates in patients with chronic pain using functional magnetic resonance imaging (fMRI).

Methods: 24 women with chronic pain and 22 healthy controls, aged 18-45 years, underwent a 20-minute psychomotor vigilance task (PVT) in an MRI scanner during measurements of reaction time and blood-oxygen-level dependent (BOLD) fMRI. CF and BOLD signal changes during PVT were analyzed using dual regression.

Results: The patients showed significant CF, i.e., prolonged reaction time, during the PVT while the controls had a stable performance. There was however no significant neural time on task effect that could be measured by BOLD fMRI. There were, however, mean differences in activated brain areas between the groups during task performance. Patients with chronic pain showed stronger activation primarily in frontal areas and lower activation in several areas, most prominently in the left middle orbital gyrus and right insula compared to healthy controls.

Conclusions: The study demonstrated presence of CF during vigilance demanding activity in patients with cognitive pain. Chronic pain was associated with increased activation in brain regions related to motor and cognitive control, reflecting possible compensatory mechanisms and also associated with lower activation in regions active in motivation, reward, and decision-making.

C2 | SLEEP-PAIN INTERACTIONS

II-C2.W.01

SLEEP DISRUPTIONS & IMMUNE MARKERS PREDICT LONGITUDINAL PAIN OUTCOMES FOLLOWING ORTHOPEDIC SURGERY

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Background and aims: While the bidirectional nature of sleep and pain is well-known, sleep characteristics may serve as better predictors of pain outcomes than pain intensity is of sleep. Increased sleep disturbances can induce, and even exacerbate, an outsized inflammatory reaction that propagates nociception after surgery. This longitudinal pilot study aimed to discern the association between postoperative sleep and inflammation on postoperative pain outcomes.

Methods: The study recruited 40 patients undergoing upper extremity orthopedic procedures from an academic medical center. Participants completed surveys, including the Patient-Reported Outcomes Information System (PROMIS) Sleep Disturbance and past 24-hour average pain intensity, 2-weeks before surgery and at 2-,6-,12-, and 24-weeks after. At each study visit, coordinators collected blood samples. Assays were run on aliquoted plasma samples using MAGPIX kits (EMD Millipore Corporation) to ascertain TNF, IL-1β, IL-6, and corresponding receptors (i.e., IL-1ra and IL-6sr). Mixed effects models estimated postoperative pain outcomes based on changes in PROMIS scores and assays.

Results: Changes in sleep disturbance scores predicted changes in postoperative average pain when accounting for surgery type, changes in inflammatory markers, preoperative sleep, and pain scores. A standard deviation increase in PROMIS Sleep Disturbance scores was linked to a 1-point increase in postoperative average pain (β=0.11;p<.001)(Figure). Elevated postoperative IL-6sr levels were also associated with increased pain in the adjusted model (β=0.0001;p=.036)(Table). Changes in other inflammatory markers were not associated with pain scores.

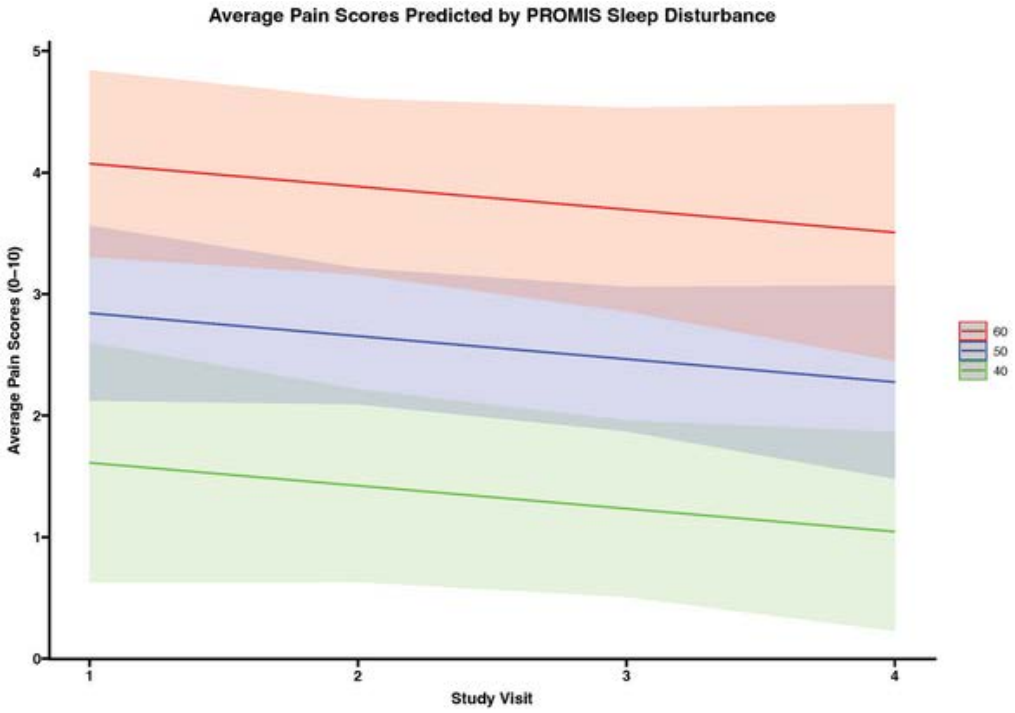

Table: Mixed-effects model estimating postoperative 24-hour average pain	β	Lower 95% Confidence Interval	Upper 95% Confidence Interval	P Value
Intercept	-6.9340	-11.5167	-2.3500	0.008*
Change in PROMIS Sleep Disturbance T-Score Postoperatively	0.1103	0.0672	0.1597	<.001*
PROMIS Sleep Disturbance T-Score Preoperatively	0.0451	-0.0289	0.1170	0.249
Past 24-hour Average Pain (0-10) Preoperatively	0.2476	-0.0453	0.5424	0.125
Study Visit (Time)	-0.1890	-0.5225	0.1654	0.285
Surgery Type				
Arthroscopy (Reference)				
Arthroplasty	-0.8510	-1.6600	0.0356	0.062
Interleukin 6 Receptor (IL-6sr) pg/mL	0.0001	0.0001	0.0001	0.036*

Conclusions: These hypothesis-generating results underscore the potential shared influences inflammation has on both postoperative pain and sleep. Therefore, continued research on changes in the IL-6 trans-signaling system is warranted.

II-C2.W.02

INTEGRATION OF COGNITIVE BEHAVIOURAL THERAPY FOR INSOMNIA IN PAIN MANAGEMENT FOR NONSPECIFIC CHRONIC SPINAL PAIN: A RANDOMISED CONTROLLED TRIAL

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Background and aims: Nonspecific chronic spinal pain (nCSP) is often significantly impacted by insomnia. Insomnia affects over 50% of nCSP patients, disrupts daily functioning, and reduces quality of life. This study

aimed to evaluate the effectiveness of cognitive behavioral therapy for insomnia integrated with best-evidence pain management (CBTi-BEPM) versus BEPM alone in nCSP patients with insomnia.

Methods: A multicenter randomized controlled trial was conducted. Participants were allocated to either the CBTi-BEPM or the BEPM-only intervention. BEPM-only included 3 pain neuroscience education and 15 exercise therapy sessions. CBTi-BEPM included 6 CBTi and 12 BEPM sessions (6 exercise sessions were replaced by CBT-I). The primary outcome was average pain intensity change at 12 months post-intervention. Secondary outcomes included measures related to pain and sleep. Outcome assessments took place at baseline, post-treatment, and at 3, 6, and 12-month follow-ups.

Results: In total, 123 nCSP patients with insomnia participated. Mean(SD) age was 40.2(11.18) years (n=123, 84 women). At 12 months, pain intensity decreased by approximately 2 points in the CBTi-BEPM group and by approximately 1 point in the BEPM-only group. Using a linear mixed model, no significant difference in pain intensity change was observed. CBTi-BEPM showed better improvements in insomnia severity, sleep quality, beliefs about sleep, depressive symptoms, and physical fatigue.

Conclusions: The addition of CBTi to BEPM may not further reduce pain intensity for nCSP patients with insomnia. Nevertheless, integrating CBTi in the treatment approach is still valuable since CBTi-BEPM significantly improved insomnia severity, sleep quality, and resulted in better improvements in other secondary outcomes.

II-C2.W.03

HOW ANXIETY, PAIN PERCEPTION, SENSITIZATION, AND SLEEP QUALITY AFFECT BREAST CANCER SURVIVORS WITH CHRONIC PAIN: A SECONDARY DATA ANALYSIS OF A RANDOMIZED CONTROLLED TRIAL

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Background and aims: Breast cancer survivors (**BCS**) with chronic pain face post-remission challenges including anxiety, central sensitization (**CS**), pain catastrophizing (**PC**), and sleep disturbances, all of which can impact health-related quality of life (**HRQoL**) and role function (**RF**). This secondary data analysis investigates whether baseline anxiety, CS, PC, and sleep quality (**SQ**) can influence and predict HRQoL and RF in BCS with chronic pain over time.

Methods: Data from 122 BCS with chronic pain in a randomized controlled trial assessing anxiety, CS, PC, SQ, HRQoL, and RF at baseline (M1), post-intervention (=13 weeks) (M2), and 3 months (M3), and 1 year (M4) were used. Linear mixed-effect models and prediction analysis with ANOVA and post-hoc analysis were performed.

Results: Significant effects on HRQoL were found for CS (**SE=0.093**, **p=0.0335**), PC (**SE=0.099**, **p=0.0005**), and SQ (**SE=0.27**, **p=0.0033**), and on RF for CS (**SE=0.14**, **p=0.0026**), PC (**SE=0.15**, **p=0.0160**), and SQ (**SE=0.44**, **p=0.0260**). Post-hoc analysis revealed significant (**SE=1.66**, **p=0.0009**) improvement after treatment (M2) in HRQoL but this was not sustained at M3 and M4. Prediction analysis identified baseline PC (**SE=0.10**, **p=0.0001**) and poor SQ (**SE=0.29**, **p=0.017**) as negative predictors of HRQoL, while PC (**SE=0.16**, **p=0.019**) and CS (**SE=0.15**, **p=0.002**) as negative predictors of RF.

Conclusions: PC, CS, and poor SQ at baseline negatively influence HRQoL and RF over time while PC is a key negative predictor for both outcomes. Thus, an individualized and ongoing treatment approach may sustain HRQoL and RF improvements for BCS with chronic pain.

II-C2.W.04

DISRUPTED CONNECTIVITY IN LARGE-SCALE BRAIN NETWORKS IS ASSOCIATED WITH COGNITIVE DECLINE IN OLDER ADULTS WITH CHRONIC PAIN

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Background and aims: Chronic pain and cognitive impairment are prevalent syndromes among older adults, being leading causes of disability in individuals over the age of 65. Although many recent studies have indicated a connection between chronic pain and cognitive decline, few studies have attempted to link alterations in brain functional connectivity with cognitive impairment in older adults with chronic pain.

Methods: A neuropsychological assessment and a fMRI resting-state recording were conducted on 30 older adults with chronic musculoskeletal pain (69.5 ± 6.58 years; 14 males), 29 pain-free older adults (70.48 ± 4.60 years; 15 males), and 29 younger adults (19.7 ± 1.64 years; 15 males). All participants completed the Digit Span test, TMT A and B, WMS word list, Stroop test, WCST, FAS and animals verbal fluency task. Functional connectivity analysis on the Default Mode Network (DMN), Salience Network (SN), and Fronto-parietal Network (FN) was conducted.

Results: Older adults with chronic pain showed significantly poorer performance than pain-free older adults in FAS, Digit Span and WCST. Younger participants outperformed both older groups in all tasks except FAS. Additionally, older adults with chronic pain exhibited increased functional connectivity in the DMN and decreased connectivity in the FN compared to the younger adult group. Notably, increased DMN connectivity correlated with poorer WCST performance in the chronic pain group. No significant differences or correlations were observed in the pain-free older group.

Conclusions: Our findings suggest that pain-induced plasticity throughout the aging process in the DMN is linked to cognitive impairment in the older adults with chronic pain, concretely, in executive functions.

II-C2.W.05

MENSTRUAL CYCLE PHASES: IMPACT ON SLEEP QUALITY, DURATION, AND PAIN CATASTROPHIZING IN PRIMARY DYSMENORRHEA

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Background and aims: This study aims to investigate sleep quality, sleep duration, and pain catastrophization across different phases of the menstrual cycle in individuals with primary dysmenorrhea (PD). Literature suggests that pain tends to become chronic in women with PD, alongside commonly reported decreases in sleep quality and duration.

Methods: This cross-sectional study included women aged 18 years and older diagnosed with according to the PD Consensus Guidelines. The Pain Catastrophizing Scale (PCS) was used to determine the degree of pain perception. Nighttime sleep duration and sleep quality and disturbances were assessed with the Pittsburgh Sleep Quality Index (PSQI) during the follicular (21 days), ovulation (14 days), and luteal phases (7 days) of the menstrual cycle. Repeated measures ANOVA analyzed data across phases, with Greenhouse-Geisser correction and Bonferroni post-hoc tests for significance ($p < 0.05$).

Results: This study included 195 individuals (mean age: 21.33 ± 1.76 years, BMI: 21.70 ± 3.38 kg/m²). PCS and PDQI results significantly changed across menstrual cycle phases ($p < 0.001$). However, sleep duration did not change according to the phases of the menstrual cycle ($p > 0.05$). Table 1 presents outcome measures for pain catastrophizing, sleep duration, and sleep quality across menstrual cycle phases.

Table 1: Change in Result Measurements According to Menstrual Phases

	Follicular Phase	Ovulation Phase	Luteal Phase	p	ηp^2
Pain Catastrophization	21.90±14.27	4.88±3.14	11.06±11.45	**<0.001[a,b,c]**	**0.508**
Sleep duration	7.39±1.58	7.27±1.21	7.23±1.27	0.231	0.008
Sleep quality	6.72 ±2.97	5.64±2.60	5.72±2.56	**<0.001[a,b]**	**0.129**

Descriptive statistics are given as mean ± standard deviation.
İstatistiksel anlamlılık değeri p<0,05 olarak kabul edildi.
a, significance in the change between follicular phase and ovulation phase; b, significance in the change between follicular phase and luteal phase; c, significance in the change between ovulation phase and luteal phase.
np2, eta squared effect size.

Conclusions: Increased pain catastrophizing and decreased sleep quality were commonly observed in the follicular and luteal phases, with no significant effect observed in the ovulation phase. Randomized controlled trials with long-term follow-up are needed to further investigate the relationship between sleep quality, duration, and pain catastrophizing across menstrual cycle phases, validating our study's findings.

II-C2.W.06

ASSESSING THE RELATIONSHIP BETWEEN PAIN, SLEEP, MENTAL HEALTH, AND COGNITION IN PEDIATRIC PATIENTS WITH CHRONIC PAIN

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Background and aims: Chronic pain in adolescents disrupts daily functioning, affecting physical activity, sleep, mental health, and cognition. Psychological distress and pain are linked to poorer executive function. Research suggests that adolescents with immature executive skills have poor self-management, emotional control, and increased pain perception that can reinforce pain-related disability. This study examines short-term associations among movement, sleep, mood, and cognition in adolescents with chronic pain undergoing rehabilitation.

Methods: A 4-week observational study was conducted from February 2022 to September 2024 in adolescents treated in an interdisciplinary pain rehabilitation program, 8 hours/5 days/week. Validated questionnaires on pain, sleep, movement, and mood were administered at baseline and discharge. Assessments included digitized cognitive tests (CANTAB®) and continuous monitoring of sleep and activity using actigraphy watches.

Results: The study included 42 adolescents (mean age=15.1 years, 76% female) diagnosed with non-cancer chronic pain syndromes. At study completion, there were significant reductions in self-reported functional disability inventory, pain-related activity avoidance, pain catastrophizing, fear of pain (all *ps*<0.001), anxiety (*p*=0.001), depression, and sleep disturbances (*ps*<0.001). Cognition improved in patients' inhibitory control (*p*<0.01), cognitive flexibility (*p*<0.001), processing time (*p*<0.01), self-monitoring (*p*<0.05), and planning (*p*<0.01) abilities across the rehabilitation period. Increased sleep efficiency and activity were associated with improved mood and inhibitory control (*ps*<0.05).

Conclusions: Reduced pain-related disturbances may be associated with improved mental health and cognition in pediatric patients suffering from chronic pain. These findings underscore the critical role of addressing sleep disturbances and promoting activity as key therapeutic components. Further research is essential to explore chronic pain's multidimensional impact on youth.

II-C2.W.07

THE IMPACT OF SLEEP AND GUT MICROBIOTA ON PAIN : PRELIMINARY RESULTS

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Background and aims: The aim of this study was to investigate two factors that could influence the susceptibility to develop peripheral and central sensitization in humans: the intestinal microbiota composition and its metabolites

and the sleep quality. Both factors are known to modulate pain perception, but their interference with the induction of peripheral and central sensitization remains largely unknown.

Methods: Healthy human participants took part in two experimental sessions separated by two weeks: a peripheral sensitization session in which we assessed heat hyperalgesia and flare response (using IR imaging) produced by topical capsaicin applied onto the volar forearm, and a central sensitization session in which we assessed secondary mechanical hyperalgesia (sensitivity to pinprick stimulation) induced by high-frequency electrical stimulation (HFS) of the skin. Sleep was assessed using a one-week actimetry and a sleep diary. Blood and fecal samples were collected for analysis of gut microbiota composition and metabolomics. Participants were categorized as short (<6h30), medium (6h30-8h30) or long (>8h30) sleepers.

Results: Data was collected in 42 out of 70 planned participants. Application of topical capsaicin led to a significant reduction of heat pain threshold and increased the skin temperature in the treated area. Application of HFS led to a significant increase in the pinprick intensity ratings. No differences were observed between the classes of sleepers, but only 4/42 participants were short sleepers. Analysis of blood and fecal samples is ongoing.

Conclusions: The very small number of short sleepers recruited so far does not allow assessing the influence of total sleep time on the susceptibility to sensitize.

II-C2.W.08

THE EFFECT OF SLEEP DEPRIVATION ON PLACEBO HYPOALGESIA INDUCED BY OBSERVATIONAL LEARNING

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Background and aims: Insufficient or disrupted sleep can contribute to many health problems, including an elevated risk of memory loss, mood disorders, and pain exacerbations. Sleep disorders increase pain sensitivity in clinical settings, while increased pain levels indicate an associated decrease in sleep quality, but the exact mechanisms are unknown. The evidence from experimentally induced sleep deprivation suggests that sleep disturbance is related to decreased hypoalgesia efficacy. However, little is known about whether sleep deprivation can potentially impair the ability to induce placebo effects in pain. Thus, we aim to determine the impact of sleep deprivation on placebo hypoalgesia induced by observational learning.

Methods: A total number of 60 participants are randomly assigned to either a sleep deprivation group or a control group with usual sleep time. The experimental setup takes place in a controlled laboratory environment, where participants are required to sleep. Initially, those in sleep deprivation group have their natural night sleep shortened by 60%, while participants in control group maintain their standard sleep duration. All participants undergo all-night polysomnography recording. Subsequently, participants from both groups undergo placebo hypoalgesia induction via observational learning. Sham TENS device attached to their forearm is used as a placebo. Participants are presented with video depicting model experiencing pain stimuli and rating them as less intense when applied with the placebo. Pain stimuli of medium intensity are applied before and after observational learning phase to test learning effects.

Results: Data collection is ongoing, and results will be presented on the poster.

Conclusions: Conclusions will be presented on the poster.

II-C2.W.09

IMPACT OF SLEEP DISRUPTION ON EXPERIMENTAL SHOULDER PAIN AND QUANTATATIVE SENSORY TESTING IN HEALTHY PARTICIPANTS: A NOVEL EXPERIMENTAL MODEL

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Background and aims: Chronic shoulder pain, affecting approximately 16% of the population, is a multimodal condition which is inadequately replicated in existing experimental pain models. Sleep disruption, known to

influence central pain mechanisms, may enhance the clinical relevance of these experimental pain models. Hence, this study aims to investigate the impact of sleep disruption on experimental shoulder pain.

Methods: Seventeen healthy participants (11 female, age 27.5 ± 4.2, BMI 24.9 ± 3.6) completed two experimental sessions, separated by three nights of disrupted sleep. Each session included Quantitative Sensory Testing (QST) using computer-controlled cuff-pressure algometry and administration of hypertonic saline (1.2 mL; 7%) injected into the dominant deltoid muscle. Pain was rated on an 11-point NRS (0; 'no pain' and 10: 'worst pain imaginable') and marked on a body chart. Participants reported sleep quality and level of rest each morning following the sleep disruption protocol. Approval was granted by the local ethical committee (N-20220063) and pre-registered on ClinicalTrials.gov (NCT06336109).

Results: The sleep disruption protocol successfully lowered both the sleep quality ($p<0.01$) and level of rest ($p<0.01$). The experimental model of shoulder pain induced mean peak pain levels of 6.6 NRS at baseline. Following the sleep disruption protocol, significant increases were found in pain distribution ($p<0.01$), but not for peak pain intensity or QST measures.

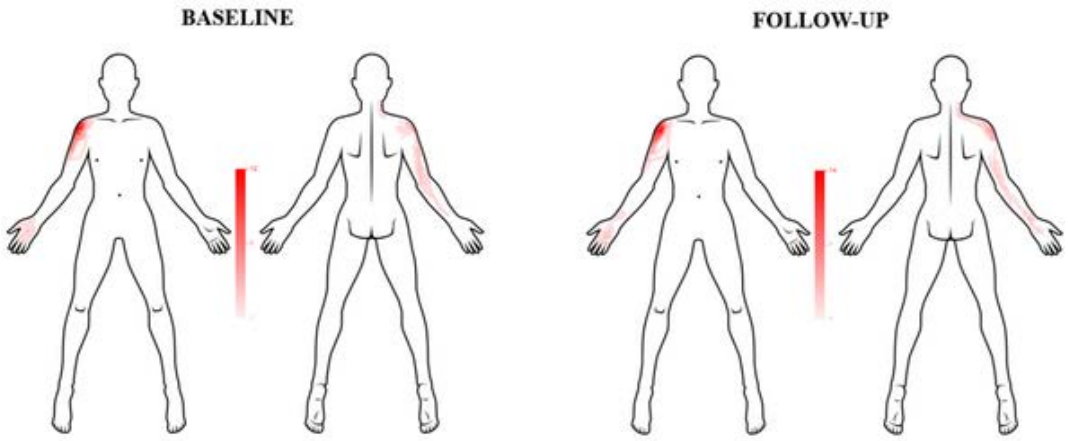

Figure 1: Distribution of pain from the hypertonic saline injection (1.2 ml; 7%) at baseline and follow-up.

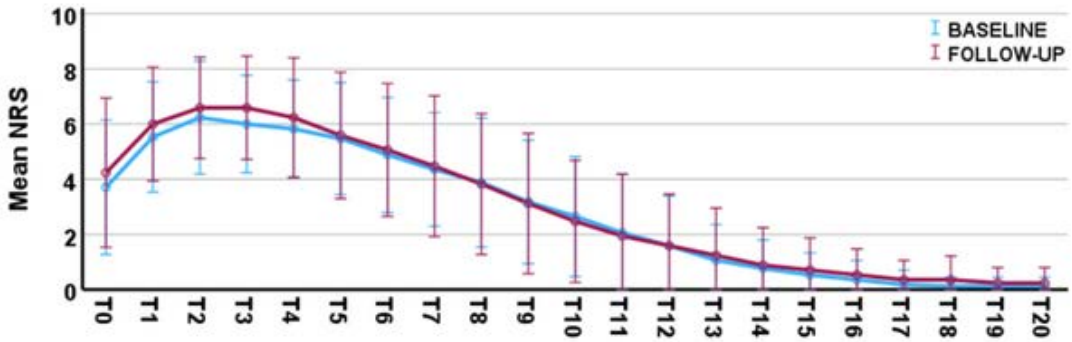

Figure 2: Mean pain rating on the NRS (0: 'no pain' and 10: 'worst pain') every 30 seconds for 10 minutes. Baseline ratings are shown in blue and follow-up ratings in purple. Abbreviations: NRS; Numeric Rating Scale: T; Timepoint.

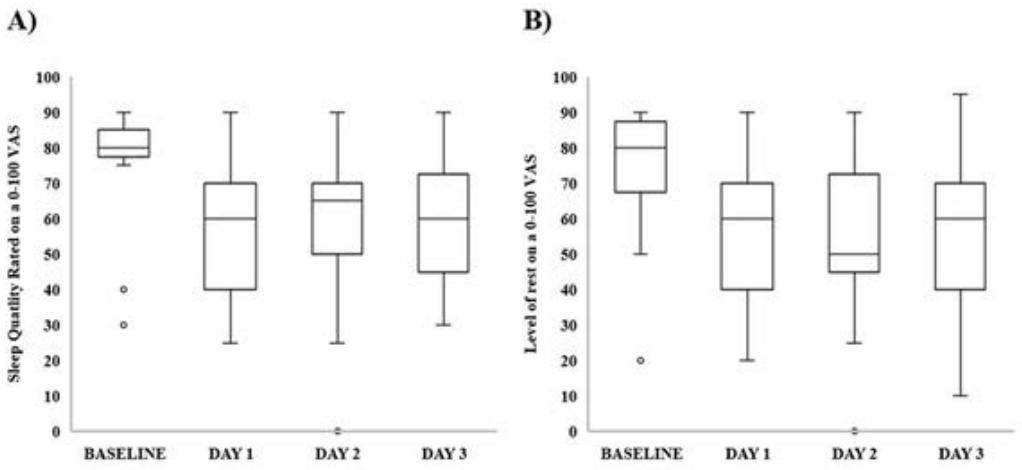

Figure 3: Box plots showing the distributions of quality of sleep (A) and level of rest (B) during a normal night's sleep (Baseline) and the morning after each night with forced awakenings.

Conclusions: The current study successfully induced shoulder pain of moderate intensity and lowered the sleep quality and level of rest. Combining sleep disruption and hypertonic saline injection resulted in significantly increased pain distribution, which potentially offers a more accurate replication of clinical shoulder pain.

II-C2.W.10

THE INFLUENCE OF EVENINGNESS CHRONOTYPE ON THE TRANSITION FROM LOW TO HIGH IMPACT CHRONIC PAIN: A LONGITUDINAL ANALYSIS PROTOCOL USING DATA FROM UK BIOBANK

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Background and aims: Approximately 43% of UK adults present with chronic pain, encompassing a broad range of impact in affected persons' lives. High impact pain is defined by the extent of difficulties in functioning and disability (self-care, work and/or social activities). Chronotype, individual variation in preferred sleep-wake cycle timings, may have causal value. Eveningness chronotype is a predictor of poorer mental and physical health outcomes. Applied to chronic pain, some evidence suggests that eveningness chronotype is associated with poorer pain-related outcomes. We are yet to understand the causal role of chronotype on pain impact status. This study aims to investigate the causal effect of chronotype on the transition from low to high impact chronic pain over a 10-year period.

Methods: Utilizing directed acyclic graphing (DAG), causal relationships of interest are modelled using expert information, PPIE and relevant literature. This also helps to identify the minimal sufficient adjustment set. Variables will be matched to data collected from the UK Biobank, an epidemiological dataset comprising 500,000 adults. Confounders, colliders and mediators will be identified using propensity score matching to account for their effects in the chronic pain transition pathway. Propensity scores will be used in the outcome model to quantify the causal effect in the pain transition. To accurately quantify uncertainty in the causal effect estimate, bootstrapping techniques will be used.

Results: Anticipated results will show that eveningness chronotype predicts the transition from low to high impact status of chronic pain.

Conclusions: Findings will further inform the sleep-pain relationship alongside future combined intervention study planning.

D1 | DIGITAL INTERVENTIONS FOR CHRONIC PAIN

II-D1.W.01

EASYCOG: A DIGITAL COGNITIVE SELF-ASSESSMENT TOOL FOR CHRONIC PAIN PATIENTS

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Background and aims: Many pathological conditions, including chronic pain (CP), can impair cognitive functions. CP, defined as persistent or recurrent pain lasting more than three months, produces symptoms that affect the sensory-discriminative, motivo-affective, cognitivo-behavioral dimensions. In CP centers, cognitive assessment is far from being present in the follow-up of CP patients, due to lack of time, appropriate tools or trained health professionals. To fill this gap, our laboratory has developed easyCOG, a digital tool that allows rapid self-assessment of cognitive functions without the help of an experimenter, thanks to speech recognition supported by an artificial intelligence neuronal network.

Methods: In the initial validation steps, we established normative values for 7 cognitive functions on a cohort of 70 healthy subjects. As easyCOG includes a Montreal Cognitive Assessment (MoCA) score, we assessed its

reliability in comparison with MoCA normative values. To assess its specificity, we made comparisons with 20 subjects with mild cognitive impairment (MCI) and 20 CP patients selected from a CP center. Finally, we tested the fidelity of easyCOG (i.e. test-retest) by repeating sessions at different intervals.

Results: Compared with normative MoCA scores, easyCOG has excellent age-related reliability. Several cognitive functions were significantly and differentially impaired in MCI subjects and CP patients compared to normative values in healthy subjects, confirming good specificity. Finally, fidelity analysis revealed a zero test-retest effect for a 4-month interval.

Conclusions: In conclusion, easyCOG is a convenient and reliable digital tool for the assessment and monitoring of cognitive function in patients with CP.

II-D1.W.02

SUPPORTING SELF-MANAGEMENT THROUGH EHEALTH - EXPLORING THE NEEDS, CHALLENGES AND SOLUTIONS IN GENERAL PRACTICE: A QUALITATIVE AND PARTICIPATORY DESIGN STUDY

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Background and aims: Digital transformation and integration of eHealth solutions into chronic pain management faces significant challenges that have not yet been met. To realize the potential of eHealth solutions there is a need to understand the challenges, needs and care processes of eHealth into specific contexts and specific purposes. The objective of this study was to explore challenges, barriers, support needs, and visions experienced by patients and general practitioners (GPs) in the context of an eHealth solution designed for chronic pain management in general practice.

Methods: The study used action-research as a methodological framework. We conducted two future workshops involving eight patients living with chronic pain and seven GPs with clinical experience in managing chronic pain. Through case vignettes and inspiration cards, these workshops stimulated discussions and shared knowledge construction. Data were analysed using reflexive thematic analysis, separated by the groups, and were synthesized via a matrix analysis.

Results: The analysis revealed five content summary themes: Theme 1—patients' experience of challenges in life with pain; Theme 2—challenges in treating patients with chronic pain; Theme 3—patients' suggestions for the structure of the eHealth solution; Theme 4—GP' suggestions for the structure of the eHealth solution; and Theme 5—differences and similarities: Visions for an eHealth solution. The analysis generated several touchpoints and tension within the patient-physician encounter.

Conclusions: In conclusion, these themes provide distinct narratives, offering valuable insights into the design objectives. Our study represents a significant advancement in developing personalized and innovative eHealth solutions for general practice, addressing key clinical challenges.

II-D1.W.03

THE EFFECTS OF TELEREHABILITATION ON PAIN, STRENGTH AND BALANCE IN ADULT PATIENTS WITH KNEE OSTEOARTHRITIS: A SYSTEMATIC REVIEW OF THE LITERATURE

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Background and aims: In recent years, telerehabilitation has grown significantly due to advancements in computer science and telemedicine. Osteoarthritis (OA), causing substantial pain and disability, often sees traditional treatments hindered by accessibility and adherence issues. The COVID-19 pandemic highlighted the need for remote options, accelerating telerehabilitation adoption. This approach offers a cost-effective, efficient solution, ensuring continuous and effective care through digital technologies. This systematic review evaluates the effects of telerehabilitation on pain, strength, and balance in adult patients with knee osteoarthritis, aiming to inform clinical practice and guide future research.

Methods: A literature search was conducted regarding the last 20 years (2004-2024) in the databases PubMed, Cinhal and PEDro. Only studies satisfying the inclusion and exclusion criteria (Table1) were selected. Two reviewers independently screened the studies, used the PEDro scale and Downs and Black checklist to assess the risk of bias. Any differences, between the researchers on article selection and risk of bias assessment, were resolved through discussion or with the help of a third reviewer.

Inclusion Criteria	**Exclusion Criteria**
Randomised Control Trials (2004 - 2024)	Age <18 years old
adults (age >18 year old	Rhumatological or inflammatory conditions
knee osteoarthritis	Cardiovascular, respiratory, renal and other pathologies
intervention: telerehabilitation	study protocols, case studies, case series
Outcome Measures Pain AND/OR strength AND/ OR balance	articles written in a language other than English.
Articles in English	previous or planned surgery
	pregnancy
Table 1: Inclusion, Exclusion Criteria	

Results: This systematic review includes 6 randomized controlled trials, with the total number

of participants amounts to 581 patients infected with knee osteoarthritis. Risk of bias was assessed with PEDro and the Downs and Black Checklist (DNBC). In PEDro 5 surveys were characterized as “good quality” and one as “moderate quality” while in DNBC, four studies were rated as “moderate quality” and two as “good quality”. Statistically significant changes were reported in four of the studies (Table2). Table 2: Study characteristics

Author	**Participants**	**Intervention**	**Outcome Measures**	**PEDro Scale**	**Downs and Black Scale**	**Statistically significant difference**
Azma et al, 2017	N=54	1. Instruction manual + telecommunication 2.OBPT	1.WOMAC 2.VAS 3. KOOS	6/10	18/28	YES
Torre et al, 2022	N=48	A) telerehabilitation B) excercise at home	1.30 CST 2.KOOS 3.NRS 4.IPAQ-SF 5. FSS 6. QUIPA 7.EARS 8.HADS 9.TKS 10.Physical Activity Readiness Questionnaire for Everyone 11.Patient Satisfaction with treatment	7/10	20/28	YES
Lawford et al, 2018	N=148	A) From educational material Online exercise Sessions via Skype B) From educational material	1.NRS 2. WOMAC	4/10	16/28	YES
Odole et al, 2013	N=50	A) Telerehabilitation B) p/t in clinic	1.VAS 2. IKHOAM	6/10	19/28	YES

Author	Participants	Intervention	Outcome Measures	PEDro Scale	Downs and Black Scale	Statistically significant difference
Bennell et al, 2016	N=168	A) P/T + COACHING B) P/T	1.NRS 2. WOMAC 3.MCID 4.PASS 5.AAS 6.GROC	7/10	19/28	YES
Rini et al, 2015	N=113	A) PainCOACH B) Evaluation	1.AIMS 2 2.ASES 3.PASC 4.PNAS	8/10	22/28	NO

Conclusions: Telerehabilitation shows great promise as a treatment for knee osteoarthritis. Our examination of various telerehabilitation applications revealed that it can positively impact a broad spectrum of ailments. This makes it an ideal therapy for individuals who are unable to access face-to-face therapy for any reason.

II-D1.W.04

CHAIR YOGA VIA TELEREHABILITATION IN THE ELDERLY: EFFECTS ON PAIN, SLEEP QUALITY AND QUALITY OF LIFE

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Background and aims: With the increasing aging population, managing chronic pain, sleep disturbances, and declining quality of life has become crucial in elderly care. Innovative approaches like telerehabilitation combined with chair-based yoga may offer promising benefits. This study aimed to determine the effects of chair-based yoga via telerehabilitation on pain, sleep quality, and quality of life in elderly individuals.

Methods: A total of 32 elderly participants randomised 2 groups were enrolled in this study. The chair yoga group (69,81±4,34 years) underwents a 45-minute chair-based yoga program facilitated via telerehabilitation twice a week for six weeks. The control group (70,81±4,78 years) was informed about the benefits of physical activity and exercise on pain, sleep and quality of life. Baseline and post-intervention assessments included pain levels, sleep quality and quality of life evaluated by the McGill Pain Questionnaire, the Pittsburgh Sleep Quality Index, the Nottingham Health Profile respectively.

Results: Significant improvements were observed in all measured parameters following the intervention. Pain levels showed a significant decrease ($p<0.05$). Participants also reported better sleep quality ($p<0.05$). Additionally, quality of life measures indicated significant enhancements ($p<0.05$).

Conclusions: The findings of this study suggest that a chair-based yoga program delivered through telerehabilitation is effective in reducing pain, improving sleep quality, and enhancing the overall quality of life in elderly individuals. These results highlight the potential of integrating telerehabilitation with yoga practices in geriatric care, offering a viable option to support the health and well-being of the elderly population.

II-D1.W.05

"HOW CAN AN APP POSSIBLY HELP WITH PHYSICAL PAIN?" – EXPERIENCES OF USING THE CURABLE APP FOR CHRONIC PAIN

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Background and aims: Chronic pain affects millions globally, and often traditional management falls short. Pain management apps are gaining popularity for providing timely, accessible care when face-to-face services are

backlogged. However, digital health intervention research is in its infancy, with a limited understanding of the impact of these apps. This study aims to explore users' experiences with the Curable app, considering its impact and the influence of contextual factors.

Methods: This qualitative study, situated within an interpretivism paradigm, used semi-structured interviews with previous users of the Curable app for chronic pain (n = 12). Data was analysed using reflexive thematic analysis.

Results: Five themes were conceptualised from the data: (1) A Tale of Two Stories, (2) Tin Man and the Invisible Women, (3) It Takes a Village, (4) Enjoy Being in the Process of Becoming, (5) Fiend to Friend; a story of neuroplasticity.

Conclusions: Participants navigate a paradoxical space, where trust coexists with scepticism and desperation with hope in a delicate balance. This tension is compounded by the gendered bias within the healthcare system, leaving many feeling abandoned and isolated, suffering in silence. The Curable app appears to foster a validating community, offering participants a sense of hope and belonging. Embracing its biopsychosocial approach, pain was reframed as a protective mechanism created by the brain, rather than tissue damage. This appeared to shift participants from chasing pain resolution to reclaiming their lives with purpose and joy. Participant self-selection may have led to recruiting those with positive experiences, limiting the findings' transferability to the wider pain community.

II-D1.W.06

A CONNECTED WEARABLE TRANSCUTANEOUS ELECTRICAL NERVE STIMULATION DEVICE IMPROVES PAIN MANAGEMENT, PHYSICAL ACTIVITY, AND DRUG CONSUMPTION IN PATIENTS WITH PAINFUL KNEE OSTEOARTHRITIS

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Background and aims: Knee osteoarthritis (KOA) affects approximately 1.6 million people in France. Pharmacological treatments, often poorly tolerated, offer limited efficacy, leading to the recommendation of non-pharmacological approaches. A randomized study demonstrated the pain-relieving efficacy of a connected W-TENS device compared to step 2 analgesics (Maheu et al.,Ther Adv Musculoskelet Dis. 2022 ;14:1759). This online survey aimed to evaluate the real-life impact of a connected W-TENS device on pain management, physical activity, drug consumption, sleep, and mood.

Methods: The survey was conducted from July to August 2024 among patients with painful KOA who had used the connected W-TENS device for at least 15 days.

Results: Out of 67 patients who consented to data analysis, 45% had been suffering from KOA for more than 5 years. A significant proportion of patients reported improvements in pain (87%), physical activity (82%), and drug consumption (80%). Patients using the device for more than 3 months reported greater pain reduction than those using it for less than 3 months. Patients under 75 years old were more likely to resume physical activity than those above 75. Finally, 50% (respectively 52%) of patients reported an improvement in sleep (respectively mood).

Conclusions: The use of the connected W-TENS device appears promising for relieving KOA pain, with benefits for physical activity and drug consumption. Randomized clinical studies are necessary to confirm these results.

II-D1.W.07

TO EXPLORE THE SMARTPHONE APP USE HABITS AND PREFERENCE AMONG COMMUNITY-DWELLING OLDER ADULTS WITH CHRONIC PAIN

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Background and aims: Older adults are often overlooked as app users, yet their phone usage is important. Effective mobile app use can motivate older adults to engage in exercise and access information on pain and pain management, supporting healthy aging.

This study aims to investigates chronic disease and pain in older adults, their phone usage patterns, obstacles to using phones, and strategies for effective app learning.

Methods: This study used an online self-administered questionnaire to gather data on demographics, chronic diseases, smartphone use, and barriers to smartphone usage.

Results: There were 280 participants (143 males, 137 females, mean age = 65.88 years) who joined in the study. Among them, 66.78% (n = 187) experienced chronic pain, averaging a score of 4.69±1.85 on a 1–10 scale. Common pain locations included the waist (17.6%), legs (15.5%), and shoulders and arms (11.8%). The prevalent chronic diseases were hypertension (p = 0.014), arthritis (p = 0.027), and diabetes (p = 0.007).

Over half of the participants (61.78%) used smartphone apps more than three times a week, primarily for weather (70.0%) and family communication (64.29%). Among them, 67.5% found app usage challenging, mainly due to difficulty locating needed functions (65%). Family assistance was the main support for 54.29% of those facing smartphone issues, and participants expressed a willingness to share apps with others.

Conclusions: Older adults with chronic pain face challenges when using smartphones, especially finding functions. Through the use of personalized smartphone apps and family assistance, chronic pain in older adults can be effectively managed.

II-D1.W.08

INDIVIDUAL-LEVEL EFFECTS OF A DIGITAL BEHAVIORAL INTERVENTION FOR CHRONIC PAIN: A SINGLE-CASE EXPERIMENTAL DESIGN STUDY AND PROOF-OF-CONCEPT

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Background and aims: The chronic pain population is heterogeneous, and thus, behavioral treatment will benefit patients in various ways. In the multi-phase DAHLIA project, a digital behavioral intervention for chronic pain is being developed, evaluated, and sustainably implemented in an agile, data-driven, user-informed process with the goal to promote changes in processes and pain-specific functioning. The aim of this proof-of-concept study is to examine individual-level treatment effects in a heterogeneous chronic pain sample receiving the DAHLIA prototype 1.0.

Methods: A single-case experimental design (SCED) was conducted with participants experiencing chronic pain (>3 months) recruited through healthcare. Participants were randomized at baseline (5-10-day A-phase) and completed a digital, 6-module intervention based on Acceptance and Commitment Therapy (ACT) (6-8-week B-phase) with weekly therapist contact. Digital diaries, prompted twice daily, tracked pain intensity, well-being (sleep, mood, stress, fatigue), functioning (pain avoidance, catastrophizing, self-efficacy, interference), social support, and general avoidance/activity engagement. Data were analyzed using visual analysis, effect size calculations, and randomization tests.

Results: N=11 enrolled and data from n=10 were analysed (n=1 refused digital diary, n=2 partial completers, n=8 full completers). Pain profiles varied (e.g., chronic migraine, fibromyalgia, disc hernia, etc). Participants displayed idiosyncratic patterns of improvement. Most participants benefitted from the DAHLIA intervention, though results varied across individuals and across variables.

Conclusions: The DAHLIA prototype 1.0 shows promise in addressing diverse pain profiles and associated functioning. The observed variability in response patterns highlights the need for personalized digital behavioral interventions. Findings support further development and refinement of DAHLIA 1.0 to optimize adaptability and effectiveness across chronic pain subgroups.

II-D1.W.09

USING CO-DESIGN TO DEVELOP GAMIFICATION PAIN MANAGEMENT PROGRAM TO ADDRESS CLIENTS WITH CHRONIC PAIN

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Background and aims: Chronic pain is a leading cause of adults seeking medical care, necessitating effective management solutions. This study describes a co-design process for developing a gamified pain management (GPM) intervention tailored to individuals with chronic pain.

Methods: Semi-structured interviews were conducted to gather feedback, focusing on potential improvements, on the GPM intervention. Informational materials, including background, instruction and flow of intervention, were presented face-to-face.

Results: A total of 10 adults aged from 25 to 65 (83% female, mean age = 39) with chronic pain participated. Four key themes were identified: User Experience, Intervention Content, Tracking and Monitoring, and Engagement. Within these, twelve categories emerged:"clear instructions","game flow","suitable game duration","age specific","seek medical help","modification on exercise","psychological skills","tracking","simplified tracking",""feedback for learning","rewards for adherence" and "social support". A total of 22 strategies were produced, key recommendations included simplifying instructions, improving game flow, adjusting session durations, better guidance on medical help, the inclusion of psychological aspects of pain, addressing the impact of exercise on pain, integrating tracking features, and providing feedback and social support. The study highlights the importance of designing interventions that accommodate diverse user needs, particularly for older adults who were not familiar with digital device.

Conclusions: This study identified strategies for the intervention designed to address the needs of chronic pain patients. The insights gained provide a solid foundation for the further digital pain intervention, potentially enhancing patient outcomes and improving quality of life.

II-D1.W.10

EXPLORING THE USE AND PERCEPTION OF VIRTUAL REALITY FOR CHRONIC PAIN MANAGEMENT: A MIXED METHODS STUDY

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Background and aims: Chronic pain affects approximately 20% of the global adult population. Conditions such as neuropathic pain and fibromyalgia significantly contribute to this prevalence. Virtual reality (VR) has shown to offer potential therapeutic benefits for pain management. Nevertheless, the adoption and perception of VR by individuals with chronic pain remain uncertain. In this study, we want to gain knowledge about that.

Methods: We conducted a mixed methods study to explore the use of VR among chronic pain patients. Firstly, we administered a survey to 511 chronic pain patients, assessing: VR usage, context/s of use, willingness of using VR for health, and advantages/disadvantages. Additionally, 2 focus groups (FG) were carried out with 18 fibromyalgia patients, which provide qualitative insights to the statistical data.

Results: Most of the surveyed sample (76.9%) reported never having used VR. Entertainment contexts account for most frequent uses (16.4%), while health-related apps were less common (2.7%). 46.6% of participants were "very interested" in VR interventions. The key advantage was receiving treatment at home (72.0%), while the main disadvantage was lack of knowledge/resources (45.6%). Main results from the FG showed that participants were open to VR for health (taking into account, among others, convenience, affordability, and safety). Identified barriers included device weight, lack of professional training, and potential social isolation. These, stress the need to provide tailored, reliable, and interactive applications.

Conclusions: VR technology is underutilized by people with pain, despite evidence supporting its benefits. However, they are interested in using it, indicating potential to enhance the transference of results to clinical practice.

D2 | DIAGNOSIS & TREATMENT OF NEUROPATHIC PAIN

II-D2.W.01

THE EFFECTS OF NON-INVASIVE TRANSCRANIAL MAGNETIC STIMULATION ON COMORBIDITIES IN INDIVIDUALS WITH CHRONIC NEUROPATHIC PAIN

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Background and aims: Neuropathic pain is associated with sensory, motor and emotional disturbances caused by a lesion or disease of the somatosensory system which can lead when chronic to comorbidities such as fatigue

and depression. Available pharmacotherapy treatments have partial and unpredictable response; therefore, it is necessary to find new therapeutical approaches that could alleviate pain symptoms and improve patients 'emotional state' and global quality of life. Non-invasive brain stimulations are recommended for pain relief, but its dual effectiveness on concomitant comorbidities has not been investigated.

Methods: 34 individuals with neuropathic pain received four sessions of repetitive transcranial magnetic stimulation (rTMS) over the primary motor cortex (M1), with one session every two weeks. Effects on pain (intensity, relief and dominant pain symptoms), self-rated health quality, psychological (depression, and anxiety) and physiological variables (sleep and fatigue), and the motor function of upper limbs was assessed. Participants reporting pain relief ≥ 10% were categorized as responders.

Results: Fatigue was initially higher in individuals' responders (n=19) to rTMS than non-responders (n=15, Cohen's d = 0.8). Fatigue, sleep quality and latency improved after rTMS, but were not correlated with pain relief. Motor function improvement was positively correlated with pain relief (p = 0.001, rho=0.57).

Conclusions: These findings suggest that rTMS is an effective therapeutic approach for ameliorating neuropathic pain and alleviating comorbidities as well as motor deficits. Understanding the close relationship between chronic pain and fatigue is important as they may share common mechanisms and could be a potential factor influencing the analgesic effect of rTMS.

II-D2.W.02

DAILY REPORTS OF PAIN INTENSITY DECREASED AFTER TREATMENT WITH HOME-BASED TRANSCRANIAL ELECTRICAL STIMULATION (HB-TES) IN CHRONIC PAIN PATIENTS

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Background and aims: Transcranial electrical stimulation (tES) can be used at home as an alternative treatment for chronic pain (CP), but the existing evidence of its effectiveness is insufficient.

Methods: To overcome some limitations of previous research, we conducted a randomized, double blind, sham-controlled clinical trial using daily assessments of the main outcome variable- pain intensity. The sample of 120 patients, with different CP conditions, completed 15 self-administered home-based sessions of either transcranial direct current stimulation (tDCS), transcranial alternate current stimulation (tACS) or sham stimulation. Pain intensity was assessed online (using numerical rating scales) throughout 45 days (pre-treatment, treatment and post-treatment periods each of 15 days).

Results: The data were analysed with time series analysis and the results consistently showed that both tDCS and tACS decreased the patients' daily reported pain intensity, while this trend was not observed in the sham group.

Conclusions: These findings support the use of home-based tDCS/tACS to manage CP, which could significantly reduce the high economic burden associated with chronic pain management in healthcare systems.

II-D2.W.03

EARLY DETECTION AND TREATMENT OF INTER-COSTO-BRACHIAL NEURALGIA AFTER BREAST CANCER SURGERY: A MULTICENTER RANDOMIZED CONTROLLED CLINICAL TRIAL COMPARING CAPSAICIN 179 MG PATCH VS PREGABALIN

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Background and aims: Neuropathic pain following mastectomy occurs in 8% -70% of patients. Diagnosing peripheral neuropathic pain (PNP) is challenging and diagnostic difficulties and may delay appropriate analgesic

therapy. This study assesses the efficacy of topical treatment with high concentration 179 mg capsaicin patch (HCCP) compared to pregabalin. There is no comparative efficacy data in this indication.

Methods: Multicenter, randomized, parallel-arm, open-label study to demonstrate non-inferiority of early treatment *(within 12 months after surgery)* with topical HCCP vs oral pregabalin 2 months after randomization. Patients were randomized into one of two treatment arms. Assessments included the Numeric Pain Rating Scale (NPRS), painful area size, patient global impression of change (PGIC), quality of life (EQ-5D).

The primary endpoint was change from baseline on the NPRS at Month 2. Non-inferiority could be concluded if the predefined non-inferiority margin was not exceeded (upper bound of the 90% CI for the mean change in NPRS score in the HCCP group < 0.4 at Month 2) in the per protocol population (PPP). *Tolerability and desire to switch treatment* were reported.

Results: 140 were randomized. *The predefined non-inferiority criteria was met (upper bound of the 90% CI = +0.26). Two months after treatment initiation, the mean painful area reduced from mean (SD) 115.3 cm^2 (79 cm^2) to 66.1 cm^2(49.9 cm^2) with HCCP, significantly more than with pregabalin (p=0.02). After 2 months, no HCCP patient switched to pregabalin, whereas 27/51 patients switched from pregabalin to HCCP.*

Table 1: Adverse events reported more than once in HCCP or pregabalin treatment arm reported in the 2 months after treatment initiation

Adverse event	*HCCP* *Total adverse events count : 8*	*Pregabalin* *Total adverse events count : 32*
Burning sensation at site of application	*7*	
Vertigo		*4*
Ataxia		*6*
Somnolence		*5*
Imbalance		*5*
Memory problems		*5*
Difficulty concentrating		*5*

Conclusions: Early diagnosis/treatment of PNP post-breast surgery are important . HCCP is an effective alternative to oral treatment.

II-D2.W.04

RETROSPECTIVE COHORT STUDY EVALUATING THE TREATMENT EFFECT OF CAPSAICIN (179 MG) PATCH ON POST HERPETIC NEURALGIA

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Background and aims: Postherpetic neuralgia (PHN), is the most common complication of herpes zoster. PHN reduces patient's quality of life. The goal of this study was to evaluate the outcomes of PHN patients treated with high concentration capsaicin (179 mg) patch (HCCP) in a clinical practice setting.

Methods: Data of PHN patients who were treated at least once and up to 4 times with (HCCP) and followed up for 12 months, were extracted from the German pain e-registry. We evaluated the impact of HCCP treatment on average pain intensity (Visual-Analogue-Scale (VAS), 0-100 mm), Quality of Life (QoL) (QLIP), ability to perform activities (von Korff pain severity) and concomitant pain medication use.

Results: 961 patients with PHN were included. Overall 187, 209, 207 and, 358 patients received 1, 2, 3 and 4 HCCP treatments respectively. Baseline characteristics included [mean (SD)] age [66.8 (13.1)] years, duration of PHN [3.3 (3.5)] years and concomitant medication use [4 (1.7)] (Table 1).

With 4 HCCP treatments, average pain intensities decreased (Figure 1); QoL increased (Figure 2), the number of days without usual activities decreased (Figure 3). All these changes from baseline at month 12 were significant (p< 0.001). A clinically relevant decrease in concomitant medication use was noted (Table 2).

Table 1: Demographic data of PHN patients (N=961) at baseline	
Age in years : mean (SD)	63.8 (14.3)
Females (%)	69.7
Pain duration in years: mean (SD) [min;max]	3.3 (3.5)[0;12]
24-hour pain intensity on 0-100 mm VAS: average (SD)	61.8 (17.5)
Concomitant pain treatments at baseline: mean number (SD) [min;max]	4.0 (1.7) [1; 9]
Von Korff pain severity : number of days where usual activities could not be done : mean (SD)	44.7 (32.4)
QLIP sum score : mean (SD)	14.9 (6.2)
PDQ-7 proportion (%) of patients with total score ≥19	81.9

Table 2: Proportion of patients taking concomitant analgesic medications for the treatment of PHN in the observation period; strong opioids (SOA), antiepileptic treatments (AED) or antidepressant treatments (ADD)

	Baseline %	3 months %	6 months %	9 months %	12 months %
1 HCCP treatment					
SOA	63.1	55.6	57.8	55.1	58.8
AED	71.7	64.2	54.5	60.4	66.8
ADD	84.5	77.0	72.7	77.0	81.8
2 HCCP treatments					
SOA	69.4	57.9	46.4	43.1	45.9
AED	66.0	60.3	52.6	41.6	45.0
ADD	88.0	80.4	64.1	62.2	71.8
3 HCCP treatments					
SOA	68.1	59.4	46.9	38.6	31.4
AED	72.9	65.2	52.7	38.2	30.0
ADD	86.0	75.8	63.8	46.9	60.4
4 HCCP treatments					
SOA	65.6	57.5	47.2	35.8	20.9
AED	66.2	58.7	46.6	37.7	27.9
ADD	87.2	80.7	65.9	45.5	30.7

Figure 1. Average pain intensity (API) at baseline and 3, 6, 9 and 12 months, by number of HCCP treatments

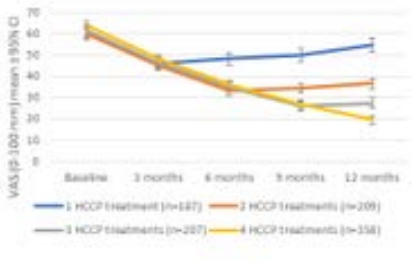


Figure 2. Quality of life impaired by pain (QLIP) at baseline and 3, 6, 9 and 12 months, by number of HCCP treatments

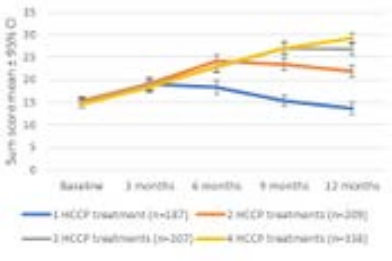
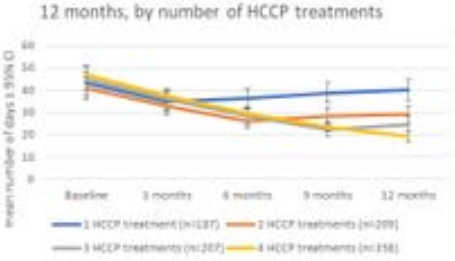


Figure 3. Number of days that usual activities could not be performed (Von Korff) in the 3 month period preceding baseline, 3, 6, 9 and 12 months, by number of HCCP treatments



Conclusions: Although patients continued to experience pain and limitations of their activities and were affected emotionally, it took them more than 3 years to get their first HCCP treatment. With repeated HCCP treatments, pain, QoL, and daily activities improved whereas analgesic co-medication could be decreased.

II-D2.W.05

SCREENING FOR CHRONIC NEUROPATHIC PAIN AFTER SURGERY: DN4 COMPARED TO THE DN2

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Background and aims: Screening questionnaires can be used to evaluate whether a patient has possible neuropathic pain (NeuP) according to the NeuP grading system. In this study, the results of the DN4 (Douleur Neuropathique en 4 Questions) versus the DN2 (Douleur Neuropathique en 2 Questions) are compared.

Methods: Approval of the ethics committee, written patients' informed consent. Participants completed the DN4 via telephone interviews 6 and 12 months (M6/M12) after surgery (positive screening: 4/10 symptoms/signs present). The DN4 was additionally evaluated as DN2 (positive: 3/7 symptoms). Statistics: descriptive, $\chi 2$ test for comparison of DN4 positive vs. DN4 negative patients depending on type of surgery, sex, and pain-related patient-reported outcomes.

Results: 632 patients completed the DN4 at M6 and M12. More positive screenings were detected with the DN4 than with the DN2 (M6: 11% vs. 7.5%; M12: 10.5% vs. 8.9% of patients; $p<0.001$). More women had a positive screening (M6 DN4 13% vs. men 7%; $p=0.01$), notably after orthopaedic surgery (M6 36%, men 16%; M12: 30% vs. 20%; $p=0.02$). At M6, about one-third DN4-positive respondents had a negative DN2 ($p<0.001$). This difference was especially noticeable in women after orthopaedic and gynaecological surgery. With higher pain intensity and more pronounced pain-related functional interference, the proportion of patients with positive DN2/DN4 increased: Of the patients with mild, moderate or severe pain at M6, 34%, 54% and 63% had a positive screening for NeuP ($p<0.001$).

Conclusions: The DN4 yielded more positive results than the DN2 suggesting that a more detailed anamnestic and clinical examination of these patients is necessary.

II-D2.W.06

USING VALIDATED SCREENING TOOLS TO AID THE NEUPSIG GRADING SYSTEM AND IMPROVE THE DIAGNOSTIC PROCESS FOR NEUROPATHIC PAIN: A MULTI-CENTRE CROSS-SECTIONAL STUDY

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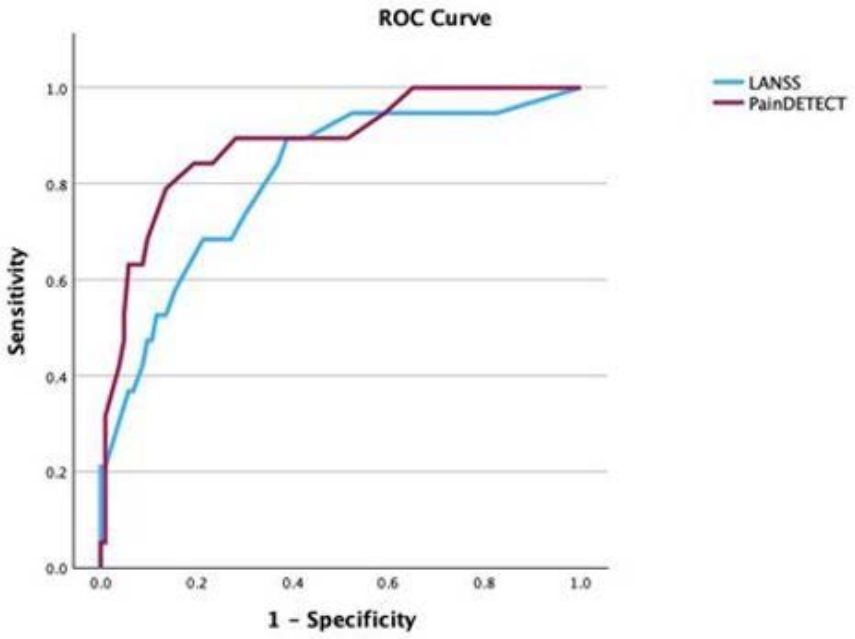
Background and aims: Neuropathic pain (NP) is characterized by severe symptoms and unfavourable prognosis. Improving the diagnostic process is an urgent need. To assess the accuracy of Leeds Assessment of Neuropathic Symptoms and Signs (LANSS) and PainDETECT, compare them the updated grading system for NP of the Neuropathic Pain Special Interest Group (NeuPSIG), of the International Association for the Study of Pain (IASP), and propose new approach for the diagnosis of NP, combining both screening tools with the NeuPSIG grading system.

Methods: Consecutive patients presenting to two private clinics from July 2018 to December 2019 were assessed by two medical doctors according to the NeuPSIG grading system for NP. Two blinded physiotherapists collected demographic data, questionnaires' scores, and clinical variables.

Results: Of 204 patients: 50.5% was classified as unlikely, 40.2% as probable, and 9.3% as definite NP. Both questionnaires showed good agreement for unlikely NP (LANSS: 84.5%; PainDETECT: 86.4%) and moderate agreement for definite NP (LANSS: 57.9%; PainDETECT: 52.6%). Area Under the Curve was 0.81 (0.7; 0.92) and 0.88 (0.8; 0.97) for LANSS and PainDETECT, respectively.We identified new cut-offs for both questionnaires, that guarantee sensitivity and specificity >90%. Using the questionnaires to aid the first step of the NeuPSIG algorithm might improve the diagnosis in at least 23.4% of patients.



Conclusions: Instead of comparing screening questionnaires to the NeuPSIG grading system, as though they are alternative to one another, using questionnaires in the initial phase of the history taking would foster a careful assessment and likely decrease clinical diagnostic uncertainty.

II-D2.W.08

REPETITIVE TRANSCRANIAL MAGNETIC STIMULATION AS NEUROPATHIC PAIN TREATMENT FOR SMALL FIBER NEUROPATHY (MAGIC-SFN): STUDY CONCEPT AND OUTLOOK

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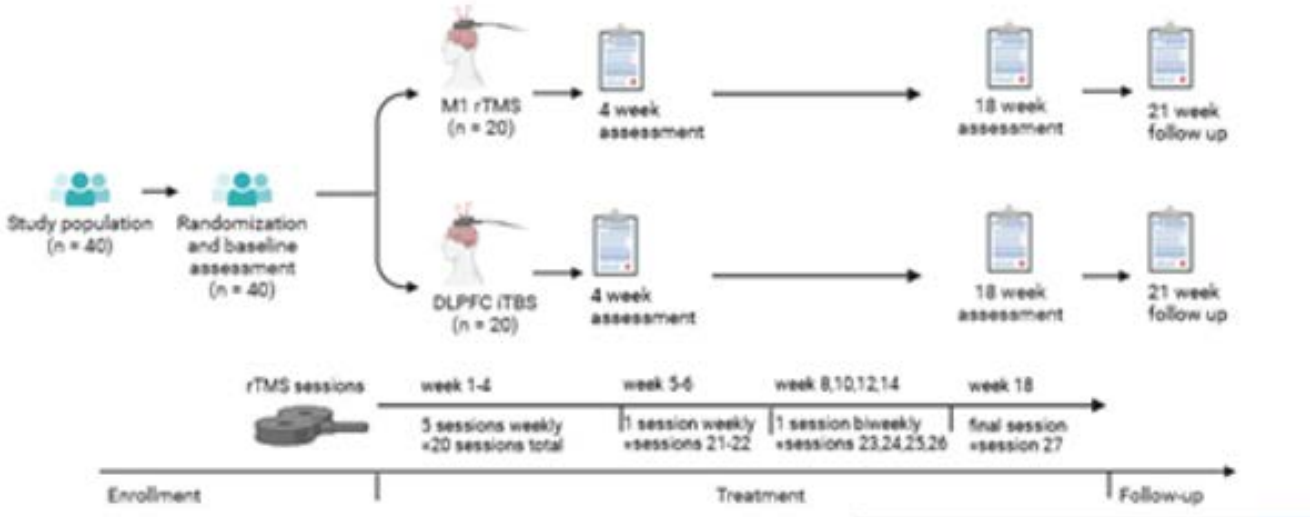
Background and aims: Chronic neuropathic pain is the lead symptom of small fiber neuropathies (SFN). Depression is a relevant comorbidity for chronic pain. Repetitive transcranial magnetic stimulation (rTMS) is a non-invasive neurostimulation procedure established to effectively treat depression. In this study, we investigate possible effects of rTMS on neuropathic pain, depression, and quality of life in a highly selected SFN cohort.

Methods: In a monocentric, prospective, rater-blinded trial, we randomize 40-50 adult patients with clinically confirmed SFN to two different rTMS protocols. Protocol 1 stimulates the left primary motor cortex in the hand area (M1-rTMS), protocol 2 applies intermittent theta burst stimulation (iTBS) to the left dorsolateral prefrontal cortex (DLPFC). To quantify the stimulation effects, we assess neuropathic pain intensity, mood, and individual pain and sensation thresholds at weeks 0, 4, 18, and 21. The primary endpoint is defined by 20% reduction in pain levels compared to baseline.



Results: 97% of our registered SFN patients describe neuropathic pain as the lead symptom. Currently, n=12 have been included. At the time of the conference, n=25-30 will have been included. We will present a novel study concept, the current status of our recruitment including cohort characterizations, and interim analyses of study results.

Table 1 Baseline pain and demographic characteristics (n=12, November 2024)

Age, years	48,2
Female, n (%)	11(92)
Average pain intensity NRS (/10)	6,38 (±2,1)
Maximum pain intensity NRS (/10)	8,75 (±1,37)
PainDETECT Score (/38)	22,9 (±6,33)
MADRS (/60)	19,6 (±8,16)
BDI (/39)	23,58 (±15,18)
pain area (n, NRS(/10))	
Feet	11(5,6)
Hands	11(4,6)
Upper limbs	11(3,75)
Lower limbs	11(5,3)
Face/head	6(2,5)
Trunk	6(3,6)
Concomitant analgesics (n,%)	3(25%)
Antidepressant	3(25%)
Anti-epileptic	1(9%)
No analgesic	9(75%)

Conclusions: In SFN, conventional pain treatment cannot always provide sufficient symptom control. Conceptually, rTMS addresses the pain memory. Previous studies using rTMS (Lefaucheur et al., 2020) raise hopes for efficient neuropathic pain treatment. This exploratory clinical trial could open up new therapeutic avenues for neuropathic pain in SFN patients.

II-D2.W.09

GABAPENTINOIDS USE AND ABUSE IN THE NEUROPATHIC PAIN UNIT SETTING

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Background and aims: The gabapentinoids (GBPs) pregabalin and gabapentin are increasingly prescribed for various clinical conditions. However, concerns about their potential for misuse and abuse have emerged in recent years. Given their approved and off-label uses, it is essential to identify patients at risk for such issues.

Methods: In this ongoing observational study, we assess the efficacy and safety of GBPs in a Neuropathic Pain Unit. Patients referred to the Department of Human Neuroscience at Sapienza University of Rome are being recruited and evaluated using a structured questionnaire addressing the main aspects of the GBPs treatment: anamnestic information, comorbidities, the pain condition related to the GBP prescription, S-DN4, treatment information, adverse event, efficacy, use disorder.

Results: As of now, 119 patients have been enrolled (median age 61, IQR 52-72; 41 males, 77 females). Most patients were diagnosed with peripheral neuropathy (50%), fibromyalgia (19%), or radiculopathy (16%). Of these, 93 were prescribed pregabalin and 26 gabapentin. Seventy-eight patients (57%) reported adverse events, mainly somnolence (47%), confusion (29%), and dizziness (22%), though 89% did not discontinue treatment due to these effects. Patients' pain relief ratings were: much improved (35.6%), minimally improved (26.3%), or unchanged (22.9%).

Notably, 9.2% of patients showed signs of GBPs use disorder, and 13.4% reported taking the medication differently than prescribed.

Conclusions: Although patient recruitment is ongoing and final data will be presented at the congress, these early findings suggest that the risk of misuse and developing use disorder should be considered when prescribing GBPs in a neuropathic pain setting

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II-D2.W.10

PAVING THE WAY FOR A NEW LOCAL PERIPHERAL NEUROPATHIC PAIN TREATMENT: PROOF-OF-CONCEPT CLINICAL TRIAL WITH INCOBOTULINUMTOXINA (PAINT)

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[1]INSERM U987, UVSQ Paris Saclay University, Paris, France, [2]Merz Therapeutics, Frankfurt, Germany, [3]University Hospital Schleswig-Holstein, Division of Neurological Pain Research and Therapy, Kiel, Germany, [4]Aarhus University, Aarhus, Denmark, [5]Nîmes University Hospital and Montpellier-Nîmes Faculty of Medicine, Nîmes, France

Background and aims: Overall, 6-10% of adults are suffering from chronic pain with neuropathic features. Affected patients are significantly impacted in their physical, social, economic, and psychological well-being. Existing therapies are limited by insufficient treatment effect and side effects, resulting in a huge unmet medical need. First evidence with local Botulinum neurotoxin type A (BoNT/A) treatment in Peripheral Neuropathic Pain (PNP) has shown a superior number-needed-to-treat, compared to other pharmacological treatments.

Methods: Most previous clinical trials with BoNT/A were small, single centre, and with potential bias. This resulted in a weak GRADE recommendation for use as third line treatment in PNP patients. To fill the existing evidence gap, the ongoing phase 2 proof-of-concept clinical trial (PaiNT) investigates efficacy and safety of incobotulinumtoxinA (NT 201, Xeomin®), a BoNT/A free from complexing proteins.

Results: This randomised, double-blind, multicentre (31 sites, 6 countries), clinical trial is designed to include ≥120 adults with moderate to severe chronic PNP due to postherpetic neuralgia or peripheral nerve injury after surgery or mechanical trauma. Bedside Quantitative Sensory Testing (QST), aimed at patients' phenotyping, is used for the first time in a BoNT/A clinical trial. Patients receive subcutaneous injections into the painful area with either incobotulinumtoxinA (≤300 units) or placebo and are followed-up for 20 weeks. The trial evaluations include changes in Average Daily Pain intensity, Neuropathic Pain Symptom Inventory, and safety endpoints.

Conclusions: The large-scale PaiNT trial, investigating incobotulinumtoxinA in patients with PNP, may pave the way for a new local treatment of this burdensome condition.

A1 | NEUROBIOLOGICAL INTERPLAY BETWEEN EMOTIONS AND CHRONIC PAIN, WITH A FOCUS ON SEXUAL DIMORPHISM

III-A1.W.01

DECODING CHRONIC PAIN-INDUCED DEPRESSION CIRCUITRY

S. Lima[1,2], H. Elseedy[1], V. Mathis[1], K. Abdallah[1], C. Fillinger[1], F. Wang[2], Y. De Koninck[2,3], I. Yalcin[1,2,3]

[1]Institut des Neurosciences Cellulaires et Intégratives, Centre National de la Recherche Scientifique, Strasbourg, France, [2]Université Laval, Centre de Recherche CERVO, Quebec, Canada, [3]Université Laval, Department of Psychiatry and Neuroscience, Quebec, Canada

Background and aims: Mood disorders often coexist with chronic pain, and emerging evidence from preclinical and clinical research highlights the shared neural pathways implicated in both pain and depression. A key player in this comorbidity is the anterior cingulate cortex (ACC), a region responsible for processing the emotional, sensory, and cognitive aspects of pain and mood regulation. Notably, ACC dysfunction in the context of comorbid pain and depression is characterized by an imbalance of excitation and inhibition, manifesting as increased spontaneous firing rates and bursting activity. The GABAergic network in particular appears to be responsible for these alterations. Hence, we hypothesize that chronic pain-induced depression disrupts GABAergic neurons in the ACC, reducing their ability to inhibit neural circuits. This leads to hyperexcitability, which may drive anxiodepressive-like behaviors.

Methods: Therefore, to further study the GABAergic network, a combination of techniques, such as fiber photometry, electrophysiology, behavior, and viral gene manipulation, was used.

Results: *In vivo* fiber photometry recordings of mice with chronic pain-induced depression show we have altered GABAergic activity in tasks associated with anxiety and depressive-like behaviors, indicating a potential malfunction of the inhibitory network in the ACC. In addition, sequencing data of GABAergic cells revealed genetic alterations, and viral manipulation of these genes demonstrated their role in driving anxiety and depressive-like behaviors.

Conclusions: Taken together, these findings highlight GABAergic functioning in the ACC as a key element in the pathophysiology of comorbid pain and depression.

III-A1.W.02

MAPPING PAIN PERCEPTION PATHWAYS: SINGLE-NEURON CALCIUM TRACKING HIGHLIGHTS ANTERIOR PARAVENTRICULAR NUCLEUS' DUAL INFLUENCE ON SENSORY AND AFFECTIVE PAIN

W.-H. Chen[1], Y.-W. Chang[1], S.A. Mindaye[1], C.-C. Chen[1]

[1]Institute of Biomedical Sciences, Academia Sinica, Taipei, Taiwan

Background and aims: The experience of pain is multidimensional, encompassing both sensory and emotional aspects, yet its underlying neural mechanisms are not fully understood. Our previous research has investigated anterior paraventricular nucleus of the thalamus (PVA) role in different pain model regulation. However, the neural mechanisms underlying its response to various pain perceptions remain largely unknown.

Methods: We utilized a combination of axonal tracing, retrograde tracing, behavioral tests, optogenetics, and miniscope calcium imaging techniques to map the pain perception pathways of the PVA.

Results: In this study, we identified PVA as a key brain region that mediates both sensory and affective aspects of pain. Using Miniscope calcium imaging, we discovered PVA neurons exhibit dynamic change across different pain states. Furthermore, we found single-neuron and ensemble activity in the PVA encode sensory states, distinct from representations of aversive behavior. Quantification of 8 mice clearly demonstrated the two pain-like behaviors are processed separately, where only 2 of 237 (1% overlap) neurons responded to both pain-induced aversion and mechanical hypersensitivity. Additionally, AAV retrograde calcium imaging and optogenetic assistance confirm that separate PVA neuronal circuits are responsible for the sensory and affective aspects of pain.

Conclusions: PVA neurons exhibit dynamic change across different pain states and aspects. These findings advance our understanding of the neural coding and regulation of different aspect of pain.

III-A1.W.03

INFLUENCE OF ESTROUS CYCLE AND HORMONES 17B-ESTRADIOL AND PROGESTERONE ON NEUROPATHIC PAIN

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Background and aims: Pain perception is influenced by numerous factors, including sex hormones. Women generally report more intense, frequent, and long-lasting pain compared to men, particularly in chronic pain conditions and during endocrine fluctuations such as menstruation and menopause. These differences are hypothesized to stem from the role of sex hormones, which affect pain thresholds in both humans and rodent models. Despite this, basic research often underrepresents females and neglects to consider estrous cycle stages. This study aims to evaluate the influence of the estrous cycle and the hormones 17β-estradiol and progesterone on pain perception in female Wistar rats.

Methods: Pain behaviors and estrous cycle stages were monitored daily before and after surgical procedures, including chronic constriction injury (CCI) to induce neuropathic pain and ovariectomy (OVX) to model hormonal depletion. Following OVX, hormone replacement therapy was administered for two weeks using 17β-estradiol and progesterone at two different doses.

Results: After 14 days of CCI, female rats exhibited heightened sensitivity to tactile allodynia during proestrus and diestrus stages. No significant differences were observed in hyperalgesic responses across the estrous cycle. OVX animals showed increased pain sensitivity, while progesterone-treated rats demonstrated a significant increase in nociceptive thresholds compared to vehicle-treated controls. Conversely, 17β-estradiol treatment did not produce statistically significant changes in pain sensitivity.

Conclusions: This study highlights that pain sensitivity is heightened during the diestrus and proestrus phases of the estrous cycle. Progesterone replacement attenuated pain sensitivity in OVX rats, suggesting a modulatory role for progesterone in this neuropathic pain model.

III-A1.W.04

MOLECULAR AND CELLULAR ALTERATIONS IN THE DORSAL RAPHE NUCLEUS IN THE CORMOBIDITY OF CHRONIC PAIN AND MOOD DISORDERS

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Background and aims: Neuropathic pain affects 16% of the world's population and is often associated with major depressive disorder (MDD). Compelling evidence from human studies and animal models suggests an important role for the dorsal raphe nucleus (DRN) in both chronic pain and MDD. Therefore, by combining next generation sequencing and fiber photometry with behavioural approaches, we aim to unravel the molecular and physiological changes in the DRN in the development of chronic pain and its comorbidity with MDD.

Methods: Neuropathic pain was induced by implanting a polyethylene tube around the sciatic nerve in male mice. Behavioural characterization was performed using a battery of tests. We used RNA sequencing to study the transcriptomic changes, while fiber photometry recordings were performed to determine whether the response in the DRN to nociceptive and non-nociceptive stimuli is altered by neuropathic pain.

Results: Neuropathic mice developed mechanical hypersensitivity (until 13 weeks) and depressive-like behaviours (until 16 weeks post-surgery). Sequencing data revealed time-dependent alterations within the DRN. Interestingly, strong genomic changes were observed during recovery from hypersensitivity. Calcium-imaging results showed alterations in the calcium dynamics in the DRN during nociceptive stimulation.

Conclusions: Altogether, these data highlight that neuropathic pain induces alterations in the DRN that differ at different stages of the neuropathic pain and that DRN plays an important role in the comorbidity of chronic pain and mood disorders.

This work was supported by CNRS, Fondation pour la Recherche Médicale ("ÉquipeFRM", ARF202110013920) and French National Research Agency (EURIDOL program (ANR-17-EURE-0022, ANR- 19-CE37-0019, ITINeurostra.

III-A1.W.05

CHRONIC JOINT PAIN AND EMOTIONAL COMORBIDITIES - TARGETING THE STRESS-REGULATOR FKBP51 TO COMBAT IT ALL

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Background and aims: Joint-diseases are accompanied by significant pain but also secondary symptoms like low mood and memory-impairment. Such comorbidities strongly impact patients' well-being, but receive little attention in preclinical studies. We hypothesised that inhibiting the stress regulator, FKBP51, would reduce both pain and emotional comorbidities that accompanies joint diseases.

Methods: In a mouse model of joint-pain (monoiodoacetate-induced arthritis, MIA) we characterized the sensory, functional (weight bearing), anxiety-, depressive-, motivational-, and cognitive-like behavioral changes for up to 6 months after injury. Next, we explored the efficacy of the FKBP51-antagonist, $SAFit_2$ delivered in a slow-release gel (VPG), in reversing these outcomes when given at different stages of the disease.

Results: MIA-injection resulted in robust and immediate mechanical allodynia lasting at least 6 months. Cognitive- and motivation-impairment was present already at 3-4 weeks, while anxiety- and depressive-like behaviors only emerged at 3 months after injury. Next, $SAFit_2$-VPG, given once the injury was fully established, reduced both sensory and functional deficits, but these symptoms always re-emerged as soon as treatment was discontinued. Additionally, continuous treatment from 8-12 weeks after injury delayed the development of anhedonia at 12 weeks, but had no effect on anxiety-like behaviors. Crucially, when $SAFit_2$-VPG was administered during the induction phase of the joint-injury, sensory- and functional-impairment were permanently reduced, and the development of anxiety- and depressive-like behavior was prevented for up to 6 months.

Conclusions: These findings suggest beneficial effects of FKBP51-inhibition as a treatment for both pain and accompanying emotional comorbidities related to joint diseases, and particularly when provided at the time of injury.

III-A1.W.06

INVOLVEMENT OF THE TAIL OF THE VENTRAL TEGMENTAL AREA (TVTA) IN THE PROCESSING OF NOCICEPTIVE INFORMATION

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Background and aims: The nervous system's processing of nociceptive information leading to pain is crucial for survival, acting as an alarm to prevent potential damage. The tVTA is a GABAergic mesencephalo-pontine structure discovered about fifteen years ago. It is now recognized as the primary inhibitory control of dopaminergic (DA) neurons originating from the ventral tegmental area (VTA) and the substantia nigra pars compacta. Recent evidence suggests that this structure is important to the processing of information leading to aversion and may also be involved in nociception. The aim of our study is to investigate further this potential role of the tVTA in the integration of nociceptive information.

Methods: The study was conducted in Sox14-CRE mice, a genetic tool allowing for the selective study of tVTA neurons. We used fiber photometry to study variations in calcium activity of the tVTA neurons in response to foot shocks of increasing intensity.

Results: Our results indicate that tVTA is recruited by foot shocks withy an intensity of tVTA responses that is positively correlated with the intensity of the stimulus and with behavioral responses. Finally, some adaptation in the calcium response of tVTA neurons develops following repeated exposure to foot shocks.

Conclusions: Our study provides evidence for the involvement of tVTA neurons in nociceptive information processing. It indicates that the tVTA encodes the intensity of the stimulus and adapts to repeated stimulations.

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III-A1.W.07

ANALGESIC EFFICACY OF CONDITIONED PAIN MODUALTION, HYPNOSIS AND PLACEBO – DO MEN AND WOMEN RESPOND DIFFERENTLY?

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Background and aims: Conditioned pain modulation (CPM), hypnosis-induced hypoalgesia and placebo effect are three approaches that can reduce pain perception. The aim of this study was to compare the hypoalgesic effect of these 3 approaches, and to assess whether sex has an impact on the response.

Methods: Thirty-three pain-free individuals (15 women, 18 men; mean age 26 ± 1) were recruited to participate to this quasi-experimental study in which all participants experienced the 3 analgesia-induced procedures.

[1] CPM were activated using a cold pressor test of the forearm,

[2] hypnosis was induced with by a trained hypnotherapist,

[3] and placebo effect was created using a placebo pill.

A 2-minute heat pain paradigm was applied on the forearm before and after each procedure, and a computerized visual analog scale was used to assess pain perception. The analgesic effect of CPM, hypnosis and placebo was calculated by comparing the mean of pain after and before analgesia-induced procedure.

Results: Results showed that the 3 procedures reduce pain perception (all $p \leq 0.002$), although hypnosis (-35%) was significantly more effective than placebo (-15%; $p < 0.001$). Comparison between men and women revealed that sex had no impact on the hypoalgesic effect impact of the 3 procedures (all $p \leq 0.01$).

Conclusions: Our results confirm that CPM, hypnosis and placebo can reduce pain, with a highest effect of hypnosis, and that sex did not influence analgesic efficacy.

III-A1.W.08

ANALYSIS OF THE VAL158MET POLYMORPHISM (*COMT* GENE) IN FIBROMYALGIA PATIENTS SUGGESTS IMPLICATIONS FOR DOPAMINE SYSTEM ALTERATIONS

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Background and aims: The Val158Met genetic variant in the catechol-O-methyltransferase (COMT) gene has been extensively studied as the main polymorphism associated with chronic pain. However, there are conflicting results, particularly regarding fibromyalgia and many studies lead to contradictory conclusions. This study aims to better investigate its role in a large cohort of fibromyalgia patients and their unaffected relatives thoroughly characterized.

Methods: The polymorphism Val158Met was genotyped comparing fibromyalgia patients (n=294) and controls (n=209) using Taq-Man Genotyping Assays (Thermo Fisher). Logistic regression models examined the combined effects of Val158Met genotypes and comorbid conditions (depression and sleep impairment) on the risk of fibromyalgia. Furthermore, the genotypic distribution was analyzed in the fibromyalgia patients' subgroup according to pain intensity.

Results: The Val allele was found more prevalent in the fibromyalgia group (57.8%) than in the control group (48.8%; $P = 0.037$). In addition, individuals with the Val/Val homozygous genotype had a twice higher risk of developing fibromyalgia than those with the Met/Met genotype ($P = 0.038$). Depression and sleep disturbances were associated with a 12-fold and 8-fold increased risk of fibromyalgia, respectively ($P < 0.001$). However, within

the fibromyalgia patients' subgroup, the Val/Val homozygous genotype was significantly associated with severe pain intensity (P = 0.007).

Conclusions: In light of the involvement of the COMT enzyme in the dopaminergic pathway and the fact that dopamine system dysfunctions are associated with both depressive symptoms and sleep problems, further studies should explore this SNP in fibromyalgia patients with and without depression and sleep problems, in conjunction with COMT enzymatic activity.

III-A1.W.09

EFFECTS OF OXYTOCIN IN PAIN AND ANXIETY RESPONSES IN MALE AND FEMALE MICE SUBJECTED TO THE HYPERALGESIC PRIMING MODEL

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Background and aims: Chronic pain conditions involve physical, psychological, and sociocultural aspects. The oxytocin is associated with the regulation of pain and processes involving affective-emotional behaviors. This study evaluates whether treatment with oxytocin alters responses related to pain and anxiety and whether its effects differ according to sex.

Methods: Eight groups of male and female Swiss-Webster mice were assigned based on sex and treatment. Oxytocin is being evaluated at doses of 1 or 5 mg/kg. The mechanical hyperalgesia test (Von Frey) is being used to assess pain responses and the elevated plus maze (EPM) to record anxiety responses. The data will be analyzed by the one-way ANOVA for repeated measures and significant results will be followed by Duncan's post hoc test. **Funding:** FAPESP (2024/05877-2 and 2022/04387-6).

Results: The preliminary data showed that ANOVA in females revealed a statistical difference for the interaction between the factors time and treatment ($F(6,32) = 3.02$, $p < 0.05$). Duncan's post hoc demonstrated that the group treated with a 5 mg of oxytocin post-incision showed a reduction in mechanical hyperalgesia 3 hours after PGE2 administration compared to the saline group. Additionally, animals that received a 1 mg dose at both time points also exhibited a reduction in mechanical hyperalgesia 24 hours after PGE2 compared to the saline group. The Von Frey analyses in males and EPM tests in both sexes did not show statistical significance.

Conclusions: The preliminary results suggest that oxytocin may exert analgesic effects on mechanical hyperalgesia in a sexually dimorphic manner in mice subjected to the hyperalgesic priming model.

III-A1.W.10

CO-OCCURRING CHRONIC PAIN CONDITIONS IN PATIENTS WITH MENTAL DISORDERS

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Background and aims: Co-occurrence of chronic pain is common in individuals with mental disorders. However, the specific types and comorbidities of pain conditions have not been extensively studied. This study aims to identify and differentiate pain conditions in a patient sample with mental disorders and comorbid chronic pain.

Methods: In this cross-sectional study, we recruited patients consecutively from outpatient units at a mental health hospital in Norway. Inclusion criteria were any mental disorder and co-occurring chronic pain. A total of 151 participants (79% females, mean age 36) underwent thorough physical examinations of their reported pain. Pain conditions were categorized into chronic primary and secondary pain according to ICD-11. Descriptive analyses were conducted.

Results: The sample included participants with anxiety disorders (28%), stress-related disorders (23%) and mood disorders (23%). The most frequent pain conditions were chronic primary musculoskeletal pain (94%), chronic primary headache or orofacial pain (81%), chronic secondary musculoskeletal pain (34%) and chronic primary

visceral pain (32%). The most common combination of pain conditions included primary musculoskeletal pain, primary visceral pain, secondary musculoskeletal pain and primary headache or orofacial pain.

Conclusions: The complexity of chronic pain conditions poses significant challenges for optimal pain management and may as well interfere with mental health treatment. Identifying chronic pain and providing appropriate management is crucial for effective mental healthcare and patients' quality of life. This underscores the importance of recognizing and addressing complex chronic pain in this population.

A2 | CHRONIC PAIN IN THE AGING POPULATION

III-A2.W.01

REDUCED INFLAMMATION-INDUCED VISCERAL SENSITIVITY IN AGED MICE IS ASSOCIATED WITH HIGH POTENCY OF T CELLS TO PRODUCE ENKEPHALINS

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Background and aims: Aging is closely linked with low-grade inflammation, or "inflammaging", due to immune senescence. Both innate and adaptive immune responses are altered in elderly individuals notably with an increase in activated T lymphocytes. Numerous studies have highlighted the significant role of opioid-producing $CD4^+$ T lymphocytes, upon activation, in the peripheral regulation of inflammation-induced pain. The activation of T lymphocytes leads to the local release of opioids, which impedes the activation of sensory neurons by inflammatory mediators secreted from damaged tissues and infiltrating immune cells. This study aimed to assess whether the opioid-mediated analgesic effect of T lymphocytes is preserved in older mice.

Methods: The intestinal homeostasis of elderly mice was assessed together with the ability of memory T cells to produce opioids (enkephalin). Visceral sensitivity was evaluated by colorectal distension in both basal and inflammatory conditions (DSS (Dextran Sulfate Sodium)-induced colitis).

Results: Our findings show that elderly mice exhibit a higher number of activated memory T-cells and a higher ability to produce enkephalin than young mice. Notably, elderly mice do not display intestinal hypersensitivity typically observed in DSS-induced colitis and develop a milder colitis than young mice.

Conclusions: Because of the higher potency of memory T cells to produce enkephalin, DSS-induced colitis severity including inflammation and related visceral pain is significantly reduced in elderly mice.

III-A2.W.04

REFINING PAIN MANAGEMENT IN ALZHEIMER'S DISEASE: SPINAL MECHANISMS OF PAIN PROCESSING AND THE IMPORTANCE OF ADAPTIVE DRUG PRESCRIBING

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Background and aims: Alzheimer's disease (AD) primarily affects cognitive functions, but altered neuronal transmission could potentially impact pain processing. This study aimed to investigate sensory processing in a mouse model of AD and the potential requirements for adaptative drug prescription.

Methods: Experiments were conducted on non-carrier and J20 mice aged 5 (young) and 15 (old) months. To evaluate spinal mechanisms of sensory processing, approaches encompassed behavioral evaluation, ELISA, synaptic fractionation and biochemistry. To examine potential differences in drug-induced antinociception between J20 and non-carrier, both acute and chronic pain models were treated with saline, ibuprofen, gabapentin, or morphine. Mechanical hypersensitivity was evaluated using von Frey tests.

Results: Naïve old J20 mice exhibited increased $A\beta_{42}$ levels in the spinal cord and reduced thermal sensitivity. Furthermore, old J20 mice developed less hypersensitivity following paw incision surgery than all other groups. Ibuprofen's effectiveness was reduced in old J20 mice, while no differences in mechanical sensitivity were observed

with morphine. J20 and $A\beta_{42}$-injected mice demonstrated similar reduction in synaptic expression and activation of NMDA receptors.

Conclusions: These findings suggest that $A\beta_{42}$ disrupts spinal transmission in late-stage AD, leading to altered pain perception and differential effects of commonly prescribed medication. This may cause misreported trauma in individuals with AD, alongside complicating clinical assessments and pain management. Understanding these mechanisms is crucial for developing effective pain management strategies and improving overall health in AD patients. Future research should explore molecular pathways of pain processing and refine therapeutic strategies to alleviate pain in this specific population.

III-A2.W.05

CHRONIC PAIN AND POST-TRAUMATIC STRESS IN OLDER PATIENTS WITH PSYCHIATRIC DISORDERS DURING THE COVID-19 PANDEMIC: CO-OCCURRENCE AND INFLUENCE OF ATTACHMENT AND PERSONALITY FACTORS

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Background and aims: The Covid-19 pandemic context may have had numerous effects on the health of older patients with psychiatric disorders (PD), confronting them with a new source of stress and hindering their access to care. The aim of this study was to assess the long-term effects of the pandemic on both chronic pain (CP) and post-traumatic stress (PTS); the comorbidity of the two disorders; and to identify common psychological risk factors.

Methods: Setting: The STERACOVID longitudinal cohort study, conducted in two French hospitals. Medical interviews were conducted during and after (12 and 18 months later) the first lockdown.

Participants: 71 patients aged 65 or over; treated in an outpatient psychiatric service; and free of major neurocognitive disorders.

Measurements: Validated scales were used to assess CP (ICD-11 criteria); PTS (PCL-S); personality traits (BFI-Fr); attachment style (RSQ); and coping strategies (BRIEF-COPE). Patients with or without CP and/or PTS were campared in terms of attachment styles, personality traits and coping strategies.

Results: CP and PTS were frequent and often co-occurring at T2. Fearful and preoccupied attachment styles and neurotic and extraverted personality traits were associated with the development of these two disorders; while coping strategies were not determinant.

Conclusions: Our study identified factors associated with a higher risk of developing CP and/or PTS in the pandemic context. Assessment of attachment style and personality traits in clinical routine could help identify patients who are most vulnerable to this type of stress, and prevent the development of disabling chronic conditions.

III-A2.W.06

URBAN GREEN SPACES AND SUNLIGHT: GEOGRAPHIC ANALYSIS OF POTENTIAL REMEDIES FOR CHRONIC WIDESPREAD PAIN IN OLDER ADULTS

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Background and aims: While the residential environment influences biopsychosocial factors in chronic pain patients, the potential of green spaces as a modifiable factor for chronic widespread pain (CWP) remains underexplored. This study investigates associations between green spaces, climate, and CWP among older adults in Japan.

Methods: We analyzed data from 7,276 older adults living in 304 elementary school districts participating in the 2019 Japan Gerontological Evaluation Study (JAGES). Pain-related questionnaires were merged with sociodemographic, climate, and green space data, including Normalized Difference Vegetation Index (NDVI) from NASA satellite imagery. Multilevel modified Poisson regression models estimated relative risk (RR) and 95% confidence intervals (CI) of CWP prevalence using quartiles of NDVI, sunshine duration, humidity, precipitation, and temperature as explanatory variables, adjusting for sociodemographic factors and depressive symptoms.

Results: Higher levels of urban green space and sunshine duration were associated with reduced risk of CWP. Compared with the lowest tertile, the third tertiles of green space and sunshine duration showed RRs of 0.79 (95% CI: 0.65–0.97) and 0.72 (95% CI: 0.53–0.99), respectively. Conversely, moderate temperatures were associated with an increased risk of CWP, with the second tertile showing an RR of 1.35 (95% CI: 1.07–1.70) compared to the first tertile. Random effects analysis revealed small but statistically significant differences between elementary school districts.

Conclusions: Urban green spaces and longer sunshine duration may reduce the risk of CWP in older adults, while moderate temperatures may increase it. Urban planning to increase green space may support pain prevention in the aging population.

III-A2.W.07

THE HIDDEN CRISIS: CHRONIC PAIN AND ITS ASSOCIATION WITH FAMILY AND OLDER ADULTS ABUSE

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Background and aims: Chronic pain sufferers often experience psychological distress and anger, which may increase the risk of abusive behavior towards family members and older adults. This study aims to examine the association between chronic pain and abusive behavior towards family and older adults, a topic that has not been thoroughly investigated.

Methods: A cross-sectional web survey conducted in 2022-2023 included 39,173 Japanese adults aged 18-83. The survey focused on self-reported verbal and physical abuse toward family members and individuals aged 65 and older. Participants were asked if they had ever engaged in verbal or physical violence, with responses categorized as never or at least once. A modified Poisson regression model with multivariate adjustment calculated relative risks (RRs) for abuse among those with current or past chronic pain compared to those without.

Results: Of the participants, 13.8% admitted to verbal violence against family members, 9% to physical violence, 6.2% to verbal violence against older adults, and 3.9% to physical violence against older adults. Individuals with chronic pain were approximately 50% more likely to engage in verbal violence (RR: 1.54) and 40% more likely to commit physical violence against family members (RR: 1.41). Although the pattern of violence towards older adults was similar, it was not statistically significant.

Conclusions: Chronic pain is associated with an increased risk of abusive behaviors towards family members and older adults. This highlights the need for targeted interventions to support individuals with chronic pain and protect their families and older adults from potential abuse.

III-A2.W.08

QUANTIFYING THE BURDEN OF CHRONIC PAIN IN A LARGE COHORT OF MIDDLE-TO-OLDER ADULTS IN THE UK: HEALTH UTILITIES, ANNUAL QALY LOSSES, AND POPULATION ATTRIBUTABLE FRACTIONS

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Background and aims: Chronic pain (CP) is a prevalent and disabling condition, but its burden is not comprehensively understood. We aimed to quantify the burden of CP in a cohort of 166,178 (56.8% female) middle-to-older age community-dwelling UK adult volunteers.

Methods: We used UK Biobank Experience of Pain EQ-5D-5L questionnaire responses and crosswalked EQ-5D-3L population norms derived from the nationally representative Health Survey for England. We estimated CP prevalence and health utilities by age, sex, and pain-duration (PD;3-12m,1-5y,>5y). We then compared health utilities of those reporting CP with those who did not, and with population norms, and then estimated age, sex, and pain-duration specific annual Quality-Adjusted Life Year (QALY/100,000) losses. Using multivariable logistic regression, we estimated novel population attributable fractions (PAFs) for selected modifiable risk factors (overweight/obesity, past/current smoking, low physical activity, and major comorbidities (Charlson Comorbidity Index), deprivation[Townsend Deprivation Index]).

Results: For females, prevalence ranged from 13.6% (ages 55-64y,PD 3-12m) to 24.4% (74y,PD>5y). For males, it ranged 12.8% (45-54y,PD 3-12m) to 20.7% (>74y,PD 1-5y).

For females without CP, utilities ranged from (mean[SD]) 0.912[0.114];>74y to 0.930[0.102];65-74y. For males, the range was 0.915[0.113];>74y to 0.932[0.102];65-74y.

For those with CP, mean disutilities ranged from -0.002(65-74y,PD 3-12m) to -0.158 (45-54y,PD>5y) for females, and males -0.003 (>74y,PD 3-12m) to -0.151 (45-54y,PD>5y).

Annual QALY losses were greatest for those 45-54y (females,6,378/100,000;males 5,240/100,000).

Significant PAFs were overweight/obesity (females,19.22%[95%CI 18.41-20.03];males,24.24%[23.21-25.25]), past/current smoking (females,8.28%[7.62-8.94];males,10.25%[9.43-11.06]), deprivation (females,2.50% [1.52-3.47];males,2.39%[1.46-3.32]), moderate/severe comorbidities (females,1.61%[1.49-1.72];males,2.82%[2.62-3.02]).

Conclusions: Burden was greatest for those aged 45-54y (both sexes). Reducing overweight and smoking could significantly reduce the burden for individuals, health systems, and society.

III-A2.W.09

RELATIONSHIP BETWEEN PAIN SEVERITY AND COGNITIVE STATUS, PERIPHERAL MUSCLE STRENGTH, FALL RISK AND PROPRIOCEPTION IN THE ELDERLY

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Background and aims: The impact of cognitive decline from aging is linked to the neuromuscular system, affecting mobility, balance, fear of falling, and musculoskeletal impairments. The aim of this study is to investigate the relationship between pain levels and cognitive status, peripheral muscle strength, fall risk and proprioception in elderly.

Methods: A total of 36 individuals aged 65-80 years (67.52±3.46 years) who were able to read and write and were able to follow physiotherapist instructions were included in the study. Pain levels were assessed using the Geriatric Pain Scale (GPS), cognitive status using the Montreal Cognitive Assessment (MoCA), fall risk using the Falls Efficacy Scale (FES), proprioception using the AMEDA device, dynamic balance using the Functional Reach Test (FRT), and peripheral muscle strength using the Jamar hand dynamometer and the Timed Up and Go Test (TUG).

Results: It was found that the grip strength of the geriatric subjects was below the normative values (R: 32.71±9.27, L: 30.37±10.89) and the FRT scores, were below 30 cm (fall risk). TUG test score was found to be below average (8.52±3.69). Participants were also found to have a moderate level of pain (47.60±21.21) and a high risk of falling (35.27±9.16). The results of the study showed a weak correlation between pain levels and grip strength-left (r=-0.413, p=0.012), TUG (r=-0.340, p=0.043)) and FES (r=0.420, p=0.011).

Conclusions: It is suggested that rehabilitation approaches aimed at reducing perceived pain in the geriatric individual should include comprehensive assessments focusing on increasing peripheral muscle strength and reducing fall risk.

III-A2.W.10

DEVELOPING QUALITY INDICATORS FOR THE PHARMACOLOGICAL MANAGEMENT OF CHRONIC NON-CANCER PAIN IN OLDER PATIENTS: A RAND/UCLA DELPHI STUDY

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Background and aims: Chronic non-cancer pain (CNCP) affects 28-88% of older patients and managing it with pharmacological therapies carries a high risk of medication-related problems. Currently, there is no validated set of quality indicators (QIs) to guide the pharmacological management of CNCP in this population.

Therefore, this study aims to achieve expert consensus on a set of QIs.

Methods: A previous systematic literature search was used to identify and develop QIs. We conducted a two-round RAND/UCLA Delphi study, in which experts in nursing, pharmacy and medicine rated the validity and feasibility of the QIs on a Likert scale from 1 to 9. We included QIs with a median ≥ 6.5 and excluded those with < 3.5. If there was disagreement or the median rating was ≥ 3.5 and < 6.5, experts discussed the QIs in three focus groups, followed by re-rating and QI prioritisation.

Results: In this Delphi study, 19 out of 22 experts (86%) participated in the written rounds, while 9 experts (41%) took part in the focus groups. The experts evaluated 61 proposed QIs, modified 11 of them, and suggested 13 new QIs. The final set consisted of 51 QIs, with experts prioritising 23. These QIs covered general pharmacotherapy, and the appropriate use of opioids, non-steroidal anti-inflammatory drugs (NSAIDs), paracetamol, metamizole, and co-analgesics.

Conclusions: This is the first set of QIs developed for the pharmacological management of CNCP in older patients. This set can help standardise care, track and benchmark quality of care, and prioritise patients for interventions.

B1 | SOCIAL ASPECTS OF CHRONIC PAIN

III-B1.W.01

FROM BREAST CANCER DIAGNOSIS TO SURVIVORSHIP: ANALYZING PERIOPERATIVE BIOPSYCHOSOCIAL PHENOTYPES AND THEIR RELATIONSHIP TO PAIN ON LONG TERM

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Background and aims: Persistent breast cancer treatment-related pain affects up to 40% of patients, decreasing their quality of life (QoL). While current research typically utilizes correlation and regression analysis to identify biopsychosocial phenotypes contributing to this pain, this study employs cluster analysis to identify qualitatively different phenotypes based on somatosensory and psychosocial characteristics both before and one week post-breast cancer surgery. Further, it investigates how these phenotypes are related to pain intensity one year post-surgery.

Methods: Somatosensory and psychosocial functioning was evaluated pre- and post-surgery in 184 women undergoing unilateral breast cancer surgery. Eight different quantitative sensory testing methods including mechanical detection and pain thresholds, pressure pain thresholds, thermal detection and pain thresholds, and conditioned pain modulation were performed at the surgical area and a distant location. Psychosocial functioning was assessed using the Central Sensitization Inventory, Pain Catastrophizing Scale, Depression Anxiety Stress Scale-21, and the McGill Quality of Life Questionnaire. Pain intensity was evaluated one year post-breast cancer surgery using the Visual Analogue Scale. Phenotypes were identified by latent class analysis (LCA) and correlated with pain intensity one year post-surgery using a categorical latent variable multinomial logistic regression analysis.

Results: LCA identified five distinct phenotypes before and post-surgery, characterized by differences in mechanical and pain thresholds alongside psychosocial factors. Moreover, higher psychosocial distress and lower QoL correlated with elevated pain intensity one year post-surgery.

Conclusions: These findings underscore the importance of addressing breast cancer patients' mental health perioperatively. Future research should explore whether psychological interventions perioperatively can reduce long-term pain intensity.

III-B1.W.02

THE ASSOCIATION OF ATTENTION BIAS AND TASK DEMANDS WITH EXPERIMENTAL PAIN SENSITIVITY AND AUTONOMIC RECOVERY

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Background and aims: Previous research used traditional tasks like the dot-probe to study attention bias toward pain-related information, yielding little response variability and rarely linking attention bias to pain ratings or recovery. To address these gaps, we propose a modified perceptual load (PL) task to investigate attention bias and its association with experimental pain measures in healthy females, as part of a broader study on female pain sensitivity.

Methods: Eighty-six healthy females completed questionnaires measuring anxiety, depression, and fear of pain. Thereafter, they performed two tasks measuring attention bias towards pain; the modified PL with two task difficulties (i.e. easy and hard), and the pain dot-probe. Baseline pain assessment included identifying the temperature-induced pain-40 and pain-60 on the visual analog scale (VAS), tonic heat pain rating, and the conditioned pain modulation (CPM) paradigm. Simultaneously, electrocardiogram heart rate (HR) was monitored.

Results: Longer reaction time in the presence of pain-related distractors in hard PL task correlated with lower pain-60 temperatures [r=.22, *p*=.044]. In the dot-probe, higher avoidance of pain-related words correlated with higher fear of pain [r=.264, *p*=.015] and heightened HR during CPM recovery [r=.39, *p*< .001].

Conclusions: Our study underscores the importance of using both the modified PL task and the traditional dot-probe task in understanding the complex role of attention bias in pain sensitivity. The modified PL task revealed differences in pain-relevant attentional biases linked to experimental pain sensitivity, while the dot-probe task showed that higher pain avoidance is associated with increased fear of pain and difficulties recovering from pain.

III-B1.W.03

SOCIAL PREDICTIONS IN CHRONIC PAIN

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Background and aims: Most studies on emotion-pain interactions tend to unidirectionally examine the influence of emotional stimuli on pain perception, although bidirectional interactions are plausible. Furthermore, while previous studies have primarily focused on the influence of pain-related expectations on perceived pain intensity, expectations regarding negative valence information more broadly may impact perception beyond pain and be altered when pain becomes chronic. The current experimental study aimed to investigate whether individuals with chronic pain exhibit alterations in predictive processing, beyond pain perception, in the social and emotional domains.

Methods: Participants diagnosed with chronic pain (n= 35) and gender- and age-matched healthy control participants (n= 35) performed a social perception task, designed to elicit expectations about facial expressions that were then fulfilled to a given extent (by presenting a stereotypical expression for the evoked emotion; matched) or not (by presenting a stereotypical expression for a different emotion category than the one evoked; non-matched). Expectations (predictability rating) and social evaluation (likability rating) were measured.

Results: No significant between-group differences in predictability ratings were found, suggesting similar emotion predictions. However, chronic pain patients exhibited a significantly stronger relationship between predictability and likability ratings, compared to controls, suggesting a stronger use of predictions in social cognition. Interestingly,

this effect was driven by negative valence emotion evoked trials (sadness and fear) rather than by positive trials (happiness).

Conclusions: Overall, the observed effects suggest an altered use of intact emotional predictions in social contexts. Our findings highlight the complex interplay between chronic pain, emotion, and social evaluation in the predictive brain.

III-B1.W.04

EARLY-LIFE ADVERSITY PREDICTING THE INCIDENCE OF MULTISITE CHRONIC PAIN IN THE GENERAL POPULATION

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Background and aims: Adverse childhood events (ACEs) have been linked to widespread chronic pain (CP) in various cross-sectional studies, mainly in clinical populations. However, the independent role of different ACEs on the development of different types of CP remains elusive. Accordingly, we aimed to prospectively assess the associations between specific types of ACEs with the development of multisite CP in a large population-based cohort.

Methods: Data stemmed from the three first follow-up evaluations of CoLaus|PsyCoLaus, a prospective population-based cohort study of initially 6734 participants (age range: 35-75 years). The present sample included 1537 participants with 2161 analysable intervals (49.7% men, mean age 57.3 years). Diagnostic criteria for ACEs were elicited using semi-structured interviews, CP was assessed by self-rating questionnaires. Multinomial logistic regressions with Generalized Estimating Equations method analysed the relationship between the different ACEs measured in the beginning of the interval and the risk of developing multisite CP during the follow-up. Sensitivity analyses were performed to assess the predictive value of ACEs on multisite CP with neuropathic features.

Results: Participants with a history of parental divorce or separation had an increased risk of developing multisite CP at during follow-up in comparison to those without (RR1.98; 95% CI 1.13-3.47). A strong association was highlighted between parental divorce or separation and the risk of subsequent CP with neuropathic characteristics (RR 4.21, 95% CI 1.45-12.18).

Conclusions: These results highlight the importance of psychotherapeutic management of people experiencing parental separation to prevent CP, in the future.

III-B1.W.05

DEVELOPMENT OF A SEMANTIC DATABASE FOR BUILDING PSYCHOSOCIAL MODELS OF CHRONIC PAIN

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Background and aims: Modelling the psychosocial contributions to chronic pain, and testing these models against new and existing evidence is key to helping us understand the contribution of psychosocial factors to the onset, maintenance and worsening of chronic pain. To do this we are developing a database and accompanying model building software, with the aim of integrating and storing diverse types of information gathered across the CRIISP project to inform models created by researchers.

Methods: Software has been developed to allow researchers to create diagrams that visually show connections between chosen key concepts in pain research. Evidence collated across a series of systematic reviews can be attached to the concepts in these diagrams to help visualise connections between ideas and existing research. User surveys have been conducted at intervals to align software features with user requirements.

Results: The first iteration of the software and database have been developed, allowing users to create models, store these models and attach evidence contained in the database. Future work will focus on adding datasets to build on this evidence base.

Conclusions: This iteration of the database and model building software provides a base for future integration of analysis using tools from computer science. This future version of the software will allow researchers to test their models against the stored available data. This will allow researchers to quickly see where evidence exists for a psychosocial factor of interest, which psychosocial factors have little evidence to support their contribution to chronic pain and which areas have been understudied.

III-B1.W.06

PSYCHOLOGICAL CORRELATES OF PAINKILLER MISUSE

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Background and aims: Painkiller misuse represents an emerging public health challenge, and preventive interventions are needed to tackle this phenomenon. Behavioural science research can inform such interventions but, to date, there has been limited research into the psychological correlates of painkiller misuse.

Methods: The present research explored painkiller misuse using a mixed methods approach.

Results: In study 1, face-to-face interviews were used to explore painkiller misuse experiences and relevant social cognitive factors in general population (N = 17, M age = 32,41; 70 % females) and were analysed with thematic analysis. The themes from Study 1 were used to inform the development of the questionnaire included in Study 2, which involved the empirical investigation of a novel social cognitive model of painkiller misuse intentions. Using a cross-sectional design, 204 participants completed quantitative measures of socio-cognitive variables derived from the Theory of Planned Behaviour and the Prototype Willingness Model, past behaviour, and intentions to misuse painkillers. Hierarchical linear regression analysis showed that a significant model emerged predicting 42.9% of the variance in intentions, and significant predictors included past behaviour, anticipated regret, family norms, and behavioural willingness. Multiple mediation analysis further showed that the effects of past behaviour on future misuse intentions were significantly mediated by family norms, anticipated regret and behavioural willingness.

Conclusions: Taken together, the present findings suggest that some people may misuse painkillers for reasons other than just pain relief, and that intentions to misuse painkillers are associated with normative influences and social cognitive processes.

III-B1.W.07

COMPARING AND DISTINGUISHING PLACEBO HYPOALGESIA AND NOCEBO HYPERALGESIA INDUCED BY OBSERVATIONAL LEARNING

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Background and aims: This study aimed to compare the magnitude of placebo hypoalgesia and nocebo hyperalgesia induced by observational learning (OBL) and investigate whether placebo hypoalgesia masks nocebo hyperalgesia. Additionally, extinction rates and the mediating role of expectations were explored.

Methods: Pain was evoked via electrocutaneous stimulation, with inactive TENS device serving as a placebo. Participants were randomly assigned to one of four groups: placebo, nocebo, random control, natural history control. OBL was implemented via two videos, showing a model rating pain stimuli. The first video (OBL I) showed moderate pain ratings, the second video (OBL II) showed the model with a sham TENS device, rating pain as higher (nocebo), lower (placebo), or in random order (random). In natural history group, no OBL was implemented. Pain expectancy was assessed after each experimental phase.

Results: Preliminary results are based on a pilot study conducted on a sample of 16 participants. A one-factor ANOVA on the change in mean pain ratings (before and after OBL II) revealed a significant difference between the nocebo group and the random control group ($F(3,11)=4,79$; $p=0,023$; $\eta^2=0,57$). In contrast, the placebo group exhibited results similar to those of the control group.

Conclusions: Preliminary findings suggest that OBL has a stronger impact on nocebo hyperalgesia than placebo hypoalgesia. This highlights the greater influence of negative observational cues over positive ones in modulating pain.

III-B1.W.08

SOCIAL INFLUENCES IN THE EXPERIENCE OF TRANSITION TO OR FROM LONG-TERM (CHRONIC) PAIN: A META-SYNTHESIS OF QUALITATIVE RESEARCH STUDIES

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Background and aims: Despite increasing attention to contextual and psychosocial aspects of pain, little is known about how social contexts relate to individuals' transitions into and out of chronic pain. We aimed to describe how qualitative studies have understood pain experiences in relation to social contexts and to explore what can be understood from those studies about transitions to and from pain. We conducted a systematic review and synthesis of qualitative studies that explored social aspects of the experience of people (age 18+) with chronic pain relating to any condition.

Methods: A thematic synthesis approach was used. Literature searches were carried out in major scientific databases to identify relevant qualitative studies relating to a range of chronic pain conditions. Quality assessment of methodology and completeness of reporting was undertaken using the Critical Appraisal Skills Programme checklist. Material from relevant literature was extracted, coded and thematically grouped and analysed, with double-processes where appropriate to ensure rigour.

Results: Analysis of the 66 relevant articles enabled development of three overarching themes: social connections, lifestyle and occupation. Although elucidating the importance of social worlds for pain experience, the literature included in the review paid scant attention to transitions to and from chronic pain or any mechanisms that might support such transitions.

Conclusions: The review suggests that social phenomena influence people's experience of living with chronic pain in a number of important ways. However, little research has explored how and why these social phenomena combine with and influence the ebb and flow of transitions to and from chronic pain.

III-B1.W.09

BORDERS THAT HURT: THE GLOBAL SPREAD OF ANTI-IMMIGRATION ATTITUDES LINKED TO THE EPIDEMIC OF CHRONIC PAIN IN ADOLESCENCE

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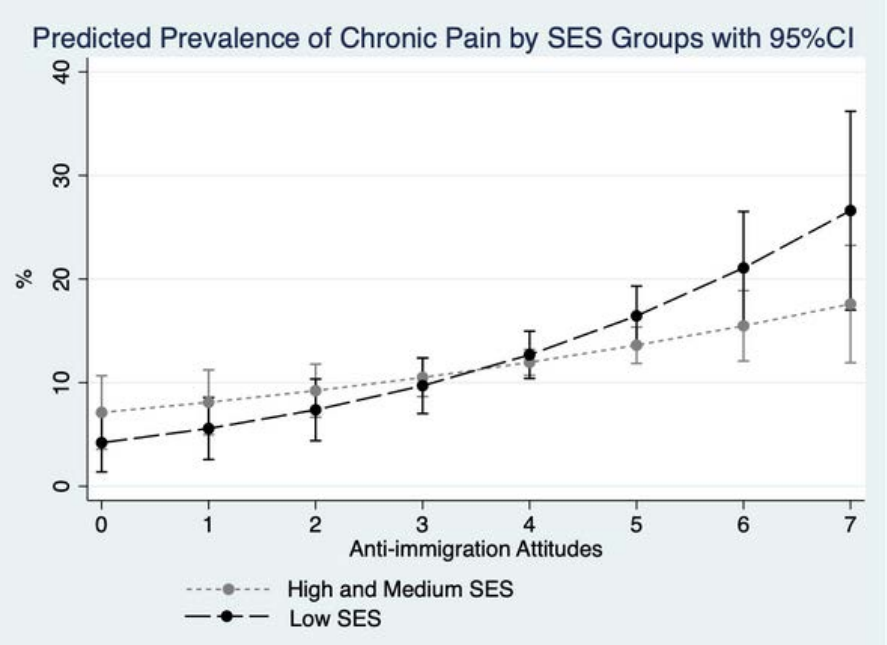
Background and aims: Immigration is becoming an increasing concern in Europe and is expected to continue rising due to the growing frequency of environmental disasters and sociopolitical conflicts. Research has shown that immigrant adolescents are disproportionately affected by chronic pain. Anti-immigration attitudes may exacerbate this disparity by fostering social exclusion, discrimination, and toxic stress. In response to calls for anti-racist, intersectional pain research, this study examined: (1) the association between country-level anti-immigration attitudes and chronic pain in immigrant adolescents, and (2) whether this association varied by gender and socioeconomic status (SES).

Methods: Cross-sectional data were drawn from 5,621 immigrant adolescents across 20 European countries/regions using the 2018 Health Behaviour in School-aged Children survey. Country-level anti-immigration attitudes were obtained from the European Values Study 2018. Weighted mixed-effects logistic regression models assessed the association between anti-immigration attitudes and chronic pain and tested for interaction effects with gender and SES.

Results: Country-level anti-immigration attitudes were significantly associated with adolescent chronic pain (OR=1.19; p=.02), with a higher prevalence of chronic pain among immigrant adolescents in countries with stronger anti-immigration sentiments, ranging from 8% in Finland to 37% in Bulgaria. This association was significantly

stronger in immigrant adolescents of low SES than in middle or high SES (OR=1.17; p=.04).



Conclusions: Anti-immigration attitudes at the country level are associated with higher rates of chronic pain in immigrant adolescents, particularly among those with low SES. Context-specific interventions may mitigate the impact of exclusionary sociopolitical attitudes on immigrant health, while policy changes targeting anti-immigration sentiment could address the root causes of these disparities.

III-B1.W.10

HOW DO PSYCHOSOCIAL ASPECTS OF EVERYDAY LIFE INFLUENCE CHRONIC PAIN TRANSITIONS?

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Background and aims: We know that people experience pain in different ways, but little is known about how social contexts are linked to chronic pain or why individual variation exists. The aim of this research is to characterise the role of individual, social and community contexts in transitions to and from chronic pain.

Methods: Using ethnographic approaches drawn from social science, we spent 12 months with people who live with chronic pain. 19 participants were identified through Avon Longitudinal Study of Parents and Children, all of whom were around 30 years old. Data collection comprised of interviews and periods of shadowing (observations) with participants and members of their immediate social circles in homes and local communities. Using inductive thematic analysis we identified key ways people make sense of their pain transitions in relation to their everyday lives.

Results: Early analysis indicates that pain transitions are interconnected with social phenomenon. Social phenomenon are such things as relationships with friends, family and employers, lifestyles, hobbies and activities within everyday life routines. Pain transitions tend to be influenced by a collection of social phenomena that change together. As such, alterations in close relationships or lifestyle, are not isolated events and play a considerable and important role in the onset, maintenance or reduction in chronic pain.

Conclusions: Interventions that focus on improving the quality of these relationships may provide an additional way to support people with chronic pain alongside existing interventions and approaches. This study highlights the importance of addressing the broader social context in which individuals navigate their lives.

B2 | MOLECULAR MECHANISMS OF PAIN

III-B2.W.01

ROLE OF SLC7A11 IN CHRONIC PAIN AFTER PARTIAL SCIATIC NERVE LIGATION

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Background and aims: Considering the limited efficacy and important side effects of available treatments, neuropathic pain remains a clinical challenge. Central sensitization, an adaptation of the central nervous system to persistent inflammation and heightened excitatory transmission in pain pathways, significantly contributes to persistent pain. Considering the modulation of glutamate transmission and neuroinflammatory response by the cystine/glutamate exchanger (system x_c^-), this study investigates the contribution of this exchanger in neuropathic pain.

Methods: We evaluated system x_c^- expression/activity in the dorsal spinal cord of mice after unilateral partial sciatic nerve ligation, a surgical model of neuropathic pain. We examined the effects of genetic suppression of system x_c^- (using mice lacking the specific subunit xCT) and its pharmacological inhibition on pain-associated behavioral responses. Additionally, we assessed glial activation and inflammatory response in the spinal cord by measuring mRNA and protein levels of GFAP and selected microglial markers.

Results: After the sciatic nerve lesion, xCT was upregulated at the spinal level. The genetic deletion of xCT attenuated pain sensitization, evidenced by reduced responses to mechanical and thermal stimuli, and was accompanied by reduced glial activation. Pharmacological inhibition of system x_c^- using sulfasalazine also had analgesic and anti-inflammatory effects in lesioned mice.

Conclusions: These findings indicate a role for system x_c^- in central mechanisms associated to neuropathic pain. Reduced hypersensitivity in xCT-deficient or sulfasalazine-treated mice is likely mediated by reduced gliosis and/or a shift in microglial polarization towards an anti-inflammatory phenotype. These findings suggest that drugs targeting system x_c^- could prevent or reduce neuropathic pain.

III-B2.W.02

LIPID RAFT DISRUPTION INHIBITS THE ACTIVATION OF TRANSIENT RECEPTOR POTENTIAL VANILLOID1, BUT NOT TRP MELASTATIN 3 AND THE VOLTAGE-GATED L-TYPE CALCIUM CHANNELS IN SENSORY NEURONS

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Background and aims: Transient Receptor Potential (TRP) ion channels like Vanilloid 1 (TRPV1) and Melastatin 3 (TRPM3) are nonselective cation channels expressed in primary sensory neurons and peripheral nerve endings. They are located in cholesterol- and sphingolipid-rich membrane lipid raft regions and have important roles in pain processing. We showed earlier that lipid raft disruption leads to decreased capsaicin-induced TRPV1 but not pregnenolone sulphate-evoked TRPM3 ion channel activation. Besides TRP receptors a wide variety of voltage-gated ion channels were also described in the membrane raft regions of neuronal cells.

Methods: Here we investigated the effects of lipid raft disruption by methyl-beta-cyclodextrin (MCD) and sphingomyelinase (SMase) on TRPM3 and voltage-gated L-type Ca^{2+} channel activation in cultured trigeminal neurons and sensory nerve terminals of the trachea. We also examined the mechanism of action of MCD on TRPV1 and TRPM3 by *in silico* modeling.

Results: Disruption of lipid rafts by MCD or SMase did not alter CIM0216-induced TRPM3 cation channel activation and the voltage-gated L-type Ca^{2+} channel activation by FPL 64126 or veratridine neither on trigeminal sensory neurons nor sensory nerve terminals. We provided the first structural explanation with *in silico* modeling that the activation of TRPV1 and TRPM3 ion channels is affected differently by the cholesterol content surrounding them in the plasma membrane.

Conclusions: It is concluded that modifying the hydrophobic interactions between lipid rafts and ion channels and receptors might provide a selective novel mechanism for peripheral analgesia.

III-B2.W.03

HUMAN COLD PAIN

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Background and aims: In contrast to detection cooling, the detection of noxious cold is controversial. Many targets have been proposed to be required for the transduction and transmission of cold, including TRPM8, TRPA1, $Na_V1.7$ and $Na_V1.8$. So far, there is no experimental human model that allows the application of potential antagonists at the same site as the cold.

Methods: We have developed a human pain model based on intradermal injection of cooled extracellular solution into the volar forearm. The temperature decreases largely linear down to 3°C, followed by a cold plateau. This allows to assess a cold pain threshold as well as the super-threshold time course. Volunteers periodically rated the perceived pain during the injection using a numerical rating scale. Addition of antagonists allowed to assess contributions individual targets to cold pain. The study was approved by the local ethics committee and conducted in accordance with the Declaration of Helsinki.

Results: The cold pain model induced pain in the majority of subjects. In contrast the negative control with the same solution without cooling only induced minimal pain. Cold pain thresholds showed considerable variation, as described before. The addition of lidocaine reduced cold-induced pain, providing proof of concept for pharmacological inhibition. No side effects were observed. The majority of pain remained even when multiple suspected cold-mediating receptors were simultaneously blocked.

Conclusions: The injection-based pain model allows a noxious cold stimulus to be reliably co-administered with a compound of interest at the same site. Key mechanisms of cold pain remain elusive.

III-B2.W.04

A HUMAN SKIN BACTERIAL INFLAMMATION MODEL

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Background and aims: Inflammatory pain causes an increased response to noxious stimuli or pain due to normally innocuous stimuli. To better understand the mechanisms underlying hyperalgesia, it is essential to develop practical and relevant models of inflammation. In contrast to the large number of animal models, only a few studies have looked at human models that reflect bacterial inflammation.

Methods: To induce inflammation in human skin, lipopolysaccharide (LPS) was injected intradermally into the volar forearms of healthy volunteers. To study the time course of inflammation, in 12 healthy volunteers LPS was injected at intervals of 50-1.5 hours before blood flow and sensitivity to noxious stimuli were assessed. Mechanical force, heat and injection of an increasingly acidic solution were applied to inflamed or non-inflamed control sites. Volunteers periodically rated the perceived pain during the injection using a numerical rating scale. The study was approved by the local ethics committee and conducted in accordance with the Declaration of Helsinki.

Results: Injection of LPS resulted in localised inflammation in all subjects, as indicated by increased blood flow and increased pain sensitivity to mechanical and acidic stimuli. Hyperaemia peaked at 4.5 hours and largely resolved within 2 days after injection. Maximum pain hypersensitivity was at 4.5 - 6 hours and had largely resolved on the day after LPS injection.

Conclusions: This model of skin inflammation mimics gram-negative bacterial inflammation and reliably induces hyperalgesia in human skin. The model can therefore be used to test substances that interfere with the development of inflammation and inflammatory pain.

III-B2.W.05

MODULATION OF G PROTEIN-COUPLED ESTROGEN RECEPTOR (GPER) AS A THERAPEUTIC STRATEGY FOR OSTEOARTHRISTIS PAIN MANAGEMENT

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Background and aims: Osteoarthritis (OA) is the most common musculoskeletal disease, affecting millions of people worldwide. Pain is the dominant symptom of OA and the main reason for medical consultation. Current treatments are often ineffective and/or linked to significant adverse effects. Therefore, new therapeutic approaches are needed.

Our recent studies have highlighted the potential of modulating the G protein-coupled estrogen receptor (GPER) in managing inflammatory pain.

Here, we propose to perform a functional study investigating the involvement of GPER, using genetic and pharmacological strategies, in a murine model of OA.

Methods: Male C57BL/6 mice (10 week-old) underwent destabilization of the medial meniscus (DMM) surgery to induce OA. Mechanical hypersensitivity was assessed using the von Frey test during OA progression. The involvement of GPER was assessed with various pharmacological (GPER inverse agonist and antagonist) and genetic tools.

Results: After DMM surgery, mice developed a significant mechanical allodynia that was reduced after treatment with the GPER inverse agonist. This effect was abolished when the GPER antagonist was co-administered with the inverse agonist. Using genetically modified mice with a specific deletion of GPER in primary nociceptive neurons, we observed a decrease in OA-induced hypersensitivity. A similar result was obtained after the specific knock-out of GPER in the dorsal horn of the spinal cord.

Conclusions: In DMM model, these results demonstrate that GPER, both at peripheral and spinal levels, contributes to OA-induced hypersensitivity. Collectively, these findings highlight that GPER could be a promising new therapeutic target for the management of osteoarthritis pain.

III-B2.W.06

SOLUBLE EPOXIDE HYDROLASE INHIBITION POTENTIATES THE ANALGESIC EFFECT OF SIGMA-1 ANTAGONISM IN RHEUMATOID ARTHRITIS PAIN

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Background and aims: Pain associated with rheumatoid arthritis (RA) is highly prevalent and the main concern for patients. However, there are no specific drugs and classic ineffective analgesics, mainly NSAIDs, are used. Both sigma-1 receptor (S1R) antagonism and soluble epoxide hydrolase (sEH) inhibition have shown robust analgesic efficacy in different models, but the effects of their association had not been explored.

Methods: We used the collagen-induced arthritis (CIA) model in female Wistar rats, von Frey test for assessing mechanical allodynia and acetone test for cold allodynia. The S1R antagonist S1RA, the sEH inhibitor EC-5026 and the dual compound EPB-117 were administered subcutaneously on day 8 or 13 after immunization. Behavioral assessments were performed 1, 2 and 3 h after administration. We also associated those treatments with PRE-084, a S1R agonist, and MS-PPOH, an inhibitor of microsomal CYP450s which avoids the beneficial effect of sEH inhibition.

Results: S1RA and EC-5026 reduced mechanical and cold allodynia in a dose- and time-dependent manner, with a maximum analgesic efficacy of 50-60%. When two ineffective doses of S1RA (20 mg/kg) and EC-5026 (2.5 mg/kg) were combined, a robust synergistic effect was observed. The dual compound EPB-117 showed a similar dose- and time-dependent synergistic effect, which was reversed by either PRE-084 or MS-PPOH, confirming that both targets are necessary for the potentiation.

Conclusions: We observed a clear synergistic analgesic effect of S1R and sEH inhibition in a rat model of RA pain. The dual compound also exhibited robust analgesic efficacy suggesting that it may be useful for treating RA pain.

III-B2.W.07

THE EFFECT OF A COMBINED CAPSAICIN-DICLOFENAC-CONTAINING TRANSDERMAL THERAPEUTIC SYSTEM (TTS) IN A RAT MODEL OF ACUTE POSTOPERATIVE AND ACUTE INFLAMMATORY PAIN

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Background and aims: High-concentration capsaicin patches have several disadvantages, but lower concentrations can promote the release of natural pain-relieving compounds and improve the absorption of other drugs. We aimed to develop patches with sustained release of low-concentration capsaicin or diclofenac, or a combination of both, and to study their release and analgesic effects in rat models.

Methods: After a plantar skin-muscle incision, postoperative pain was assessed using a thermonociceptive threshold test before and after surgery and after applying transdermal therapeutic systems (TTS). Inflammatory pain was induced by injecting carrageenan, and the mechanonociceptive threshold was measured before and after the injection and after applying TTS. Different TTS containing capsaicin, diclofenac, or their combination were applied, along with control TTS with no active substance.

Results: Increased sensitivity to heat was reduced 6 hours after using capsaicin TTS and 2.5 hours after using diclofenac TTS. Additionally, combining capsaicin and diclofenac TTS reduced heat sensitivity at both time points.

Mechanical pain caused by carrageenan injection was reduced 6 hours after using capsaicin TTS. Both diclofenac TTS and the combined capsaicin-diclofenac TTS reduced mechanical pain sensitivity at 2.5 hours and 6 hours.

Conclusions: We have created a modified silicone polymer-based TTS for the controlled release of capsaicin and diclofenac. When combined, these compounds can enhance each other's release. This formulation allows low-concentration capsaicin to alleviate acute postoperative pain and extend the analgesic effect of diclofenac while reducing its concentration. The combined TTS is effective in relieving acute inflammatory pain, making it a promising therapeutic tool for various pain states.

III-B2.W.08

NERVE INJURY-INDUCED ALTERATIONS OF GANGLIOSIDE LEVELS IN RAT PERIPHERAL NERVES ASSESSED BY HPLC-HRMS

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Background and aims: Neurohistochemical tracing studies demonstrated robust changes in GM1 ganglioside level of primary sensory neurons (PSNs) following peripheral nerve injuries. Alterations in the ganglioside phenotype of PSNs has been suggested to contribute to the development of sensory abnormalities and neuropathic pain. In the present study we examined nerve injury-induced changes in glycosphingolipid/ganglioside levels of rat sciatic nerves by using HPLC-HRMS.

Methods: Adult male Wistar rats were used in these experiments. Tissue samples of intact and proximal and distal segments of transected sciatic nerves were collected for analysis. One-step lipid extraction was performed with a CHCl3/MeOH/H2O solvent mixture. After chromatographic separation with HPLC, in-line mass spectrometry was performed on a Q Exactive Plus hybrid quadrupole-Orbitrap mass spectrometer. Compound Discoverer 3.3 software was used for data evaluation.

Results: In samples of intact sciatic nerves the presence of major gangliosides (GM1, GD1, GQ1, GM3) was detected. Significant, or even robust (GM3 and GD1) increases in ganglioside levels were observed in samples of both the proximal and the distal nerve stumps of the cut sciatic nerve. GM1 ganglioside levels showed threefold and nearly sixfold increases in the proximal and the distal nerve stumps, respectively.

Conclusions: In vitro studies demonstrated modulation of nociceptive functions of cultured PSNs following inhibition of glucosylceramide synthase, the key enzyme of ganglioside synthesis. The present results support and

extend previous findings by showing marked changes in levels of major gangliosides in PSNs following peripheral nerve injury and provide further support for an important role of gangliosides in sensory functions in health and disease.

III-B2.W.09

SIGMA-1 ANTAGONISM AND SOLUBLE EPOXIDE HYDROLASE INHIBITION ACT SYNERGISTICALLY TO INHIBIT TACTILE ALLODYNIA INDUCED BY CAPSAICIN AND BY A SURGICAL INCISION

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Background and aims: Tactile allodynia is a feature of pain hypersensitivity common in many clinically-relevant circumstances, such as postoperative pain. Three quarters of postoperative patients experience moderate, severe, or even extreme pain in the immediate postoperative period despite pharmacological treatments, even with opioids. Both sigma-1 receptor (S1R) antagonism and soluble epoxide hydrolase (sEH) inhibition are promising pharmacological tools for pain treatment, although the effects of their association are unknown.

Methods: CD-1 female mice were used in all experiments. We used two different models to induce tactile allodynia: the intraplantar injection of capsaicin and a transverse laparotomy to model postoperative pain.

Results: Association of structurally unrelated S1R antagonists (BD-1063, S1RA and NE-100) and three representative sEHIs (AS2586114, EC-5026, and UB-SCG-54) induced a robust synergistic effect reversing capsaicin-induced tactile allodynia. We selected the association of the clinical candidates S1RA and EC-5026 for further experiments in laparatomized animals, and found that they also exerted a synergistic full reversal of tactile allodynia. We then developed a dual compound which binds in the nM range both S1R and sEH, named EPB-117. This compound was able to abolish tactile allodynia induced by either capsaicin or laparotomy. The effects of the drug associations or the dual compound were reversed by either the S1R agonist PRE-084 or the inhibitor of microsomal CYP450s MS-PPOH, confirming that both S1R and sEH are necessary for the antiallodynic effects.

Conclusions: S1R antagonism and sEH inhibition can be associated in separate drugs or in a dual compound as a novel strategy for pain treatment.

III-B2.W.10

INVOLVEMENT OF THE SYSTEM X_c^- IN THE CONTEXT OF CHRONIC INFLAMMATORY PAIN

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Background and aims: Affecting one in five individuals with major consequences on their quality of life, chronic pain is a public health concern. It largely results from disturbances in glutamatergic homeostasis and persistent inflammation, causing peripheral and central sensitization. In a model of neuropathic pain, we previously identified the cystine-glutamate exchanger (system xc-) as a molecular actor in pain sensitization, influencing glutamatergic signaling and inflammatory responses. This study aimed at examining the role of this exchanger in a model of chronic inflammatory pain.

Methods: Our models consisted in the injection of Complete Freund adjuvant (CFA) in the left hindpaw of control mice and genetically modified mice lacking the xCT subunit of system xc-. Behavioral studies assessed tissue inflammation and pain sensitivity for up to 21 days. We also measured IL-6 and TNF-α in peripheral blood.

Results: Our results showed that system xc- deficient mice showed reduced edema, mechanical allodynia, and thermal hyperalgesia compared to wild-type mice following CFA injection. Additionally, the absence of system xc- was correlated with a lower induction of peripheral pro-inflammatory cytokines, measured 4,7 and 21 days after the inflammatory insults.

Conclusions: Our findings suggest that system xc- is involved in the establishment and maintenance of inflammatory pain, as its genetic suppression alleviates inflammation and pain symptoms. This study offers perspectives for treating patients suffering from chronic pain.

C1 | PERIPHERAL AND CENTRAL SENSITIZATION

III-C1.W.01

MANIFESTATION OF CENTRAL SENSITIZATION IN HIGHLY TRAINED ATHLETES

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Background and aims: Athletes, compared with non-athletes, exhibit higher pain threshold and tolerance. The susceptibility to develop central sensitization (CS) – defined as an "increased responsiveness of nociceptive neurons in the central nervous system" has not been studied in this population. Here, we aimed to compare secondary hyperalgesia (SH), a manifestation of CS, elicited experimentally in volunteers grouped according to their level of regular physical activity (elite, intermediate and sedentary).

Methods: We investigated mechanical pinprick sensitivity (MPS; Visual Analog Scale 0-100) and area of SH after high frequency electrical stimulation (HFS) of the volar forearm skin, at three time points (20, 30, 35 min) in two groups of rugby women (12 elite *vs.* 12 intermediate). Similar data is currently being collected at four time points (10, 20, 30, 50 min) in male and female volunteers practicing endurance sports (elite, intermediate and sedentary, n = 43/78).

Results: After HFS, a similar increase in MPS was observed in elite and intermediate rugby women. The area of SH was significantly smaller in the elite rugby women group compared to the intermediate. With the currently available data for the other groups, MPS and area of SH appear similar between endurance elite, intermediate and sedentary participants

Conclusions: Women highly trained for a contact sport have a reduced susceptibility to develop experimentally induced CS. The upcoming data from male and female endurance athletes will help us disentangle whether this effect is specific to females or relates to the practice of a contact sport implying repeated nociceptive stimulations.

III-C1.W.02

MODULATING SPINAL ACTIVITY WITH HYPNOSIS: CAN HYPNOTIC HYPOESTHESIA MODULATE EARLY SOMATOSENSORY EVOKED POTENTIALS?

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Background and aims: Effective pain management often requires approaches beyond pharmacological treatments and interest has been growing for the use of analgesic techniques such as hypnosis in the clinical field. Despite its increasing use, the mechanisms underlying hypnosis remain unclear. Previous studies have shown that hypnosis can reduce the RIII component of nociceptive withdrawal reflexes, suggesting involvement of descending modulatory pathways. This study aims to further investigate spinal mechanisms of hypnosis by examining the N13 components of somatosensory evoked potentials (SERPs) and exploring its effects on cortical SERPs.

Methods: In this study, N13 and early cortical SERPs were recorded from healthy volunteers in response to median nerve stimulation under a normal waking and a hypnosis condition. Participants rated stimulus intensity and unpleasantness, and their hypnotizability was assessed using the Elkins Hypnotic Susceptibility Scale.

Results: Regarding intensity and unpleasantness ratings, the differences between hypnosis condition and control condition did not reach significance. The amplitude of the N13 and N20 did not decrease significantly in the hypnosis condition compared to the control condition.

Conclusions: Based on these results, we observe that the unpleasantness perception and the intensity of the stimulation aren't reduced under hypnosis, suggesting that our actual design is inappropriate to efficiently induce

hypnotic hypoesthesia. Therefore, it is not currently possible to determine whether hypnosis can affect spinal transmission and early cortical processing of somatosensory inputs.

III-C1.W.03

DIFFERENCE IN SENSITIZATION MECHANISM ACROSS LOW-FREQUENCY EPISODIC, HIGH-FREQUENCY EPISODIC, AND CHRONIC MIGRAINE

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Background and aims: This observational study assessed differences in sensitization across chronic migraine(CM), low-frequency(LFEM), high-frequency episodic migraine(HFEM), and healthy controls.

Methods: Signs of sensitization were assessed with Quantitative sensory tests(QST) (trigeminal Wind-up ratio(WUR); trigeminal and upper-cervical pressure pain-threshold(PPT). CM were assessed ictally and interictally and compared vs controls. LFEM and HFEM were assessed interictally, preictally, ictally, and postictally and compared vs. 1) each other's, matched for the phase; 2) CM (ictal-LFEM and HFEM vs. ictal-CM; postictal, interictal, preictal LFEM and HFEM vs interictal-CM); 3) control.

Symptoms of sensitization were assessed with the Central Sensitization Inventory(CSI) questionnaire and CSI results of CM, HFEM, and LFEM were compared.

Results: 56 controls, 32 CM, 105 LFEM, and 74 HFEM were included. Compared to controls:

1) ictal-CM had lower trigeminal and upper-cervical PPTs($p<0.001$), and higher trigeminal WUR($p=0.020$); no differences were observed with interictal-CM;

2) preictal-HFEM had lower upper-cervical PPT($p=0.014$); ictal-HFEM had lower trigeminal($p=0.002$) and upper-cervical($p=0.009$) PPTs, and higher trigeminal WUR($p=0.002$); postictal-HFEM had lower trigeminal($p=0.004$) and upper-cervical($p=0.010$) PPT. No differences were observed with interictal-HFEM.

3) interictal-LFEM had lower trigeminal($p=0.002$) and upper-cervical($p=0.016$) PPTs; preictal-LFEM had lower upper-cervical PPT($p=0.014$); postictal-LFEM had lower upper cervical PPT($p=0.006$). No differences were observed with ictal-LFEM. Ictal-LFEM had higher trigeminal($p=0.013$) and upper-cervical($p=0.012$) PPTs compared to CM. No other differences were observed between HFEM and LFEM or HFEM and CM.

Patients with HFEM and CM had increased symptoms related to sensitization (HFEM, $p=0.003$; CM, $p<0.001$) compared to LFEM with no differences between HFEM and CM($p> 0.05$).

Conclusions: HFEM patients have a sensory profile matching CM better than LFEM.

III-C1.W.04

CHARACTERIZATION OF SECONDARY HYPERALGESIA IN CUTANEUS AFFERENTS IN OSTEOARTHRITIS MOUSE MODEL

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Background and aims: We previously showed that Complete Freund's Adjuvant (CFA)-induced knee joint inflammation in mice does not only cause joinpain but is also accompanied by secondary mechanical hyperalgesia in remote skin regions such as the ipsilateral hindpaw, which appears to be mediated by a sensitization of cutaneous C-fiber and A-fiber nociceptors. Here we aimed to unravel the cellular and molecular mechanism that underlie the sensitization of cutaneous afferents during CFA-induced monoarthritis.

Methods: To decipher the mechanism of cutaneous afferent sensitization, we utilized single unit teased fiber recordings from the tibial nerve and patchclamp recordings from retrogradely labelled cutaneous afferents in combination with behavioral assays, single cell RNAseq and AAV-mediated gene silencing.

Results: Extracellular recordings from single tibial nerve afferents, showed that C-fiber and Aδ-fiber nociceptors exhibit lowered mechanical activation thresholds and increased action potential firing rates during CFA-induced knee joint inflammation, which was consistent with the reduced paw withdrawal

thresholds in response to mechanical hind paw stimulation with von Frey filaments. A similar reduction of the rheobase was observed in patchclamp recordings from retrogradely labelled cutaneous afferents and RNAseq revealed altered expression levels of several voltage-gated ion channels in

cutaneous nociceptors during CFA-induced knee joint inflammation. Currently, we are investigating the role of these voltage-gated channels in controlling excitability of cutaneous afferents and, hence, pain sensitivity, using pharmacological tools as well as AAV-mediated gene silencing and behavioral assays

Conclusions: Currentyl, our data is preliminary, but we are confident that we can provide meaningful mechanistic insights at the time of the meeting

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III-C1.W.05

PLASTICITY OF THE RACC DIFFERS BETWEEN MECHANICAL AND THERMAL NEUROPATHIC PAIN IN MICE

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Background and aims: The anterior cingulate cortex is well-known for its important role in nociceptive processing, but our understanding of its involvement in the development and persistence of chronic pain remains limited. This study aims to assess the plasticity of the rostroanterior cingulate cortex (rACC) in response to evoked mechanical and thermal stimuli throughout the progression of neuropathic pain.

Methods: We used fiber photometry to record the calcium activity of excitatory CamKIIa neurons within the rACC, following innocuous and noxious mechanical and thermal stimulations. We compared rACC activity at the onset of sciatic nerve injury (SNI) and during the maintenance and recovery of pain symptoms.

Results: SNI resulted in persistent static and dynamic mechanical allodynia, persistent prick hyperalgesia, and transient hot and cold hyperalgesia. Three weeks after the nerve injury, when animals exhibited the most mechanical and thermal hypersensitivity, rACC activity was characterized by a significant increase in resting-state activity. Light dynamic and static mechanical stimulations, as well as noxious mechanical stimulations, elicited an increase in calcium activity in the rACC, whereas the evoked response to heat or cold stimulation remained unaffected.

Conclusions: This study demonstrates that the rACC undergoes plastic changes in response to neuropathic pain. This increased activity differs between evoked sensory modalities, suggesting distinct mechanisms underlying mechanical versus thermal hypersensitivity.

III-C1.W.06

A POTENTIAL OBJECTIVE SIGN OF CENTRAL SENSITIZATION: REFERRED PAIN ELICITED BY MUSCLE EXPLORATION IS COINCIDENT WITH PATHOLOGICAL AUTONOMIC RESPONSE PROVOKED BY NOXIOUS STIMULATION

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Background and aims: There is a debate over whether trigger points are related to peripheral phenomena or central sensitization (CS) processes. Referred pain is considered a possible sign of CS, likely occurring due to abnormal activity in the immune and autonomic nervous systems. To examine abnormal autonomic activity within referred pain, a new diagnostic method, the Skorupska Protocol (SP) test®, was recently established. Positive test results are confirmed by the percentage size of noxiously provoked amplified vasomotor reactivity coincident with the referred pain zone.

Aim: The examination of the latent and active trigger points (TrPs) within the gluteus minimus muscle by the SP test® was conducted.

Methods: The gluteus minimus muscles of pain patients and healthy subjects were examined using the SP test®, including the following groups: (i) Gluteal syndrome (GS) (n = 20), (ii) chronic sciatica (n = 30), (iii) healthy subjects with latent TrPs (n = 20), and (iv) control (n = 27).

Vid. 1 The case of chronic sciatica patients presenting the amplified vasodilatation within mechanically provoked referred pain from gluteus minimus trigger points (positive SP test®).

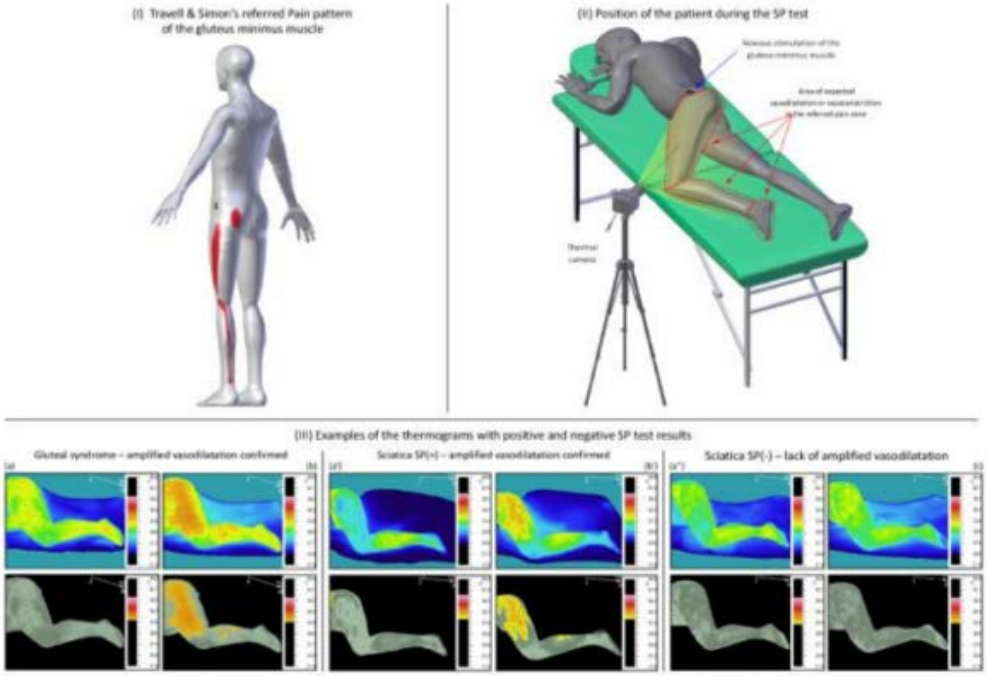

Figure 1

An illustration of the SP test applied to a gluteal syndrome and chronic sciatica. Legend: (**I**) gluteus minimus-referred pain pattern established by Travell and Simons based on the post-stimulation reports of the patient with gluteus minimus trigger points; (**II**) position of the patient during the SP test; and (**III**) examples of the thermograms with positive and negative SP test results; (**a**,**a'**,**a"**) pictures of a patient without noxious stimulation; (**b**,**b'**) pictures showing positive SP test results—registered amplified vasodilatation within the patient's perceived pain zone; and (**c**) pictures showing negative SP test results—lack of amplified vasodilatation within the patient's perceived pain zone (color picture—full range of temperature; gray picture—individually isolated state above the maximum baseline temperature at rest)

Results: Positive SP test® results were confirmed for: (i) all GS patients (8.9 ± 13.6%, $p < 0.05$), (ii) TrPs-positive sciatica patients (n = 8) (15.1 ± 17.8%, $p < 0.05$), and (iii) all healthy subjects with latent trigger points (11.1 ± 10.96%, $p < 0.05$). Negative SP test® results were observed in the control group and in sciatica patients without provoked referred pain from TrPs.

Conclusions: Abnormal autonomic nervous system activity within the referred pain zone of active and latent trigger points was confirmed. This observed phenomenon supports the concept of central nervous system involvement in the pathomechanism of referred pain.

III-C1.W.07

SPINAL AND SUPRASPINAL COMPONENTS OF CENTRAL SENSITIZATION: DOES YOUR BRAIN DIFFERENTIATE?

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Background and aims: Spinal and supraspinal components of central sensitization might be reflected in different proxy measures: hypersensitivity in a pain-fee area adjacent to patients' most painful site (AD) conceivably indicates spinal sensitization; hypersensitivity in a pain-free, remote area (CON) or pain catastrophizing (PCS) might reflect supraspinal sensitization.

Supraspinal sensitization has been associated with altered resting-state functional connectivity (rsFC), but it is unknown if rsFC also reflects spinal sensitization. This study investigated relationships between proxies of spinal and supraspinal sensitization, respectively, and rsFC in chronic low back pain (cLBP) patients.

Methods: Forty-five cLBP patients completed 12min resting-state fMRI (3T, whole-brain, TR/TE:846ms/30ms, 2.2mm isotropic voxels), questionnaires and quantitative sensory testing (QST) in AD and CON. RsFC was analyzed using ICA and dual regression. Spinal and supraspinal proxy measures that differed in patients compared to 34 age- and sex-matched healthy controls (PCS, mechanical pain sensitivity (MPS) in AD, pressure eliciting a pain rating of 4/10 (NRS4) in CON) were assessed for correlation with rsFC (permutation tests; 5000 permutations, TFCE-corrected).

Results: No association of rsFC with MPS was found. Lower rsFC of the middle occipital gyrus to the default mode network correlated with higher NRS4; larger PCS correlated with higher rsFC within the sensorimotor network.

Conclusions: PCS and hypersensitivity in CON but not in AD correlated with rsFC in cLBP, involving networks previously linked to supraspinal sensitization. This suggests supraspinal but not spinal sensitization might relate to rsFC, underlining the importance of differentiating these phenomena.

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III-C1.W.08

THE EFFECT OF HIGH-FREQUENCY STIMULATION ON C-FIBER RESPONSES ELICITED BY SUSTAINED PERIODIC THERMONOCICEPTIVE STIMULATION

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Background and aims: A characteristic of pain sensitization is long-term potentiation (LTP) at C-fibers. Thus, evaluating the cortical response to C-fiber stimulation before and after the induction of LTP would permit a better understanding of pain sensitization mechanisms. The aim is to assess the cortical response of C-fiber stimulation using periodic sustained thermonociceptive stimuli before and after LTP induction via electrical high-frequency stimulation (HFS).

Methods: Electroencephalography (EEG) to periodic sustained thermonociceptive stimuli were recorded using a Thermal Cutaneous Stimulator in 27 healthy participants. Stimuli consisted of 10 trials of 60s, oscillating between 35°C and 50°C at 0.2 Hz, alternately applied to both forearms in the HFS area. HFS was administered on one forearm (randomized laterality, the other arm served as control) 10cm from the cubital fossa, as 5 trains of 100 Hz with 10s intervals and 20-minute rest until post-EEG recording. A preliminary analysis was conducted in 7 subjects using a linear-mixed-model to analyze the effects of timepoint, condition, and centro-parietal electrodes on the peak amplitude at 0.2 Hz.

Results: The linear mixed model identified a significant general effect at electrode CP3 (β=-0.32702, p=0.0106). The three-way interaction term (pre-LTP:HFS:CP3) hints at a possible trend where amplitudes at CP3 are lower for HFS before the LTP-induction, but do not reach significance (p = 0.1132). No other electrodes or interactions were significant (p>0.05) in this preliminary analyses.

Conclusions: Increased cortical responses post-LTP induction, would be consistent with LTP-induction in C-fibers. However, these preliminary findings require further investigation and validation with the full dataset.

III-C1.W.09

UNDERSTANDING THE ROLE OF CENTRAL AND PERIPHERAL SENSITIZATION IN THE PERSISTENCE OF CHRONIC PELVIC PAIN IN ENDOMETRIOSIS

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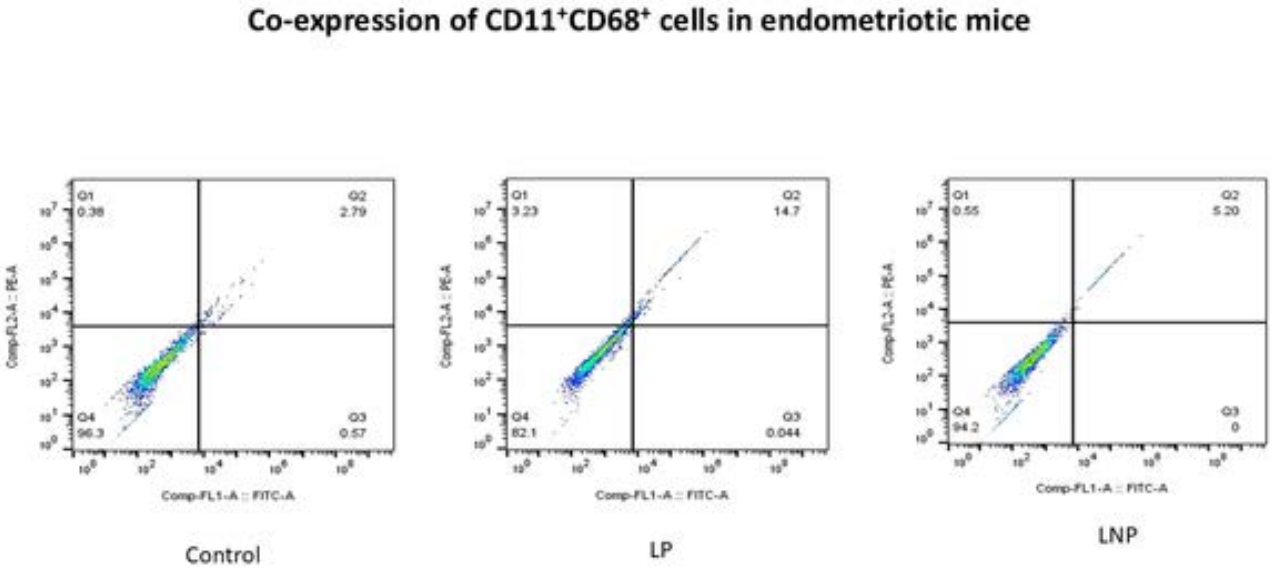
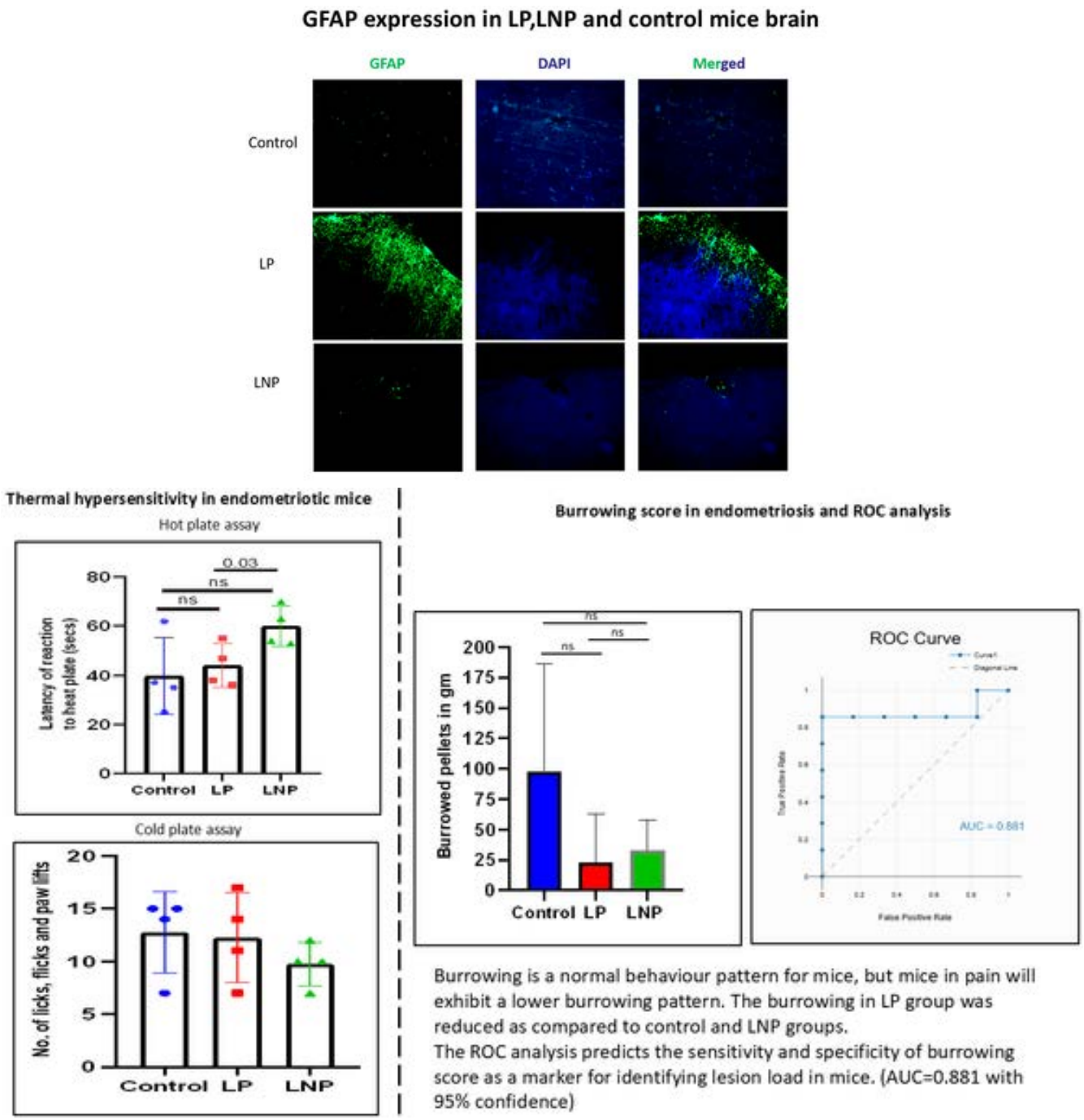
Background and aims: Endometriosis is a chronic gynaecological condition involving implantation of uterine tissue outside uterus. Several studies investigate lesion load in endometriosis, but the mechanism of chronic pelvic pain is unexplored. This study aims to evaluate the involvement of chronic pelvic pain by peripheral and/or central sensitization.

Methods: Syngeneic endometriotic C57BL mice was generated. Chronic pain was assessed via behavioural assays (BAs), followed by collection of blood, peritoneal fluid, and brain post-sacrifice. Three groups of mice were identified based on BAs and lesion load: with lesion and pain (LP), with lesion and no pain (LNP), and with no pain (NP). The ectopic lesions were characterized for anti-substance P (SP), tyrosine hydroxylase (TH), and PGP-9 markers, and the brain microglia activation was characterized using GFAP, Iba1 and CD-68. The role of gut microbiota in endometriotic pain was examined using qPCR.

Results: BAs revealed increased sensitivity to pain stimuli in LP versus LNP and control. The LP group exhibited increased GFAP expression in the brain's cortex compared to LNP and NP groups. LP brain sections showed distinct rod-like microglia activation patterns. Flow-cytometry revealed increased $CD11^{+}CD68^{+}$ positive cells in LP compared to LNP and NP groups. Contrarily, the lesions showed comparable SP, TH, and PGP-9 expression across groups.





Conclusions: The LP mice group exhibited distinct central sensitization marked by increased microglia activation, while peripheral sensitization was comparable among groups, suggesting microglia activation is a sufficient trigger for pain in the endometriotic mouse model. The role of gut microbiota in central sensitization and pain is still under investigation.

III-C1.W.10

PROPRIOCEPTORS INVOLVEMENT IN DEEP SOMATIC PAIN IN FIBROMYALGIA SYNDROME

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Background and aims: Individuals with fibromyalgia syndrome (FMS) have chronic widespread pain. Abnormal skin innervation and sensitisation of cutaneous nociceptor afferents are documented in FMS but whether they

relate to clinical pain, typically described as being deep to the skin, is unclear. The role of muscle afferents, including muscle spindle afferents, in generating pain in FMS is unexplored.

Methods: Individuals with FMS and healthy controls underwent microneurography of muscle fascicles in the proximal radial nerve using a high-impedance electrode. To selectively stimulate muscle afferents, intraneural microsimulation (INMS) was delivered through the microneurography electrode after establishing a stable recording of a single muscle spindle afferent fibre with a high signal-to-noise ratio. Current strength was increased from zero in 1 μA increments during 1 Hz, 0.2 ms stimulation, and set to ~80% of motor threshold (assessed using electromyography). Cued and uncued test stimuli were delivered at 20 Hz for 5 and 30 seconds. Pain intensity was continuously recorded using an electronic visual analogue scale, and the quality of evoked sensations was recorded using standardised questionnaires.

Results: Stimulation currents for FMS and healthy controls were comparable. INMS was never painful in healthy controls, although some participants noted non-painful tightening sensations. INMS in individuals with FMS elicited deep pain, typically centred around the muscle innervated by the stimulated fascicle. This pain was described as cramping, aching, and burning, similar to FMS pain.

Conclusions: Targeted stimulation of muscle spindle afferents in FMS elicits pain, implicating proprioceptors as mediators of deep somatic allodynia.

C2 | PATIENT-REPORTED OUTCOMES

III-C2.W.01

THE LEVEL OF AGREEMENT BETWEEN THE NUMERICAL RATING SCALE AND VISUAL ANALOGUE SCALE FOR ASSESSING PAIN INTENSITY IN ADULTS WITH CHRONIC PAIN

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Background and aims: The Numerical Rating Scale (NRS) and Visual Analogue Scale (VAS) are frequently used to quantify pain intensity. However, it has not yet been explored in adults with chronic pain whether these scores are interchangeable.

Methods: Data from the prospective multicenter cross-sectional INTERVAL study was used, in which 366 patients with chronic pain provided pain intensity scores on the NRS and VAS. Patients were instructed to provide a pain intensity rating for current pain, average pain, minimal pain and maximal pain. Wilcoxon paired samples tests, intra-class correlation (ICC) coefficients, Bland-Altman plots and weighted kappa were calculated to explore the agreement.

Results: A factor analysis confirmed the one-dimensionality of the pain measures. A significant difference was found between NRS and VAS scores for average pain, current pain, minimal pain and maximal pain. ICC estimates ranged from 0.739 to 0.858. According to the Bland and Altman method, all measures failed to demonstrate sufficient and acceptable agreement at the 95% level. The strength of agreement between pain severity categories was classified as moderate for average and minimal pain and as substantial for current and maximal pain.

Conclusions: This study failed to demonstrate an acceptable agreement between the Visual Analogue Scale and Numerical Rating Scale when pain intensity was rated by adults with chronic pain, despite showing both scales measure the same information. The disagreement could not be explained by measuring different information with both scales.

III-C2.W.02

USING MACHINE LEARNING TO EXPLORE HOW THE OUTCOMES OF PEOPLE WITH CHRONIC PAIN DIFFER FOLLOWING A PAIN MANAGEMENT PROGRAMME

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Background and aims: Machine Learning has the potential to generate new knowledge of chronic pain presentation and treatment response. This study aimed to explore how the outcomes of people with chronic pain differ following a UK NHS Pain Management Programme (PMP).

Methods: An exploratory retrospective observational cohort study utilised unsupervised machine learning techniques to analyse routinely collected outcome data from 399 individuals following a UK NHS pain management programme. Data from two pain management programmes were clustered with KMeans to identify patterns of outcomes, and K-shape clustering was used to observe differences in follow-ups.

Results: Results highlighted the heterogeneous response to UK NHS pain management programmes among individuals with chronic pain, with distinct patterns based on baseline function and psychological factors. The majority improved in key domains of chronic pain, but significant variability exists based on baseline function and psychological factors. Key variables such as physical function, pain catastrophising, and self-efficacy emerged as potential outcome influences. While improvements were observed across cohorts, long-term outcomes varied, suggesting personalised treatment approaches were needed.

Conclusions: This exploratory study used unsupervised machine-learning techniques to explore the outcome of individuals following a UK NHS PMP. These findings highlight the potential of data-driven methods to enhance understanding and optimise outcomes in chronic pain management. Future research should focus on identifying and targeting these factors early in treatment to optimise outcomes.

III-C2.W.03

APPLICATION OF THE IASP GRADING SYSTEM FOR NOCIPLASTIC PAIN IN BREAST CANCER SURVIVORS WITH PERSISTENT PAIN: A CROSS-SECTIONAL STUDY

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Background and aims: Persistent pain is one of the most common symptoms in breast cancer survivors (BCS). A clinical grading system was proposed by IASP to detect the probability (*unlikely*, *possible* or *probable*) of nociplastic pain in chronic musculoskeletal pain. This cross-sectional study aims to investigate the application of this grading system in BCS with persistent pain after finishing cancer treatment.

Methods: BCS with persistent pain were recruited. For the classification of "*possible* nociplastic pain", patients should have pain for at least 3 months, have one or more painful locations away from BC-related pain region and have evoked hypersensitivity phenomena measured with pressure pain thresholds, or cold/heat pain thresholds or dynamic mechanical allodynia. Patients who scored positive on items of the Central Sensitization Inventory related to the presence of comorbidities were classified as having "*Probable* nociplastic pain".

Results: 110 BCS were included, of whom 96 (87.3%) were classified as "*unlikely* nociplastic pain", 2 (1.8%) were classified as "*possible* nociplastic pain" and 12 (10.9%) were classified as "*Probable* nociplastic pain". Moreover, 51 (46.4%) were under "*probable* neuropathic pain".

Conclusions: Only one-tenth of the patients were in the "*Probable* nociplastic pain" group. We hypothesize that this grading system or some of the instruments used, such as quantitative sensory testing for local hypersensitivity, may be underestimating the number of BCS who have nociplastic pain.

III-C2.W.04

THE ROLE OF BIOPSYCHOSOCIAL FACTORS IN CLASSIFYING CHRONIC PAIN INTENSITY ACROSS VARIOUS CHRONIC PAIN CONDITIONS

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Background and aims: Chronic pain is a complex condition influenced by biological, psychological, and social factors, posing significant challenges for diagnosis and treatment. While many previous studies have focused

on distinguishing chronic pain mechanisms primarily through sensory profiles, we incorporated biopsychosocial factors and compare the classification performance to using sensory profiles alone.

Methods: This secondary analysis of an original dataset including 101 individuals with chronic pain of different etiologies (i.e., complex regional pain syndrome, low back pain and neuropathic pain after spinal cord injury) and 63 healthy controlsclassified these individuals using two distinct models: one based on sensory profiles assessed through quantitative sensory testing (QST-model) and another extending QST with a biopsychosocial framework (biopsychosocial-model). The latter model incorporated biological factors (e.g., age, sex, fatigue, experimental pain paradigms), psychological factors (e.g., anxiety, depression, pain catastrophizing), and social factors (e.g., education, relationship status). Both models aimed to classify individuals into three groups: “no pain,” “mild-to-moderate pain,” and “severe pain.”

Results: The QST-model achieved an overall accuracy of 0.51 with an F1-score (harmonic mean of precision and recall) of 0.48 (poor performance), while the biopsychosocial-model improved these metrics, achieving an accuracy and F1-score of 0.71 (average performance). Key predictive features included quality of life, anxiety, depressive symptoms, pain catastrophizing, sensory loss, fatigue, and general health.

Conclusions: Incorporating biopsychosocial factors notably improved the classification of chronic pain severity compared to sensory profiles alone, highlighting the importance of a multidimensional approach for the diagnosis and treatment of chronic pain.

III-C2.W.05

HOW TO ICD-11? THE INITIATION OF A NOVEL CODING TOOL IN A TERTIARY CARE PROVIDER

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Background and aims: The 11 th revision of the International Classification of Diseases (ICD-11) contains the novelty of allowing precise chronic pain diagnoses. However, existing coding tools have significant limitations. This study, conducted at the outpatient pain clinic of the Kantonsspital St. Gallen, evaluated the usability of a new online coding tool based on Korwisi et al.’s (2021) classification algorithm.

Methods: Eighteen physicians were invited to use an online survey-type tool to assign ICD-11 codes including extension codes to every new patient of the clinic. After six months, a survey was conducted among the physicians to assess their experiences with the tool.

Results: Ten physicians responded. Nine (90%) found the tool easy to use. Seven (70%) reported coding times under two minutes, while two (20%) reported under five minutes. Despite no prior training, five (50%) were confident to have coded correctly in the last four weeks, while 30% reported one error, and 20% two errors—demonstrating a high reliability compared to other tools like the WHO browser. Overall, 80% wanted to continue using the tool. Despite staffing shortages and associated limited time resources, 201 diagnoses were recorded within the period of one year.

Conclusions: The ICD-11 coding tool was well-received, with high ratings for user-friendliness, efficiency, and accuracy. Most participants wished to continue using the tool, indicating its potential for streamlining chronic pain diagnoses even under limited resources. A future use of this tool could be its integration into a database to record all ICD-11-coded pain diagnoses assigned within participating centres.

III-C2.W.06

EVALUATING THE OUTCOMES OF INVASIVE LUMBAR TREATMENTS IN A NEWLY ESTABLISHED PAIN MANAGEMENT UNIT

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Background and aims: Chronic low back pain (CLBP) with or without radiculopathy is one of the most common ailments that bring a patient to a pain specialist. Interventional therapies (IT) for CLBP are highly effective when

used in conjunction with other adjuvant modalities but guidelines exhibit heterogeneity in their recommendations.[1,2] The aim of this study is to determine whether pain improvement translates into functional improvement in patients treated with IT for CLBP.

Methods: Retrospective observational study is performed in the Pain Unit of Hospital Nostra Senyora de Meritxell (Andorra). Patients suffering from refractory CLBP (no response to rehabilitation and analgesia) with or without radiculopathy who underwent an IT (lumbar facet block, radiofrequency denervation, interlaminar, caudal or transforaminal epidural block) are recruited. Visual analogue scale, Oswestry scale and SF12 are analysed to assess pain, functionality and quality of life, respectively before and 60 days after the procedure.

Results: 230 patients are recruited (143 women and 87 men). 19.13% were treated with radiofrequency denervation, 34.78% with lumbar facet block and 45,21% with epidural block. All outcomes analysed (Visual Analogue Scale, Oswestry and SF-12) show a statistically significant difference after the treatment (p£0.001).

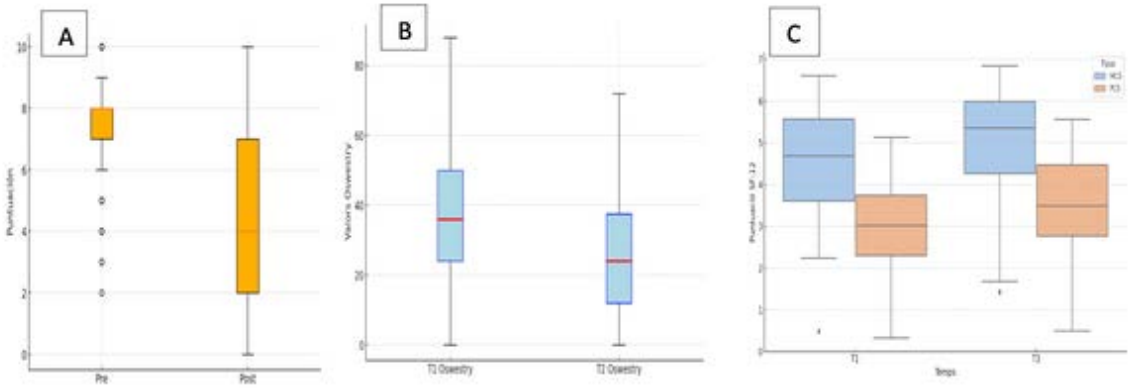

Figure 1. Comparative results pre-post treatment for Visual Analogue Scale (A); Oswestry (B) and SF-12 MCS and PCS (C).

	SF12-MCS pre	SF12-MCS post	SF12-PCS pre	SF12-PCS post	Oswestry pre	Oswestry post	VAS pre	VAS post
N	132.0	132.0	132.0	132.0	129.0	129.0	158.0	158.0
mean	45.03	49.9	31.5	35.5	37.50	25.33	7.32	4.25
STD	11.97	12.36	8.802	10.68	17.43	16.69	1.67	3.06
min	48.7	14.25	32.52	49.6	0.0	0.0	2.0	0.0
25%	36.03	42.63	23	27.65	24.0	12.0	7.0	2.0
50%	46.84	53.562	30.15	34.92	36.0	24.0	8.0	4.0
75%	55,70	59.92	37.42	44.70	50.0	38.0	8.0	7.0
max	66.11	68.43	51.30	55.61	88.0	72.0	10.0	10.0
Mean Difference							3.06	3.06
Std Difference							2.81	2.81
t-value		3.27		3.38	9.54		13.68	
p-value		0.0012		0.0008	<0.001		<0.001	

Table 1. Differences pre-post treatment in outcome measures: SF12, Oswestry and VAS.

Conclusions: This study shows clinical and functional improvements in the short-term treatment of CLBP refractory to conservative treatment. Both clinical and functional improvements in the treatment of CLBP using IT is key to determining the true impact of the therapy. Pain measurement alone is insufficient for a comprehensive evaluation. To fully assess therapeutic outcomes, it is essential to include an analysis of functional improvements.

III-C2.W.07

WHAT DOES REGISTRY DATA TELL US ABOUT MANAGEMENT OF PERIOPERATIVE PAIN IN PERSONS UNDERGOING SURGERY FOR AMPUTATION? DATA FROM PAIN OUT

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Background and aims: Perioperative pain management in patients undergoing an amputation is complex.

The literature is sparse. A large patient registry could provide valuable data to support research and guideline development.

Methods: PAIN OUT, a perioperative pain registry, provides clinicians internationally, with tools for assessing patient-reported outcomes and management on the first postoperative day. We searched the registry for data about amputations.

Results: From Jan 2012–Oct 2024, data from 393 patients undergoing an amputation were entered into the repository, 93% related to lower limb amputation. Patients were a median 66 (IQR 57-75.5) years old, 63% were male. The most common comorbidities: hypertension, diabetes, coronary heart disease; 52% of patients reported persistent pain before surgery; its intensity 7.0/10 (IQR 5-7).

Post-surgery, 32% of patients spent ≥ 50% of the first POD in severe pain; 36% reported pain interfering with bed mobility (≥6/10); 34%/35% felt anxious/helpless (≥4/10); 27% wished more pain treatment, and 58% were dissatisfied with their pain care.

Regional anesthesia (RA) was administered to 42% of patients, mostly local anesthetics only. The wound was infiltrated in 8.3% patients.

On the ward, 5% received no analgesics; 23% received only non-opioid analgesics (NOA); 67% were given both opioid and NOA, but opioids were single daily doses, and few received full daily NOA doses. Gabapentinoids were administered to15%; ketamine was administered intraoperatively/recovery/ward in 16%/3%/3% of patients.

Conclusions: The findings demonstrate that after amputation; patient's outcomes are poor and care is not standardized. Will these findings and the complexity of this condition, motivate providers to improve management?

III-C2.W.08

COMBINING THE IASP AND ICD-11 PAIN TAXONOMY: WHAT CAN WE GAIN?

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Background and aims: The ICD-11 taxonomy replaced the IASP taxonomy in the coding of chronic pain diagnoses, aiming for the harmonization and quantification of chronic pain burden, now understood not as a symptom but as a disease. This led to the discontinuation of the IASP classification, which was more exhaustive and had several advantages over the ICD-11, such as the use of diagnostic axes. This work aims to combine these two taxonomies to create an application that allows precise ICD-11 codification using IASP taxonomy axes.

Methods: Both pain codes were manually integrated, including all 826 codes of the IASP classification. IDC-11 implementation guide was followed. Parent, child, and optional localization ICD-11 codes were used together to closely match the IASP diagnosis (Figures 1 and 2).

Results: Upon reviewing the IASP axis coding, the most efficiently represented diagnoses were those of spinal pathology. In contrast, limb diagnoses and pain disorders due to non-spinal cancer were poorly defined. Chronic post-surgical pain ICD-11 coding is not addressed in the IASP taxonomy. As shown in the figures, this approach allows clinicians to make a proper and accurate differential diagnosis by filtering through the different IASP axes and outputting a granular ICD-11 code.

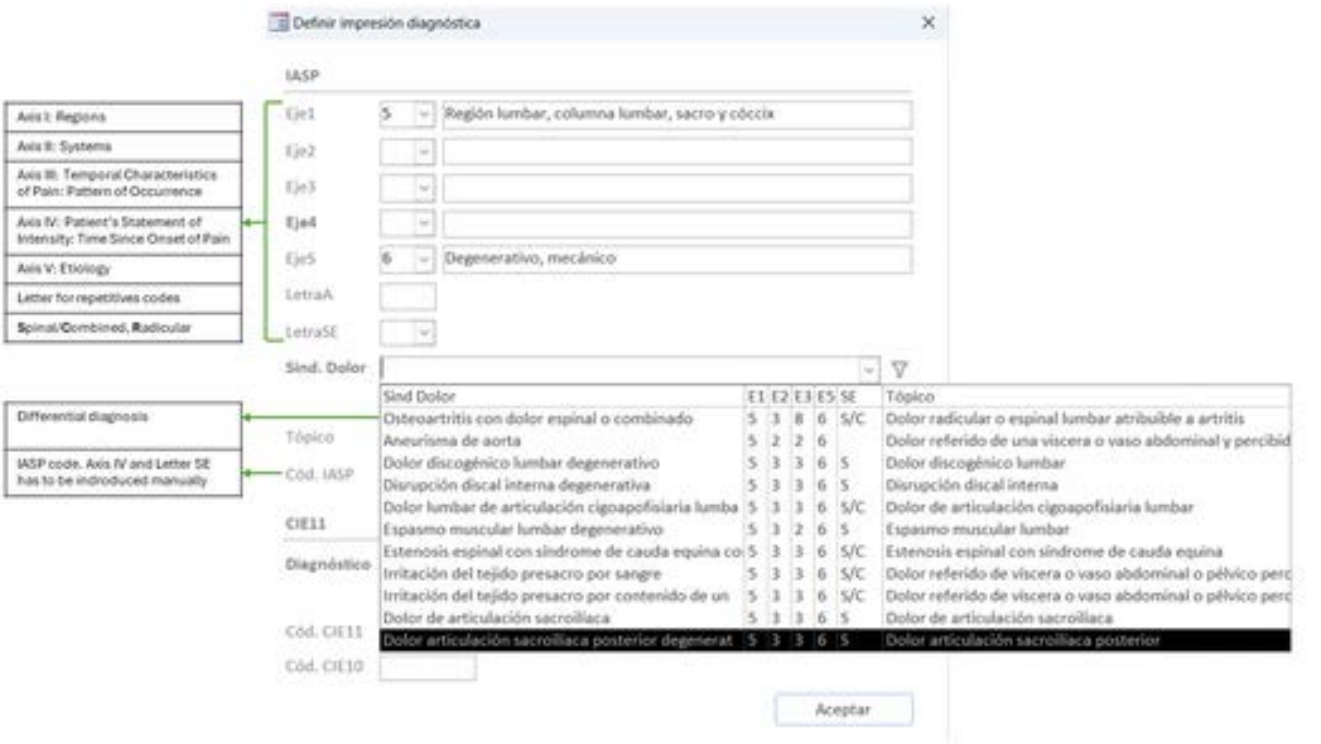

Figure 1. Combining Axis I, 5: Lower back, lumbar spine, sacrum, and coccyx, with Axis V, .06: Degenerative, mechanical, yields the differential diagnosis of lumbar pain of degenerative or mechanical origin. Axis IV and Letter SE must be selected manually.

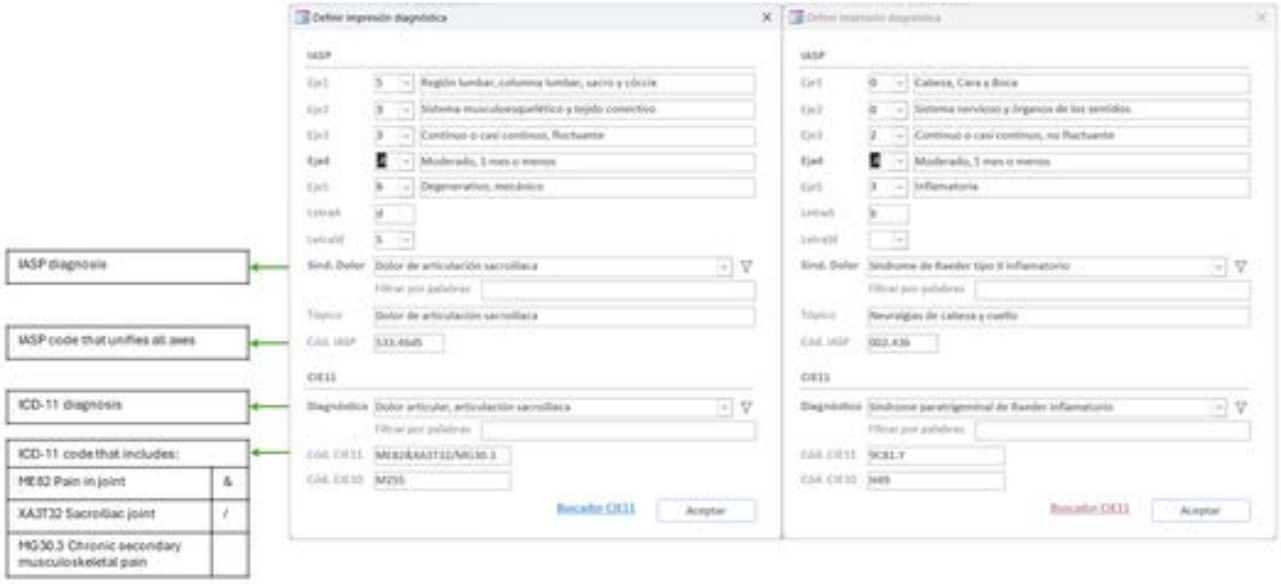

Figure 2. When the IASP diagnosis is chosen, the associated ICD-11 and ICD-10 codes appear automatically. As shown in the figure on the right, other diseases display different results. In case an IASP code doesn't exist, the ICD-11 code can be used alone and filtered by words or code.

Conclusions: A differential diagnosis can be achieved by the combined use of both taxonomies, which is impossible using ICD-11 alone. This approach allows us to retain the more comprehensive IASP taxonomy while moving toward a final unification.

III-C2.W.09

OUTCOME DOMAINS FOR CHRONIC MUSCULOSKELETAL PAIN THAT MATTER TO PATIENTS, INFORMAL CAREGIVERS, AND HEALTHCARE PROFESSIONALS: AN INTERNATIONAL ONLINE SURVEY

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Background and aims: The multidimensional nature of chronic pain requires assessment of multiple outcome domains in clinical trials and practice. Potential heterogeneity in these domains impedes comparison or synthesis of clinical trial results and limits the application of evidence in clinical practice. It is unclear what matters to people with chronic pain, informal caregivers, and healthcare professionals (HCP). This study aims to provide a comprehensive list of outcome domains that matter for chronic pain as a step toward greater uniformity in outcome assessment.

Methods: Participants (≥18 years) were people living with chronic pain, informal caregivers, and HCPs. We conducted an international online survey available in Danish and English and used large-scale qualitative content analyses of open-text answers. We formulated open-ended questions aimed at identifying difficulties living with chronic pain, and desired treatment benefits, tailored to each stakeholder group. We recruited participants by convenience sampling and used a multimodal recruitment strategy to distribute the survey worldwide.

Pre-registration: https://doi.org/10.17605/OSF.IO/T3B9X

Results: The online survey was initiated on April 17, 2023. The qualitative content analysis included 4735 participants (4045 people with pain, 351 informal caregivers, and 339 HCPs). We identified critical domains, such as having impact on emotions, cognition, social dimensions, functioning, work-limitations, identity, family-life and feelings of isolation.

Conclusions: Our results highlight the significant multi-domain impact of the lived experience of chronic pain. These findings will set the foundation for future research and practice to measure outcome domains that matter to people living with pain, informal caregivers, and HCPs.

III-C2.W.10

PHENOTYPING OF PERSISTENT POST-SURGICAL PAIN AT 1 YEAR IN BREAST CANCER SURVIVORS: CLINICAL APPLICATION OF PAIN PHENOTYPING ACROSS DISEASE STUDY

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Background and aims: The International Association for the Study of Pain (IASP) developed a grading system for nociceptive, neuropathic, and nociplastic pain. The Cancer Pain Phenotyping (CANPPHE) Network has adapted the grading system for cancer pain. However, the differentiation process lacked sufficient quantified assessments. This study aimed to reconsider the grading system for clinical use and explore pain phenotypes in breast cancer survivors (BCS).

Methods: This cross-sectional study included 80 BCS at least 1-year post-surgery with persistent post-surgical pain (PPSP) lasting more than 3 months. The pain phenotypes were classified by adding quantified assessments to the method, referring to CANPPHE guidelines. Nociceptive pain was identified through computed tomography, inflammation, responsive to anti-inflammatory drugs, etc.. Neuropathic pain was identified using the Douleur Neuropathique 4, surgical records, etc.. Nociplastic pain was identified through widespread pain, allodynia, hypersensitivity history and comorbidities. Pain intensity and disability were assessed with Brief Pain Inventory. Statistical analyses compared the nociplastic pain (NP) group and the no nociplastic pain (NNP) group, with significance set at $p < 0.05$.

Results: Among the 80 participants, 31.2% had dominant nociceptive pain, 6.3% had dominant neuropathic pain, and 11.3% had dominant nociplastic pain. A total of 42 participants (52.5%) were identified as having mixed pain including nociplastic. The NP group (n = 42) had significantly higher pain intensity and disability compared to the NNP group (n = 38) ($p < 0.01$).

Conclusions: This study demonstrated that more than half of BCS with PPSP exhibited nociplastic component, suggesting greater severity of symptoms.

D1 | NOVEL PHARMACOLOGICAL TARGETS FOR CHRONIC PAIN

III-D1.W.01

PROKINETICIN SYSTEM BLOCK AND MICROGLIA INHIBITION CONTROL PAIN AND NEUROINFLAMMATION IN A MODEL OF FABRY DISEASE

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Background and aims: Fabry-Anderson disease (FD) is an X-linked lysosomal storage disorder. A deficient alpha-galactosidase A (Gal-A) leads to Gb3 accumulation in different tissues, including the nervous system. FD patients suffer from lifetime-lasting neuropathic pain that develops in childhood and resists specific treatments. Glial and infiltrating immune cells are involved in neuropathic pain pathogenesis. The prokineticin system (PKS) is a family of chemokines important in inflammation and pain that may represent a new therapeutic target. PKS antagonists counteract chronic inflammatory and neuropathic pain. This study wants to investigate whether PKS antagonism with PC1 and glial inhibition with minocycline, contrasting neuroinflammation, may relieve FD pain both in an early and more advanced stage of the pathology, proposing a novel pharmacological approach.

Methods: 10 and 25-week-old FD male mice, Gal-A deficient, were treated with minocycline (10 mg/kg, intraperitoneal, once daily) and PC1 (150 µg/kg, subcutaneous, twice daily) for fourteen consecutive days. Hypersensitivity was constantly monitored. Levels of PKS, cytokines and (neuro)inflammatory markers were evaluated in sciatic nerve, dorsal root ganglia, spinal cord and gut as mRNA and protein.

Results: All FD mice suffer from mechanical allodynia, thermal hyperalgesia, abdominal pain and are hyposensitive to cold stimuli. These alterations are associated with marked neuroinflammation with PKS up-regulation, pro-inflammatory cytokines increase, and glia/immune cells' markers overexpression in the analyzed tissue. Both PC1 and minocycline relieve all the painful symptoms and reduce neuroinflammation.

Conclusions: Our data demonstrate that pharmacological inhibition of the PK system (by PC1) or the glial cells (by minocycline) may be a promising approach to control FD pain.

III-D1.W.02

PRECLINICAL DEVELOPMENT OF SST4-TARGETED ANALGESICS

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Background and aims: The neuropathic and chronic inflammatory pain cannot be adequately eliminated by the marketed conventional or adjuvant analgesics, therefore new potential target molecules need to be identified. Somatostatin (SS) regulates endocrine, vascular, immune and neuronal functions as well as cell proliferation via Gi protein-coupled receptors (SST1-SST5). According to the early discoveries of our research group, SS released from the capsaicin-sensitive peptidergic sensory nerves mediates anti-inflammatory and antinociceptive effects acting on SST4 (Pintér et al. 2023). Therapeutic importance of the native SS is limited by its broad-range actions and short plasma elimination half-life. Therefore, SST4 selective ligands could be promising analgesic and anti-inflammatory drug candidates which work in a different mode of action from clinically applied compounds.

Methods: We investigated the binding mode of the novel SST4 receptor agonists in silico (molecular docking) and measured the cAMP decreasing effect in vitro on human SST4 receptor expressing CHO cell line. In vivo analgesic and anti-inflammatory effects in chronic neuropathic pain and arthritis models were also investigated in mice.

Results: The test compounds selectively reduced the cAMP level in the SST4 receptor expressing CHO cells but they were ineffective in the SST2 expressing cell line.

The SST4 agonists also showed effectiveness in vivo in partial nerve ligation-induced traumatic neuropathy and monoiodacetate-induced osteoarthritis in mice.

Conclusions: Our data suppose that SST4 could be a promising therapeutic target in the therapy of neuropathic and inflammatory chronic pain conditions.

III-D1.W.03

COMPOUND A, A NOVEL DUAL MU AND KAPPA OPIOID RECEPTOR AGONIST, DEMONSTRATES A POTENT ANALGESIC EFFECTS COMPARABLE TO OXYCODONE WITHOUT REINFORCING EFFECT IN MONKEYS

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Background and aims: Agonists of Mu opioid receptor (MOR) provide potent analgesic effects, but their potential for abuse leading to overdose and death has become a significant social problem. Psychological dependence is known to involve the activation of the mesolimbic dopaminergic system, the increased dopamine release in the nucleus accumbens (Nac) through the activation of the MOR in the ventral tegmental area. This response is counteracted by the activation of the kappa opioid receptor (KOR) in the Nac. We evaluated the analgesic effects and potential for psychological dependence of a novel MOR/KOR dual agonist, compound A, positioned as a potent analgesic drug without the addiction-related side effects.

Methods: The functional activity of Compound A was investigated through in vitro cAMP assay. Its analgesic efficacy was evaluated using several behavioral tests, including both hot-plate tests on normal rats and pain-model rats. Dopamine release in the Nac was quantified using microdialysis. The potential for psychological dependence was assessed using the rat conditioned place preference (CPP) test and a monkey intravenous self-administration study.

Results: Compound A demonstrated agonistic activity against both MOR and KOR in vitro and showed a dose-dependent analgesic effect in rats. This effect was comparable to, or exceeded, that of oxycodone. Compound A caused less dopamine release in rats' Nac compared to oxycodone and did not elevate the CPP score. Unlike oxycodone, Compound A exhibited no reinforcing properties in monkeys.

Conclusions: Compound A is a promising drug candidate with potent analgesic efficacy comparable to opioids, but with a reduced risk of psychological dependence.

III-D1.W.04

SAFETY, PHARMACOKINETIC AND PHARMACODYNAMIC EFFECTS OF ODM-111, A SELECTIVE NAV1.8 INHIBITOR: A RANDOMISED, DOUBLE-BLIND, PLACEBO-CONTROLLED TRIAL IN HEALTHY PARTICIPANTS

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Background and aims: ODM-111 is a novel NaV1.8 inhibitor shown to block human dorsal root ganglia action potential firing. Aim of this first-in-human trial was to study safety, PK and PD of ODM-111.

Methods: In Part I escalating single dose levels ranging from 50 mg to 2000 mg were administered. In Part II repeated total daily dose levels ranging from 200 mg to 500 mg were administered for 10 days.

Plasma samples were drawn for PK. Participants took a battery of experimental pain tests before and after single dosing.

Results: 46 participants received single doses of ODM-111 and 14 placebo, and 32 participants received multiple doses of ODM-111 and 8 placebo.

All treatment-emergent adverse events were mild in severity and transient in nature. No serious adverse events were reported.

ODM-111 consistently increased the cold pressor test pain tolerance threshold (CPTT) compared to placebo (estimated increases in geometric mean of post-dose averages 41–156%). A PKPD analysis was conducted for CPTT indicating early signs of exposure-response relationship. No clinically relevant effects were seen in other experimental pain tests.

Median t_{max} was 3-5 hours after a single dose. Less than dose-proportional PK was seen after single dose administration. Food increased exposure dose-dependently. Mean $t_{½}$ varied between 14 and 20 hours. Solubility limited exposure of high doses.

Conclusions: ODM-111 was well tolerated and demonstrated robust target blockade related analgesic potential in this trial.

III-D1.W.05

SIGMA-1 RECEPTOR INHIBITION REDUCES RHEUMATOID ARTHRITIS PAIN

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Background and aims: Rheumatoid arthritis (RA) is one of the most prevalent chronic inflammatory diseases and one of the most common causes of chronic pain, affecting 0.5–1% of the population. The sigma-1 receptor is a modulatory chaperone that is expressed in areas of the central and peripheral nervous system relevant to pain transmission and its blockade is effective in various preclinical models of pathological pain and in clinical trials for neuropathic pain. We hypothesize that the sigma-1 receptor inhibition could reduce arthritic pain.

Methods: We used collagen-induced arthritis (CIA) model of RA in female wild type (WT) and sigma-1 receptor (KO) Wistar rats. The sigma-1 antagonists S1RA and BD1063, administered either as a single acute dose or continuously over 7 days using osmotic minipumps, were evaluated. Pregabalin and methotrexate were used as standard control drugs. Painful hypersensitivity was assessed using the von Frey test (mechanical allodynia), the acetone test (cold allodynia), the Hargreaves´ test (heat hyperalgesia). Additionally, the loss of function was measured with the grip strength and burrowing tests.

Results: Acute and chronic administration of both sigma-1 antagonists exerted a robust analgesic effect in the three different pain-related outcomes explored. The effect was dose-dependent and started immediately after drug administration persisting during the complete period of treatment. In addition, their efficacy was superior to the standard analgesic pregabalin and the anti-arthritic methotrexate. Furthermore, chronic administration of both drugs ameliorated grip strengh and burrowing deficitis.

Conclusions: Sigma-1 antagonism exhibited strong efficacy in alleviating rheumatoid arthritis pain while also improving functional outcomes.

III-D1.W.06

DOLONERSEN, A NOVEL THERAPEUTIC APPROACH BASED ON THE USE OF AN ANTISENSE OLIGONUCLEOTIDE TO RELIEVE PAIN SYMPTOMS OF CHEMOTHERAPY-INDUCED PERIPHERAL NEUROPATHY

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Background and aims: Oxaliplatin, a chemotherapeutic platinum-based agent is widely used for treating solid tumours. However, it can engender several debilitating aversive side-effects, including Oxaliplatin-induced peripheral neuropathy (OIPN) with painful symptoms difficult to manage. We have established Fxyd2 as a key actor involved in the maintenance of a chronic pain state in neuropathic and inflammatory rodent models. Accordingly, we recently developed an efficient therapeutic protocol using chemically lipid-modified antisense oligonucleotides (LASO-Gapmer) to inhibit FXYD2 expression and alleviate both types of pain. The aim of this study was to assess the efficacy of FXYD2-LASO-Gapmer called Dolonersen on pain symptoms of OIPN.

Methods: As a model, we chronically treated rats with Oxaliplatin to induce mechanical and cold hypersensitivity over time, and tested the efficiency of two therapeutic approaches. First, we injected Control- or FXYD2-LASO-Gapmer after Oxaliplatin treatment. Second, we injected Control- or FXYD2-LASO-gapmer in preventive before Oxaliplatin treatment. Throughout the experiments, we evaluated animal's hypersensitivity with Randall-Selitto, von Frey, tail immersion and thermal place preference tests.

Results: First, we showed that OIPN rats post-treated with Fxyd2-LASO-Gapmer do not maintain mechanical and cold hypersensitivity over the long term, in contrast to rats treated with Control-LASO-Gapmer which remain hypersensitive.

Second, we established that animals treated in preventive with the FXYD2-LASO-Gapmer are significantly protected against the induction of mechanical and cold hypersensitivity after Oxaliplatin treatment, in contrast to rats treated with Control-LASO-Gapmer which become hypersensitive.

Conclusions: Altogether our data establish Dolonersen (FXYD2-LASO-Gapmer) as a new promising preventive and curative therapeutic molecule for pain symptoms of OIPN patients.

III-D1.W.07

DEVELOPMENT OF NEW PRRPR ANTAGONISTS FOR THE TREATMENT OF CHRONIC PAIN

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Background and aims: Chronic pain is a world-wild public health issue affecting up to one-third of adults. However, current treatments are effective for a relatively low number of patients and display adverse side effects. Here, we explored PrRPR and its ligand PrRP as potential targets for treating persistent pain. Previous research suggests that this system has pronociceptive and anti-opioid properties, but its role in inflammatory or neuropathic pain is unknown. Up to now, the lack of specific pharmacological tools particularly antagonists selectively targeting PrRPR has severely limited the study of the involvement of PrRPR/PrRP system in the modulation of pain.

Methods: We screened novel compounds on CHO cells overexpressing human PrRPR using radioligand binding and calcium mobilization assays. The activity of the most promising small molecules was evaluated in mouse models of inflammatory and neuropathic pain.

Results: After several rounds of optimization, we identified a few number of compounds that displayed high affinity (nanomolar) and good selectivity for PrRPR over the other receptors of the RFamide receptor subfamily. We showed that these molecules display potent antagonist activity at PrRPR *in vitro* and selected one of them for further *in vivo* evaluation. We first studied its pharmacokinetic parameters in mice and showed that it crosses efficiently the

blood brain barrier. We next observed that low doses of this compound efficiently reduced hyperalgesia in mouse models of persistent inflammatory and neuropathic pain.

Conclusions: Our findings indicate that the PrRPR/PrRP system plays a critical role in chronic pain and could represent a promising target for new treatments.

III-D1.W.08

SON OF SEVENLESS 1 (SOS1) IN THE NERVE GROWTH FACTOR PATHWAY; A NOVEL PAIN TARGET FOR SMALL MOLECULE INHIBITORS

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Background and aims: Quantitative Systems Pharmacology is an approach to identify optimal drug discovery targets. Clinical data with anti Nerve Growth Factor biological drugs has validated the potential of inhibiting this pathway in a number of pain states. Using a published QSP model, we have identified SOS1 as a control point within the Nerve Growth Factor pathway. Literature has shown that the SOS1:RAS interaction can be inhibited with small molecules and hence we designed an in vivo pharmacokinetic pharmacodynamic experiment.

Methods: All modelling was carried out using Matlab. The pain weight bearing endpoint was modelled using an indirect effect model. Pain sensitivity in the mouse was induced via injection of intraplantar Complete Freund's Adjuvant. Weight bearing was then measured automatically. A prototype SOS1 inhibitor BI3406 was administered at 3 doses and PD endpoint effects measured over 72 hours. Plasma PK was determined using a satellite group of animals and sparse PK samples taken during the PD experiment.

Results: QSP was used to determine the target occupancy time profile required for a maximum NGF pathway inhibition response. Given the PK of the prototypical SOS1 inhibitor, doses were then identified that could best define PKPD. These results showed that the model accurately predicted the PD effect of the SOS1 inhibitor and that the compound could achieve an effect similar to 3mg/kg high dose tanezumab.

Conclusions: SOS1 is a target of interest for pain. A preclinical pain model indicates the target can be inhibited by a small molecule and that the effect is comparable to high dose anti-NGF.

III-D1.W.09

CONTRIBUTION OF THIK POTASSIUM CHANNELS TO NOCICEPTION

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Background and aims: Potassium channels are crucial in the nervous system by finely regulating neuronal excitability through hyperpolarization of the membrane, making them important targets for neuronal modulators. RNA-seq data shows that members of the Tandem pore-domain Halothane-Inhibited K+ channels subfamily (THIK1 and THIK2) are highly expressed in both Central and Peripheral Nervous System (CNS and PNS), especially in Microglia and Dorsal Root Ganglia (DRG), but their role in nociception remains unstudied. Considering the role of THIK1 in inflammasome activation, these channels could contribute to inflammatory pain. Our aim is to demonstrate the involvement of THIKs channels in peripheral nociception and microglial inflammation.

Methods: We are working on Kcnk12 and Kcnk13 knockout mice (respectively coding for THIK2 and THIK1). Various pain behavior tests are used, such as formalin plantar pain test, Von Frey and Hargreaves test. We used Fluorescent In-Situ Hybridization technique (FISH) to localize THIK mRNA expression in DRG neurons.

Results: We showed that THIKs channels are co-expressed by unmyelinated nociceptive neurons expressing the Purinergic Receptor 2X3 (P2RX3), involved in the transmission of slow nociceptive messages in DRG. We showed that Kcnk12 knockout mice display thermal allodynia and inflammatory hyperalgesia, accompanied by altered microglial morphology during inflammation. Final conclusions are still pending to determine the roles of THIK1 and THIK2 as homomers or heteromers. This distinction is crucial for developing specific pharmacology.

Conclusions: THIKs channels are expressed in nociceptive DRG neurons in mice. THIK2 appears to play a role in thermal and inflammatory nociception and may impact microglial morphology.

III-D1.W.10

TARGETING MU-DELTA OPIOID HETEROMERS IN NEUROPATHIC CONDITION

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Background and aims: Neuropathic pain represents an unmet medical challenge which requires to develop novel therapeutic strategies. Mu and delta opioid receptors are widely expressed in pain related areas and can functionally interact to form heteromers. Activation of mu-delta heteromers reduces thermal and mechanical nociception in naïve animals but their antinociceptive efficacy remains poorly explored in neuropathic conditions.

Methods: We determined nociceptive thresholds in naïve and neuropathic male and female mice following acute injection of CYM51010 or MP135, two ligands targeting mu-delta heteromers and compared them to those following mu agonist morphine administration. We also investigated the ability of the compounds to activate G protein and beta arrestin dependent signaling cascades. In parallel, we assessed changes in mu-delta neuronal co-expression in neuropathic condition.

Results: Targeting mu-delta opioid heteromers alleviates mechanical allodynia in neuropathic condition which correlates with broader mu-delta neuronal co-expression in brain regions of the pain matrix.

Conclusions: Our results indicate that mu-delta opioid heteromers represents an alternative therapeutic target to reduce pain in neuropathic conditions.

D2 | PHYSICAL ACTIVITY AND CHRONIC PAIN

III-D2.W.01

THE EFFECTS OF EXERCISE ON HEART RATE VARIABILITY IN PATIENTS WITH CHRONIC MUSCULOSKELETAL PAIN: A SYSTEMATIC REVIEW

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Background and aims: Heart rate variability (HRV) is a marker of cardiac autonomic function. Reduced HRV in patients with chronic musculoskeletal pain (CMP) suggests a potential link between autonomic dysfunction and chronic pain pathophysiology. This review explores how various exercise modalities affect HRV parameters in CMP patients.

Methods: This review adhered to PRISMA guidelines, conducting a literature search across PubMed, Scopus, Web of Science, and Cochrane databases. Inclusion criteria encompassed active exercise interventions lasting ≥ 4 weeks for CMP in adults aged 18-65, with HRV assessed pre-and post-intervention. Exclusion criteria encompassed studies exclusively investigating acute exercise effects or non-experimental research designs. Risk of bias was appraised using Cochrane RoB-2 and ROBINS-I tools, and evidence levels were assessed with GRADE.

Results: Ten studies, comprising five randomized and five non-randomized controlled trials, met the inclusion criteria. Bias assessment indicated a low-to-moderate risk of bias. The studies involved 277 patients with CMP and 116 controls. HRV measurements and analyses varied across studies. Interventions included resistance, aerobic, or multi-component training. Significant improvements were noted in various HRV metrics, particularly in time-and frequency-domain associated with vagal modulations.

Conclusions: This review highlights the positive impact of diverse exercise interventions on cardiac autonomic function in patients with CMP, as reflected in HRV changes, particularly vagal modulations. Future studies should adhere to rigorous criteria for reporting exercise interventions and HRV assessments to evaluate exercise effects on cardiac autonomic function. The paucity of comprehensive data on exercise influence on cardiac autonomic function in the CMP population indicates a need for further research to clarify these effects.

III-D2.W.02

THE EFFECTS OF EXERCISE THERAPY ON RETURN TO WORK IN CHRONIC NON-SPECIFIC LOW BACK PAIN: A SYSTEMATIC REVIEW

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Background and aims: Chronic low back pain (CLBP) is a leading cause of disability worldwide and contributes to 13% of work absenteeism, placing a significant strain on healthcare systems. In Belgium alone, over €260 million is spent annually on treatment, excluding hospital costs, with global costs rising. Effective CLBP management is crucial to reduce absenteeism and promote return to work (RTW). This systematic review aims to explore the impact of exercise therapy on RTW in CLBP patients, before examining the effects of high-intensity training on work ability in the TECHNOHIT trial.

Methods: This review follows PRISMA 2020 guidelines. A literature search of PubMed and Web of Science identified studies on adults (18+) with chronic low back pain (CLBP) examining exercise interventions for work absenteeism or return to work (RTW). Interventions will be categorized (e.g., exercise modalities, multimodal vs. isolated therapy) to compare effects on RTW and work ability. Primary outcomes are RTW and absenteeism, with additional consideration of pain, disability, and psychosocial factors.

Results: 13 studies with 2468 participants with chronic low back pain were included. The most common interventions were trunk exercises, strength training, and general exercises. Other types of exercise such as yoga or endurance training were also included. Outcome measures included return to work, sick leave duration, and days until RTW. Various exercise forms reduced sick leave and promoted return to work.

Conclusions: In general, exercise therapy improves RTW outcomes. There is little significant difference between interventions. Due to heterogeneity in interventions and outcomes, it remains unclear which form of exercise and specific modalities are most effective.

III-D2.W.03

SHORT-TERM HYPOALGESIA FOLLOWED BY HYPERALGESIA AFTER AEROBIC PHYSICAL EXERCISE IN HEALTHY INDIVIDUALS

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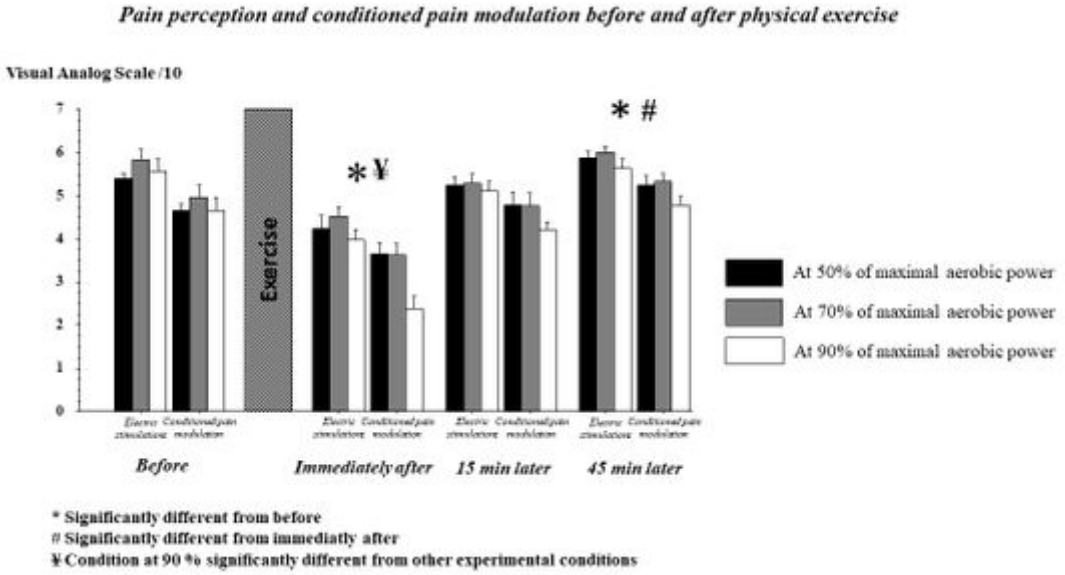
Background and aims: Inefficient pain inhibition systems have been implicated as contributing factors in several chronic pain conditions. Aerobic physical exercise has the potential to reduce pain sensitivity and promote endogenous pain modulation mechanisms. This study aimed to investigate whether aerobic physical activity at varying intensity levels could decrease pain perception by activating endogenous pain modulation in healthy individuals.

Methods: Twelve healthy participants (5 women, aged 18 to 27) completed 20 minutes of cycling at 50%, 70%, and 90% of their maximal aerobic power (MAP). Conditioned pain modulation (CPM) was assessed using both continuous pressure (blood pressure cuff on the calf) and contralateral electric hand stimulation. Pain perception was evaluated using the Pain50 measure (50/100 pain rating). These assessments were conducted before exercise, immediately after, at 15- and 45-minutes post-exercise.

Results: Immediately following exercise, pain perception significantly decreased ($p < 0.05$), particularly at 90% of the participants' MAP in response to CPM ($p < 0.05$). However, 15 minutes after exercise, pain perception returned to its pre-exercise level, and after 45 minutes, pain perception was significantly higher than its pre-exercise level ($p < 0.05$).



Conclusions: Aerobic exercise induces a short-term hypoalgesia and an improvement in endogenous pain modulation immediately after exercise, depending on the intensity of exercise. However, a potential hyperalgesia emerges 45 minutes after exercise. These transient changes in pain perception and endogenous pain modulation suggest that aerobic exercise can lead to both temporary pain relief and, later, heightened sensitivity. The underlying mechanisms driving these effects need further investigation.

III-D2.W.04

LONG-TERM EFFECTS OF SPINAL CORD STIMULATION COMBINED WITH PHYSIOTHERAPIST-LED EXERCISE AND PHYSICAL ACTIVITY ON PRESCRIPTION FOR CHRONIC NEUROPATHIC PAIN

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Background and aims: Rehabilitation, including physical activity, is recommended for chronic pain. Spinal cord stimulation (SCS) is a treatment option for unmanageable chronic neuropathic pain. This trial aimed to assess the effects of SCS combined with physiotherapist-led exercise and physical activity on prescription (PAP) on pain intensity, physical activity levels, and health-related quality of life (HRQL) among patients with chronic neuropathic pain.

Methods: Three months after SCS implantation, patients started an individualized 6-month physiotherapist-led exercise program comprising strength and conditioning training. Exercises could be performed at home, the clinic, or a local gym. After 6 months, the patients were instructed to continue exercising and were prescribed physical activity. The following outcomes were assessed at baseline and after 9 and 21 months: neuropathic pain intensity (Numeric Rating Scale, NRS; 0-10), physical activity levels (accelerometer), and HRQL (EuroQol 5-dimensions questionnaire, EQ5D-VAS; 0-100).

Results: A total of 35 adults with chronic neuropathic pain treated with SCS completed the 21-month follow-up. Neuropathic pain intensity was significantly reduced from baseline compared to 9- and 21 months (baseline mean=6.7; 9-month mean=4.8, Bonferroni-corrected p=0.003; 21-month mean=4.8, Bonferroni-corrected p=0.006). Moderate-to-vigorous physical activity levels (min/week) increased from baseline by 37% and 23% at 9- and 21-months, respectively (not statistically significant). EQ5D-VAS increased significantly (baseline mean=39; 9-month mean=55.6, Bonferroni-corrected p=0.033; 21-month mean=55; Bonferroni-corrected p=0.036). No significant differences were found between 9 and 21 months follow-up for any outcomes.

Conclusions: Patients receiving treatment with SCS had sustained long-term effects on neuropathic pain intensity, HRQL, and physical activity levels after add-on physiotherapist-led exercise and PAP.

III-D2.W.05

THE EFFECTIVENESS OF A NON-SUPERVISED HOME-BASED EXERCISE TRAINING, IN THE MANAGEMENT OF CHRONIC LOW BACK PAIN PATIENTS

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Background and aims: Pain intensity, functional limitation, sleep quality, anxiety, stress, and work limitation, are major factors in the prognosis of chronic low-back pain (Hayden et al., 2019). Since the availability of centers for exercise therapy within the public health system is limited (Kanas et al., 2018), and the cost of traveling and attending sessions at a physiotherapy clinic is quite high, non-supervised exercise training is recommended as a first-line treatment (Quentin et al., 2021). Given that, home is the most accessible setting, home-based exercise training may be particularly beneficial in managing low-back pain (LBP). This study aimed to investigate the effectiveness of a non-supervised home-based exercise training combining resistance and stabilization exercises, in patients with chronic low-back pain.

Methods: This was a prospective, same-subjects, repeated measures study. A sample of 30 low-back pain patients performed a non-supervised home-based exercise program, combining resistance and stabilization exercises, for 6 weeks. Pain intensity (NRS), disability (ODI), kinesiophobia (TSK), pain catastrophizing (PCS), sleep quality (PSQI), central sensitization (CSI), anxiety, depression and stress (DASS-21), quality of life (SF-12), range of motion (Modified Modified Schober Test) as well as muscle endurance (Beiring Sorensen Test), were evaluated before and after the practice of the above exercise training.

Results: The results were encouraging for all evaluated parameters (NRS p=0.000, TSK p=0.015, PCS p=0.006, CSI p=0.000, PSQI p=0.658, SF-12 p=0.028, ODI p=0.000, MMST p=0.249, BST p=0.011, DASS-21 p=000).

Conclusions: Non-supervised, home-based exercise training seems to be effective in the management of low-back pain patients.

III-D2.W.06

A FEASIBILITY STUDY OF INTEGRATING NEURAL MOBILIZATION TECHNIQUES INTO A PHYSICAL EXERCISE PROGRAM FOR OLDER ADULTS WITH CHRONIC MUSCULOSKELETAL PAIN

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Background and aims: Chronic musculoskeletal (MSK) pain has been associated with disability in older adults. An intervention that has been used to improve pain and disability is neural mobilization (NM). However, few studies have investigated its effectiveness in older adults. Therefore, this 2-arm pilot study aimed to evaluate the feasibility of using active NM integrated into an exercise program for community-dwelling older adults with chronic MSK pain (primary aim) and the impact of NM on pain and disability (secondary aim).

Methods: The control group (CG) received an 8-week exercise program (twice a week), while the experimental group (EG) received the exercise program plus NM. Adherence and dropout rates were registered. Acceptability was assessed through focus groups.

Results: Thirty participants were included (EG=14; CG=16). Adherence rates were above 90% and dropout rates were below 15% in both groups. Adjustments to the NM protocol had to be made during the intervention program. Participants from both groups considered that the intervention was appropriate for their condition and that its components met their needs. There were no relevant differences in reports between participants in both groups, showing that participants did not know which group they belonged to. There was no interaction effect (time/group) for pain ($p = 0.36$) and disability ($p = 0.78$).

Conclusions: Adherence rates were high and dropout rates were low. NM was well accepted and can be use considering that adjustments were made to suit the participant´s abilities. The results suggest that active NM integrated in an exercise program will be viable in a future RCT.

III-D2.W.07

CHANGES IN THE CCR2, CCR5, AND THEIR LIGANDS LEVELS IN MICE MODEL OF OBESITY-INDUCED HYPERSENSITIVITY

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Background and aims: Patients with obesity frequently experience pain, including neuropathic pain. CCR2, CCR5, and their ligands are known to be involved in the pathomechanism of neuropathic pain of different etiology. Therefore, the aim of our study was to examine the changes in the mRNA and protein levels of these factors in parallel with hypersensitivity induced by obesity.

Methods: The experiments were performed on male and female C57BL/6 and $Lep^{ob/ob}$ mice with obesity-induced model of pain hypersensitivity. Pain-related behavior was assessed by the von Frey and cold plate tests. An analysis of CCR2, CCR5, and their ligands mRNA and protein levels was performed by qRT-PCR and ELISA, respectively.

Results: The result shows that from week 10 of age, the weight is increased in $Lep^{ob/ob}$ mice, and at the same time mechanical and thermal hypersensitivity is developed. At the same time CCR2, CCR5, and their ligands levels change and the sex-related differences are present.

Conclusions: Based on our results we suggest that CCR2, CCR5 and their ligands may be important in the pathophysiology of obesity-induced hypersensitivity.

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III-D2.W.08

RELIABILITY OF EXERCISE-INDUCED HYPOALGESIA IN HEALTHY YOUNG MALES

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Background and aims: A single session of physical exercise can reduce pain perception for up to 45 minutes. In a recent systematic review, we reported that this exercise-induced hypoalgesia (EIH) is not reliable in healthy adults and recommended that future studies ensure assessor blinding and strict control of source of variations. This study aimed to assess the reliability of EIH, taking those methodological adaptations into account.

Methods: We recruited 40 healthy males (18-30 years). Their pressure pain threshold (PPT) was measured at the rectus femoris muscle, forearm muscles, and tibia periosteum by a blind assessor before and after two identical cycling exercise sessions (25 minutes; 75% heart rate reserve; 1 week apart). EIH was defined as the $Post_{exercise}$ - $Pre_{exercise}$ PPT. We used a linear mixed model to estimate EIH across sessions and computed intraclass correlation coefficients [ICC(2,k)] to assess reliability.

Results: We analyzed data from 39 participants (22.4 ± 2.8 years) and observed a significant increase of post vs pre exercise PPT only at the quadriceps ($p < .001$). EIH was not different between sessions. Despite reliable pre-exercise PPT at all sites (all ICCs > 0.7), the reliability of EIH was poor, with ICC estimates of -0.05, -0.44, and -0.13 for the quadriceps, forearm, and tibia, respectively.

Conclusions: Our results suggest that while EIH is consistent at a group level in an exercising body part, its reliability is poor. This may be due to an unknown fluctuation of the mechanism(s) driving EIH or its small effect size compared to the measurement error of PPT.

III-D2.W.09

INTEGRATING EXERCISE THERAPY INTO DAILY LIFE: EXPERIENCES OF THERAPISTS AND PATIENTS WITH CHRONIC MUSCULOSKELETAL PAIN – A QUALITATIVE STUDY

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Background and aims: Patients with chronic musculoskeletal pain (CMP) face challenges in daily activities. Exercise therapists can address these issues using strategies that target patients' movement behavior (MB). However, transfer of MB from the treatment center to the patient's own context remains a challenge. This study explored the experiences of physical therapists and patients with CMP to apply MB in patients' own context.

Methods: Semi-structured face-to-face interviews were conducted with patients with CMP. Additionally, focus groups with exercise therapists were performed who had experience in guiding patients with CMP. All interviews and focus groups were audio recorded, transcribed verbatim, and independently analyzed by two researchers using thematic analysis.

Results: A total of sixteen interviews with patients and two focus groups were analyzed. Four main themes emerged from data of patients: 1. learning by doing; 2. awareness and insights; 3. continuous focusing on context; and 4. conditional factors as having a click with practitioner. From the data of therapists, three main themes emerged: 1. continuous focusing on patient's context; 2. strong patient-therapist connection as conditional factors; 3. Exercise-specific guidance.

Conclusions: Both patients and therapists experienced the continuous focus on the context to optimize the transfer of MB to patients' own daily life. Both groups also perceived the importance of good therapist-patient connection. Experience-based learning is another valuable component for effectively applying movement behavior (MB) in the patient's own environment.

III-D2.W.10

THE BENEFITS OF APNOE DIVING TECHNIQUES FOR PATIENTS WITH CHRONIC BACK PAIN AND EXHAUSTION DISORDERS

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Background and aims: Worldwide people suffer from stress-induced exhaustion disorder. Chronic back pain (CBP) is another reason for a high number of absences from work and sick leave. The occurrence of the dual diagnosis emphasizes the importance of holistic pain management for both physical and mental health. Therefore, we investigated in a quasi-randomized controlled clinical trial the add-on effects of an interprofessional approach integrating apnoea diving techniques on pain-related outcomes.

Methods: 61 patients (M_{age}=55.2, *SD*=7.5) were assigned during a clinical rehabilitation either to a control group receiving usual care (CG) or to the "Relaqua" intervention group (IG). Relaqua comprises mindfulness-based breathing exercises out and in the water, floating and diving exercises. During a rehabilitation stay of 5 weeks the IG received 4×60-min sessions of supervised practice. Variables of interest were physical and mental quality of life (QoL; SF-12; primary outcome), perceived pain (VAS), physical disability due to low CBP (RMDQ), sleep quality (PSQI).

Results: For QoL Wilcoxon-Tests with the delta between pre-post showed in the IG only a higher physical score (W = 599, p = 0.05). As expected, an increase of sleep quality (W=244.5, p=0.001) and lower physical disability (W=314.5, p=0.03) were found. Perceived pain was not significant.

Conclusions: The diagnosis exhaustion disorder may be one reason for the lack of effects in the mental score. Because of the expected clinical benefits on a physical level, the low cost and simple application in the context of on chronic pain, the effects of Relaqua warrant further study.

Conclusions: Our results suggest that while EIH is consistent at a group level in an exercising body part, its reliability is poor. This may be due to an unknown fluctuation of the mechanism(s) driving EIH or its small effect size compared to the measurement error of PPT.

III-D2.W.09

INTEGRATING EXERCISE THERAPY INTO DAILY LIFE: EXPERIENCES OF THERAPISTS AND PATIENTS WITH CHRONIC MUSCULOSKELETAL PAIN – A QUALITATIVE STUDY

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Background and aims: Patients with chronic musculoskeletal pain (CMP) face challenges in daily activities. Exercise therapists can address these issues using strategies that target patients' movement behavior (MB). However, transfer of MB from the treatment center to the patient's own context remains a challenge. This study explored the experiences of physical therapists and patients with CMP to apply MB in patients' own context.

Methods: Semi-structured face-to-face interviews were conducted with patients with CMP. Additionally, focus groups with exercise therapists were performed who had experience in guiding patients with CMP. All interviews and focus groups were audio recorded, transcribed verbatim, and independently analyzed by two researchers using thematic analysis.

Results: A total of sixteen interviews with patients and two focus groups were analyzed. Four main themes emerged from data of patients: 1. learning by doing; 2. awareness and insights; 3. continuous focusing on context; and 4. conditional factors as having a click with practitioner. From the data of therapists, three main themes emerged: 1. continuous focusing on patient's context; 2. strong patient-therapist connection as conditional factors; 3. Exercise-specific guidance.

Conclusions: Both patients and therapists experienced the continuous focus on the context to optimize the transfer of MB to patients' own daily life. Both groups also perceived the importance of good therapist-patient connection. Experience-based learning is another valuable component for effectively applying movement behavior (MB) in the patient's own environment.

III-D2.W.10

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POSTERS
IN VIEWING SESSIONS

A | PAIN SYNDROMES

I-A.01

EVALUATING THE ANALGESIC POTENTIAL OF *OXYURANUS SCUTELLATUS* SNAKE VENOM

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Background and aims: Literature has shown that snake venoms with neurotoxic activity contain analgesic molecules. However, this approach has not yet been investigated in the venom of *Oxyuranus scutellatus* (vOs) snakes, which is also neurotoxic. Here we investigated the analgesic activity of vOs in animal models for assessing pain sensitivity.

Methods: Wistar rats were submitted to the paw pressure test before and 3 h after intraplantar injection of carragenin (Cg, 200µg/100 µL) for evaluation of hyperalgesia. Were investigated: 1) dose-response effect of vOs administered orally (doses used: 1, 5, 25 and 125 µg/kg); 2) duration of analgesic effect and 3) reversion of hyperalgesia. The vOs (1, or 25 µg/kg) was too evaluated in mice submitted to hot plate test. The action of vOs (25 µg/kg) on the motor deficit of rats was assessed in the open field test. Protocol number 4120310323.

Results: All doses of vOs induced analgesia. The lowest dose (1 µg/kg) was the most efficient. It not only induced analgesia when administered 4 hours before the Cg injection but also reversed hyperalgesia present 1 hour after the Cg injection. The vOs, at both doses used, did not induce analgesia when evaluated in the hot plate test. Furthermore, the vOs did not alter the exploratory activity of the animals.

Conclusions: The data presented here reveal, for the first time, the analgesic effect of *Oxyuranus scutellatus* snake venom. Furthermore, the data suggest that the analgesia results from the venom‘s inhibitory action on the mechanisms involved in the pathophysiology of inflammatory pain.

Funding: Fundação Butantan, CAPES.

I-A.02

COMPARING CORTICAL RESPONSES TO CUTANEOUS THERMAL HEAT PAIN AND DEEP-TISSUE CUFF PRESSURE PAIN IN HUMANS

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Background and aims: Pain comes in different shapes and forms posing a challenge to pain research. Since different methods have been used to mimic *real-life* pain through thermal, pressure, or electric stimulation, the findings in one pain domain might not be transferrable to other pain domains due to diverging mechanisms.

Methods: We aimed to identify those potentially diverging behavioural responses and brain activation patterns of cutaneous thermal heat and deep-tissue cuff pressure pain using functional magnetic resonance imaging (fMRI).

Results: We found that both pain modalities induced reliable behavioural responses with no significant difference in perceived painfulness between heat and pressure pain. In the brain, heat and pressure pain showed overlapping activation in regions associated with pain perception including the anterior Insula (antIns). Still, heat pain revealed a stronger and more widespread activation pattern especially in the dorsal posterior Insula (dpIns) bilaterally. Interestingly, in the dpIns heat pain revealed an increase of the BOLD response across the stimulus duration with a peak in the second stimulus half (‘late’ pain) whereas BOLD activation for pressure pain peaked in the first stimulus half (‘early’ pain). Furthermore, an interaction of stimulus intensity and pain modality was evident behaviourally, where lower-intensity pressure stimuli were rated as more painful than lower-intensity heat stimuli (VAS 30, 50). This pattern was reversed at the highest stimulus intensity (VAS 70).

Conclusions: Overall, our findings suggest that there are some differences in brain activation patterns and perceived intensity of thermal heat and cuff pressure pain.

I-A.05

EFFECTIVENESS OF REGIONAL BLOCKS IN REDUCING POSTOPERATIVE PAIN AND IMPROVING OUTCOMES IN BREAST CANCER SURGERY: A PROSPECTIVE OBSERVATIONAL STUDY

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Background and aims: Prompt management of acute pain following breast cancer surgery can reduce chronic post-surgical pain, morphine requirement, postoperative nausea and vomiting (PONV) and improve early mobilisation. Despite strong evidence supporting perioperative regional analgesia, limited data from Sri Lanka and resource constraints lead to a preference for local infiltration of analgesics over regional blocks.

Methods: We conducted a prospective observational study on patients undergoing breast cancer surgery at the Surgical Oncology Unit of Teaching Hospital Anuradhapura from October 2023 to February 2024. Postoperative pain was assessed using a visual analogue scale at 4, 6, 12, and 24 hours, as well as alternative analgesic requirements, postoperative outcomes, including PONV, time to mobilisation, and chronic pain.

Results: 56 patients(100% female, mean age=57.38), 41 (73.2%) received ultrasound-guided regional blocks, while 15 (26.8%) had local infiltration intraoperatively. Regional blocks included paravertebral (n=16), erector spinae (n=13), and Pectoralis I/II (n=12) blocks. Regional blocks significantly reduced mean postoperative pain scores compared to local infiltration at 4 hours (2.54 vs 4.67, p=0.001), 6 hours (1.90 vs 3.20, p=0.003), and 12 hours (1.39 vs 2.60, p=0.009), respectively. Regional blocks reduced postoperative nausea (1.19 vs 1.73, p<0.001) and vomiting (1.02 vs 1.33, p=0.001) compared to local infiltration, furthermore time to mobilisation (mean=6hr vs 7hr, p=0.032, t=-2.205), reduced morphine requirement(mean requirement 1.26 vs 1.93, p<0.001), and reduced incidence of chronic pain at three months (1.00 vs 1.40, p=0.009).

Conclusions: Regional analgesia significantly reduces postoperative pain, morphine use, and PONV while promoting early mobilisation and decreasing chronic breast pain in breast cancer surgeries, thus emphasising the importance of the use of regional blocks even in resource-limited settings.

I-A.06

INFORMATION ABOUT PAIN AFTER MINOR VIDEOASSISTED THORCOSCOPIC SURGERY: CONTENT, TIMING AND PRESENTATION METHOD

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Background and aims: Patients are rarely involved in preparing postoperative pain management information, leaving their preferences unexplored. Video-assisted thoracoscopic surgery (VATS), is reported to have similar pain levels and chronic postsurgical pain incidence as thoracotomy. This survey aimed to assess perioperative pain information content, timing, and presentation methods most valued by patients.

Methods: Patients undergoing minor VATS procedures were included. On the first postoperative day (POD1), patients completed a questionnaire addressing pain content (immediate pain, side effects, and pain after discharge), timing of information, and preferred method of receiving information. Data were collected using the International Pain Outcomes Questionnaire for patient-reported outcomes and pain management on POD1 (assessments of variables were made on 0-10 NRS).

Results: In 24 patients, the mean total score was 8.24/10, with all questions rated as moderately (5-6) to highly (7-10) important. The most valued information concerned pain management after discharge if prescribed medications were ineffective (9.5±1.1), followed by pain management plans and side effects. Patients were less interested in immediate pain information, including pain description (5.08±2.9) and concerns about pain and analgesics (6.58±2.7).

Most patients (96%) preferred preoperative information delivered by surgeon or anesthesiologist. Patient interests were not influenced by severe pain, pain during coughing and deep breathing, or satisfaction with analgesia. Older patients were more concerned about analgesic side effects, while patients receiving greater intraoperative opioid doses showed more interest in immediate pain information.

Conclusions: Further exploration of patient information interests is needed. Developing surgery-specific models collaboratively with patients and medical professionals is important for clinical practice.

I-A.07

INFLUENCE OF FRAILTY STATUS ON THE HEALTH-RELATED QUALITY OF LIFE IN OLDER PATIENTS WITH CHRONIC LOW BACK PAIN: A RETROSPECTIVE OBSERVATIONAL STUDY

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Background and aims: Understanding the influence of frailty on health-related quality of life (HRQoL) in older individuals experiencing chronic low back pain can provide valuable insights into the impact of frailty. Therefore, the aim of our study is to assess how different frailty statuses among older outpatients with chronic low back pain affect their HRQoL.

Methods: Patients aged 60 and above with chronic low back pain were recruited from March 2022 to February 2023. Frailty was assessed via the frailty phenotype questionnaire, and HRQoL was evaluated using the EQ-5D-5L. Multiple regression models were used to explore the influence of frailty status on the EQ-5D-5L index and EQ-VAS. Logistic regression was used to determine odds ratios for the impact of frailty status on belonging to the lowest EQ-5D-5L index quartile.

Results: A total of 1,054 participants were classified into robust (29.8%), pre-frail (47.7%), and frail (22.5%) groups. Frailty was significantly associated with declining HRQoL. Pre-frail and frail statuses were inversely linked to the EQ-5D-5L index, with significantly higher odds of scoring in the lowest quartile compared to robust individuals. Stratification analysis identified sex as an effect modifier, emphasizing a more substantial association between frailty and the lowest EQ-5D-5L index quartile in female patients.

Conclusions: A significant association exists between frailty and reduced HRQoL in patients with chronic low back pain. This association was predominant in female patients. Furthermore, considering the dynamic nature of frailty, early detection and effective interventions targeting pre-frailty are essential to delaying the transition to full frailty and improving HRQoL.

I-A.08

COMPARING EFFICACY OF ERECTOR SPINAE PLANE BLOCK VERSUS INTERCOSTAL NERVE BLOCK IN MANAGING POSTOPERATIVE PAIN IN VIDEO ASSISTED THORACOSCOPIC SURGERY (VATS)

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Background and aims: Video assisted thoracoscopic surgery (VATS) is associated with a high incidence of moderate to severe postoperative pain. The use of regional techniques in thoracoscopic surgeries has been introduced in recent years. The erector spinae plane (ESP) block was first introduced in 2016 and was shown to be efficacious in providing acute post-surgical pain relief. It is easy to perform and has a good safety profile. The intercostal nerve block (ICB) is usually performed by the surgeon under direct thoracoscopic vision, and has also been demonstrated to reduce post-operative pain scores. This study aims to compare the efficacy of ESP versus ICB in postoperative pain management.

Methods: 136 adult patients scheduled for elective VATS were recruited between July 2023 to December 2024 and assigned to the ESP or ICB arm in a 1:1 ratio. The primary outcomes were pain scores in post-anaesthesia care unit (PACU) and on post-operative days (POD) 1, 2 and 3. Secondary data included perioperative opioid use, procedural timings and adverse events, time to first ambulation and postoperative length of hospital stay.

Results: Our study included 77 female and 59 male patients. Both groups had similar patient characteristics. Postoperative pain scores in PACU were significantly higher in the ESP arm (4.19 ± 2.35) as compared to the ICB arm (2.77 ± 2.92), p-value 0.008. However, there was no difference in pain scores on POD1, 2 and 3. Both groups had similar rates of receiving additional opioid analgesia. There was no difference in incidence of perioperative complications. Number of days to first ambulation and postoperative length of hospital stay were similar in duration.

Conclusions: Our preliminary results suggest that ICB and ESP are equally effective in pain relief with minimal differences in perioperative outcomes. ICB confers better pain relief in the immediate postoperative period. This is an ongoing study, and further data collection and analysis will be required for definitive study conclusions.

I-A.09

COMPARISON OF DURATION OF POSTOPERATIVE ANALGESIA WITH ADDUCTOR CANAL BLOCK USING ROPIVACAINE,BUPRENORPHINE AND DEXAMETHASONE VS ROPIVACAINE AND DEXAMETHASONE IN KNEE SURGERY PATIENTS

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Background and aims: Adductor canal block has become newer minimally invasive approach for postoperative pain management in knee surgery patients.The duration of block can be prolonged with addition of multiple perineural adjuvants, reducing the requirement of continuous catheters,parenteral or oral analgesics.

Aims: To compare duration of postoperative analgesia provided by addition of Buprenorphine and Dexamethasone to Ropivacaine vs addition of Dexamethasone alone in adductor canal block

Methods: This randomised double-blinded study included 70 patients of ASA I,II, III, aged 18-75 years planned for knee surgeries,divided into two groups containing 35 patients each: Group A received 0.25% ropivacaine 25 ml,150 mcg Buprenorhine and 8 mg dexamethasone whereas Group B received 0.25% ropivacaine 25 ml with 8 mg dexamethasone in adductor canal block given immediately postoperatively.Duration of postoperative analgesia was recorded for 24 hours in form of time in hours at which rescue analgesia was required.Data was analysed by STATA (14.2). Descriptive statistics [Mean (SD), Frequency (%)] were used to portray the base line profile of the study population and clinical outcomes. Independent sample t-test was applied to contrast the mean rescue analgesia time in hours across groups. P value < 0.005 was considered statistically significant.

Results: Inter-group comparisons showed statistically highly significant P value < 0.0001 indicating prolonged duration of analgesia in Group A with mean rescue analgesia requirement at 12.91 ± 2.13 hours as compared to group B with requirement at 9.14 ± 2.07 hours

Conclusions: Duration of analgesia can be prolonged for longer hours by addition of both Buprenorphine and Dexamethasone perineurally as compared to Dexamethasone alone.

I-A.10

THE USE OF FENTANYL PATIENT-CONTROLLED ANALGESIA POSTOPERATIVELY IN OPEN VERSUS LAPAROSCOPIC CHOLECYSTECTOMIES: A RETROSPECTIVE COHORT STUDY

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Background and aims: Fentanyl patient-controlled analgesia has become the analgesic treatment of choice in the acute setting postoperatively in the Mercy University Hospital. This study will compare the use of this treatment in patients who have underwent laparoscopic and open cholecystectomies. We will be aiming to recognise potential improvements in the delivery of pain medicine in the acute setting postoperatively.

Methods: This is a single centre, retrospective cohort study which aims to examine the use of fentanyl patient controlled analgesia (PCA) since its introduction. The two groups of comparison in this study are those who underwent laparoscopic and open cholecystectomies. Perceived pain at regular intervals and time to discharge will help to understand the need for fentanyl PCAs in the acute care setting.

Results: Patients who underwent laparoscopic cholecystectomies were seen to use more fentanyl on average in the first 24 hours with 864mcg in comparison to open cholecystectomies (676.92mcg). However, after the initial 24 hours postoperatively, the mean use of fentanyl in open procedures surpassed that of laparoscopic as did length of treatment. 86.1% of patients received multimodal analgesia, with intravenous paracetamol (n=62) being administered to all of these patients.

Conclusions: The use of fentanyl PCAs allowed adequate pain relief for a large portion of patients to mobilise early, undergo physiotherapy and thus improve recovery quality and shorten hospital stays. This study showed that changes to local prescribing protocols are required in both open and laparoscopic analgesics in order to optimise pain relief and improve recovery. Future research should consider comparing fentanyl PCAs to PCAs with other analgesics employed, with emphasis on multimodal analgesia.

I-A.11

THE EFFECT OF PRE-INDUCTION OPIOID ADMINISTRATION ON INTRAOPERATIVE ANESTHETIC REQUIREMENTS AND POSTOPERATIVE ANALGESIC USE

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Background and aims: Postoperative pain is a significant outcome of surgery. Pre-emptive analgesia aims to prevent central neuron sensitization from pain signals during surgery. This study compares intraoperative anesthetic requirements and postoperative analgesics in patients administered fentanyl, oxycodone, or morphine pre-anesthesia. The goal is to guide opioid selection for optimal analgesia and enhance patient care.

Methods: Data from a completed double-blind, 3-arm, randomized controlled trial assessed subjective effects of fentanyl 0.1 mg, oxycodone 5 mg, or morphine 10 mg IV pre-anesthesia in 199 surgical patients (Nov 2021 - Dec 2022). Anesthesia personnel were unblinded after induction, so differences in analgesic use cannot be attributed solely to the drugs. All postoperative opioids were converted to oral morphine equivalents (OME) using a conversion table(Anon n.d.). A Kruskal-Wallis ANOVA evaluated data distribution, and post-hoc Dwass-Steel-Critchlow-Fligner pairwise comparisons analyzed drug effects.

Results: The Kruskal-Wallis test showed significant OME differences between groups ($p = 0.008$). Post-hoc tests revealed that the Fentanyl group had significantly higher OME compared to the Morphine group ($p = 0.006$, means: 5.89 vs 3.84). No significant difference occurred between Fentanyl and Oxycodone ($p = 0.64$, means: 5.89 vs 4.36), while morphine and oxycodone showed marginal non-significance ($p = 0.054$, means: 3.84 vs 4.36).

Conclusions: Pre-induction fentanyl led to higher postoperative OME requirements than morphine, suggesting increased analgesic needs. The choice of pre-anesthesia opioid impacts postoperative pain management and should be carefully considered for optimal patient care.

I-A.12

POSTOPERATIVE PAIN MANAGEMENT EFFECTIVNESS AT THE ORTHOPEDIC HOSPITAL: RESULTS FROM PAIN OUT STUDY

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Background and aims: Pain is an integral complication after surgery. This research investigates postoperative pain treatment differences in different facilities at the same hospital. Understanding these distinctions is crucial for tailoring effective pain management strategies in postoperative care.

Methods: Altogether 446 patients were enrolled in this prospective cohort study, conducted at the Hospital of Traumatology and Orthopaedics in Riga, Latvia since November 2022, focused on post-operative patients. On the

first post-operative day, eligible patients, who had been in the ward for at least 6 hours and were conscious, were randomly selected. They were administered a questionnaire, to assess different aspects of pain. These studies were conducted as part of an international project “PAIN OUT”.

Results: Worst pain intensity was 5.4 (95%CI; 5.14:5,66), least pain intensity 1.89 (95%CI; 1.71:1.89).

Pain was significantly affecting sleep 3.0 (95%CI; 2.81:3.36), and verticalization since surgery 3.74 (95%CI; 3.45:4.02). Severe pain proportion since surgery was reported as high as 31 %. Nevertheless, satisfaction with a pain treatment was 8.31 (95%CI; 8.12:8.31). 24% patients would like to have more pain treatment.

82% of patients received opioids as a rescue analgesic (95%CI; 0.78:0.85).

We have found significant difference between departments in the terms of pain affecting verticalization (p 0.000), least pain (p< 0.05) and opioid use after surgery (p< 0.005).

Conclusions: Not all patients are receiving the best evidence-based care they deserve.

We should make a deeper analysis of the postoperative analgesia guidelines and their implementation.

Differences in the patient care in the different departments of the same hospital influence postoperative pain.

I-A.13

COMPARISON OF PAIN INTENSITY ACCORDING TO TYPE OF ANALGESIA USED DURING SURGERY ON THE FIRST POSTOPERATIVE DAY IN THE ORTHOPAEDIC PATIENTS

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Background and aims: This research explores the relationship between different types of analgesia and the intensity of pain postoperatively. The main objective was to determine how regional anaesthesia and local infiltration anaesthesia affect pain intensity in patients.

Methods: Altogether 198 patients undergoing joint replacement were enrolled in this prospective cohort study, conducted at the Hospital of Traumatology and Orthopaedics in Riga, Latvia from November 2022 up to November 2024. On the first post-operative day, eligible patients, were randomly selected. They were administered a questionnaire, utilizing a rating scale from 0 to 10 to assess different aspects of pain. This study was conducted as part of an international project “PAIN OUT”.

Results: In this study, postoperative pain outcomes were evaluated between two cohorts: patients who received regional anesthesia (RA) – 58 patients, and those who underwent local infiltration analgesia (LIA) – 69 patients. Statistically significant differences were found in the group of severe pain time proportion since surgery. For patients who received RA during surgery, severe pain time proportion since surgery is 0,4 [IR: 0.3; 0.5] or 40% of time since surgery and for patients who received LIA during surgery, severe pain time proportion since surgery is 0,3 [IR: 0; 0.5] or 30% of time since surgery, (p = 0.002).

LIA patients requested less opioids (p 0.014). Their satisfaction with a pain relief was higher (p 0.005).

Conclusions: These results suggest that LIA may be associated with better postoperative outcomes in terms of patient comfort and pain management compared to RA in joint replacement surgery.

I-A.14

INCIDENCE AND FACTORS AFFECTING THE DEVELOPMENT AND OUTCOME OF PHANTOM LIMB PAIN (PLP) – A SINGLE-CENTRE PROSPECTIVE COHORT STUDY

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Background and aims: Phantom limb pain (PLP) is a complex phenomenon characterized by pain perceived in a limb that has been amputated. Globally, the incidence of PLP varies widely between 50% to 80%. However, majority of PLP studies are based on Westerners, and there is a paucity of data in Southeast Asia and we aim to fill this gap.

Methods: This was a single-centre, prospective cohort study conducted at Singapore General Hospital from Aug 21-Dec 23. All patients undergoing vascular limb amputation surgery at SGH were screened and identified by a study team member for eligibility. The study included patients 21-80 year-old who underwent vascular limb amputation surgeries, including forefoot, below knee and above knee amputation. Exclusion criteria were cognitive impairment, uncommunicative patients, and existing psychiatric conditions. The questionnaires included Pain catastrophising scale (PCS), painDETECT, and the 5-level EQ-5D (EQ-5D-5L).

Results: Incidence of PLP was 64.8% (35/54) overall and 24.1% (13/54) at 3 months after surgery. The onset of PLP was 22%, 24% and 18.5% immediately, 1 week and 1 month after surgery respectively. Intraoperative ketamine use (10-30 mg) and method of anaesthesia (GA vs RA) did not alter incidence of PLP after 3 months. However, patients at risk of catastrophising (PCS>30) reported higher incidence of PLP at 36% after 3 months.

	GA	RA
PLP	7	6
NO PLP	21	20
% PLP	25%	23%

	Intraoperative Ketamine	No ketamine
PLP	4	9
NO PLP	11	30
% PLP	26%	23%

	PCS > 30	PCS < 30
PLP	4	9
NO PLP	7	34
% PLP	36%	21%

Conclusions: This is the first prospective cohort study on PLP incidence in Singapore, and likely in Southeast Asia. We did not demonstrate any benefits of intraoperative ketamine or regional anaesthesia in reducing PLP. Pain catastrophising remains a risk factor for PLP.

I-A.15

THE EFFECTIVENESS OF ACUPUNCTURE IN NEUROPATHIC PAIN FROM CHEMOTHERAPY-INDUCED POLYNEUROPATHY

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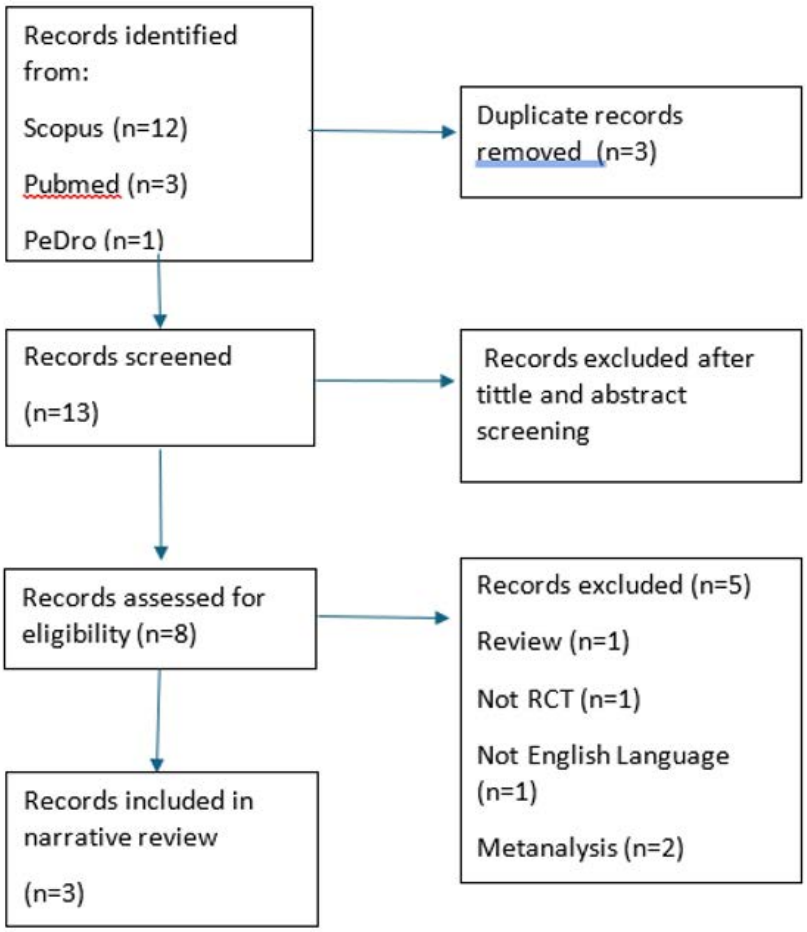
Background and aims: Chemotherapy-induced peripheral neuropathy (CIPN) is a common dose-dependent side effect of many anticancer drugs. It causes symptoms such as pain, numbness, and instability, significantly affecting patients‘ quality of life. This study aims to review the effectiveness of acupuncture in alleviating these symptoms, especially since pharmaceutical treatments often prove inadequate. CIPN lacks a standardized diagnostic approach, and various clinical tools are used for diagnosis.

Methods: The databases searched were PubMED, Scopus, and PeDro for randomized controlled trials (RCTs) and pilot studies, published in the last 15 years. The studies were deemed eligible if they evaluated adult patients suffering from CIPN due to any chemotherapeutic drug for any type and stage of cancer and if the study protocols included acupuncture with a specific protocol.

Results: A total of 16 studies were identified in the initial search, but only three met the inclusion/exclusion criteria (Image 1). The review includes two randomized controlled trials and a pilot study with a total of 143 patients.



Acupuncture showed improvements in CIPN symptoms compared to vitamin B1 and gabapentin whilst In another study, patients receiving acupuncture and usual care showed significant improvement in symptoms and quality of life compared to the control group. Studies indicate that acupuncture can significantly improve pain, numbness, and nerve conduction velocity and has a long-lasting effect in improving quality of life neurotoxicity related symptoms (table 1)

Author	Type of Study	Partici-pants	Cancer Type	Variables	Acupucnture Frequency	Acu-puncture Points	Measurement Tools	Results
Somayeh et al., 2020	RCT	40	Breast, Ovaries, Prostate. Large Intestine. Lung	Acupuncture Vs. B1 Vit and Gabapentin	3 /week for 4 weeks	CV6, GV20, St36, SP4, LI4, LE11, Liv3, Bafeng και Baxie	NRS, NCI-CTCAE, NCS, Patients satisfaction, Safety	Pain reduciton in Acupucnture Group
Molassiotis et al., 2019	RCT	87	Breast, Large Intestine, Ovaries, Head and Neck, Myeloma	Acupuncture and usual care Vs Usual Care	2/week for 8 weeks	LI4, LI11, PC 7, TW5, Baxie, SP5, St36, St41, Liv3, Bafeng	Brief Pain In-ventory, Distress Scaly, Total Neu-ropathy Score CV, NCI-CTACA, NCS, Sociode-mographics	Significant improvement in the Acupuncture Group
Jeong et al., 2018	Pilot Study	10	Breast	Acupuncture	3 /week for 4 weeks	LI4, LI11, St36, Li3, Bafeng, Baxie	NPSI, NCS, Sp-36	Improvement in pain and quality of life

Conclusions: Acupuncture appeared to have a positive effect on managing chemotherapy-induced polyneuropathy. However, further studies with larger populations, better homogeneity in assessment scales, and consistent interventions are necessary.

I-A.16

A CROSS-SECTIONAL STUDY TO IDENTIFY THE SOCIAL CONTEXT OF PAIN IN CANCER PATIENTS - INDIAN PERSPECTIVE

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Background and aims: In recent decades, heightened recognition has been given to biopsychosocial models of cancer pain. However, the preponderant literature focuses on the biopsychological factors only. This study aims to identify the effect of pivotal social factors in the biopsychosocial triad for cancer pain.

Methods: It was an exploratory, cross-sectional study recruiting patients attending oncology pain clinic at AIIMS, New Delhi. The outcome variables were quantified using Numerical Rating Scale for pain severity, and seven-item interference subscale of Brief Pain Inventory for pain interference. The independent variables were transportation, environmental context, psychosocial factors and socio-economic characteristics. A total of 119 patients were enrolled in 12 months. Bivariate analyses, multiple regression analyses and multivariate analyses were conducted between outcome and predictor variables using STATA-11.

Results: Initial analyses indicated that transport, environmental and psychosocial factors were significantly associated with pain severity and interference. However, in the final model, only psychosocial variables namely interference in social functioning, social support and stress depicted significant main effect for both pain outcomes, thereby indicating that more interference in social functioning, more social support and more stress were associated with increase in both pain severity and interference. Due to cross-sectional nature of the study, inferences of causality cannot be drawn. Also, a replication study on larger sample is needed to validate these findings.

Conclusions: It is recommended that clinicians should routinely screen and address social challenges of cancer pain patients if inadequate cancer pain treatment needs to be conquered and universal right to be pain-free needs to be delivered.

I-A.17

EXPLORING THE IMPACT OF PAIN INTENSITY, ACCEPTANCE, AND CATASTROPHIZING ON PSYCHOLOGICAL DISTRESS IN CANCER PATIENTS

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Background and aims: Pain is a prevalent and distressing symptom in cancer patients, significantly impacting their psychological well-being. This study aimed to examine the relationships between pain intensity, pain acceptance, pain catastrophizing, and psychological distress in a sample of cancer patients with chronic pain.

Methods: A cross-sectional study was conducted with 406 adult cancer patients experiencing chronic pain. Participants completed the Numeric Rating Scale for pain intensity, the Chronic Pain Acceptance Questionnaire, the Pain Catastrophizing Scale, and the Kessler Psychological Distress Scale.

Results: The participants' mean age was 47.8 years (SD = 12.3). The majority were male (63.5%), married (50.2%), and had at least a diploma-level education (87.9%). The prevalence of psychological distress was high, affecting 88.4% of participants, with 19.7% experiencing severe distress. Pain intensity (B = 0.498, p = .007) and pain acceptance (B = -0.260, p < .001) were significant predictors of psychological distress, while pain catastrophizing was not a significant predictor when controlling for other factors. Other significant predictors included employment status, comorbidity with chronic illnesses, smoking status, advanced cancer stage, and gynecological cancer diagnosis. The regression model explained 50.5% of the variance in psychological distress.

Predictors of Psychological Distress: Emphasis on Pain-Related Factors among Patients with Cancer.							
Predictors	**Unstandardized Coefficients**		**Standardized Coefficients**	**t**	**P-value**	**95 % Confidence Interval for B**	
	B	Std. Error	Beta				
Constant	36.99	2.83		13.06	<.001	31.43	42.56
Pain Intensity	0.498	0.184	0.18	2.71	.007	0.14	0.86
Pain Acceptance	-0.260	0.031	-0.43	-8.34	<.001	-0.32	-0.19
Pain Catastrophizing	0.029	0.039	0.03	0.73	.468	-0.05	0.11
Age	-0.014	0.018	-0.04	-0.79	.428	-0.05	.021
Employment (Reference group: unemployed)	-0.997	0.467	-0.09	-2.13	.033	-1.92	-0.08
Gastrointestinal Cancers (Reference group: Breast)	-0.537	0.683	-0.05	-0.79	.433	-1.88	0.81
Urinary Cancers (Reference group: Breast)	-0.093	0.784	-0.01	-0.12	.906	-1.63	1.45
Gynecological Cancers (Reference group: Breast)	3.563	0.951	0.15	3.74	<.001	1.69	5.43
Lung cancer (Reference group: Breast)	-0.065	0.920	-0.01	-0.07	.944	-1.87	1.74
Having Addition Chronic (Reference group: No)	1.730	0.670	0.12	2.58	.010	0.41	3.05
Physical Activity (Reference group: Low activity)	0.602	0.519	0.05	1.16	.246	-0.42	1.62
Chemotherapy (Reference group: Radiotherapy)	0.866	0.739	0.07	1.17	.242	-0.59	2.32
Surgery (Reference group: Radiotherapy)	0.082	0.862	0.01	0.09	.924	-1.61	1.78
Smoking (Reference group: Non-smoker)	1.129	0.509	0.09	2.21	.027	0.13	2.13
Cancer Stage (Reference group: early stage)	1.783	0.914	0.09	1.94	.050	-0.02	3.58
Family History of Cancer (Reference group: No)	0.665	0.488	0.05	1.36	.173	-0.29	1.62
Education Level (Reference group: Up to secondary school)	0.964	0.692	0.06	1.39	.164	-0.39	2.32
P-values significant at ≤ 0.05							

Conclusions: The high prevalence of psychological distress highlights the need to prioritize pain management within mental health care for cancer patients. Pain intensity was a key driver of distress, while pain acceptance emerged as a protective factor, underscoring the value of acceptance-based interventions. Integrating pain relief, mental health support, and attention to socioeconomic factors may improve the psychological outcomes of cancer patients with chronic pain.

I-A.18

ENHANCING MULTIDISCIPLINARY COLLABORATION IN SEVERE CANCER PAIN: A EUROPEAN EXPERT CONSENSUS ON MANAGEMENT STRATEGIES

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Background and aims: Approximately 51% of patients are affected by inadequate treatment of cancer pain, impacting their quality of life. This study aimed to develop expert consensus recommendations for multidisciplinary management of persistent severe cancer pain through European pain specialist and oncologist collaboration.

Methods: Two expert committees developed and distributed a clinical practice survey covering six key areas of cancer pain management. Seventy-seven experienced European oncologists completed the assessment. Subsequently, fifteen specialists used a two-round Delphi-like methodology (9-point scale, consensus ≥75%) to establish recommendations addressing identified controversies in clinical practice.

Results: Consensus was achieved in 13 of 16 recommendations (81.25%). Experts unanimously supported 1] educational sessions on cancer pain management and protocols (100%), while endorsing training on interventional techniques (80%). Strong consensus was reached for 2] implementing telematic consultations (100%), creating pain committees (87%), and ensuring pain specialist access (93%). Unanimous agreement supported 3] referring patients to pain units when quality of life is impacted, regardless of pain location or treatment-related adverse events.

Conclusions: The expert panel emphasized three critical elements for optimal cancer pain management: enhanced inter-specialty collaboration, comprehensive pain management training for oncologists, and establishment of clear referral pathways to pain units. These recommendations aim to improve access to appropriate pain management strategies for cancer patients.

I-A.19

GLOBAL PERSPECTIVES ON CANCER-RELATED PAIN IN IMMIGRANT AND ETHNIC MINORITIES CANCER SURVIVORS

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Background and aims: Cancer survival rates are improving globally, yet chronic pain remains a major challenge, especially for immigrant and ethnic minority survivors facing cultural, linguistic, and access barriers. This review explores factors shaping their pain experiences to guide culturally sensitive interventions and promote equitable, improved care.

Methods: We conducted a scoping review following the PRISMA guidelines. A comprehensive search was performed across Medline, CINAHL, Web of Science, Scopus, and EMBASE, including literature published from 1990 to November 2024. Data will be analyzed using the Theory of Unpleasant Symptoms framework to understand the factors involved in their cancer related pain experiences.

Results: Out of the 863 articles identified, 254 met the inclusion criteria and are currently being evaluated for final inclusion. Thus far, none have explicitly referred to participants as immigrants; instead, they describe them as ethnic minorities. Preliminary findings highlight key components of their cancer pain experience, including cultural perceptions of pain, cultural and ethnic expressions of pain, social support, as well as economic and spiritual needs. Recognizing these factors is essential for understanding their experiences, improving care, and optimizing pain management.

Conclusions: Our findings highlight a persistent „System blind to immigration" approach in healthcare and research. Despite pain being the most common symptom in survivorship, cancer pain management neglects immigration as

a key social determinant of health. Migration-related challenges—cultural and language barriers, limited healthcare access—worsen pain experiences and increase stress, further impacting survivors' quality of life and access to care.

I-A.20

EXPERIENCES AND THOUGHTS OF MULTIMODAL TEAM ASSESSMENT FOR PATIENTS WITH TRAUMATIC SPINAL CORD INJURY AND CHRONIC PAIN - FROM A PATIENT AND PERSONNEL PERSPECTIVE

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Background and aims: Many people living with a traumatic spinal cord injury (TSCI) are suffering from chronic pain. The pain highly affects the activity- and participation level, reducing the quality of life and causing great suffering for these individuals. Commonly, treatment involves drugs that can cause side effects and is often insufficient. People with TSCI have requested supplementary pain treatment and rehabilitation. Studies have shown that multimodal assessment and rehabilitation with a biopsychosocial approach is effective for patients with chronic musculoskeletal pain.

This study aims to explore experiences and thoughts of participating in a multimodal team assessment at a pain clinic for patients with TSCI and chronic pain from a patient and professional perspective.

Methods: Patients (n=6) with TSCI and chronic pain were invited to participate in a team-based assessment with professionals from a spinal cord injury clinic and a pain clinic at a university hospital in Sweden. Afterwards, semi-structured interviews were conducted, and interview transcripts were analysed using qualitative content analysis.

Results: The preliminary results illuminate that the earlier biomedical approach to pain influenced patients' expectations of the assessment, making it difficult for patients to appreciate the psychosocial approach offered at the pain clinic. On the other hand, the professionals expressed that they could make a relevant pain analysis that could be helpful for the patients. Some professionals also expressed that the view of pain differed between the professionals at the two clinics.

Conclusions: It is crucial to educate both patients with TSCI and professionals about the biopsychosocial impact of pain and adapted pain treatment.

I-A.21

PAIN SYNDROME IN MULTIPLE SCLEROSIS

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Background and aims: Literature indicates that two-thirds of MS patients worldwide suffer from chronic pain, with up to 90% not receiving adequate pain management.

The aim of this study was to examine the prevalence, nature, and severity of pain syndrome (PS) in MS patients and assess its impact on their quality of life.

Methods: We conducted a study involving 500 MS patients.

To assess pain, we used various scales and questionnaires: the Visual Analog Scale, the McGill Pain Questionnaire, the Pain Detect Questionnaire, and a quality of life impact assessment scale.

Results: 311 (62.2%) reported experiencing pain, with 211 (67.8%) patients reporting lower extremity pain, 166 (53.4%) back pain, 144 (46.3%) headaches, and upper extremity pain, 89 (28.6%) leg cramping, and 44 (14.1%) facial pain. Back pain resembling Lhermitte's sign was noted in 67 (21.5%) patients.

Pain was described as shooting and tightening, often accompanied by burning, itching, and paresthesia. Chronic pain syndrome was prevalent in 233 (75%) patients, while acute pain syndrome was observed in 78 (25%) patients, with trigeminal neuralgia in 10 (3.2%) and eye pain in 22 (7.1%).

Trigeminal neuralgia was the initial symptom in 4 (40%) cases.

Pain Detect scores suggested a possible neuropathic component. The Brief Pain Inventory highlighted significant negative impacts on mood and enjoyment of life.

Conclusions: Pain syndrome is a frequent complication in MS, affecting 62.2% of patients in our study. The nature of pain in MS suggests a potential neuropathic component, necessitating comprehensive pain management strategies to improve patient quality of life.

I-A.22

AN ANALYSIS OF CLINICAL DIAGNOSTIC TOOL FOR THE ASSESSMENT OF CHRONIC NEUROPATHIC PAIN IN PRIMARY CARE

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Background and aims: The International Association for the Study of Pain (IASP) defines neuropathic pain as, 'pain that arises as a direct consequence of a lesion or diseases affecting the somatosensory system.' This can manifest in different forms such as burning/shooting pains, parasthesias, hypoesthesia, hyperalgesia, and allodynia. According to the National Institute for Health and Care Excellence (NICE), the prevalence of chronic neuropathic pain in the UK is 8.2%. Accurate diagnosis is vital for addressing this debilitating condition. Primary care serves as a chief entity for early detection and acts as a gateway for optimal long-term management. This research project aims to identify the most effective methods for diagnosing neuropathic pain.

Methods: A literature review was conducted using Web of Science platform with key terms such as 'clinical diagnostics', 'chronic neuropathic pain,' 'primary care,' and 'assessment tools.' Articles for analysis were selected from high-impact journals including American Journal of Medicine, the Journal of IASP, and Lancet Neurology.

Results: This review recognised that integrating screening tools with comprehensive patient history-taking and physical examination markedly improved the accuracy of neuropathic pain diagnoses. The research revealed that the Douleur Neuropathique 4 (DN4) and the Leeds Assessment of Neuropathic Symptoms and Signs Scale (LANSS scale) are the most effective screening instruments for diagnosing neuropathic pain.

Conclusions: The synergistic approach allows for a more nuanced understanding of the patient's symptoms. Ascertaining a true diagnosis is crucial for successful management and better patient prognoses. Screening tools play a pivotal role in consolidating diagnoses within primary care.

I-A.23

PAIN IN CHRONIC STROKE - A SINGLE CENTER CROSS-SECTIONAL STUDY

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Background and aims: Pain is a common occurence in chronic stroke phase and may attribute to the worsening of functional status and quality of life. The aim of this study was to evaluate different pain subtypes in chronic stroke patients and the effect of chronic pain on the rehabilitation outcome, functional and emotional status and the quality of life.

Methods: This research was designed as a prospective single center cross-sectional study. Forty five inhospital stroke patients were included in the study. Pain intensity was measured by Numeric Rating Scale (NRS), while pain characteristics were assessed by Douleur Neuropathique en 4 Questions (DN4) scale.Functional status was evaluated by Barthel index and Fugl-Meyer assessment and quality of life by SF-36 tool. Emotinal functioning was estimated by The Depression, Anxiety and Stress Scale (DASS 21).

Results: The results showed a high prevalence of pain among patients in the chronic phase of stroke (46.7%), with various types of pain present. Neuropathic pain according to DN4 scale was present in 36% of patients. The presence of pain was associated with worse functional recovery, reduced independence in activities of daily living, and the presence of depression, anxiety, and stress. A strong correlation was found between pain levels and life quality (p=0.557).

Conclusions: Pain in the chronic phase of stroke is a significant issue due to its frequency and its impact on rehabilitation outcomes, functional recovery, and overall quality of life. Timely diagnosis and treatment of post-stroke pain are crucial for successful rehabilitation and functional recovery of patients.

I-A.26

IS AUTONOMIC FUNCTION ASSOCIATED WITH (CENTRAL) PAIN PROCESSING IN INDIVIDUALS WITH CHRONIC PAIN? A SYSTEMATIC REVIEW

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Background and aims: Dysfunctions of the autonomic nervous system (ANS) are hypothesized to be associated with altered central pain processing (CPP). Altered CPP characterizes nociplastic pain, which is common in non-specific chronic pain conditions. However, the exact interaction between ANS function and chronic pain remains unclear.

Methods: PubMed, SCOPUS, and Web of Science were searched, followed by a two-phased screening by two independent researchers (IM & CQ). Risk of bias (Newcastle-Ottawa Scale), level of evidence and data collection were performed double-blind.

Results: Two cohort studies, 10 cross-sectional studies, and one case-control study were included. ANS function was measured by cardiovascular measurements (blood pressure, heart rate, and heart rate variability), sympathetic skin response, plasma catecholamines, and skin temperature. All studies used questionnaires to assess pain, nine used additional quantitative sensory testing. Significant associations between autonomic function (heart rate and blood pressure) and pain intensity (VAS) were found in patients with Irritable Bowel Syndrome ($p<0.05$). Patients with chronic musculoskeletal pain showed significant associations between conditioned pain modulation and cardiac autonomic response ($p=0.002$) and increased hyperalgesia ($p<0.01$). Conflicting evidence was found for patients with Complex Regional Pain Syndrome and fibromyalgia. No significant associations were found in patients with chronic Whiplash Associated Disorders and chronic pancreatitis.

Conclusions: Both ANS and pain measurements were performed by a heterogeneous variety of assessments, creating a pitfall to provide a qualitative comparison of results. Therefore, this review provides insight into the potential involvement of autonomic pathways in pathological pain mechanisms in several chronic pain populations, but clearly urges the need for standardized measurements.

I-A.27

THE MISMATCH-HYPOTHESIS FOR CHRONIC PAIN – INTEGRATING INSIGHTS FROM ANCIENT, COMPARATIVE AND NEUROIMAGING GENOMICS

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Background and aims: An evolutionary perspective on chronic pain offers unique insights into the adaptive origins and vulnerabilities of the pain system. The mismatch hypothesis, a prominent concept in evolutionary medicine, posits that the gradual processes of evolution have failed to keep pace with the rapid changes and challenges of modern society, resulting in a mismatch between our biological predisposition and the demands of our environment. Despite its widespread popularity in evolutionary medicine, this theory currently lacks empirical support.

Methods: Here, we take advantage of a recent large-scale genome-wide association study (GWAS, N = 164,178) on chronic pain and publicly available GWAS data on brain morphology measures (N = 33,000) to investigate the influence of various evolutionary time scales on the genetic architecture of chronic pain and associated brain morphology. Furthermore, we test heritability enrichment for epigenetic influences, including epigenetic activity related to immune-diseases, and active marks in fetal human brain development.

Results: Our findings reveal a strong involvement of enhancer elements that emerged in the human lineage after our last common ancestor with Old World monkeys about 30 million years ago and of recent genetic changes within the last 100 generations. Conversely, we find no evolutionary enrichment signals for human accelerated

regions, ancient selective sweeps, signals originating from interbreeding events with Neanderthals, and signals from epigenetic activity related to immune-diseases. Strongest enrichment signals were found for epigenetic active marks in fetal human brain development.

Conclusions: Our results support the mismatch hypothesis for chronic pain and underscore the importance of early epigenetic influences on chronic pain.

I-A.28

PAIN SCIENCE EDUCATION FOR PEOPLE WITH PERSISTENT PAIN ON NHS WAITING LISTS – A PRAGMATIC EVAULATION MIXED-METHODS STUDY

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Background and aims: Persisting pain is the leading cause of disability globally affecting one in four adults. Pain management waiting lists in Britain can vary from 6-112 weeks. Pain science education (PSE) aims to address misconceptions about pain and has the potential to improve pain knowledge, movement evoked pain, worry about tissue damage, pain levels and associated disability.

This is the first study evaluating the experience of delivering PSE en masse to people with persistent pain who are on NHS waiting lists for pain management care.

Methods: This was an exploratory mixed-methods, observational cohort study using descriptive statistics to assess the quantitative outcomes and reflexive thematic analysis to interpret the qualitative data and facilitate identification of patterns or themes.

Results: 114 people on Scottish NHS waiting lists awaiting management for persistent pain participated in the PSE webinars. The majority of participants felt more hopeful about their future, intended to increase activity, were more likely to reduce their opioids. Participants felt more confident to talk to others about their pain. Attitudes towards wanting imaging for the problem changed in 35% of the sample population to less likely. PSE was well received as interesting and gave feelings of hope and empowerment, and gave participants a feeling that they were not alone. The majority of participants said that they would recommend the webinars to others.

Conclusions: Participants awaiting pain management on Scottish NHS waiting lists generally found PSE webinars to be helpful in their perception of their pain and their intention to be more active in their pain management.

I-A.29

EFFECTS OF CBT-I ACROSS DIFFERENT DELIVERY MODES ON SLEEP, PAIN, AND DISABILITY IN INDIVIDUALS WITH CHRONIC PAIN AND COMORBID INSOMNIA: A SYSTEMATIC REVIEW WITH META-ANALYSIS

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Background and aims: Chronic pain and insomnia are significant public health concerns, with over 50% of individuals with chronic reporting insomnia. Cognitive Behavioral Therapy for Insomnia (CBT-I) is the recommended first-line treatment for insomnia, however the effects of different CBT-I delivery methods (face-to-face, hybrid, and digital) remains unclear. This systematic review and meta-analysis aims to assess the effects of face-to-face, hybrid, and digitally delivered CBT-I on sleep, pain intensity, and disability in individuals with chronic pain and comorbid insomnia.

Methods: In this pre-registered systematic review (PROSPERO: CRD42024543029), we searched Medline, Embase, PsycInfo, and the Cochrane Library on June 18th 2024, for randomized controlled trials investigating the effects of multi-component CBT-I on sleep, pain intensity, or disability against any comparator for adults with chronic pain and comorbid insomnia. The systematic search resulted in 1,855 articles, and 50 articles were identified for full-text screening. Data extraction is completed for the included studies. A citation search yielded 5,159 articles to screen, which is ongoing. Two independent reviewers screened studies by criteria. Risk of bias was assessed using the revised Cochrane Risk of Bias tool, and the GRADE approach evaluated evidence certainty.

Results: The final study results are not available yet, but we expect to be finished in February 2025 and able to present the results on the conference.

Conclusions: This review will provide comprehensive evidence on the effects of various CBT-I delivery modes on sleep, pain intensity, and disability in individuals with chronic pain and comorbid insomnia guiding clinical practice and inform future research directions.

I-A.31

THE FRACTALKINE RECEPTOR CX3CR1 MEDIATES PAIN IN THE PASSIVE TRANSFER-TRAUMA MOUSE MODEL OF COMPLEX REGIONAL PAIN SYNDROME

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Background and aims: Complex Regional Pain Syndrome (CRPS) is a severe chronic pain condition that develops after a small injury, characterized by hyperalgesia, oedema and autonomic dysfunction. Autoimmunity, complex sensory-immune-vascular interactions and neuroinflammation are involved in its pathophysiology. The treatment is unsatisfactory, so it is necessary to identify novel therapeutic targets. We investigated the role of the inflammatory chemokine fractalkine receptor 1 (CX3CR1) expressed on microglia and macrophages in the CRPS mouse model.

Methods: Female mice were treated i.p. daily with purified IgG from CRPS patients or healthy volunteers. Plantar skin-muscle incision was performed to model the microinjury. The role of the CX3CR1 receptor was investigated in gene-deficient and wild-type mice treated with the receptor antagonist AZD8797 (80 µg/kg i.p/day). Paw mechanonociceptive threshold was measured by aesthesiometry and paw volume by plethysmometry. Density and morphology of astrocyte and microglia in pain-related central nervous system regions were investigated by glial fibrillary acidic protein and ionized calcium-binding adapter molecule 1 immunohistochemistry.

Results: Plantar incision induced 45-50% mechanical hyperalgesia, which persisted throughout the 7-day experiment in CRPS IgG-treated animals. Both CX3CR1 deficiency and antagonist treatment significantly reduced CRPS IgG-induced mechanical hyperalgesia-increase. CRPS IgG treatment increased microglia and astrocyte activation in the somatosensory cortex and periaqueductal gray. Microglia immunoreactivity was suppressed by CX3CR1 gene deficiency in the somatosensory cortex, while astrocyte activation was significantly reduced by the antagonist treatment in the periaqueductal gray.

Conclusions: The CX3CR1 receptor may play a role in CRPS-related chronic pain. Therefore, CX3CR1 antagonists represent a potential novel therapeutic target in this primary chronic pain condition.

I-A.33

RETROSPECTIVE SINGLE-CENTRE STUDY OF THE CHARACTERISTICS, MANAGEMENT AND OUTCOMES OF PEDIATRIC COMPLEX REGIONAL PAIN SYNDROME

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Background and aims: Complex regional pain syndrome (CRPS) is a severe and debilitating condition affecting patients' quality of life.

Aims: To analyze demographics, clinical characteristics, and treatment of a single-center group of pediatric CRPS patients and identify predictors of disease severity.

Methods: The present retrospective study included patients with paediatric CRPS based on Budapest criteria, who had been seen at the study centre over the past 10 years. The comparison of patients with a favourable outcome and those who experienced at least one flare during the disease course was conducted using either the Pearson X2 or Fisher Exact Test.

Results: We included 29 patients (F 23). Symptoms began at an average age of 11.2 years (5.7-13.6 yrs), and the diagnosis took 78 days (30-275 days). Most cases (82.7%) had lower limb involvement. 16 patients had a history of trauma.

26 patients received pharmacologic treatments (neridronate in 6); 20 patients (68.9%) received physiotherapy.

Fifty percent of the subjects exhibited a favourable disease course, while the remaining 50% demonstrated a relapsing disease. Patients who relapsed had a mean time to diagnosis of 84.55 days compared to 57.77 for patients with a favorable disease course. The percentage of patients treated with neridronate was significantly higher in patients experiencing complete resolution of symptoms compared to patients with relapsing disease (66.7% versus 22.3%). There were no differences between the groups in age, sex, pain intensity, radiological features and psychiatric comorbidities.

Conclusions: Shorter time to diagnosis and bisphosphonate therapy may predispose patients to more favorable outcomes.

I-A.34

CLINICAL CHARACTERISTICS OF PATIENTS WITH PERSISTENT CRPS

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Background and aims: High pain levels, functional impairment and/or psychological distress are clinical indicators of the severity of the Complex regional pain syndrome (CRPS). Some studies suggest that patients with persistent CRPS have a higher severity of the disease and worse outcomes for functional recovery compared to early CRPS.

The study‘s main aim is to determine the clinical features and prevalent phenotype in patients with persistent CRPS referred for rehabilitation compared with early CRPS.

Methods: Clinical data were analyzed for 38 participants (14 patients with early CRPS and 24 - with persistent CRPS). The following data were collected: sex, age, CRPS type, location of CRPS, years of CRPS beginning, average pain, worst pain (all numerical rating scale), the Central Sensitisation Inventory (CSI), The McGill Pain Questionnaire (SFMPQ-2), The DASH Questionnaire (for upper extremities), LEFS (for lower extremities).

Results: All enrolled patients were diagnosed with CRPS type I. Of these, 22 patients presented with upper extremities CRPS, and 16 had lower extremities CRPS. The onset of CRPS was associated with trauma in all cases. The condition was slightly more prevalent on the left (56%) than on the right side (44%) in both groups. The majority of patients with persistent CRPS exhibited the highest frequency of pain, along with pronounced motor and trophic changes. Sensory disturbances were observed in 72.4% of patients with persistent CRPS, while signs of vasomotor dysfunction were relatively uncommon.

Conclusions: The study revealed that most patients with persistent CRPS exhibited more often severe pain, motor and trophic changes, while vasomotor dysfunction was infrequent.

I-A.35

MOTOR CORTICAL EXCITABILITY AND CONNECTIVITY METRICS BY TMS COUPLED TO ELECTROENCEPHALOGRAPHY OR ELECTROMYOGRAPHY IN COMPLEX REGIONAL PAIN SYNDROME

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Background and aims: Complex regional pain syndrome (CRPS) is associated with altered cortical activity which might affect corticospinal excitability (CE). Using transcranial magnetic stimulation (TMS), the CE can be measured

non-invasively using electroencephalography (EEG) and peripherally using electromyography (EMG). This narrative review aims to investigate the current knowledge on corticospinal changes in CRPS.

Methods: We searched PubMED using search terms such as 'TMS AND electroencephalogram OR electromyography AND CRPS'. Original papers with human subjects were included. The search produced 63 hits and after screening abstract and titles, 6 full text articles were reviewed and finally 3 articles were selected.

Results: One study (Krause et al., 2006) found a decrease in motor cortical representation maps (affected 9.8 ±3.5 cm^2 vs unaffected 12.3 ±4.1 cm^2 side) and motor evoked potentials (MEPs) in affected (1.8±0.9 mV) vs unaffected (3.3±1.1.mV) side and the effect was more pronounced with more severe symptoms. No difference was found in MEPs produced in the upper (Turton et al., 2007) or lower extremities (Van de Beek et al., 2002) with TMS pulses administered to the corresponding area of the primary motor cortex (M1) when comparing patients with CRPS and healthy controls. No studies used EEG to assess CE in response to TMS stimulation.

Conclusions: TMS stimulation of the M1 contralateral to the painful side showed an increased corticospinal excitability and representation of the area of the M1 compared to the ipsilateral side in patients with CRPS. More studies are needed to validate these findings.

I-A.39

ASSOCIATION BETWEEN EXPERIMENTAL PAIN MEASUREMENTS AND THE CENTRAL SENSITIZATION INVENTORY IN PATIENTS AT LEAST 3 MONTHS AFTER COVID-19 INFECTION: A CROSS-SECTIONAL PILOT STUDY

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Background and aims: Fatigue, pain, headache, brain fog, and sleep disorders are symptoms commonly experienced by people with post-COVID-19 condition. These symptoms could be considered as manifestations of central sensitization. The aim of this study is to evaluate whether there are indicators of central sensitization by using experimental pain measurements and to determine their association with patient-reported outcome measures.

Methods: A cross-sectional study including 42 patients after COVID-19 infection was conducted. The central sensitization inventory (CSI) was administered as a PROM to evaluate central-sensitization-associated symptoms. Pressure pain thresholds (PPT), temporal summation, and descending nociceptive pain inhibition (CPM) were assessed as experimental pain measurements.

Results: The median score on the CSI was 46.5 (Q1-Q3: 33-54). The presence of central-sensitization-associated symptoms was seen in 64.3% of patients based on the CSI (≥40/100 points). A deficient CPM was seen in 12% and 14% of patients when measured at the trapezius and rectus femoris, respectively. A negative correlation between pressure sensitivity on the rectus femoris and the CSI score (r=-0.36, 95%CI -0.13 to -0.65, p = 0.007) was observed. Central-sensitization-associated symptoms were present in up to 64% of patients post-COVID-19 infection, based on a PROM, i.e., the CSI.

Conclusions: A more objective evaluation of nociceptive processing through experimental pain measurements was less suggestive of indicators of central sensitization. Only a small negative correlation between pressure sensitivity and the CSI was observed, pointing towards the discrepancy between the CSI and experimental pain measurements and presumably the complementary need for both to evaluate potential indicators of central sensitization in this population.

I-A.40

INTERVENTIONAL METHODS FOR MANAGEMENT OF PAIN SYNDROMES IN POST-COVID PATIENTS: A SYSTEMATIC REVIEW

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Background and aims: Coronavirus disease 2019 (COVID-19) pandemic led its way for another imminent healthcare crisis that is commonly referred to as "long covid" and involves the lingering effects of COVID-19 post-acute infection. These include a plethora of debilitating manifestations with pain-related symptoms being diverse with an incidence

of 5–17%. Evidence on management of COVID-19 related pain syndromes is still lacking and with new data showing an association and a possible transition to chronic pain, the issue demands further assessment, since no official guidelines have been established yet. The purpose of this study, therefore, is to conduct a systematic review on interventional methods for management of pain syndromes in post-covid patients.

Methods: For this purpose, a thorough search on PubMed and medRxiv was conducted using keywords to identify all relative studies. The literature was then reviewed by all authors and screened based on title and abstract, followed by full text assessment for eligibility. Five studies were included in the review that were independently assessed for risk of bias.

Results: Pain levels were recorded prior and post intervention and in all studies there was a significant improvement in all symptomatology.

Conclusions: Despite limitations in number of studies and methodology, findings of this review show that individualized interventional methods can alleviate neuropathic pain syndromes in post-covid patients, highlighting a promising intervention for cases refractory to life modifications and pharmaceutical agents.

I-A.41

SERUM LIGHT CHAIN NEUROFILAMENT IN NEW-ONSET POST-COVID-19 CHRONIC PAIN: A CONTROLLED CROSS-SECTIONAL STUDY

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Background and aims: Chronic new-onset pain (chronic-NewP) is a relevant post-COVID-19 condition symptom. Meanwhile, serum neurofilament light chain (sNfL), a promising biomarker for neuro-axonal damage, and has been found persistently elevated after acute COVID-19. The aim of this research is to explore sNfL's relationship with chronic-NewP.

Methods: This cross-sectional case-control study enrolled people with post-COVID-19 condition and healthy volunteers (HV). The former underwent structured interview, including pain- and quality-of-life-related questionnaires, and in-person standardized physical examination. Blood samples were collected from all participants for sNfL measurement with Single Molecule Array (Simoa®) on a HD-1 Analyzer (Quanterix Corp). Clinical and laboratory data were compared between post-COVID-19 condition subjects who had developed persisting chronic-NewP (i.e. "de novo" chronic pain, which had persisted up to enrolment), those who had not, and HV.

Results: Sixty HV (mean age: 47.8 ± 13.7 years-old; females: 41.7%) and 201 people with post-COVID-19 condition (mean age: 50.5 ± 13.8 years-old; females: 74.6%), from which 74 (36.8%) reported persisting chronic-NewP, were included. Those with chronic-NewP presented more frequently with new-onset fatigue (p=0.004) and hyposmia (p=0.017), higher anxiety (p=0.041) and lower semantic verbal fluency (p=0.006) scores; but with similar sNFL levels (p=0.779) compared to post-COVID-19 subjects without new chronic pain. Additionally, there was no significant difference between sNFL levels among participants with post-COVID-19 persisting chronic-NewP and HV (p=0.225).

Conclusions: No association was observed between post-COVID-19 persisting chronic-newP and sNFL levels. Further studies are necessary to confirm our findings and explore the relationship between sNFL levels and specific pain phenotypes within this population.

I-A.42

AUTOANTIBODIES FROM LONG-COVID PATIENTS INDUCE SENSORY HYPERSENSITIVITY IN MICE

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Background and aims: SARS-CoV-2 infections worldwide led to a surge in cases of the post-infectious syndrome Long-COVID. It has been hypothesized that autoantibodies play a crucial role in the development of Long-COVID

and related syndromes, such as fibromyalgia and ME/CFS. Our objective is to elucidate the involvement of autoantibodies in Long-COVID pathogenesis.

Methods: First we aimed to subgroup our patients based on plasma proteomics. Autoantibodies profiles in these subgroups were determined with Huprot analysis. Mice were injected intraperitoneal with IgGs (260mg/kg) from the different subgroups, or with IgG's from health controls. Pain-associated behavior such as mechanical and thermal sensory hypersensitivity was measured using Von Frey and Hargreaves test, respectively. Locomotor activity and stamina was determined with an open field test and rotarod analysis, respectively.

Results: We detected three Long-COVID subgroups based on plasma levels of GFAP, NFL, and IFN-signatures. One subgroup was characterized by elevated levels of neuronal damage and astrocyte activation markers, whilst the second subgroup had higher IFN-signature, compared to the third subgroup. IgG transfer from subgroup 1&3 to mice, both induced pronounced and persistent sensory hypersensitivity. Control IgG or IgG from patients from subgroup 2 did not induce pain-associated behavior. The subgroup with higher IFN-signature, reduced locomotor activity in mice without affecting their motor coordination. One of the signature autoantibodies we observed is anti-keratin (subgroup-1), anti-IFNα1 (subgroup-2), and anti-TGF-b.

Conclusions: These findings demonstrate that transfer of IgG from Long-COVID patients to mice replicates some disease-like symptoms, underscoring a putative causal role for IgG's in Long-COVID pathogenesis.

I-A.43

EFFECTS OF AN ACTIVE COPING PROGRAM IN LONG-COVID PATIENTS WITH CHRONIC PAIN. PRELIMINARY RESULTS OF A RANDOMIZED CONTROLLED TRIAL

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Background and aims: Chronic musculoskeletal pain is highly prevalent in Long-COVID (LC). Pain Science Education (PSE) and Therapeutic Exercise (TE) have been shown to be effective approaches for managing chronic pain. However, there is a lack of knowledge on treatment strategies for LC patients with chronic pain.

Aim: To compare the effects of PSE associated with TE with the usual treatment delivered in Primary Care on functional and psychosocial outcomes in LC patients with chronic pain.

Methods: A total of 89 individuals were randomly assigned to receive PSE+TE (n=45; experimental group: 39 females, 52±7.03 years) or usual treatment (n=44; control group: 38 females, 49±7.44 years) over 12 weeks. Outcome measures included quality of life, pain intensity, pain pressure thresholds, sit-to-stand test, 6-min walking test, grip strength, respiratory muscle strength and pain catastrophizing. Assessments were performed at baseline and immediately after treatment. NCT05894629.

Results: A total of 79 individuals completed the second assessment (PSE+TE n=42; usual treatment n=37). The mixed-model ANOVA revealed that the experimental group showed after treatment a more beneficial time*effect in terms of self-perceived quality of life ($p=0.045$), pain intensity ($p<0.001$), grip strength of both sides ($p>0.040$), number of squats ($p=0.023$), meters walked ($p=0.017$), respiratory muscle strength ($p<0.024$), and catastrophizing ($p=0.009$) compared to the usual treatment group. There was not time*effect in the pain pressure thresholds at the tibialis anterior muscle ($p=0.213$), but a positive effect at the deltoideus muscle ($p=0.021$).

Conclusions: Preliminary results suggest that the combination of PSE+TE achieves a better multidimensional improvement over conventional treatment in patients with LC.

I-A.44

EEG OSCILLATORY PATTERN IN NEW-ONSET LONG COVID CHRONIC PAIN PATIENTS COMPARED TO HEALTHY CONTROLS

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Background and aims: New-onset chronic pain is a common and debilitating symptom of Long COVID (LC) that remains poorly managed due to lack of understanding of underlying pathophysiology and therapeutic targets. A growing body of evidence demonstrates specific patterns of changes in oscillatory cortical neural activity in chronic pain syndromes. This study aims to investigate EEG oscillatory features of LC-chronic pain.

Methods: We collected resting-state EEG data from LC patients reporting new-onset chronic pain (20 females, 11 males) and post-covid no-LC healthy controls (age/sex-matched). Our ongoing investigations are focused on individual peak alpha frequency (IAF) and power spectral densities of main EEG frequency bands.

Results: Our preliminary results showed lower IAF over the posterior scalp region significantly predicts higher pain intensity in LC group when controlling for age and depression. This result was robust to method of IAF estimation ($F(3,21) = 7.447$, $p = 0.002$, adj $R^2 = 0.446$ for Welch's method; $F(3,21) = 7.451$, $p = 0.002$, adj $R^2 = 0.446$ for FOOOF method). Novel findings indicate that posterior IAF does not significantly differ between groups (LC = 10.38±1.1, controls = 10.00±1.1, $p = 0.182$ for Welch's; LC = 10.44±1.0, controls = 10.09±0.9, $p = 0.147$ for FOOOF).

Conclusions: Our preliminary results highlight associations between IAF and pain in LC. Planned further analyses of additional spectral features, including adjusted power to differentiate periodic and aperiodic EEG components, aims to provide a more comprehensive view of EEG spectral features and potential neuromodulatory targets for this new post-pandemic chronic pain syndrome.

I-A.45

HIGH BODILY THREAT MONITORING IS ASSOCIATED WITH REDUCED INFLAMMATORY CYTOKINE SECRETION FROM IMMUNE CIRCULATING CELLS IN FIBROMYALGIA AND DEPRESSION

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Background and aims: The Bodily Threat Monitoring Scale (BTMS) is a 19-item self-report measure designed to assess the tendency to monitor and interpret bodily sensations as indicative of potential health issues (Heathcote LC, 2023), and hence appraised as threatening. The aim of this study is to evaluate, for the first time, whether BTMS symptoms are amplified in fibromyalgia (FM) and depressive (MDD) patients and to study whether heightened bodily threat appraisal is associated with inflammatory cytokines secreted by PBMC immune cells.

Methods: Adult females with FM (N = 26), MDD (N = 14) and HC (N = 27) completed the BTMS and underwent blood extraction. PBMC cells from blood samples were analyzed using Luminex assays to quantify cytokine (19 cytokines) secretion concentrations.

Results: We found higher BTMS threat appraisal scores in both FM ($t=-2.6$, $p=0.01$) and MDD ($t=-2.06$, $p=0.05$) patients (vs. HC) (Figure 1). BTMS scores were significantly correlated with concentration levels of the following cytokines (Figure 2): MIP1A (CC=-0.53), MIG (CC=-0.48), IL2R (CC=-0.52) and IL10 (CC=-0.38), suggesting immune hypoactivity in both anti-inflammatory and pro-inflammatory cytokine secretion in patients with higher BTMS scores.

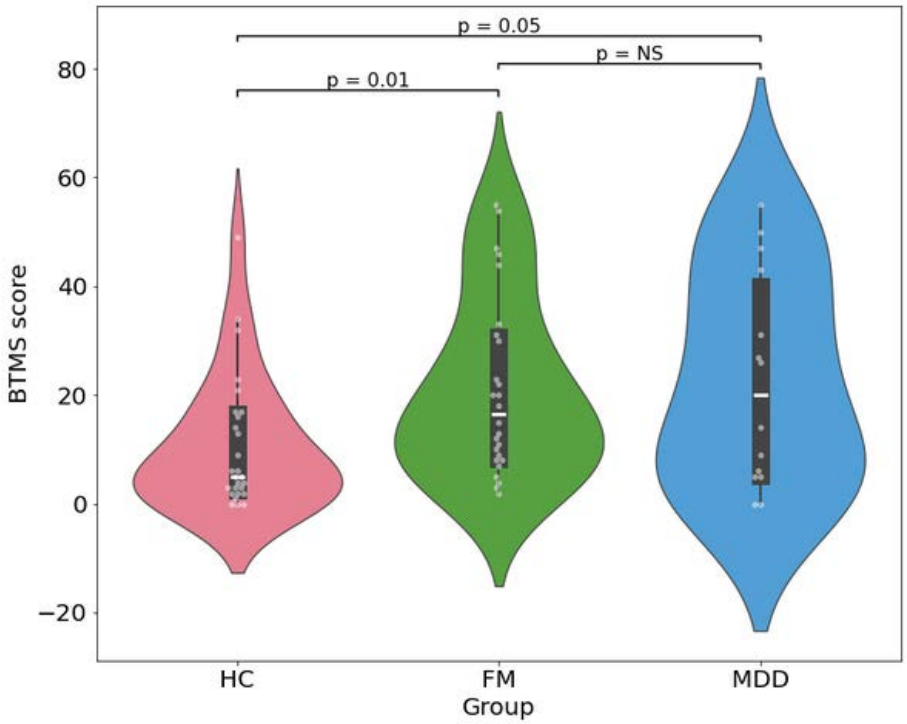

Figure 1

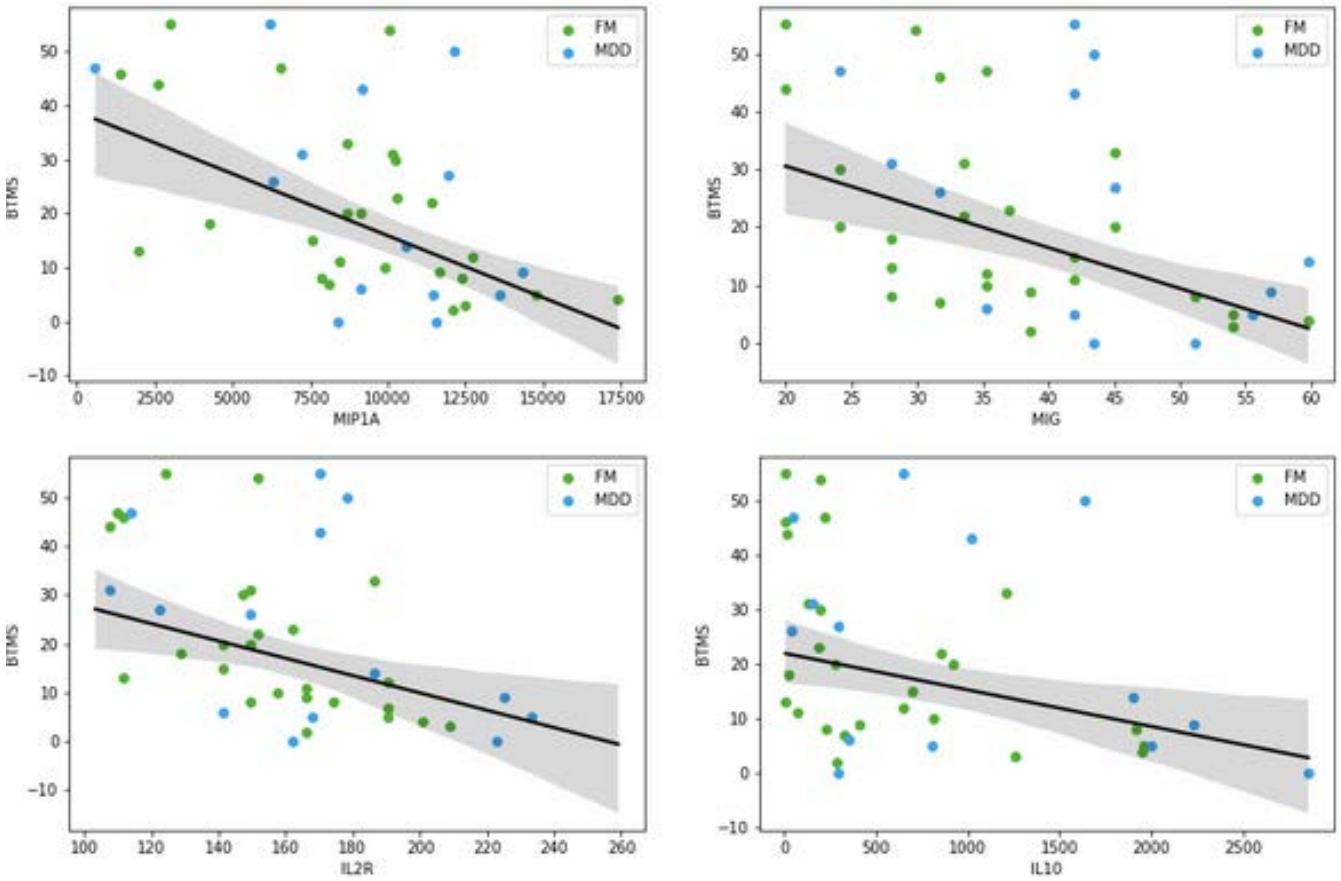

Figure 2

Conclusions: The BTMS is a potentially useful tool to assess bodily threat monitoring in fibromyalgia and depression and it is a relevant transdiagnostic dimension across conditions. Lower cytokine secretion by circulating immune cells is associated with greater bodily threat monitoring in patients, suggesting a relationship between low-level inflammatory activity of immune cells and threat monitoring in these patients.

I-A.47

DO PATIENTS WITH FIBROMYALGIA SYNDROME RECEIVE UPDATED MANAGEMENT STRATEGIES? A WEB MIX-METHODS SURVEY AMONG ITALIAN PHYSIOTHERAPISTS

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Background and aims: Fibromyalgia syndrome (FMS) causes significant pain, disability, and costs among patients. It is paramount that healthcare professionals have an updated knowledge of its characteristics and Clinical Practice Guidelines (CPGs). We aimed to determine the knowledge, adherence to CPGs, and confidence of Italian physiotherapists in managing FMS patients, to explore their difficulties in implementing CPGs' recommendations, compare groups' adherence to CPGs, and determine which variables explained most of the participants' knowledge.

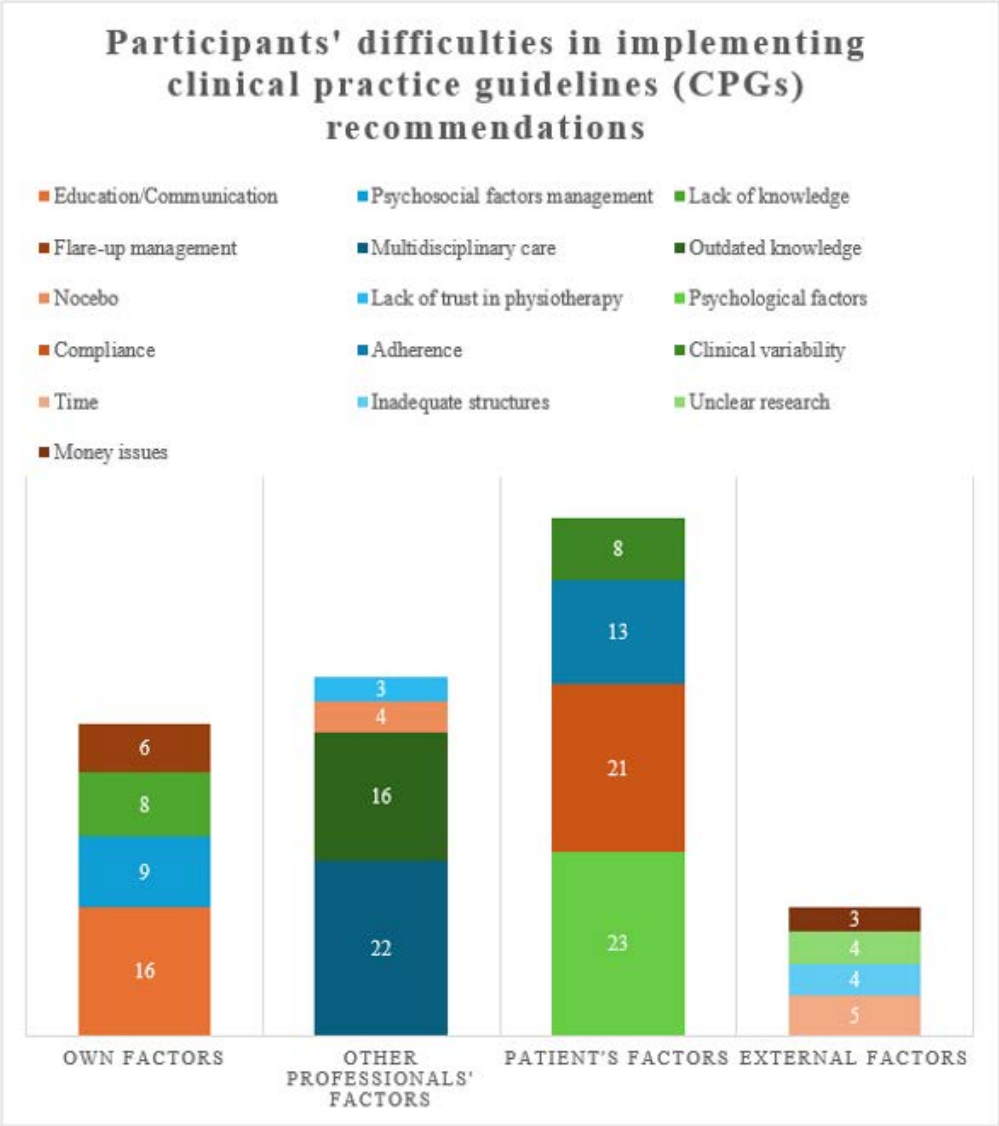
Methods: The survey was administered via social media and newsletter to Italian practicing physiotherapists. The protocol of this work was prospectively registered in Open Science Framework.

Results: Total replies were 398

Sex Males, *n (%)* Females, *n (%)*	 219 (55) 179 (45)
Age, *m (SD)*	35.04 (10.32)
Years of professional activity, *m (SD)*	11.14 (9.69)
Education* Bachelor's Degree, *n (%)* Master's Degree, *n (%)* Philosophie Doctor, *n (%)* OMPT, *n (%)* Osteopathy Diploma, *n (%)*	 283 (71.1) 112 (28.1) 3 (0.8) 160 (40) 20 (5)
Courses on FMS Yes No	 39 (9.8) 359 (90.2)
Number of FMS patients, monthly 0-2, *n (%)* 3-5, *n (%)* 5-10, *n (%)* +10, *n (%)*	 343 (86.2) 50 (12.6) 3 (0.8) 2 (0.5)
Recommended medical specialty* Rheumatology, *n (%)* Orthopedics, *n (%)* General Medicine, *n (%)* Physical Medicine, *n (%)* Psychiatry, *n (%)* Neurology, *n (%)* Other, *n (%)*	 342 (86.6) 59 (14.9) 125 (31.5) 182 (45.8) 174 (43.8) 105 (26.4) 74 (18.6)
Confidence in treating FMS patients Not at all, *n (%)* Low, *n (%)* Medium, *n (%)* High, *n (%)* Extreme, *n (%)*	 34 (8.5) 135 (33.9) 193 (48.5) 32 (8.0) 4 (1.0)
Perceived knowledge of CPGs Very poor, *n (%)* Poor, *n (%)* Good, *n (%)* Very good, *n (%)*	 67 (16.8) 199 (50.0) 123 (30.9) 9 (2.3)

Italian physiotherapists showed a good knowledge of FMS and adherence to CPGs. Ninety-one percent reported a medium or lower confidence in managing FMS patients. Sixty-seven percent judged their knowledge of CPGs as poor or very poor. The remaining 33% mentioned patients' psychosocial aspects, multidisciplinary relationships, and lack of training on communication strategies as the main barriers for implementing CPGs.

Being an Orthopaedic Manipulative Physical Therapist (OMPT) resulted in a better adherence to CPGs on 11/15 items. Knowledge scores were correlated (R= 0.244) with being an OMPT (Stand b= 0.123) and years of professional activity (Stand b= -0.126).



Variable	R	β (95% CI)	Stand β	p-value
Years of professional activity	0.244	-0.025 (-0.046; -0.005)	-0.126	**0.017**
FMS courses		0.248 (-0.429; 0.925)	0.038	0.471
Monthly FMS patients		0.332 (-0.131; 0.794)	0.072	0.160
OMPT		0.488 (0.084; 0.891)	0.123	**0.018**
Confidence		0.200 (-0.076; 0.477)	0.082	0.155
Perceived CPGs knowledge		0.077 (-0.231; 0.385)	0.029	0.623

Conclusions: Despite a good knowledge of FMS and adherence to its CPGs, only a small percentage reported having high or extreme confidence in managing these patients. Together with the most mentioned difficulties, this could indicate that Italian physiotherapists need to develop transversal skills through specialized training.

I-A.48

TOWARDS THE IDENTIFICATION OF MARKERS IN THE FIBROMYALGIA SYNDROME

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Background and aims: The identification of clinical clusters and biomarkers could allow a better medical care of patients suffering from fibromyalgia (FM), but data are still heterogeneous and markers are missing. Our aim was to identify in a cohort of FM patients, clinical clusters and microRNAs expression in order to unveil possible correlations and guide towards specific markers.

Methods: A case-control study (NCT 04624581) was conducted at the Clermont-Ferrand University Hospital in 109 FM and 28 healthy volunteers (HV). Pain evaluation and exploration, questionnaires and blood samplings were performed; microRNAs were extracted using Qiagen miRNeasy serum/plasma kit and the sequencing was performed.

Results: Two epigenetic groups were identified in FM patients. FM1 n=46 and FM2 n=63. FM1 versus HV displayed 9 down- and 1 up-regulated microRNAs; FM1 versus FM2 16 down- and 53 up-regulated microRNAs; FM2 versus HV 2 down-regulated microRNAs (Fold Change (FC)>2; False Discovery Rate (FDR)<0.01). No significant clinical difference was shown between FM1 and FM2 patients.

Three clinical clusters of mild, intermediate and severe FM were shown. The expression levels of two microRNAs: miR-4771 and miR-2115-3p, are significantly correlated with the Brief Pain Inventory daily life sub-score (r=-0.32 $p=0.8x10^{-4}$ and r=0.23 p=0.02 respectively). miR-4771 expression decreases with increasing FM severity whereas miR-2115-3p expression decreases with diminished FM severity.

Conclusions: This study analyses for the first time the full sequencing of microRNAs in 109 FM patients with correlation on clinical clusters. These preliminary findings pave the way to the characterization of microRNAs and the impact of pain on daily life.

I-A.49

TRENDS IN FIBROMYALGIA RESEARCH: CLINICAL FEATURES, MECHANISMS, TREATMENT, EPIDEMIOLOGY AND METHODOLOGY

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Background and aims: Since the term fibromyalgia was coined in 1976, diagnostic criteria, treatment recommendations, research methodology and our understanding of the pathophysiology and psychological underpinnings of fibromyalgia has changed dramatically. We used a bibliometric approach to summarize trends in fibromyalgia research and how they have changed over time. We also explored national differences in prevalence and research output.

Methods: Bibliometrics data on fibromyalgia research were collected from Web of Science using the search term „fibromyal*“ (Title) on September 30, 2023. We organized keywords into categories Clinical Conditions and Symptoms, Psychological Factors and Impact, Physiological Mechanisms and Aspects, Epidemiology and Demographics, and Treatment Methodology and Assessment. We then calculated summary statistics across publication years to visualize trends over time. We collected prevalence data of the 30 countries with highest research records and compared these data with relative research output focused on fibromyalgia.

Results: Annual fibromyalgia publications have increased continually from 1981 until today, yet the ratio of fibromyalgia research relative to all pain research reached its highest in 1998. One notable trend was that psychological therapies and Complementary and Integrative Medicine has increased in popularity in recent years compared to Pharmacological treatment and Physical interventions. Turkey had both a high prevalence and the highest national ratio of fibromyalgia publications relative to all research papers, while Eastern Asian countries showed lower prevalence and relative research output.

Conclusions: We found large variety of patterns and trends in Fibromyalgia research, e.g. a shift away from pharmacological and toward psychological, behavioral, and complementary/integrative care, in addition to large national differences.

I-A.51

THE INVOLVEMENT OF TRANSIENT RECEPTOR VANILLOID 1 (TRPV1) RECEPTOR IN CHRONIC RESTRAINT STRESS-INDUCED PAIN

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Background and aims: The pathogenesis of fibromyalgia is unclear, but chronic stress might be a key-player in its development. TRPV1 receptor is a non-selective cation channel expressed mainly in capsaicin-sensitive primary sensory neurons and activated by a variety of exogenous and endogenous stimuli. Its contribution in development of chronic stress and stress-induced nociception is not cleared, therefore we aimed to investigate the role of TRPV1 in chronic restrain stress-induced FM-like mouse model.

Methods: Female TRPV1 gene-deleted and C57/Bl6 wildtype mice (WT) were used, on which stress was applied by restraining them for 6 hours daily for 2 weeks. Changes in the cold and mechano-nociceptive thresholds were determined by using cold tolerance test or dynamic plantar aesthesiometry. Behavioural tests (open field (OFT), light-dark box and thymus/adrenal-gland weighed were performed at the end of the experiment.

Results: CRS induced 45-50% cold sensitivity in the WT groups, which was significantly lower in the TRPV1 KO mice in both timepoints. Stressed WT animals had a significantly larger mechanical hyperalgesia at week 2 than the stressed TRPV1 KO group. Non-stressed WT mice spent more time in the center zone in the OFT compared to the KO animals. No significant alterations were observed in the weight of thymus/adrenal-gland.

Conclusions: According to our results the cold- and mechanosensitivity of the stressed TRPV1 mice were not influenced by the restraining stress. This is strengthened by the results of the behavioural tests, and the weighing of the thymus/adrenal-gland. Our results suggest that TRPV1 might have a role in the pathogenesis of the stress-induced disorder, fibromyalgia.

I-A.52

IS THERE A RELATIONSHIP BETWEEN FIBROMYALGIA AND AUTISM? A SCOPING LITERATURE REVIEW

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Background and aims: Fibromyalgia is a chronic widespread pain condition that is also associated with other symptoms such as hypersensitivity, poor sleep, fatigue, difficulty concentrating and poor mental health. The cause of Fibromyalgia is unknown, but it's thought to be related to abnormal changes in how the central nervous system processes pain. Autism is a lifelong developmental disability which affects how people communicate and interact with the world. There are many similar characteristics between Fibromyalgia and Autism but there is no mention of a relationship between them in medical guidelines. The aim of this literature review is to explore the current literature on the relationship between Fibromyalgia and Autism.

Methods: A systematic search for articles was conducted in June 2024. Search engines used were Pubmed, Medline, CINNAHL, APA Psychinfo and Web of

Science. Inclusion criteria: (a) Studies investigating a relationship between Autism & Fibromyalgia; (b) Studies using outcome measures that are associated with one of the conditions on people who have the other condition; (c) Studies available in English. Snowballing and reverse snowballing search techniques were also used.

Results: Only Eight studies were included. A wide range of outcome measures and varying diagnostic criteria were used thus unable to compare results. Some studies were small and poor quality. In general the research suggests a positive relationship between Fibromyalgia and Autism.

Conclusions: There is very limited research on this topic. There seems to be a positive relationship between Fibromyalgia and Autism but It is unknown if there is a causal link. More high quality research is needed.

II-A.01

BODY PERCEPTION IN FIBROMYALGIA SYNDROME

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Background and aims: It is known that body perception is disturbed in some diseases such as complex regional pain syndrome and phantom pain. However, the relationship between body perception and fibromyalgia syndrome (FMS) is not yet fully understood. The disruption of body ownership perception caused by the rubber hand illusion (RHI) offers a good potential for body perception assessment. We aimed to investigate the perception of body ownership in FMS through the RHI paradigm.

Methods: 20 healthy volunteers and 20 patients diagnosed with FMS were included in the study. The number of tender points and symptom severity scale (SSS) score were calculated in FMS patients included. Visual Analogue Scale (VAS) was used to determine the severity of pain and Fibromyalgia Impact Questionnaire (FIQ) was completed by the patients to measure functional status. The patient and control groups were subjected to RHI with 120 s synchronised brush strokes. RHI intensity was evaluated by proprioceptive drift.

Results: The mean age of the patient and control groups was similar. Sympton severity scale score was 10.0 ± 3.6, VAS (pain) score was 6.4 ± 1.9 and FIQ score was 52.4 ± 16.6. Proprioceptive drift was 2.25 cm in the control group and 6.5 cm in the patient group, there were significant differences in RHI intensity between the control group and the FMS patient group ($p = 0.025$). There was no correlation between proprioceptive drift and clinical parameters indicating functional impairment in FMS patients.

Conclusions: Fibromyalgia patients experience much more intense disruptions in the perception of body ownership compared to the control group.

II-A.02

REDUCED NATURAL FREQUENCY IN FIBROMYALGIA PATIENTS – ASSESSED BY ELECTROENCEPHALOGRAPHIC RESPONSES TO TRANSCRANIAL MAGNETIC STIMULATION

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Background and aims: Natural frequency refers to the intrinsic oscillatory frequency a cortical region resonates when stimulated. It provides insights into the functional state and connectivity of cortico-thalamic circuits. Abnormalities in natural frequency have been associated with decreased in complexity in cortical dynamics in comatose patients, Parkinson disease and schizophrenia, and correlated to functional improvements in behavior. We hypothesized that women with fibromyalgia (FM) exhibit reduced natural frequency compared to healthy people, which could be correlated to pain symptoms.

Methods: Ten women with FM (51.0±11.5 years), diagnosed according to the 2016 ACR criteria, and ten pain-free-healthy women (54.6±12.1 years) were included. FM women completed pain, mood, and sleep questionnaires. Subjects were assessed using transcranial magnetic stimulation (TMS) to M1 coupled with electroencephalography. TMS evoked electroencephalography was analyzed using Local and Global Mean Field Power (LMFP/GMFP) and natural frequency was estimated based on the event-related spectral perturbation.

Results: Patients with FM reported a pain intensity of 6.1±1.0, and pain interference of 5.8±1.6 (Brief Pain Inventory). LMFP/GMFP were not significantly different between patients and controls ($p > 0.05$). The natural frequency of patients with FM (10.4±2.8 Hz) was lower than healthy controls (13.6±3.6 Hz; $p<0.05$). Use of central acting analgesics did not change the natural frequency ($p=1.0$). Correlation analyses showed a weak but non-significant correlation between pain interference and natural frequency.

Conclusions: Women with FM had decreased natural frequency compared to controls, which may indicate a general loss of cortical complexity in connectivity in FM.

II-A.03

EXPECTATIONS, CONDITIONING AND THE PLACEBO RESPONSE DO NOT DIFFER BETWEEN FIBROMYALGIA AND HEALTHY CONTROLS, BUT THEY ARE DIFFERENTLY ASSOCIATED

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Background and aims: Negative prior clinical experience in chronic pain conditions such as fibromyalgia (FM) should lead to diminished placebo responses. However, similar magnitudes of the placebo response have been found between healthy controls (HC) and clinical populations. This study aimed to assess expectations conditioning and placebo response, and their associations in groups of FM and HC.

Methods: Female HC and FM patients were recruited. All participants completed a battery of questionnaires, including relevant clinical information, followed by the experimental placebo task. This paradigm has the advantage of measuring expectations (baseline (E1), reinforced (E2) and after placebo (E3)), conditioning and placebo response. Repeated-Measures-ANCOVAs (RMACOVAs), correlational analysis, Stepwise and moderation regression analysis were employed.

Results: Thirty-seven HC and 32 FM participated. Three RMANCOVAs didn't show main effects of group or interactions for expectations (p = 0.692), conditioning (p=0.357), and placebo response (p=0.819). E2 predicted the conditioning strength (r=0.477, p=0.08), and placebo response (r=0.445, p=0.014) in HC but not in FM participants. In both groups, strong correlations were found between conditioning strength and the placebo response (H: r=0.385, p=0.035; FM: r=0.565, p=0.001). Stepwise linear regressions found that the major factor predicting the placebo response in HC was an interaction of E2*conditioning (R^2=19.1%), while FM it was only the conditioning (R^2=31.7%).

Conclusions: A similar magnitude of the placebo response was found, but the mechanism underlying these responses seems to differ between groups. In addition, prior clinical experience was found to moderate the relations between conditioning and the placebo response.

II-A.05

EFFECTS OF TWO YEARS OF COVID-19 PANDEMIC ON INDIVIDUALS WITH FIBROMYALGIA

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Background and aims: The COVID-19 pandemic has introduced prolonged stress, potentially worsening fibromyalgia (FM) symptoms. This study aimed to compare the health status of FM patients and healthy controls (HC) both before and 2.5 years into the pandemic.

Methods: A cohort of FM patients and healthy controls (HC), with pre-pandemic data available, completed an online survey in August 2022. The survey gathered demographic information, symptom severity, and health perception using the Fibromyalgia Impact Questionnaire (FIQ), Brief Pain Inventory (BPI), Perceived Stress Scale (PSS), along with other quality of life and physical activity assessments.

Results: Thirty-two individuals with FM and 21 HC, all female, participated in the study. Emotional responses to the pandemic were similar across groups. Clinical measures showed stability or improvement in 84% for FM severity, 66% for FIQ (quality of life), and 50% for pain intensity. Physical activity related to sports decreased in both groups, while leisure activity increased in FM but decreased in HC. In FM, insomnia correlated with pain intensity, clinical measures were linked to function and affective status, and changes in leisure activity inversely correlated with pain interference.

Conclusions: The health of individuals with FM remained stable or even improved during the pandemic. This study is unique in its use of pre-pandemic data and a control group comparison, which helps minimize bias. The results suggest that some individuals with FM may have benefited from pandemic-related lifestyle changes, such as a slower pace of life and working remotely. Yet, these trends may reflect a regression to the mean.

II-A.06

PAIN MODULATION, GENETICS AND INFLUENCING FACTORS IN DYSMENORRHEA

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Background and aims: Recurrent menstrual pain is linked to facilitated central pain mechanisms in otherwise healthy women, while evidence is scarce regarding the descending inhibitory systems. This study aimed to assess pain modulation and the influence of genetic and environmental factors in this condition.

Methods: A pilot case-control study was developed, including 16 women with dysmenorrhea, otherwise healthy, and 11 pain-free healthy control women. Pressure pain thresholds (PPTs) and CPM were assessed during the menstrual phase of the cycle. Blood samples were collected in FTA™ cards and the serotonin transporter (SLC6A4) and catechol-O-methyltransferase (COMT) genetic polymorphisms were analysed, through PCR-RFLP with *HpaII* and *NlaIII* endonucleases, respectively. Catastrophizing (Pain Catastrophizing Scale), physical activity (International Physical Activity Questionnaire) and sleep quality (Pittsburgh-PSIQ Scale) were measured over the entire menstrual cycle.

Results: Lower PPTs but comparable CPM were found in women with dysmenorrhea in contrast with controls ($P<0.05$). Participants with dysmenorrhea exhibited increased helplessness and magnification, as well as greater sleep disturbances during menstruations ($P<0.05$). The distribution of the SLC6A4 and COMT genetic polymorphisms did not differ between groups, whereas a possible association of the S_A/S_A *(SLC6A4)* and *Met/Met (COMT)* genotypes with a reduced ability to engage pain modulation was observed ($\rho=0.641$, $P<0.07$). Higher levels of physical activity were associated to increased CPM in the group of women with dysmenorrhea ($r=-0.625$, $P<0.05$).

Conclusions: Broader studies exploring the inhibitory systems, and the influence of these genetic polymorphisms in healthy women with dysmenorrhea are needed. Interventions conducted to decrease catastrophizing and increase physical activity could be recommended.

II-A.07

PHENOTYPING INTERICTAL MIGRAINE PATIENTS ACCORDING TO CLINICAL AND PSYCHOPHYSICAL CHARACTERISTICS

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Background and aims: Assess migraine patients in different phases and identify those with increased pain sensitivity; identify variables that could predict the presence of IPS independently by the phase of the assessment could be identified.

Methods: This study included Episodic(EM) and Chronic Migraine(CM). Patients were firstly divided into two cohorts according to the phase in which the evaluation occurs (interictal; ictal/perictal). In each cohort, distinct subgroups of migraine patients were identified according to clinical and psychophysical characteristics. Then, patients were treated as one cohort, and clinical predictors able to include patients in each subgroup were assessed.

Results: 198 EM and CM were included (98 interictal phase; 100 ictal/perictal phase). In both cohorts, two subgroups of migraine patients were identified: 18-19% of had No Increased pressure-Pain Sensitivity (NoIPS), while the remaining 81-82% had Increased pressure-Pain Sensitivity (IPS). In both cohorts, the IPS groups had reduced pressure pain threshold (PPT) over all tested areas (temporalis, cervical spine, hand, and leg) compared to NoIPS and a group of healthy subjects, while the NoIPS groups had either no difference or increased PPT compared with healthy subjects.

PPT over temporalis and over the hand correctly identify the IPS group with a sensitivity of 96%, a specificity of 81%, a positive predictive value of 96 %, and a negative predictive value of 81%. The overall accuracy of the model was 93% (model error: mean= 0.07; Standard error=0.02).

Conclusions: These results suggest that trigeminal and hand PPT cut-off values could be used in a clinical setting to identify patients with IPS.

II-A.09

TWO CASES OF SECONDARY HEADACHE CAUSED BY MENINGITIS WITH NEGATIVE MENINGEAL SIGNS

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Background and aims: From clinical practice we all know well how difficult the diagnosis of secondary headache can be. The purpose of this study was to draw attention to the problem of diagnosing meningitis in patients with headaches. Patient K. 25 years old and patient M. 38 years old were examined by a neurologist on the 5th and 7th days from the onset of the disease. The main symptom in both patients was headache.

Methods: The report presents two cases of aseptic meningitis in two patients. At the time of examination during the study of meningeal symptoms, all of them were negative, except for additional meningeal signs: Kerer‘s symptom (pain during palpation of the trigeminal nerve exit points and exit points of the greater occipital nerve), Bekhterev‘s zygomatic symptom (pain on percussion of the zygomatic arch).Lumbar puncture revealed lymphocytic pleocytosis in both patients.

Results: The results of both clinical examples demonstrated the possibility of negative meningeal signs and in patients with acute aseptic meningitis. Numerous studies have confirmed the possibility of meningitis in a patient with negative meningeal tests, such as neck muscles rigidity, Symptoms of Kernig and Brudzinsky, Jolt accentuation test.

Conclusions: Lumbar puncture remains the only reliable method of excluding meningitis and should be performed at the slightest suspicion of it. Additional meningeal symptoms such as Bekhterev‘s zygomatic symptom and Kerer‘s symptoms may be useful and should be used routinely in doubtful cases. However, there are not enough studies to assess their actual sensitivity.

II-A.10

THE SILENT SABOTEUR: THE IMPACT OF HEADACHES ON SLEEP DISORDERS, CENTRAL SENSITIZATION, DEPRESSION, ANXIETY, AND STRESS

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Background and aims: Headache is a common health issue affecting quality of life and associated with various psychological and physical impairments. This study aimed to explore the impact of headaches on sleep disorders, central sensitization, depression, anxiety, and stress levels in young adults.

Methods: This prospective observational study included 132 participants (78 with headaches and 54 controls). Participants were recruited from Atılım University and underwent assessments for sleep quality using the Pittsburgh Sleep Quality Index, central sensitization via the Central Sensitization Inventory, and psychological parameters using the Depression Anxiety Stress Scale (DASS-21). The mean age was 23.07 ± 2.01 years for the headache group and 22.65 ± 0.92 years for controls. Mean BMI was 23.02 ± 3.23 kg/m² in the headache group and 23.08 ± 3.02 kg/m² in controls. Independent samples t-tests were conducted to compare group differences.

Results: Participants with headaches reported significantly higher scores across all measured domains compared to controls. Mean scores were notably elevated in the headache group for sleep disorders ($p < 0.001$), central sensitization ($p < 0.001$), depression ($p = 0.008$), anxiety ($p < 0.001$), and stress ($p < 0.001$).

Conclusions: Headaches in young adults are associated with increased sleep disturbances, central sensitization, and higher levels of depression, anxiety, and stress. These findings underscore the importance of managing headaches to mitigate their impact on both physical and mental health.

II-A.11

A QUALITATIVE EXPLORATION OF MIGRAINE IN STUDENTS ATTENDING IRISH UNIVERSITIES

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Background and aims: The complex neurological disorder of migraine is prevalent (19%) and burdensome in university students. Qualitative research exploring the lived experience of migraine in students has yet to be conducted

Methods: Students clinically diagnosed with migraine were recruited (purposive sampling) from a sample of Irish third-level institutions for a one-time anonymized Zoom focus group or individual interview. Interviews were iterative. Participants were also invited to submit a drawing. The interviews were audio-recorded, transcribed, and sent to participants for validation. Reflexive thematic content analysis was undertaken, data was imported to Microsoft Excel, initial codes were generated, and themes and sub-themes were derived from the codes. The Standards for Reporting Qualitative Studies Checklist ensured study rigor.

Results: Twenty students from three Irish universities participated (mean age 23.8 years). The four key themes identified were (i) Migraine Characteristics, (ii) Migraine Self-Management, (iii) Migraine Clinical Management, and (iii) Migraine Impacts. Migraine was described as not just a headache but a debilitating sensory experience. A notable high level of self-management satisfaction indicated hopeful coping strategies. However, many participants said medications were ineffective and had side effects, and clinical management could be improved. Additionally, there was a marked academic and social impact of migraine, psychological issues abounded, and several participants worried about finances.

Conclusions: Migraine is impactful in a cohort of students attending Irish third-level institutions, with students carrying a wide range of debilitating migraine burdens. Students demonstrate an attitude of resilience and determination despite these challenges. Migraine awareness and education campaigns on university campuses are warranted.

II-A.12

PROPRIOCEPTION : POSTURAL ANALYSIS, A NEW NEUROPHYSIOLOGICAL APPROACH

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Background and aims: To perform posturographic measurements with eyes open or closed using floor coverings with différent textures surfaces to study postural control in patients with multiple sclerosis , Parkinson'desease, peripheral neuropathie, Spondylarthropathy, Muscular Dystrophies.

Methods: Différent textured contingent to study of the influence of plantar cutaneous mechanosensory

Eyes closed versus eyes open to study the influence of visualisation input and the mobilisation of proprioceptive ressources on postural control.

Combined approach to awereness of analysis and highlighting of discrete animalies

6 stabilometric recordings of 51,2s (Fusyo Medicapteur) Force Plateform) on differents surfaces (neutral, small pimples, large pimples)

Results: The study on healthy subjects shows that the addition of a smooth or textured floor covering can modifie balance with eyes open, in the closed -été condition, although moré disruptive to balance healthy subjects have better postural adaptation probably by mobilisons their proprioceptive ressources.

Study on Multiple Sclerosis sufferes shows that they have difficulty regaining stabillity with their eyes closed when they are on a textured surface with large pimples, challenging postural control and proprioceptive ressources.

Conclusions: Static posturographic mesearements with differents textured surfaces and visualisation conditions can be considered a sensitive tools for meseauring the dégrée of autonomy of patients and could therefore be used to assess proprioceptive reserve capacities in clinical practice.

II-A.14

MEMORY AND PAIN: LOWER MEMORY PERFORMANCE IS RELATED TO ENHANCED PAIN CONDITIONING IN MIGRAINE

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Background and aims: Chronic pain may stem from the persistence of pain memories reinforced by associative learning from an initial injury. Migraine is a chronic condition linked to altered pain sensitivity, and reorganization of

the brain networks critical for memory and learning. Patients often underperform memory tasks, but the relationship between memory functioning and changes in the conditioning of pain events is unclear. Our study aims to investigate the relationship between the functioning of memory and the conditioning of pain in migraine patients (MG) and healthy controls (HC).

Methods: Migraine patients (MG) and healthy volunteers (HC) attended two study visits, one with a physician to collect clinical characteristics, and in the second visit the participants underwent the Verbal Paired Associates (VPA) and an experimental-placebo-task (measuring expectations, conditioning strength (CondStren) and placebo response).

Results: Twenty-six MG and 18 HC female participants were recruited. The Evocation VPA-II was significantly higher for controls (U=75.50; p=0.033). A larger CondStren (U=147.00; p=0.038) was found for MG, which negatively correlated with VPA Total (rs=-0.533; p=0.019)), learning progression (rs=-0.458; p=0.048), and recall in delayed condition (rs=-0.506; p=0.027). Conversely in the HC, a positive correlation was found between learning progression and CondStren (rs=0.540; p=0.046).

Conclusions: Results suggest a stronger conditioning in the MG group, which was also associated with lowered memory performance. The opposite direction of these associations was found in HC. While the development of memory deficits in MG is under debate, our study suggests that memory problems can be related to a greater susceptibility to learning associations with pain events.

II-A.16

HUMAN ASSUMED CENTRAL SENSITIZATION IN INTERICTAL MIGRAINE: A SYSTEMATIC REVIEW AND META-ANALYSIS

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Background and aims: Sings of human assumed central sensitization (HACS) including enhanced pain sensitivity and impaired pain processing can be established using static and dynamic quantitative sensory testing (QST). QST findings suggest HACS occurs in ictal migraine patients. However, its presence interictally and its relationship with headache characteristics remain unclear. Therefore, this study assessed the presence of HACS in interictal episodic (EM) and chronic migraine (CM) patients.

Methods: A comprehensive search was conducted in September 2024 across three databases. Studies examining HACS using static or dynamic QST measures in adults with interictal migraine were included. Two independent, blinded researchers performed study selection, data extraction, risk of bias and quality of evidence assessment. Meta-analysis was performed in Review Manager.

Results: Seventy-one articles were included in the qualitative analysis and 38 in the meta-analysis. Results were clustered by headache frequency and QST type. Lower pain thresholds for mechanical and thermal stimuli were found in the (extra-)trigeminal, and pain-free areas of both EM and CM ($p \leq .01$). Additionally, EM showed a larger area under the curve for blink reflex R2 threshold compared to pain-free controls ($p < .001$). Differences between EM and CM were only observed for dynamic QST.

Conclusions: Enhanced local and widespread pain sensitivity reflects the presence of HACS in interictal EM and CM, suggesting a need for multimodal treatment focused on desensitizing the central nervous system. The evidenced is provided through various static and dynamic QST methods, with no single QST measure being superior. While different QST profiles may affect HACS development, headache frequency has a limited influence.

II-A.17

"I AM ACCUSTOMED TO SOMETHING IN MY BODY CAUSING PAIN" - A QUALITATIVE STUDY OF KNEE REPLACEMENT NON-IMPROVERS' STORIES OF PREVIOUS PAINFUL AND STRESSFUL EXPERIENCES

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Background and aims: Long lasting preoperative pain and poorer psychological status are predictors of persistent postsurgical pain (PPP) following total knee arthroplasty (TKA). We aimed to explore stories of previous painful or stressful experiences in life in a cohort of patients that reported no improvement in pain one year after TKA.

Methods: An explorative-descriptive qualitative design was employed. Data were collected using semi-structured interviews with 23 patients. Quantitative preoperative data included number of painful sites and chronic illnesses. Qualitative data were analyzed using qualitative content analysis.

Results: Six patients reported at least one chronic illness and 16 reported two or more painful sites before surgery. Two main themes were identified: 1) Painful years – the burden of living with long lasting pain and 2) The burden of living with psychological distress. The patients shared stories of years with painful conditions prior to surgery in addition to symptomatic knee joints. They emphasized life experiences that included loss of a close relation, long-lasting grief, and difficult family relations. Thus, their stories revealed experiences of psychological distress prior to surgery, unrelated to their painful knee.

Conclusions: This study provides insight into non-improving TKA patients as individuals. The double burden of preoperative pain and psychological distress left the patients struggling physically, socially, and psychologically, often for many years before surgery. These patients may benefit from stratified TKA education and prehabilitation and adapted perioperative pain management. Health personnel need to address the experience and perception of pain and psychological struggles preoperatively to identify possible vulnerability for PPP.

II-A.19

TREATMENT MODALITIES FOR PATIENTS WITH PERSISTENT SPINAL PAIN SYNDROME TYPE II: A NETWORK META-ANALYSIS

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Background and aims: To date, appropriate management of patients with post-surgical Persistent Spinal Pain Syndrome Type 2 (PSPS-T2) remains challenging. A broad range of therapeutic options has been proposed, whereby the need for scientific and robust evidence for each treatment modality is urgently pressing. Therefore, the aim of this systematic review and network meta-analysis (NMA) is to compare the different treatment modalities for patients with PSPS-T2 on pain intensity.

Methods: Databases consulted for this systematic review were PubMed, Web of Science, Scopus, and Embase. Risk of bias was assessed using the Cochrane RoB 2.0 tool. Randomised controlled trials of interventions for PSPS-T2 were included.

Results: Fifty studies were included in the systematic review and 14 in NMA. A high risk of bias was indicated for 64% of the included studies. Half of the studies investigated neuromodulation, 16 explored minimal invasive treatment options (predominantly epidural injections), 7 studies focussed on conservative treatments (physiotherapy/cognitive training and medication) and 2 on reoperation. Comparison of neuromodulation versus a combination of conservative and minimal invasive options resulted in an effect size of 0.45 (95% CI from 0.13 to 0.77), clearly favouring neuromodulation ($z=2.79, p=0.005$). Additionally, neuromodulation resulted in a standardised mean difference of 0.37 (95% CI from 0.19 to 0.55) compared to placebo/sham ($z=4.09, p<0.0001$). Neuromodulation has 97.3% estimated probability of producing the best pain relief, followed by conservative treatment options.

Conclusions: Neuromodulation, followed by conservative treatment options, seem to be the most effective treatment option to obtain pain relief in patients with PSPS-T2, based on NMA of interventions from available trials.

II-A.20

RISK FACTORS FOR THE DEVELOPMENT OF CHRONIC POSTOPERATIVE INGUINAL PAIN: A SYSTEMATIC REVIEW AND META- ANALYSIS PROTOCOL

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Background and aims: Inguinal hernia repair is one of the most common operations performed globally. Despite advancements in surgical technology and technique, chronic postoperative inguinal pain (CPIP) occurs in around 10-12% of patients after surgery, and as such represents one of the commonest long-term complications after surgery. CPIP is difficult to treat, but despite multiple studies investigating possible predictive factors no robust preventative strategies exist. The aim of this review is to identify and synthesise the current evidence for risk factors for CPIP development.

Methods: Three electronic databases (Embase, PubMed, and Scopus) will be searched for relevant literature. Generally, the following search terms will be used: inguinal hernia, groin hernia, chronic pain, postoperative pain, CPIP, chronic postsurgical inguinal pain, risk factors, and risk assessment. Studies will be restricted to between 2014-2024 to gather the most recent results. Titles and abstracts will be screened for eligibility. For relevant articles, full texts will then be screened. This will be completed by two independent reviewers, and in the case of disagreement, a third author will be consulted. The full review protocol has been submitted to the Open Science Framework for registration.

Results: A narrative synthesis and Bayesian multivariate meta-analysis will be employed to summarise findings. The review is in process, and the results will be presented at the congress, along with discussion of their clinical implications.

Conclusions: CPIP is an important and common surgical complication. This review aims to identify and appraise all potential predictive factors.

II-A.21

PREOPERATIVE SUSCEPTIBILITY TO DEVELOPING SECONDARY HYPERALGESIA IS ASSOCIATED WITH POST-THORACOTOMY PAIN AT TWO MONTHS

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Background and aims: Persistent pain is frequent after thoracotomy. Identifying the subset of patients at risk for persistent post-thoracotomy pain preoperatively is clinically important, as they could benefit from targeted prevention measures. In this prospective cohort study, we investigated if the preoperatively assessment of individual susceptibility to developing experimentally induced secondary hyperalgesia predicts post-thoracotomy pain at two months.

Methods: Patients scheduled to undergo a posterolateral thoracotomy were recruited before surgery and followed prospectively for two months. Of the forty-one patients that were recruited only twenty could be included. The day before surgery, we experimentally induced secondary hyperalgesia at one of the two forearms and measured the change of perception to mechanical pinprick stimuli and the spread of hyperalgesia. On postoperative day 4, day 15 and at the 2-month follow-up, patients were asked about their pain intensity at rest and during coughing, and the area of secondary hyperalgesia around the scar as well as the change in perception to mechanical pinprick stimuli was measured.

Results: Forty percent reported pain at the two-month follow-up. All of them reported cough-evoked pain and ten percent also reported pain at rest. A binary logistic regression model with both the magnitude and extent of

experimentally induced secondary hyperalgesia was statistically significant (Chi2=12.439, P=.002, McFadden R2 = .462) and showed excellent discriminative power (AUC=.938) for the presence or absence of cough-evoked pain at two-month follow-up.

Conclusions: Our findings indicate that the individual susceptibility to developing experimentally induced secondary hyperalgesia preoperatively may identify patients who are potentially vulnerable to develop persistent post-thoracotomy pain.

II-A.22

CHRONIC PAIN AND POSTSURGICAL CARE AFTER TOTAL KNEE ARTHROPLASTY: A QUALITATIVE STUDY EXPLORING THE EXPERIENCES OF PEOPLE WITH CHRONIC PAIN

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Background and aims: Approximately 15-20% of people who undergo total knee arthroplasty (TKA) will experience chronic pain after surgery. No clinical guidelines or evidence-based care pathways for managing chronic pain after TKA exist. Consequently, patients with chronic pain after TKA have reported feeling abandoned by the healthcare system. Our aim is to explore postsurgical care after TKA as experienced by people with chronic pain to inform the development of a care pathway.

Methods: Within an experiential qualitative study design, we conducted individual semi-structured interviews with 9 people experiencing chronic pain after primary TKA in Denmark. The people had experienced chronic pain for an average of 7 years (SD 3.3). We used a memorization exercise during the interviews to help participants recall and describe their experiences. We transcribed the audio recordings and made a preliminary analysis using thematic analysis.

Results: Three provisional themes from our preliminary analysis: 1) Coping with chronic pain after TKA (acceptance, seeking solutions, facing diagnostic uncertainty); 2) Feeling seen and heard (communication challenges, trust in healthcare providers, avoiding seeking help); 3) Ongoing support (desire for scheduled check-ups and monitoring, support for self-management).

Conclusions: The preliminary findings from the thematic analysis highlights the multifaceted experiences of individuals living with chronic pain after TKA and the need for comprehensive and continuous support from healthcare providers.

II-A.24

ACTIVATED SERUM PREVENTS LONG-LASTING PAIN IN A NOVEL MOUSE MODEL OF CHRONIC POST-SURGICAL PAIN

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Background and aims: Chronic post-surgical pain (CPSP) is one of the most frequent complications of surgery. Over-the-counter analgesics like non-steroidal anti-inflammatory drugs as well as corticosteroids such as dexamethasone are widely used following surgery. However, recent findings suggest that inhibiting the inflammatory response in acute pain states increases the odds of developing chronic pain. We hypothesized that activated serum (AS), which effectively treats chronic pain disorders, would also be effective in chronic postoperative settings by restoring adaptive immune states.

Methods: Following postoperative paw incision model, mice received 0.5 mg/kg/day of dexamethasone (or vehicle) subcutaneously for six consecutive days. To prepare AS, 50 mL of whole blood was taken from each human subject using a special syringe (Orthogen, Dusseldorf, Germany) and incubated for 7 hours at 37 °C, Serum was then collected. On days 2 and 4 post-surgery, mice were treated with AS or control serum were. Tactile allodynia was measured using Von-Frey filaments and 50% paw withdrawal threshold was then calculated using the up-and-down method of Dixon.

Results: Dexamethasone produced robust inhibition of allodynia on day six after incision paw surgery. However, dexamethasone substantially delayed recovery to the baseline such that the duration of the overall pain episode

was significantly prolonged after steroid treatment, lasting 100 days instead of 20 days in saline-treated mice. Treatment with activated serum prevented this dexamethasone-induced long-lasting pain.

Conclusions: Our results indicate that dexamethasone treatment results in long-lasting hyperalgesia in a commonly used mouse model of post-operative pain. AS injections prevent long-lasting pain in this dexamethasone-induced chronic post-surgical model.

II-A.28

MAXIMAL INSPIRATORY PRESSURE AND EXERCISE-INDUCED INSPIRATORY MUSCLE FATIGUE IN CHRONIC NONSPECIFIC LOW BACK PAIN

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Background and aims: To compare maximal inspiratory pressure (MIP) and exercise-induced inspiratory muscle fatigue (IMF) between persons with chronic nonspecific low back pain (CNSLBP) and healthy controls (HC).

Methods: MIP was measured pre and 0, 15 and 30 minutes post a maximal cardiopulmonary exercise test (CPET) in 25 persons with CNSLBP and 15 HC. Absolute MIP values were converted to predicted MIP (MIP_{pred}) values using age-, sex-, and BMI-specific reference equations. Inspiratory muscle weakness was defined as a MIP_{pred} below 80% and IMF as a ≥10% reduction in MIP_{pred} post- compared to pre-CPET. Correlations between MIP_{pred} and IMF with disability, pain intensity, exercise capacity, anxiety, and depression were calculated.

Results: There was no difference in age, gender, and BMI between both groups ($p>0.05$). Pre-CPET MIP_{pred} values were similar between persons with CNSLBP (87±22%) and HC (94±21%) ($p=0.362$), and revealed inspiratory muscle weakness in 36% of CNSLBP and 20% of HC participants ($p=0.777$). No exercise-induced IMF was observed 0 minutes (CNSLBP: -2%, HC: -4%), 15 minutes (CNSLBP: -5%, HC: -5%), or 30 minutes (CNSLBP: -5%, HC: -7%) post-CPET ($p>0.05$). Higher MIP_{pred} values correlated with better exercise capacity in both groups (CNSLBP: $r=0.54$, HC: $r=0.55$, $p<0.05$). In the CNSLBP group, lower MIP_{pred} correlated with higher anxiety ($r=-0.49$, $p=0.012$), and higher IMF correlated with better exercise capacity ($r=0.56$, $p<0.05$).

Conclusions: No significant differences in MIP_{pred} and inspiratory muscle weakness were found between persons with CNSBLP and HC. Additionally, no exercise-induced IMF was observed in either group, indicating similar inspiratory muscle fatiguability regardless of CNSLBP status.

II-A.29

DISCUSSING SEXUAL HEALTH WITH PATIENTS ELIGIBLE FOR SPINE SURGERY: AN ONLINE SURVEY IN SPINE SURGEON AND PAIN PHYSICIANS

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Background and aims: Spinal pain syndromes have a severe impact on the patient‘s sex life, contributing to a decrease in sexual function and sexual satisfaction. Despite the importance of sexual health on mental and physical wellbeing, sexual health is rarely discussed during consultations. The aim of this study is to explore to what extent influencing factors can alter the discussion about sexual health during consultations. More specifically, we will evaluate the influence of healthcare profession, sex of the patient and the surgical approach that is proposed.

Methods: An online survey was sent to neurosurgeons, pain physicians and orthopedists in Belgium and The Netherlands in April 2019. Participants were asked about; counseling routine, knowledge, and opinion on sexual health. Answers were scored on a 5-point Likert scale. Independence between the response levels and type of surgery as well as profession were tested.

Results: In total, 350 respondents were approached of whom 57 completed the survey. The majority of respondents (61.4%) indicated that they rarely or never discussed sexual disturbances. Profession and type of surgery had an

influence on discussing erectile dysfunction, retrograde ejaculation, and alterations in orgasms. Thirty-five percent of healthcare providers considered it the patient's responsibility to bring up the subject of sexual health.

Conclusions: Sexual health is rarely addressed by healthcare providers during spinal care. Profession as well as type of surgery seems to play a role on whether sexual health is discussed during consultations.

II-A.30

MULTIFIDUS FAT INFILTRATION IN PATIENTS WITH PERSISTENT SPINAL PAIN SYNDROME TYPE II WHO ARE TREATED WITH SPINAL CORD STIMULATION: A PILOT STUDY

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Background and aims: Functional spinal instability, resulting from multifidus muscle dysfunction, is often proposed as underlying mechanism for developing chronic postsurgical pain. In patients suffering from chronic low back pain, structural impairments of the lumbar multifidus muscles, reduced thickness and increased fat infiltrations have already been documented. This study evaluated the prevalence of multifidus atrophy after Spinal Cord Stimulation (SCS), a well-known efficient pain management technique.

Methods: Data of 4 patients was used, all suffering from Persistent Spinal Pain Syndrome Type II and treated with SCS. Manual segmentation of axial lumbar spine MRI images was conducted by 2 operators. Fat-to-muscle ratio was quantified and transformed into a classification system for multifidus fat infiltration with four categories: normal, mild, moderate, and severe fat infiltration. To assess the reliability of the manual segmentations, inter-rater reliability was determined.

Results: The median fat-to-muscle ratio at level L2-L3 was 46.12 (Q1-Q3: 44.88-47.35). At levels L3-L4, L4-L5 and L5-S1, median values of 50.45 (Q1-Q3: 45.57 – 52.98), 52.11 (Q1-Q3: 48.81 – 52.80) and 52.84 (Q1-Q3: 49.09 – 56.39) were found, respectively. An ICC value of 1 (95% CI from 0.999 to 1, $p<0.001$) was found for inter-rater agreement on muscle volume of the multifidus muscles.

Conclusions: This pilot study pointed towards moderate to severe fat infiltration of the multifidus muscles in all patients at each lumbar spinal level. Manual segmentation of axial MRI images from patients who are treated with SCS is a feasible technique with excellent inter-rater reliability to determine multifidus muscle volume, nowadays possible due to MRI compatibility of medical devices.

II-A.31

NEUROPATHIC PAIN AND FRAGILITY OSTEOPOROTIC FRACTURES

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Background and aims: One in two postmenopausal women will have osteoporosis, and most will suffer a fracture during their lifetime. Chronic and low back pain are often a consequence but the presence of neuropathic pain is still underestimated. The aim of this study is to identify in patients suffering from pain localized on the site of a previous osteoporotic fracture, the presence of neuropathic characteristics and its clinical management.

Methods: This is a pilot cross-sectional study, approved by the Ethics Committee (IRB number 2023-CF34). Pain was evaluated in consecutive post-menopausal women with a numerical pain rating scale (NRS); neuropathic pain (NP) screened with the DN4 questionnaire, sleep assessed with the Pittsburg questionnaire. Results were expressed using effect-sizes and 95% confidence intervals.

Results: Fifty new patients with at most a 2 year-history of one or more fully documented fragility vertebral (VF) or non-vertebral fracture (NVF) due to osteoporosis were included. Findings show that 21% patients with VF and 28% patients with NVF reported NP (DN≥4). NP patients had more intense pain (NRS 5.1 ± 2.9 vs 2.9 ± 2.7, ES = 0.82 [0.18; 1.44], p=0.019) and impaired sleep compared to patients without NP component (effect size 0.71 [0.08; 1.33], p=0.043). Patients had been prescribed no NP specific oral or topical treatment.

Conclusions: There are gaps in managing neuropathic characteristics of chronic and back pain after a fragility fracture in postmenopausal women. Our future research will include a larger osteoporotic population, in order to identify how to better detect and manage neuropathic pain, an underestimated comorbidity of osteoporotic fractures.

II-A.32

CENTRAL SENSITIZATION IN PATIENTS WITH CHRONIC LOW BACK PAIN

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Background and aims: Central sensitization represents an important factor in the development and maintenance of chronic low back pain (CLBP). The aim of this study is to evaluate the association between pain intensity, functional status in CLBP and central sensitization (CS).

Methods: The research included 70 subjects with CLBP. This study was conducted at the Clinical Center of Vojvodina. Patients with CLBP were divided using their CS inventory (CSI) scores into low-CSI (CSI < 40) and high-CSI (CSI ≥ 40) subgroups. The Functional status of subjects was determined using the six-minute walk test (SixMWT), which was conducted in a 30m long hallway, while pain perception was determined using the visual analogue scale (VAS).

Results: The high-CSI groups had 40 patients (19 men, 21 women). The low-CSI had 30 patients (13 men and 17 women), respectively. The high-CSI group had a significantly higher mean VAS score ($p < 0.01$), and lower mean values of the SixMWT, than the low-CSI group.

Conclusions: The degree of expression of central sensitization symptoms is associated with a pain of higher intensity and lower functional capacity, which is important when planning the multimodal treatment of patients.

II-A.33

WHAT DO THEY SAY ABOUT MY PAIN? PERCEPTION OF PATIENTS WITH CHRONIC LOW BACK PAIN REGARDING INFORMATION AND ADVICE PROVIDED BY HEALTH PROFESSIONALS

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Background and aims: The guidelines for the management of Chronic Low Back Bain (CLBP) emphasize the importance of patient education. However, few studies have investigated patient perceptions regarding the information they receive from health professionals. Aims: to investigate how individuals with CLBP perceive the information received about their condition and advice for dealing with pain.

Methods: This qualitative study utilized an interpretative description methodology based on semi-structured interviews. Patients with CLBP (> 3 months), from Physiotherapy Outpatient Clinic of the State University of Santa Catarina, Brazil, were invited. Fifteen patients (4 male, 11 female) between 33 and 70 years of age participated in face-to-face interviews. The interview transcripts were subjected to an inductive thematic analysis.

Results: Two central themes emerged. First, information regarding the health condition. Patients usually received information about diagnosis focusing on structural changes, but considered the explanations superficial and insufficient. Prognosis was insufficiently discussed and the reports were controversial (while some professionals reassure patients, others emphasized that it will not improve and suggested the possibility of permanent disability). Second, advice to managing pain. The advice given was conflicting because, although patients were encouragement to engage in physical activity and exercise, they were also advised to take postural care and avoid specific movements, reinforcing the risk for worsening symptoms.

Conclusions: Information received was insufficient and still based on a biomedical model, disregarding the multi-dimensional nature of chronic pain. Advice was conflicting, given that patients received recommendations for physical activity and, at the same time, guidance to avoid movement(s).

II-A.34

IS POSTURE RELATED TO PAIN? QUALITATIVE STUDY ON BELIEFS AND ATTITUDES OF PATIENTS WITH CHRONIC LOW BACK PAIN

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Background and aims: Posture is often related to pain by patients, professionals and in health information channels. However, we know a little about how patients understand the relationship between posture and chronic pain. This study aimed to investigate and understand the implications related to the posture of patients with chronic low back pain.

Methods: This is a qualitative descriptive study that investigated people with chronic low back pain who were on the waiting list for physiotherapeutic care. Data were found through individual and semi-structured interviews. Thematic content analysis was used to analyze the data.

Results: Fifteen adults (11 women and 4 men) were interviewed. Three themes were identified and mapped within the dimensions proposed by the Common Sense Model: (1) Identity, (2) Cause and (3) Control. Statements about posture mostly follow the biomedical model, with the mental representation of a correct posture to maintain a healthy spine and associate changes and positions perceived as incorrect as the cause or worsening of pain. To control symptoms, participants believe that care and constant monitoring of posture in different situations is necessary.

Conclusions: Misconceptions about ideal posture and the relationship between posture and chronic pain lead people with low back pain to constantly monitor and avoid movements and positions in daily activities. These opinions can interfere with the prognosis, maintenance of symptoms and adherence to treatments.

II-A.36

REASSESSING THE ROLE OF ROUTINE RADIOGRAPHS AFTER SPINAL FUSION SURGERY

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Background and aims: Routine radiographs are frequently obtained following spinal fusion surgery to monitor potential postoperative structural complications. However, their impact on clinical decision making in patients with an uncomplicated postoperative course remains unclear. This study aimed to assess the utility of routine radiographs during the first postoperative year and their influence on subsequent actions.

Methods: A retrospective study was conducted of 433 patient visits from 157 patients who underwent spinal fusion surgery for degenerative conditions in the orthopaedic department of an academic hospital between 2017 and 2021. Patient and surgical characteristics, postoperative clinical course, radiographic findings, and therapeutic implications were reviewed during the first year after surgery.

Results: Among patient visits with an uncomplicated postoperative course (n= 335), only 0.03% (n= 10) of radiographs revealed abnormalities. In four of these cases, additional computed tomography imaging was performed. None of them required revision surgery. In cases with an abnormal clinical course (new or persistent radicular pain (n= 42), new or increasing back pain (n= 17), sacroiliac joint pain (n= 3), groin pain (n= 1), or wound complications (n= 1)), 88% (n= 56) of radiographs were normal. An abnormal postoperative course lead to further actions 91% (n= 58) of the time, even with normal radiographs.

Table 1. Patient visits with routine radiographs (n= 399) with or without a normal clinical course and therapeutic implications

Clinical course	X-Ray result	Therapeutic implications	No therapeutic implications
Normal	Normal X-Ray	0	325
	Abnormal X-Ray	4	6
Abnormal	Normal X-Ray	50	6
	Abnormal X-Ray	8	0

Conclusions: Routine postoperative radiographs following spinal fusion surgery appear to have limited added value in patients with a normal clinical course. Subsequent actions are performed in the majority of patients with an abnormal postoperative course, regardless of radiographic findings, suggesting that decision making is primarily driven by symptomatology rather than imaging results.

II-A.37

WHO PARTICIPATES IN RANDOMISED CONTROLLED TRIALS EVALUATING PHYSIOTHERAPY INTERVENTIONS FOR PERSISTENT LOW BACK PAIN? A SCOPING REVIEW

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Background and aims: Low back pain (LBP) disproportionately affects socioeconomically disadvantaged individuals, ethnic communities, and those with multiple long-term health conditions. These groups are often underrepresented in research studies; however, it is unclear if this applies to LBP physiotherapy randomised controlled trials (RCTs).

This scoping review aims to establish who participates in RCTs evaluating physiotherapy interventions for persistent LBP.

Methods: Six electronic databases (CINAHL Ultimate, MEDLINE, ProQuest, Pedro, PubMed and Trip) were searched for RCTs published between January 2020 and June 2024.

Results: 108 RCTs were included in this review. Participants mean age was 42.3 years (±9.6) with 50.8% (±23.9%) being female and 72.4% (±8.5) from white ethnic backgrounds. Average pain intensity was 5.5 (±1.1) and duration was 49.5 months (±43.9). Age was the most common inclusion criteria (n=102, 94%) followed by duration of LBP (n=99, 92%). The need to understand the native language of the study's country of origin was the most reported participant characteristic (n=24, 22%). Previous spinal surgery was the single most reported reason for exclusion (n=74, 69%), followed by pregnancy (n=54, 50%) and a history of spinal trauma or fracture (n=54, 50%). People with mental health conditions were excluded in 30% (n=32) of RCTs.

Conclusions: People at higher risk of persistent and disabling LBP, including those with mental health conditions and from ethnic minority groups, either do not participate in or are excluded from RCTs evaluating physiotherapy interventions for LBP. Future RCTs should adopt strategies to ensure these under-served populations are represented.

II-A.38

VIRTUALLY PAINLESS: CODESIGNING A VIRTUAL REALITY NATURE-BASED INTERVENTION FOR CHRONIC LOW BACK PAIN

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Background and aims: Chronic low back pain (cLBP) is debilitating and pervasive, but many therapeutic outcomes are poor. There has been growing interest in the application of novel nature-based therapies for chronic pain, which

have previously been shown to provide multifaceted psychophysiological benefits, including analgesia. However, previous research has shown that real-world nature may be limited in its accessibility for a mobility-impaired population. The current research therefore aims to codesign a safe and accessible nature-based virtual reality intervention to aid the self-management of chronic low back pain.

Methods: To understand what is necessary for a chronic pain intervention, codesign workshops were conducted with individuals with cLBP (n = 7). Participants explored aspects of how they felt about nature; generated collages of their ideal nature space for pain; and experienced virtual reality (VR) instances of nature in a 'think-aloud' paradigm. Qualitative data in the form of audio recordings and visual collage images were then analysed via Thematic Analysis.

Results: Four themes were derived from Thematic Analysis; (1) *How does my pain impact me being in nature?*; (2) *What does nature do for me?*; (3) *What should nature look like?*; (4) *What should nature feel like?*

Conclusions: The results, specifically themes (3) and (4), informed the development of two 360-degree filmed scenes; one situated at a beach, the other in a town. The features highlighted in the codesign sessions were necessary for the sample to feel relaxed, safe, engaged, and absorbed. The VR footage will be further appraised for its effects on pain in a subsequent feasibility study.

II-A.39

ANXIETY, DEPRESSION AND PAIN SELF-EFFICACY IN INDIVIDUALS WITH CHRONIC LOW BACK PAIN AND SYMPTOMS OF CENTRAL SENSITIZATION: A COMPARATIVE CROSS-SECTIONAL STUDY

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Background and aims: This study aimed to investigate anxiety, depression and self-efficacy in chronic low back pain patients with central sensitization and to compare the findings in chronic low back pain patients without central sensitization and asymptomatic controls.

Methods: The study included 15 low back pain patients with central sensitization [age: 45 (37/54) years, Body Mass Index (BMI): 28.56±5.21 kg/m2], 15 patients without central sensitization [age: 50 (39/59) years, BMI: 26.97±4.63 kg/m2], and 15 asymptomatic controls [age: 44 (28/52) years, BMI: 27.35±4.01 kg/m2]. The Central Sensitization Inventory, Visual Analog Scale, digital algometry, Oswestry Disability Index, Hospital Anxiety and Depression Scale, and Pain Self-Efficacy Questionnaire were used. Statistical analyses were performed with independent samples T-test, Mann Whitney U test, One-Way ANOVA, and Kruskal Wallis.

Results: The group with central sensitization had higher resting, activity, and night pain intensity (p=0.025; p=0.004; p=0.012, respectively), pressure pain thresholds (p=0.047; p= 0.017), and conditioned pain modulation scores were lower (p=0.035), physical disability was higher (p=0.032) when compared to the group without central sensitization. There was a difference in depression among the three groups (p=0.047). There were no differences in anxiety and pain self-efficacy among the three groups (p= 0.112, p=0.252).

Conclusions: Patients with central sensitization in chronic low back pain had worse pain and physical functioning, whereas there was no difference in anxiety and pain self-efficacy. This may affect individuals with central sensitization independently of psychosocial factors and may be a further question for the future studies.

II-A.40

A SURVEY ON SCREENING FOR DEPRESSION IN LOW BACK PAIN BY IRISH CLINICAL SPECIALIST PHYSIOTHERAPISTS WORKING IN MUSCULOSKELETAL TRIAGE

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Background and aims: Low back pain (LBP) is associated with worse prognosis when there is concordant depression. Musculoskeletal (MSK) triage physiotherapists review much of the LBP referrals to public hospital outpatient waiting lists in Ireland. Their screening and onward referrals practices are unknown.

Methods: Using a descriptive cross-sectional design, a bespoke anonymous e-survey was generated, piloted, and emailed to MSK triage physiotherapists in Ireland after ethical approval was granted.

Results: Thirty-six surveys were submitted (55% response rate). All MSK triage physiotherapists encounter patients with LBP and depression, with most (83%) having encountered suicidal thoughts, plans, or attempts. More than one third (36%) do not ever screen for depression, and of those who didn't screen, 62% reported the reasons included not being trained, not feeling skilled, or not knowing what to do with the disclosure. Almost all (86%) MSK triage physiotherapists signpost people with depression back to their GP, with 53% of these reporting that this was partly due to not feeling confident about where else to refer patients. Confidence in screening for depression was low in comparison to screening for red flags (e.g. cauda equina syndrome) or yellow flags (e.g. fear avoidance beliefs). There was some indication that a day or more of training was helpful to screening practices for depression.

Conclusions: Patients with LBP are not being consistently screened for associated depression by MSK triage physiotherapists. The variations in screening practices noted may in part be due to a lack of standardised training and a lack of onward referral pathways.

II-A.41

CHALLENGES AND POTENTIAL SOLUTIONS TO SCREENING FOR DEPRESSION IN A LOW BACK PAIN POPULATION. A QUALITATIVE EXPLORATION OF IRISH MUSCULOSKELETAL TRIAGE PHYSIOTHERAPISTS

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Background and aims: Previous research has identified low rates of direct screening for depression amongst musculoskeletal (MSK) clinicians. The aim of this study is to explore challenges and potential solutions to screening for depression associated with LBP by MSK triage physiotherapists in the Republic of Ireland. The objective is to offer contextual insights that lay the groundwork for actionable improvements.

Methods: Recruitment was purposive. Semi-structured interviews were conducted via Microsoft Teams. The methodological framework of Braun and Clarke's Reflexive Thematical Analysis was used to organise data analysis.

Results: Fourteen participants (64% female, mean age 42) took part.

Three themes were generated on solutions; "quick, easy, and sensitive" relating to standardised screening tools, "mental health first aid" pertaining to standardised training, and "in case of emergency break glass" encompassing the need for standardised pathways.

Two themes were generated on challenges; capacity and culture. "Capacity" was organised into four subthemes: "where does the difficulty lie" incorporating personal capacity barriers, "underequipped " which unified professional capacity barriers, and "under resourced" which amalgamated system capacity barriers. The fourth subtheme of "beating around the bush" intersected other capacity subthemes. "Culture" was organised into two subthemes: clinic culture "time pressured", and societal/stigma „is the patient comfortable?"

Conclusions: Personal, professional, and system capacity issues impact the avoidance of direct screening for depression. Embedded triage clinic culture and societal stigma impact capacity issues. MSK physiotherapists have a need for standardised screening tools, training, and onward referral pathways to assist them to be able to efficiently and effectively screen people with LBP for depression.

II-A.43

TOPICAL AMITRIPTYLINE IN BURNING MOUTH SYNDROME: A RETROSPECTIVE REAL-WORLD EVIDENCE STUDY

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Background and aims: Burning mouth syndrome (BMS) is a complex, idiopathic, and debilitating orofacial pain disorder, impairing quality of life, with a prevalence of up to 18% in menopausal women. Available drugs to alleviate its burning sensation have inconsistent and limited efficacy. Given its physicochemical properties, excellent tolerability, and ability to target peripheral pathways, topical amitriptyline seems a promising mechanistically specific analgesic drug for BMS. Main objectives were to evaluate the effectiveness, tolerability, and safety of topical amitriptyline as a potential new treatment for BMS.

Methods: In this retrospective cross-sectional real-world evidence study, BMS patients who were prescribed topical amitriptyline for eight weeks were identified. Eligibility criteria stemmed from ICHD-3, ICOP, and consensus definitions. The primary outcome measure was mean daily pain intensity (on a 0-10 scale); secondary outcomes included adverse events and patient global impression of improvement. Data are mean±SD.

Results: A total of 15 patients fulfilling the eligibility criteria were included and analyzed. Mean daily pain was 6.67±2.16 at baseline and 3.67±2.29 after treatment, with a mean reduction of 3.00±2.83 (*P*=0.002). Half of the patients experienced a decrease in pain by at least 50% (P=0.008). Several mild adverse events were reported, such as somnolence or dry mouth.

Conclusions: Topical amitriptyline may be a safe and potent candidate in the treatment of BMS. Given the potential benefits (e.g., improved efficacy, fewer adverse events, long-lasting post-therapeutic effect) and challenges (e.g., drug delivery) of topical treatment in neuropathic/nociplastic pain, further controlled trials are needed to compare the efficacy of single and combined agents.

II-A.44

NEUROPATHIC FACIAL PAIN: TRIGEMINAL NEUROPATHY (TNO) OR TRIGEMINAL NEURALGIA (TN)? FIRST DIAGNOSTIC STEPS BY VPT (VERY POINT TECHNIQUE) DERIVED FROM ACUPUNCTURE

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Background and aims: Trigeminal Neuropathy (TNO) and Trigeminal Neuralgia (TN) are different entities (ICHD), sometimes difficult to differentiate Defining areas of allodynia and borders of affected facial areas are important criteria. The Very-Point-Technique (VPT) ist a cheap, easy to learn “on-site“-technique giving these important informations already very early in the diagnostic process.

Methods: The well established “Very Point Technique“ (VPT), developed by Gleditsch for localizing acupuncture points in ear acupuncture, was used as an investigative tool in patients with neuropathic facial pain: Skin areas are investigated by applying quick and gentle uniform strikes, perpendicularly to structures of interest, using an acupuncture needle (for small areas) or cotton swabs (larger sites); indicators are changing sensation (reported by the patient), and/or triggering a blink reflex.

Results: Without allodynia, the outline of the facial area affected by TN could clearly show the involved trigeminal branches, whereas the presence and the patchy shape of allodynic areas gave a broad hint towards a focal origin oft the TNO, and also towards the area to be treated by local capsaicin application to desensitize these areas (by acting on TRPV1 vanilloid receptors) resulting in improved success of pharmacologic treatment and other procedures.

Conclusions: The VPT, derived from ear acupuncture, is an established, simple, inexpensive, and easy to learn neurophysiological test (NOT triggering pain attacks) for everyday pain clinic practise, when caring for patients with neuropathic facial pain, before proceeding to more complex procedures.

II-A.45

TRIGEMINAL NEURALGIA WITH AUTONOMIC SYMPTOMS

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Background and aims: Trigeminal neuralgia (TN), primarily affecting the maxillary (V2) and mandibular (V3) nerves, presents as sudden, severe facial pain usually without autonomic symptoms. However, rare cases may exhibit autonomic features, necessitating differentiation from conditions like short-lasting unilateral neuralgiform headache

attacks with conjunctival injection and tearing (SUNCT) and short-lasting unilateral neuralgiform headache attacks with cranial autonomic symptoms (SUNA). This study aims to clarify distinguishing features to ensure accurate diagnosis between SUNCT/SUNA and TN.

Methods: We report a 63-year-old woman with shooting pain in the left upper premolar area upon contact with the infraorbital, zygoma, and upper lip regions after dental treatment. The tentative diagnosis of TN was made due to a lack of response to occlusal adjustment and dexibuprofen, along with a trigger zone, refractory period, and typical pain pattern, while ruling out odontogenic causes. Autonomic symptoms appeared during severe exacerbations, necessitating careful differentiation between SUNCT/SUNA and TN.

Results: SUNCT/SUNA typically involve the ophthalmic nerve (V1), have longer pain episodes without a refractory period, and show intense early autonomic symptoms, responding to lamotrigine, gabapentin, and topiramate. TN commonly affects V2/V3 with shorter pain episodes, a refractory period, milder late-onset autonomic symptoms, and responds to carbamazepine.

Table. Differential diagnosis of trigeminal neuralgia and SUNCT/SUNA

Pain location	V1 > V2> V3 Can occur outside the trigeminal sensory territory (back of the head)	V2 / V3 > V1 Exclusive to the trigeminal sensory territory
Pain duration	1-600 seconds(longer)	1-120 seconds
Frequency/day	1-600	Triggerable
Refractory period	Absent	Present
Autonomic symptoms	Intense Associated with relatively lower pain levels	Less intense Associated with increasingly severe pain
Associated neurologic deficits	Miosis and/or ptosis may occur ipsilateral to pain	No clinically evident neurological deficits
Response to treatment	More respond to lamotrigine, gabapentin, topiramate	More response to carbamazepine

Conclusions: This case, with pain localized to V2, brief episodes, and a refractory period, supports a diagnosis of TN, despite later-onset autonomic symptoms. A positive response to carbamazepine further differentiates it from SUNCT/SUNA. Proper differentiation is essential due to varying treatment responses.

II-A.46

INDIVIDUALS WITH TEMPOROMANDIBULAR DISORDERS AND NECK DISABILITY PRESENTED MORE SYMPTOMS RELATED TO CENTRAL SENSITIZATION

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Background and aims: Individuals with Temporomandibular Disorders (TMD) have reduced cervical extensor muscle resistance, global and upper cervical hypomobility, and worse self-reported neck disability compared to healthy individuals. Also, a negative correlation was found between neck disability and pressure pain threshold in facial and cervical muscles in these individuals. However, to our knowledge, the influence of neck disability on the presence of symptoms related to Central Sensitization (CS) in individuals with TMD has not been established. Therefore, this study aims to analyze the relationship between the presence of symptoms related to CS and neck disability.

Methods: Individuals diagnosed with painful and mixed TMD were assessed for the presence of CS symptoms using the Central Sensitization Inventory (CSI) and neck disability using the Neck Disability Index (NDI). The prevalence ratio of CS symptoms relative to the presence of neck disability was calculated. In addition, the correlation between the CSI and NDI scores was calculated using Spearman‘s correlation.

Results: Individuals with TMD and neck disability have 1.84 times more symptoms related to CS than individuals without neck disability. Also, a significant, positive, moderate correlation (rho=0.61; p<0,001) was found between the CSI and NDI scores.

Conclusions: Individuals with TMD and neck disability presented more symptoms related to CS. Furthermore, a significant, positive, moderate correlation exists between CSI and NDI scores. Therefore, patients with TMD associated with neck disability are likely to have more pronounced CS-related symptoms and should be evaluated for the presence of CS.

II-A.48

PATHOPHYSIOLOGY OF SUBACROMIAL PAIN SYNDROME: CONTRIBUTIONS OF JOINT STRUCTURAL CHANGES AND PAIN SENSITIZATION

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Background and aims: Subacromial pain syndrome (SAPS), formerly known as shoulder impingement syndrome, is a common shoulder disorder characterized by pain, weakness, and limited range of motion. This study aims to investigate the relationship between shoulder pain in patients with SAPS and the associated joint structural changes and pain sensitization.

Methods: This study recruited 60 patients diagnosed with SAPS. Data collection included demographics, radiographic and magnetic resonance imaging (MRI) assessments (acromiohumeral distance, types of rotator cuff tears, tendinosis), Shoulder Pain and Disability Index (SPADI), pressure pain threshold (PPT) at the shoulder, temporal summation of pain (TSP) at the shoulder, and conditioned pain modulation (CPM). Hierarchical linear regression was employed to analyze the associations of SPADI with radiographic/MRI findings and pain sensitization, adjusting for demographics.

Results: Hierarchical linear regression analysis highlighted a significant association between TSP at the shoulder and SPADI, suggesting a link between pain sensitization and shoulder pain symptoms in SAPS.

Conclusions: The findings indicate that the pathophysiology of SAPS is more strongly correlated with pain sensitization than with joint structural changes as detected by radiographic or MRI findings. These results emphasize the need for therapeutic strategies focusing on altered pain perception in the treatment for SAPS.

II-A.49

DIABLO MODELING FOR EFFICACY OF 3-WEEK NONSTEROIDAL ANTI-INFLAMMATORY DRUGS AND PARACETAMOL IN PATIENTS WITH PAINFUL KNEE OSTEOARTHRITIS

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Background and aims: Pain in osteoarthritis is complex and studies have shown that pain sensitization, epigenetic mechanisms, inflammatory markers, and psychological factors might be important when explaining clinical pain. Anti-inflammatory therapy is a recommended treatment for pain in osteoarthritis, though efficacy varies among patients. This study utilized a multifactorial machine learning algorithm to predict the analgesic responses of 3-weeks of NSAID therapy using pretreatment assessments of pain sensitivity, inflammation, microRNA, and psychological factors.

Methods: Patients (n=101) underwent a 3-week NSAID and paracetamol therapy. Assessments were collected before and after treatment and included the Knee Injury and Osteoarthritis Outcome Score, assessment of pain sensitivity using cuff algometry, the Hospital Anxiety and Depression Scale, Pain Catastrophizing Scale, and EQ-5D-3L scale. Inflammatory biomarkers were analyzed using Olink, and miRNA expression using Next-Generation-RNA-Sequencing. Data Integration Analysis for Biomarker discovery using Latent cOmponents (DIABLO), a supervised multivariate data analysis was utilized to integrate the pre-treatment data and explain the analgesic effect.

Results: The DIABLO model identified 30 significant variables, including 20 microRNAs, 5 inflammatory biomarkers, 3 PROMS, and 2 pain sensitivity assessments. The model performance showed an area under the curve (AUC) of 0.77, p-value of 0.003; sensitivity of 0.83; specificity of 0.87; and an accuracy of 84%.

Conclusions: This is the first study to utilize a machine learning algorithm, based on pain sensitization, epigenetic mechanisms, inflammatory response, and psychological factors, to predict the analgesic response of NSAIDs in patients with osteoarthritis. The study shows that an integration of data can identify patients who will benefit from therapy.

II-A.50

RELATIONSHIPS AMONG COGNITIVE, FUNCTIONAL, BEHAVIORAL, AND SENSORY FACTORS IN INDIVIDUALS WITH KNEE OSTEOARTHRITIS: A NETWORK APPROACH

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Background and aims: Knee osteoarthritis (KOA) is increasingly recognized as a complex interplay of cognitive, functional, behavioral, and sensory dimensions. This study aimed to conduct a network analysis on cross-sectional data to investigate the relationships among cognitive, functional, behavioral, and sensory factors in individuals with KOA.

Methods: A total of 240 individuals with KOA participated. Assessments included the Pain Self-Efficacy Questionnaire (PSEQ), Pain Catastrophizing Scale (PCS), Numeric Pain Rating Scale (NPRS) at rest and during movement, Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC), World Health Organization Disability Assessment Schedule 2.0 (WHODAS 2.0), Central Sensitization Inventory (CSI), and quadriceps strength assessment. A network analysis was conducted using the Extended Bayesian Information Criterion (EBIC) graphical technique combined with the graphical least absolute shrinkage and selection operator (Glasso) algorithm to identify clusters and connections between factors.

Results: The network revealed strong connections between the NPRS (at rest and during movement) and WOMAC (pain and functionality domains). The PSEQ exhibited the highest strength and betweenness centrality, highlighting its role in linking different factors. The WHODAS 2.0 showed the highest closeness centrality, suggesting its potential influence across the network.

Conclusions: This network analysis underscores the central role of cognitive (self-efficacy) and functional (WHODAS 2.0) factors in mediating behavioral and sensory dimensions in individuals.

II-A.52

PROBING THE TRANSCRIPTOMIC BASIS OF 17-HDHA MEDIATED ANALGESIA IN OSTEOARTHRITIS PAIN

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Background and aims: Osteoarthritis (OA) is often associated with chronic pain which hugely impacts upon daily life. The molecule 17-HDHA (a metabolite of DHA and a precursor to the D series resolvins) has a robust analgesic effects in animal models of pain, while healthy volunteers with lower levels of 17-HDHA are more sensitive to pain. People with OA who have lower levels of 17-HDHA experience significantly more pain. Currently, the mechanisms underpinning the analgesic effects of 17-HDHA are not fully understood.

Aim: To identify the cellular and molecular processes that lead to analgesia produced by the 17-HDHA.

Methods: Participants with osteoarthritis (average age of 62.3, 60% were female, n=30) were stratified by levels of 17-HDHA and self-reported pain scores. RNA from CD14++/CD16-/CD66b-/HLA-DR+ (classical) monocytes were sequenced and differentially expressed mRNAs were identified with DESeq2.

Results: QIAGEN Ingenuity Pathway Analysis identified the top ranked canonical biological pathway to be eukaryotic initiation factor 2 (EIF2) signalling (lower activation level in the Low 17-HDHA-High Pain group compared to the High 17-HDHA-Low Pain group (z score -3)), followed by EIF4 and P70S6K signalling pathways and mTOR signalling. Metacore analysis of these pathways identified candidate micoRNAs: miR-155-5p; miR-101-3p; miR-9-5p; miR-98-5p; miR-132; and miR-146a-5p.

Conclusions: Our approach provides insight into the biological pathways contributing to the association between 17-HDHA and chronic OA pain, identifying EIF2 signalling, with known roles in osteoclast differentiation, OA pathology and pain, as a potential downstream target. Current studies are building on this work to investigate how different populations of monocytes and miRNA signalling are influenced by 17-HDHA.

III-A.01

HOW DOES SUSTAINED OPIOID EXPOSURE WORSEN CHRONIC OSTEOARTHRITIS PAIN IN FEMALES? MECHANISTIC STUDIES IN A TRANSLATIONAL RODENT MODEL

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Background and aims: Exposure to opioids can intensify reactions to future painful injuries, but prescriptions for opioids in chronic pain conditions, such as osteoarthritis (OA), continue to be common. This especially affects females, who experience more chronic pain and receive more opioid prescriptions. To address this, we established a model of prolonged opioid exposure and chronic OA-like pain in female rats, and investigated the underlying mechanisms.

Methods: Adult female (6-8 weeks old) Sprague-Dawley rats received bidaily systemic dosing with morphine (3mg/kg, s.c.) or saline (1mL/kg) throughout the study. To model OA-like pain, a single unilateral intra-articular injection of sodium monoiodoacetate (2mg) or saline (50mL) was administered one week later. Pain behaviour (weightbearing asymmetry and paw withdrawal thresholds) was assessed for 3 further weeks. Tail vein blood was collected at baseline and 21 days after intra-articular injections. Spinal sensory network activity was then assessed via multi-electrode array (MEA) recordings under terminal anaesthesia, with fixed tissues collected for immunohistochemistry.

Results: Magnitude and duration of OA-like pain behaviour was greater in morphine-treated rats, despite similar joint pathology, suggesting a central mechanism. Elevated astrogliosis and markers of synaptic plasticity were detected 3 weeks after injury, suggesting priming of spinal sensory networks by opioid exposure. *In vivo* electrophysiological recordings reveal regional changes in spinal network responses, identifying a potential locus for sensory changes.

Conclusions: Understanding how prior opioid use primes sensory circuitry to subsequent injury may enable interventions to prevent or reduce the impact of chronic pain in females, with exciting potential to alleviate suffering.

III-A.03

PAIN AND EVERYDAY CHALLENGES OF HYPERMOBILITY IN PEOPLE WITH HYPERMOBILITY SPECTRUM DISORDER (HSD) OR HYPERMOBILITY EHLERS DANLOS SYNDROME (HEDS)

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Background and aims: This study describes aspects of pain and how pain affects everyday life in people with Hypermobility Spectrum Disorders (HSD) or Ehlers Danlos Syndrome (EDS).

Methods: This cross-sectional study uses data from 2016 to 2021 obtained from the Swedish Quality Registry for Pain Rehabilitation (SQRP). The HSD/EDS group has been contrasted with a mixed group of pain conditions the Reference group, containing other pain diagnoses such as fibromyalgia, myofascial pain syndrome, lumbago, and nociceptive, neuropathic, idiopathic, and unspecified chronic pain.

Results: Of the 43,801 people registered in the SQRP, 1,211 (2.8%) were diagnosed with HSD/EDS, the majority were women (88.9%). For the HSD/EDS group, the mean age was younger (36.3 ± 11.8) than the Reference group (45.7 ± 12.8), furthermore, the HSD/EDS group had a statistically significant ($p < 0.001$) earlier Onset of pain (calculated in year) in contrast to the Reference group. The HSD/EDS group reported more Pain Regions (20.0 ± 7.9) than the Reference group (14.8 ± 8.8). Persistent pain was also reported more in the HSD/EDS group, however Pain Intensity was statistically significantly lower ($p < 0.001$) in the HSD/EDS in contrast to the Reference group. The HSD/EDS group reported more problems performing leisure, social and household activities than the Reference Group.

The study is unpublished.

Conclusions: There were indications that pain affected daily activities for people with HSD/EDS. Pain Average in the last week and Number of Pain Regions could explain Interference in Daily Activities; however, onset of pain was not a predictor for Interference in Daily Activities in HSD/EDS group and Reference group.

III-A.04

MENTAL HEALTH AND INTERICTAL PAIN IN EPILEPSY PATIENTS

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Background and aims: Interictal pain in patients with epilepsy in relation to mental health is a new topic.

Methods: This is a prospective cross-sectional study in which n = 150 patients with focal and generalized epilepsy were included, with a predominance of women (56.7%), with an average age of M = 40.25, with an average number of seizures per month M = 1.27 ± 2.99, with duration of epilepsy M = 21.87 years. The intensity of interictal pain was measured by the visual analogue scale (VAS), anxiety by the GAD-7, depression by the BDI-II, and quality of life by the QOLIE – 89. Premorbid intellect was measured by the CRT (Czech Reading Test) and executive function by the Epitrack.

Results: The group of patients with interictal pain in the last month (N = 117) and without pain in the last month (N = 33) did not differ in age, gender, premorbid intellect, cognitive functions, duration of epilepsy, number of seizures ($p > 0.05$). The pain group had significantly higher anxiety, depression and overall poorer quality of life (QOLIE–89) ($p < 0.05$). Linear regression model can explaine 19.5% of the variability intensity of interictal pain by the number of seizures in the last month and by depression.

Conclusions: Interictal pain in patients with epilepsy can be significantly related to mental health. So the cooperation of a clinical psychologist and psychotherapist in epilepsy team which also focuses on pain management, mental health related epilepsy and suffering is appropriate.

III-A.05

LIPEDEMA PATIENTS SHOW STAGE-DEPENDENT ALTERATIONS IN PAIN PERCEPTION AND QUANTITATIVE SENSORY PROFILES DIFFER FROM LYMPHEDEMA PATIENTS

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Background and aims: Lipedema is a painful bilateral subcutaneous adipose tissue disorder of the extremities. Differential diagnosis against in part comorbid lymphedema and obesity remains challenging. Recently, we found a distinctly altered sensory profile of non-obese lipedema-stage I patients. Whether this is present also in higher-staged lipedema-patients and if it may serve for differentiation of lymphedema-patients has not been studied.

Methods: Pressure pain and vibration detection was investigated at the lateral thigh before and after manual lymphatic drainage in 28 participants (13 lymphedema- versus 15 lipedema-patients of all stages). Pain perception and psychometry was assessed using the German Pain Questionnaire.

Results: Lipedema-patients show stage-dependent alterations with respect to anthropometric and psychometric data. Higher-staged lipedema-patients were older with an increased Waist-to-Height-Ratio as well as clinically relevant psychometric scores with respect to depression, stress, anxiety, and general well-being. In contrast to stage I and II, stage III lipedema patients rated pain intensity higher. All lipedema- but not lymphedema-patients showed decreased pressure pain thresholds. Manual lymphatic drainage left both thresholds unchanged in lipedema patients but normalized vibration detection in lymphedema-patients.

Conclusions: Anthropometric and psychometric data indicate an increase of burden with increased lipedema stage. Increased psychological burden may underly the more emotionalized pain description of stage III patients. In contrast to lymphedema, altered sensory thresholds were specific to lipedema-patients of all stages and remained constant also after manual lymphatic drainage. This corroborates pressure pain threshold and vibration detection threshold as potential differential diagnostic criterium.

III-A.06

COVID (CORONA VIRUS INFECTIOUS DISEASE): SHARED COAGULOPATHY WITH LVP (LIVEDOID VASCULOPATHY) – SHARED THERAPY?

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Background and aims: COVID and LVP (“Rare Disease“ : incidence 1:100000) share their coagulopathy within the PAI (Plasminogen Activator Inhibitor) Complex (increased levels, stability). LVP causes episodes of skin ischaemia, angina cutis, painful ulcers, and ischaemic peripheral neuropathy. Specific LVP-therapies may offer causally directed treatment options for similarities in COVID.

Methods: Case report: A 60yr old female patient developed LVP : discolorations (‘livedo racemosa‘), angina cutis, ulcers, and ischaemic neuropathic pain.

Intervenable macroangiopathy was excluded by angiography, which showed prominent arteries in affected areas.

Anti-Xa-Treatment (Nadroparin=LMWH, National Guidelines) was ineffective,

Preexisting coagulopathies were excluded (revealing by chance -25% F.XII-deficiency) before starting ‘off-label‘ treatment.

On re-occuring angina cutis and quick (<24hours) ulcer development, Dabigatran-therapy was started, as pathologies of PAI had previously been found in LVP, fibrinolytic therapy had been shown to be effective beforehand, and meanwhile this direct thrombin-inhibitor had been developed.

Within 48hours (Dabigatran 75mg od) the ulcer started receding; within five days the ischaemic neuropathic pain (ischaemic mononeuropathy: n.peronaeus prof.sin./pars-sens.). resolved.

Complete healing needed Dabigatran 110mg bd. . Otherwise typical LVP-scarring (‘Atrophie blanche‘) failed to come. Continuing Dabigatran, there were no LVP-recurrences.

Results: Fibrinolysis and Direct Thrombin-Inhibition can be effective goal-directed therapies in PAI-associated thrombophilic conditions like COVID, LVP (Livedoid Vasculopathy) , atherosclerosis, and colorectal cancer.

As F.XII (Hagemann-Factor, initiating intrinsic pathway of coagulation) is connected as well to the Kallikrein-Kinin-System, Anti-F.XII.-Therapies may also become new anti-inflammatory Analgesics.

Conclusions: COVID and LVP share pathologies, but maybe also share therapeutic options (and more).

III-A.07

PLX5622 PREVENTS INFLAMMATION IN A MURINE MODEL OF CORNEAL NEUROPATHIC PAIN

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Background and aims: Corneal Neuropathic Pain (CNP) is closely linked to inflammatory responses along corneal pain pathways, involving the trigeminal ganglia and trigeminal brainstem. Recent studies suggest a key role of macrophages and microglia in the pathophysiology of CNP. PLX5622, a colony-stimulating factor 1 receptor (CSF1R) inhibitor, is commonly used to deplete macrophages and microglia. Here, we examined whether PLX5622 can prevent inflammatory responses in a mouse model of CNP.

Methods: Male C57BL/6JRj mice were divided into four groups: those receiving topical PBS and fed either a normal diet or PLX5622 chow, and those receiving topical 0.2% Benzalkonium chloride (BAC) and fed either a normal diet or PLX5622 chow for 21 days. Tissues from the eyes, trigeminal ganglia, and trigeminal brainstem were collected for immunostaining to assess inflammatory and neuronal responses.

Results: In mice fed with normal chow, topical 0.2% BAC significantly increased the number of Iba1+ and CD68+ cells (macrophages) in the ipsilateral cornea and trigeminal ganglia compared to the PBS group. Additionally, in both PBS and BAC groups, three weeks of treatment with PLX5622 effectively depleted macrophages in the cornea and trigeminal ganglia. Mice fed with PLX5622 chow also exhibited a marked reduction in microglial cells (Iba1+)

in the trigeminal brainstem. Preliminary results further suggest that PLX5622 reduced the number of c-Fos+ cells in the trigeminal nucleus in mice with CNP.

Conclusions: These initial findings confirm that PLX5622 depletes macrophages and microglial cells in both peripheral and central tissues. Further studies are needed to assess the impact of this cell depletion on corneal pain.

III-A.08

ASSOCIATION OF COGNITIVE CONTROL AND FLEXIBILITY WITH SHOULDER PAIN, CENTRAL SENSITIZATION SYMPTOMS, AND PSYCHOLOGICAL FACTORS IN PATIENTS WITH CHRONIC SUBACROMIAL PAIN SYNDROME

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Background and aims: Subacromial pain syndrome (SPS) often tends to be chronic. Cognitive control and flexibility help individuals manage and adapt to chronic pain. This study aimed to examine the association of cognitive control and flexibility with pain, central sensitization symptoms, and psychological factors in patients with chronic SPS.

Methods: This cross-sectional study included 47 patients with chronic SPS (34 female, 13 male; mean age = 50.75 ± 13.96 years). Pain complaint duration was recorded, and shoulder pain intensity was assessed using the Visual Analog Scale. Cognitive control and flexibility were evaluated with the Cognitive Control and Flexibility Scale (CCFS), central sensitization symptoms with the Central Sensitization Inventory, and psychological status using the Pain Catastrophizing Scale, Tampa Kinesiophobia Scale, and Hospital Depression and Anxiety Scale (HDAS). Data were analyzed using Spearman‘s correlation coefficients.

Results: The CCFS scores exhibited a moderate negative association with the Central Sensitization Inventory (rho = -0.566, $p < 0.001$), as well as with the depression (rho = -0.529, $p < 0.001$) and anxiety (rho = -0.531, $p < 0.003$) sub-scores of the HDAS. No statistically significant association was found between the CFCS and the other variables ($p > 0.050$).

Conclusions: Our preliminary results support the incorporation of interventions targeting cognitive control and flexibility in managing patients with chronic SPS, particularly to address symptoms of central sensitization, depression, and anxiety. However, cognitive control and flexibility may not directly influence pain intensity, duration, catastrophizing, or kinesiophobia. This study was supported by the Scientific and Technological Research Council of Turkey (TUBITAK) within the scope of 2209-A.

III-A.09

UPPER QUARTER POSTURE, AND NECK AND TRUNK MUSCLE ENDURANCE, AND THEIR ASSOCIATIONS WITH PAIN AND DISABILITY IN PATIENTS WITH UNILATERAL LATERAL EPICONDYLALGIA: A CASE-CONTROL STUDY

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Background and aims: This study aimed to compare upper quarter posture and neck and trunk muscle endurance between patients with lateral epicondylalgia (LE) and controls and to examine their associations with elbow pain intensity and upper extremity function.

Methods: This cross-sectional study included 19 individuals with unilateral LE (mean age= 43.11 ± 9.99 years; 12 females) and 17 age- and sex-matched asymptomatic controls. None of the participants had experienced spinal pain in the past six months. Pain intensity was assessed using the Numerical Pain Rating Scale, while disability was evaluated with the shortened Disabilities of the Arm, Shoulder, and Hand questionnaire (QDASH). Upper quarter posture was assessed through forward shoulder and forward head angles (FHA) calculated from photographs. Endurance was evaluated using neck flexor endurance, trunk flexor endurance, Sorensen, and side bridge (asymptomatic side) tests. Between-group comparisons were performed using the Mann-Whitney U test, and Spearman’s correlations analyzed associations between variables.

Results: Patients with LE exhibited higher FHA (p = 0.049) and lower trunk flexor endurance times (p = 0.045) compared to controls. Side bridge endurance times showed moderate negative correlations with QDASH scores (r = -0.581, p = 0.009) and elbow pain intensity (r = -0.474, p = 0.040). Other endurance times and forward shoulder angle were similar between groups and did not demonstrate significant associations with pain or disability levels (p > 0.050).

Conclusions: Our preliminary results suggest that patients with LE have increased forward head posture and reduced trunk flexor endurance, while greater lateral flexor endurance is associated with reduced pain and disability.

III-A.10

EFFECTS OF HIP STRENGTHENING ON SHOULDER AND HIP MUSCLE STRENGTH, SHOULDER RANGE OF MOTION AND FUNCTIONAL PERFORMANCE IN VOLLEYBALL PLAYERS: A RANDOMIZED CONTROLLED TRIAL

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Background and aims: Shoulder pain is frequent among volleyball players. Hip strengthening may offer an opportunity to prevent shoulder injuries by improving kinetic chain efficiency. This study aimed to investigate the effects of hip strengthening training on shoulder range of motion (ROM), shoulder and hip strength, and functional performance in volleyball players.

Methods: Sixty volleyball players were randomly assigned to either a training group (TG) (n=30), which underwent a hip-strengthening program, or a control group (CG) (n=30). The hip-strengthening training program was performed three times a week for six weeks. Shoulder internal rotation (IR) and external rotation (ER) ROM were assessed using a bubble inclinometer. Isometric muscle strength was measured with a handheld dynamometer. The closed kinetic chain upper extremity stabilization test (CKCUEST) and spike speed (measured with a sports radar) were used to determine upper extremity performance. Assessments were conducted at baseline, after 6 weeks, and after 12 weeks.

Results: In baseline, groups were similar for all variables (p>0.05). At both 6 and 12 weeks, the TG showed higher dominant and non-dominant shoulder IR and ER strength, as well as hip ER, abduction, and extension strength, compared to the CG (p<0.01). While dominant shoulder passive IRROM was higher in the TG at six weeks (p=0.04), this difference was not sustained at 12 weeks (p=0.10). Additionally, TG exhibited greater improvements in CKCUEST performance over time (p<0.01), whereas spike speed remained similar between groups (p>0.05).

Conclusions: Clinicians could incorporate hip strengthening to improve shoulder and hip strength and upper extremity performance for injury prevention in volleyball players.

III-A.12

BODY PERCEPTION DISTURBANCES IN CHRONIC NON-CANCER PAIN: A QUALITATIVE STUDY

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Background and aims: Body perception disturbances (BPD) in chronic pain can manifest as an altered perception of a body part or a feeling of foreignness towards it. While this phenomenon is well documented in certain pain conditions (e.g., complex regional pain syndrome (CRPS), chronic low-back pain (CLBP)), it remains far less studied in chronic pain as a general condition. Thus, the aim of this qualitative study was to elicit key-concepts pertaining to BPD in chronic non-cancer pain.

Methods: Semi-structured interviews were performed among a heterogeneous sample of adults with chronic non-cancer pain. Interviews were then analyzed based on grounded theory principles.

Results: Twelve participants (4 men; age: 50±16 years) with various pain conditions (e.g., fibromyalgia, CRPS, spinal cord injury, phantom limb pain, migraine, rheumatoid arthritis, CLBP) and symptoms duration [range: 0.5 – 53 years] were interviewed. Six main concepts encompassing 28 sub-concepts were extracted: (1) distorted perception of body parts; (2) proprioceptive and postural awareness; (3) emotions and beliefs; (4) attention towards the body; (5) neglect-like symptoms; and (6) a disturbed sense of agency.

Conclusions: To our knowledge, this was the first study to qualitatively document BPD among a heterogeneous sample of chronic non-cancer pain conditions. This process allowed to appraise BPD in a way that is not body part- or diagnosis-specific, but rather as an independent phenomenon that can manifest in chronic pain as a general condition. Future research should seek to further document BPD in larger samples.

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III-A.13

WHEN PAIN FEELS 'STUCK': AN INTEGRATIVE 'STICKINESS' FRAMEWORK AND MEASURE DEVELOPMENT

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Background and aims: Individuals with unremitting pain may feel their pain is 'stuck', however this experience and role of specific psychological factors remains unclear. Perseverating cognitive and behavioural patterns may be important and are explored in the broader literature and other contexts (e.g., depression). Drawing on this perspective, the current research proposes an integrative 'Stickiness' framework and develops general and pain-specific questionnaires.

Methods: 502 UK adults recruited via Prolific online crowdsourcing completed questionnaires to capture pain characteristics, demographics and 'Stickiness'. Two new measures of general and pain-specific stickiness were developed, capturing four proposed domains:

1. (in)flexibility of thought,

2) (in)flexibility of behaviour,

3) repetitive thinking and

4) attentional focus and fixation.

Items were informed by existing research, measures of similar concepts (e.g., cognitive flexibility), expert input, and insights from those with lived experience of pain.

Results: Exploratory factor analysis was conducted to explore the underlying latent structure of general and pain-specific stickiness. For general stickiness, a 3-factor solution was identified; 1) repetition and fixation, 2) openness and alternatives and 3) attentional flexibility. For pain stickiness, a clear factor structure could not be established. General Stickiness demonstrated good convergent validity.

Conclusions: Initial findings suggest 3 distinct domains of General Stickiness and an effective self-report measure; however, the pain-specific stickiness measure requires refinement. Future research is needed to consolidate stickiness and its role in pain, including longitudinal designs to explore relationships over time. Furthermore, neurocognitive and behavioural assessments of stickiness need development and deeper exploration, particularly within the context of chronic pain.

III-A.14

COMPARISON OF SLEEP QUALITY AND MUSCULOSKELETAL PAIN IN PATIENTS WITH MAJOR DEPRESSION, GENERALIZED ANXIETY DISORDER AND IN HEALTHY ADULTS: CASE-CONTROL STUDY

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Background and aims: The aim was to investigate and compare musculoskeletal pain in patients with major depression (MD), generalized anxiety disorder (GAD), and relatively with healthy controls (CG).

Methods: Fifty-two MD (age: 35.07±12.11 years, Body Mass Index (BMI): 25.39±4.10 kg/m^2); 49 GAD (age: 34.12±10.30 years, BMI: 26.42±5.28 kg/m^2) and 47 CG (age: 32.65±9.52 years, BMI: 24.08±3.77 kg/m^2) were included. Nordic Musculoskeletal Questionnaire (NMQ) for musculoskeletal pain presence, localization, Visual Analog Scale (VAS) for pain severity, Sleep Hygiene Index (SHI) for sleep quality were used. Kruskal-Wallis, Tukey HSD and Dunn-Bonferroni tests used for statistical analyses.

Results: In MD,GAD, and CG the pain presences in the low back(%73.1, %63.3, %66.0), upper back (%69.2, %55.1, %72.3), neck (%67.3, %65.3, %70.2), and shoulder(%69.2, %51.0, %51.1) were quite high, with no differences between groups. Differences were observed for neck, shoulder, back, low back, and ankle pain level (respectively; p=0.008, p=0.007, p=0.040, p=0.022, p=0.029) between groups; MD (5.00 (6.00) cm) and GAD (5.00 (6.50) cm) had higher neck pain levels than the controls (2.00 (4.00) cm); MD had higher shoulder (4.00 (4.75) cm), back (4.00 (7.75) cm), low back (4.00 (7.00) cm), and foot-ankle pain (3.00 (5.00) cm) levels than the other two groups. SHI total scores were 19.13±7.15, 18.22±7.77 and 15.97±6.11 for MD, GAD and CG, respectively (p>.005).

Conclusions: Low back, back, neck, shoulder pain presences, and sleep quality were similar between groups. However, the severity of pain levels for neck, shoulder, back, low back, and foot-ankle were higher in MD.

III-A.15

DYNAMIC INTERPLAY OF ANXIETY, DEPRESSION AND PHYSICAL EFFORT IN EXERCISE-INDUCED PAIN

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Background and aims: Exercise-induced pain (EIP) is influenced by psychological and physical factors. This study examines how anxiety sensitivity, generalized anxiety, and depression interact to predict EIP intensity in recreational endurance athletes.

Methods: A cohort of 130 hikers and trail runners completed the Anxiety Sensitivity Index-3 questionnaire, which measures anxiety sensitivity through the subscales of rumination, magnification, and helplessness; the Generalized Anxiety Disorder-7 and Patient Health Questionnaire-9, which assesses the severity of generalized anxiety and depressive symptoms, respectively. Activity intensity was rated on an 11-point Likert scale, and activity duration was recorded in minutes. EIP intensity was expressed as a composite score, calculated as the mean of maximum and average pain intensity during activity. Generalized Linear Models were used to evaluate the main effects and interactions among psychological and physical predictors of EIP intensity.

Results: Rumination and depression were significant predictors of EIP intensity ($p = 0.044$ and $p = 0.048$, respectively). A significant positive interaction between depression and activity intensity ($p = 0.008$) revealed that depression amplifies the relationship between activity intensity and pain perception. Rumination and activity duration showed a significant negative interaction ($p = 0.010$), suggesting that prolonged activity reduces the influence of rumination on pain. Helplessness and activity duration exhibited a significant positive interaction ($p = 0.048$), indicating that helplessness increasingly impacts pain as activity duration extends.

Conclusions: Depression amplifies the effect of activity intensity on EIP, while rumination and helplessness dynamically influence pain perception based on activity duration.

III-A.17

SACRAL CEMENTOPLASTY FOR RIGHT HIP PAIN: NOT ALL OSTEOPOROTIC HIP PAINS ARE FEMUR FRACTURES

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Background and aims: Sacral insufficiency fractures occur in 1-5% of osteoporotic elderly patient at risk, often following trivial trauma. Rate of missed or delayed diagnosis was estimated to range from 25-70%. This diagnosis heterogeneity, low incidence and lack of awareness could lead to misdiagnosis, underestimation and inadequate treatment.

Methods: Case report and review.

Results: A 94-year-old osteoporotic patient presented with right hip pain limiting home mobility unrelieved by codeine after a fall two weeks ago. Her initial hip, lumbar spine and pelvic X-rays did not reveal any acute fractures. MRI Lumbar spine performed showed insufficiency fractures at the right sacral alar and posterior iliac bone. She was started on a patient controlled analgesia (PCA) Fentanyl, charting up to 284mcg/day, and restarted on pregabalin with assisted physiotherapy to prevent deconditioning. Her acute functional decline from her independent state was complicated by severe sepsis from community acquired pneumonia, myocardial injury and adjustment disorder.

After multidisciplinary evaluation, she underwent a cementoplasty of her right sacral alar fracture and right L5 epidural steroid injection with almost immediate decrease in PCA use. She resumed ambulating again with a rollator and sat out of bed independently. She had been on a drug holiday from intravenous zolendronate since four years ago, after her beta crosslaps showed a low value.

Conclusions: Conservative treatment of these stress fractures involve rest for six weeks from high impact activities with concurrent osteoporotic therapy including calcium and vitamin D while minimally invasive cementoplasty provided immediate structural support and analgesia.

III-A.18

IMMEDIATE EFFECT OF PAIN EDUCATION COMBINED WITH CERVICAL MOBILIZATION AND EXERCISE ON PAIN PERCEPTION AND FUNCTIONS IN CHRONIC NECK PAIN – RANDOMIZED CONTROLLED PILOT STUDY

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Background and aims: Pain neuroscience education (PNE) is an approach that changes maladaptive thoughts in chronic neck pain (CNP). This study aims to examine the immediate effect of PNE included in conventional therapy on pain intensity, perception of change, cervical mobility, and endurance in CNP.

Methods: Twenty-four individuals with neck pain intensity of 3.5-7.4 on the Visual Analogue Scale were included. All participants were equally divided into PNE [20.92±1.92 years; 22.03± 2.26 kg/m^2; PNE video and conventional therapy] and conventional therapy [21.25±1.54 years; 22.29±4.02 kg/m^2; cervical mobilization and exercise] groups. Pain intensity, cervical mobility, and deep cervical flexor endurance (DCFE) were assessed before (BI) and after one session intervention (AI). Rumination (Ruminative Response Scale), pain neurophysiology (Revised Neurophysiology of Pain Questionnaire), neck disability (Neck Disability Index), and perception of change (Global Perceived Impact Scale) were evaluated. The Wilcoxon and The Mann Whitney-U tests were used in statistical analysis.

Results: Age, body mass index, pain intensity, duration, rumination, pain neurophysiology and disability were similar in both groups. PNE group showed improvement in left lateral flexion (BI:32.25±9.99 degree; AI:35.91±11.45 degree; p=0.033), and DCFE (BI:13.60±6.73 sec; AI:16.74±6.80 sec; p=0.041). Conventional group showed improvement in pain intensity (BI:3.74±1.90 cm; AI:2.16±2.00 cm; p=0.033), and DCFE (BI:14.64±9.13 sec; AI:19.81±16.62 sec; p=0.012). No significant differences were observed between groups for pain intensity (p=0.623), mobility (p=0.190 to 0.795), DCFE (p=0.817), and perception of change (p=0.169).

Conclusions: Conventional therapy with or without PNE can provide instant improvement in pain perception and function in CNP.

III-A.19

EXERCISE-INDUCED HYPOALGESIA IN BOTH LOCAL AND REMOTE BODY AREAS ARE HIGHER IN MEN WITH CHRONIC NECK PAIN THAN IN WOMEN

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Background and aims: Due to its high prevalence, Chronic neck pain (CNP) is common, with exercise being one of the recommended treatment approaches. However, the pain relieving effects of exercise in this population is still controversial. Gender differences in exercise-induced hypoalgesia (EIH) have been previously reported in the literature, with some evidence indicating that women have higher EIH; however, it is unclear whether EIH gender differences exist in CNP. This exploratory baseline analysis from a longitudinal intervention study compared the difference in the EIH response between men and women with CNP.

Methods: 16 men (age of 41.2 ± 3.9) and 35 women (age of 36.9 ± 2.3) with chronic neck pain were included in this analysis. Participants were randomized to perform either a lateral shoulder raise (exercise in painful area) with a resistance band for 2 minutes or until fatigue, or an isometric wall squat (exercise in non-painful area) for 3 minutes or until fatigue. Pressure pain thresholds (PPT) were measured before and immediately after the exercise at the upper trapezius (UT) and quadriceps femoris (QUA) muscles.

Results: Men exhibited a higher EIH response (Trapezius: 28%; Quadriceps: 8%) than women (Trapezius: 18%; Quadriceps: 5%) ($P<0.02$) for both points tested, regardless of the exercise.

Conclusions: This study supports the evidence that gender play a role in the EIH response. However, the mechanisms involved in this difference are still unclear. The involvement of exercise pain, hormones, and muscle fatigue may differ between genders and should be investigated further.

III-A.20

SYMPTOM PROFILE IN PATIENTS WITH WHIPLASH-ASSOCIATED DISORDER

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Background and aims: People with whiplash-associated disorder (WAD) experience a wide range of diverse symptoms, and activity and participation limitations. However, the symptom profile of patients with WAD has yet to be defined. Our study aimed to identify the symptoms, impairments, activity limitations and participation restrictions in patients with WAD to determine an adequate representative sample for developing a condition-specific questionnaire.

Methods: First, we conducted a systematic review, based on which we then formed a survey of experts and patients with WAD and nonspecific neck pain (NSNP) using the International Classification of Functioning, Disability, and Health (ICF) classification. We evaluated the experts' answers using the content validity index, content validity ratio, and modified kappa. The intensity and magnitudes of disorders experienced by patients were reported as averages, and standard deviations and comparisons between patient groups were analyzed using a two-sample t-test.

Results: Based on our preliminary analysis, the most relevant disorders assessed by experts (n=14) were included in the *Sensory Functions and Pain*, *Movement-related Functions*, and *Activity and Participation* ICF subcategories. The most frequent disorders in the WAD group (n=92) were mainly included in the *Mental Functions*, and *Activity and Participation* subcategories, and their intensities and magnitudes differed statistically significantly from the results of the NSNP group (n=44).

Conclusions: Our preliminary results, which highlight the most relevant and most disabling symptoms and impairments in patients with WAD, have the potential to significantly improve the evaluation and management of WAD. This research paves the way for developing a new, more effective WAD-specific outcome measure.

III-A.21

EXERCISE DURATION, MUSCLE PAIN INTENSITY, AND TYPE OF EXERCISE DID NOT PREDICT EXERCISE-INDUCED HYPOALGESIA IN INDIVIDUALS WITH CHRONIC NECK PAIN

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Background and aims: Exercise duration, whether the exercise is painful or not, and the type of exercise play a role in the exercise-induced hypoalgesia (EIH) response. However, in chronic neck pain, the relationship is not yet consolidated. This study investigated if these factors predicted the EIH response.

Methods: Fifty participants (age 38.3±14.2) with chronic neck pain were randomized to either a specific exercise in the neck/shoulder area (SE) (n=25), consisting of a lateral shoulder raise with a resistance band for 2 minutes or until fatigue, or a non-specific exercise remote from the neck/shoulder area (NSE) (n=25), consisting of an isometric wall squat for 3 minutes or until fatigue. PPT was measured before and immediately after the exercises at the upper trapezius (UT) and quadriceps femoris (Qua) muscles. Exercise duration and the exercising muscle pain intensity were recorded at the moment when the participant stopped the exercise. The outcomes were included in a backward multiple linear regression model, adjusted for sex and age.

Results: The mean exercise duration was 98.9 ± 48 seconds (40% completed the duration and 60% stopped due to fatigue), and the mean pain intensity was 7.2 ± 2.5. There was no model with a significant association in the analyses, either for the EIH response at the UT or Qua points ($p > 0.05$).

Conclusions: This exploratory study demonstrated that exercise duration, pain intensity, and exercising at painful versus non painful areas did not predict the EIH response.

III-A.22

INVESTIGATION OF RESPIRATORY FUNCTION, RESPIRATORY MUSCLE STRENGTH, ENDURANCE AND POSTURAL CONTROL IN INDIVIDUALS WITH NON-SPECIFIC CHRONIC NECK PAIN AND DIFFERENT SEVERITY OF DISABILITIES

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Background and aims: Respiratory dysfunction may be observed in patients with chronic non-specific neck pain, there are no studies evaluating respiratory muscle endurance and postural control in these individuals and respiratory dysfunction according to the severity of pain. In our study, we examine the respiratory dysfunction in individuals with chronic non-specific neck pain by evaluating respiratory muscle strength, endurance and postural control.

Methods: Having a complaint of non-specific neck pain for at least 3 months, being between the ages of 18-65 were included. We used Neck Disability Index(NDI) to classify the severity. A total of 60, including healthy individuals, mild, moderate and severe neck pain, 15 individuals from each were evaluated. We evaluated Pulmonary Function(PF), Functional Reach(FR), Respiratory Muscle Strength(RMS) and endurance(RME).

Results: It was determined that there was a significant negative correlation between NDI and Peak Expiratory Flow (PEF) measurements. With the increase in NDI score (increased severity), a decrease in PEF measurement was detected. The intergroup comparison of Forced Vital Capacity (FVC) value was significant. The difference was observed in terms of FVC parameter between the healthy group versus moderate and severe neck disability. No significant difference was observed in FR, RMS and RME.

Conclusions: Reduced PEF will reduce the effect of effective expiration, forced expiration behavior and effective coughing methods due to airway restriction.In the data, we found that the PEF and FVC value decreased in correlation with the increase in the severity of neck disability. Respiration is negatively affected as the severity of disability increases in individuals with severe neck pain.

III-A.23

NECK PAIN AND PSYCHOLOGICAL DISTRESS IN ITALIAN UNIVERSITY STUDENTS: A CROSS-SECTIONAL STUDY

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Background and aims: Neck pain (NP) is a prevalent musculoskeletal disorder in the general population, also in young people. This study aimed to investigate the association between NP and psychological distress in a sample of Italian university students.

Methods: This cross-sectional study was conducted from February to April 2024 in Italy by distributing a Google Forms survey to university students. Demographic data, Neck Disability Index (NDI), Hospital Anxiety and Depression Scale (HADS) and the Short-Form 12 (SF-12) were collected. Spearman rho and multivariate linear regression analysis were performed to investigated associations between NDI and HADS, SF-12 and demographic data.

Results: We received 406 responses. The mean scores for NDI Total, HADS Sub A, HADS Sub D, PCS12, and MCS12 were 16.60 (SD 11.793), 9.19 (SD 4.386) , 6.25 (SD 3.577), 51.10 (SD 7.373) , and 35.89 (SD 11.328), respectively. There was a moderate positive correlation between NDI Total and HADS Sub A (rho = 0.528) and a moderate negative correlation between NDI Total and PCS12 (rho = -0.513). Multivariate linear regression analysis showed that weekly exercise's hours were statistically with the NDI. The multivariate model explained 42% of the variance (R^2 = 0.426), with exercise's hours as the most influential variable (stand β = 0.731).

Conclusions: The findings of this study suggest that neck pain is a common and significant problem among university students in Italy. Psychological distress and exercise must be taken into account when assessing this type of patient.

III-A.26

EXPLORING THE CONNECTION BETWEEN CHRONIC PAIN AND MENTAL HEALTH IN CANADIAN VETERANS: A NARRATIVE INQUIRY

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Background and aims: The intersection between chronic pain and mental health remains poorly understood, particularly in how each influences the other during a Veteran's transition from the military culture to civilian life. This study aims to explore how mental health or illness, and chronic pain are connected by examining the mutual impacts of these conditions on the quality of life and challenges among Canadian Veterans.

Methods: We used a narrative inquiry approach to gather in-depth interviews from 25 Canadian Veterans experiencing chronic pain. Interviews captured three key stages: their time in active military service, the transition process, and their experiences in civilian life.

Results: While some Veterans were generally unfamiliar with a link between chronic pain and mental health, most became aware of a potential link through personal experience or reading. Veterans described how mental health issues like depression and anxiety often exacerbated their chronic pain and, conversely, how pain intensified their mental health issues. Veterans shared stories of how having these conditions affected their identity, sense of purpose, daily functioning, and ability to adapt to civilian roles. Some veterans found that the link between mental health and chronic pain explained the challenges they continue to face during service, transition, and civilian life.

Conclusions: This study sheds light on the link between chronic pain and mental health in Veterans, emphasizing how these conditions can potentially mutually reinforce one another. The findings underscore the need for integrated healthcare approaches that address both chronic pain and mental health to improve support for Veterans.

III-A.27

EXPERIMENTAL COLD PAIN SENSITIVITY IN PATIENTS RECEIVING PHARMACOTHERAPY FOR OPIOID USE DISORDER WITH OPIOID AGONISTS AND OPIOID ANTAGONISTS: A CROSS-SECTIONAL STUDY

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Background and aims: Opioid use disorder (OUD) is primarily managed with opioid agonists that can produce analgesia and sedation, or opioid antagonists that can block opioid-mediated pain- and stress-relief, when administered acutely. However, it remains unclear whether long-term use of these medications differentially impact patients' experience of pain. We present results from preregistered analyses (osf.io/28rmk) directly comparing pain responses between agonist- and antagonist-treated OUD patients, and healthy volunteers.

Methods: This cross-sectional study was part of a larger clinical trial of extended-release naltrexone (NCT03647774). In a single study session, 74 OUD patients (34 on naltrexone, 40 on opioid agonists) and 50 healthy volunteers completed a Cold Pressor Test in which we induced pain by submerging their hand in cold water (<5°C). Group differences in cold pain threshold, tolerance and intensity, and cold pain-induced heart rate and cortisol changes, were modeled with beta and linear regression and tested with likelihood ratio χ^2-tests.

Results: Patients had lower average cold pain threshold and tolerance than healthy volunteers regardless of medication type, and agonist-treated patients showed weaker average cortisol response than healthy volunteers and naltrexone-treated patients (Table 1). There was however large variability within groups, and none of these group differences were significant ($ps \geq 0.17$). Group differences in cold pain intensity and cold pain-induced heart rate changes were also non-significant ($ps \geq 0.31$).

Table 1. *Descriptive statistics.*

	Healthy volunteers (n=50)	Agonist-treated OUD patients (n=40)	Naltrexone-treated OUD patients (n=34)
Women/Men	15/35	15/25	5/29
Age (years)	41.90±11.06	44.73±11.13	39.03±9.71
Pain threshold (0-300 s)	30.74±47.01	28.87±46.84[a]	21.64±10.82[b]
Pain tolerance (0-300 s)	118.38±117.29	83.50±89.55	72.47±78.47
Pain intensity (0-100 VAS)	60.76±22.48	73.08±15.22	64.00±20.59
Δ Heart rate (BPM)	5.05±5.79[c]	5.09±7.28	3.17±6.70
Δ Cortisol (nmol/L)	1.96±3.79[d]	0.19±1.40[e]	2.44±5.04[f]

Note. Numbers indicate n or observed mean±standard deviation. [a]n=39. [b]n=33. [c]n=48. [d]n=47. [e]n=24. [f]n=22.

Conclusions: Although non-significant, the direction of the results is consistent with prior studies showing increased pain sensitivity in agonist-treated patients. Pain sensitivity estimates in naltrexone-treated patients remain mixed, but major detrimental effects of naltrexone on pain seem unlikely.

III-A.29

CENTRAL SENSITIZATION, PAIN CATASTROPHIZING, PSYCHOLOGICAL STATE, SLEEP QUALITY AND MUSCLE STIFFNESS IN WOMEN WITH PRIMARY DYSMENORRHEA: A CASE-CONTROL STUDY

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Background and aims: The aim was to examine central sensitization, pain catastrophizing, psychological status, sleep quality and muscle stiffness in women with primary dysmenorrhea (PD) and to compare these parameters with asymptomatic women.

Methods: Women with PD (PD group, n=33, age=19.88±1.19 years, body mass index (BMI)=21.98±2.95 kg/m^2) and women without PD (control group, n=31, age=19.90±1.35 years, BMI=22.18±3.26 kg/m^2) were included. The intensity of menstrual pain with the Visual Analogue Scale (VAS), central sensitization with the Central Sensitization Scale (CSS), pain catastrophizing with the Pain Catastrophizing Scale (PCS), psychological status with the Depression Anxiety Stress Scale (DASS-21) and sleep quality with the Pittsburg Sleep Quality Index (PSQI) were assessed. Muscle stiffness was determined with ultrasonographic imaging.

Results: The mean menstrual pain intensity of the PD group was found to be 7.26±1.26 cm. It was found that the PD group had higher CSI (p=0.014), PCS (p<0.001), DASS-21-depression (p=0.012) and PSQI (p=0.036) scores than the control group. It was found that the stiffness of the rectus abdominis, erector spina, quadratus lumborum muscles in the PD group was higher than the control group (p<0.001), but the stiffness of the rectus femoris and hamstring muscles was similar (p>0.05).

Conclusions: In this study, it was observed that women with PD complaints had more central sensitization, pain catastrophizing behavior, psychological impact, worse sleep quality, and higher stiffness of the rectus abdominis, erector spinae, and quadratus lumborum muscles compared to asymptomatic women. According to these results, it may be important to consider these parameters in the management of PD.

III-A.31

DYSPAREUNIA: A MECHANISM-BASED CLINICAL APPROACH TO DIAGNOSIS AND TREATMENT

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Background and aims: Dyspareunia has traditionally been categorized as a structural issue or a mental sexual disorder (DSM-5: Genito-Pelvic Pain/Penetration Disorder), overlooking its complexity. Advances in pain science reveal that functional reorganization in pain processing can cause nociplastic pain, where pain occurs without tissue injury. Reframing dyspareunia as a chronic pain disorder addresses the limitations of the current dichotomous approach.

Aim: synthesize existing research and propose a clinical framework.

Methods: While clinically feasible subtyping exists for other pain conditions, comparable approaches for dyspareunia are lacking. Based on recent pain research, we propose a multidisciplinary, patient-centered algorithm to classify dyspareunia according to pain ,mechanisms - nociceptive, neuropathic, nociplastic, or mixed, guiding targeted treatments

Results: Step I: Proactively addressing dyspareunia normalizes its commonality, reduces stigma, and encourages patient engagement.

Step II: A thorough history distinguishes nociplastic pain (diffuse, fluctuating, linked to central sensitization or chronic pain syndromes) from nociceptive (localized, tissue damage/inflammation) and neuropathic pain (burning, electric-like sensations).

Step III: Comprehensive physical examination help identify signs of inflammation, vaginismus, or nerve dysfunction. Sensitivity to patient distress is vital.

Step IV: Diagnose pain mechanisms and their overlaps, tailor treatments accordingly, and schedule follow-ups to refine interventions until symptoms resolve.

Conclusions: Recognizing dyspareunia as primarily a pain disorder, may facilitate patient education and support integrative, tailored therapies, such as Pain Reprocessing Therapy. Incorporating modern pain science into diagnosis and treatment bridges the current mind-body divide and may improve patient outcomes. Future efforts will focus on evaluating these approaches through clinical qualitative and quantitative studies.

III-A.32

THE CORELATION BETWEEN ANXIOUS SENSITIVITY WITH EMOTIONAL AND COGNITIVE ASPECTS OF PAIN EXPERIENCE AND PAIN INTENSITY IN PATIENTS WITH CHRONIC PELVIC PAIN SYNDROME

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Background and aims: Chronic pelvic pain (CPP) is generally defined as non-cyclic pain in the pelvic area that has persisted for three to six months or longer. Typical clinical findings are intrapelvic trigger points, deep dyspareunia and parametrial pain reported during vaginal investigation. The aetiology of CPP is unknown. (2. Questionnaire as diagnostic tool in chronic pelvic pain (CPP): a pilot study). CPP impacts significantly on the lives of patients. Pain is always a personal experience that is influenced to varying degrees by biological, psychological and social factors. Aim of this study is to explore the correlation between anxious sensitivity and pain experience in patients with CPP treated at our pain clinic.

Methods: The prospective study includes 11 patients treated at Pain Clinic of University Hospital Center Sisters of Charity (Zagreb, Croatia). Age range from 20 to 54 years. Female to male ratio is 5:1. In this study several questionnaires and scales were used: McGill pain questionnaire, Anxiety Sensitivity Index scale, Pain Catastrophizing Scale and VAS scale to find the correlation between pain experience and intensity and anxious sensitivity among the patients.

Results: Results have shown a significant positive correlation of anxiety sensitivity with sensory and affective dimension of pain ($p<0.5$). Higher pain catastrophizing score is significantly correlated with pain intensity and affective component of pain ($p<0.5$).

Conclusions: Psychological factors play a significant role in the experience of pain. Due to complexity of understanding of CPP an individual multidisciplinary approach is necessary to ensure comprehensive and effective patient care.

III-A.33

EXPLORING THE INTERPLAY BETWEEN CATASTROPHIZING AND ENDOMETRIOSIS PAIN THROUGH TWO-WAVE AND INTENSIVE LONGITUDINAL DATA

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Background and aims: Endometriosis, marked by the presence of endometrial-like tissue outside the uterus, often results in chronic pelvic pain. However, while lesion characteristics contribute to endometriosis-related pain, they alone fail to fully account for its complexity, highlighting the role of psychological factors. Among these, pain catastrophizing—a cognitive process shaping pain perception—has typically been investigated using cross-sectional or two-wave designs, which fall short in capturing its dynamic relationship with endometriosis pain. To bridge these gaps, our study examines the bidirectional relationship between pain catastrophizing and pain outcomes—including intensity, frequency, and flares—over a detailed four-week period, an aggregated 30-day timeframe, and within sensory and affective dimensions.

Methods: A Latent Growth Curve Model evaluated the relationship between pain catastrophizing, initial pain levels, and endometriosis pain trajectories over four weeks. Four mediator models further examined how baseline pain catastrophizing influences various pain aspects, including sensory and affective dimensions, and its subsequent impact on pain catastrophizing.

Table 1. Characteristics of Participants (N=32).

	Median [IQR]; Mean (SD)
Age	34.68(8.09)
BMI (kg/m2)	28.10 (6.72)
Physical exercise yes (n [%])	7 (22.6%)
Alcohol yes (n [%])	11 (34%)
Sleep (hrs per night)	7 [5, 8]
Chronic pain time (months)	48.0 [24.0, 120.0]
Anxiety yes (n [%])	10 (31.2%)
Depression yes (n [%])	3 (9.7%)
Analgesic yes (n [%])	10 (31.2%)

Table 2. Descriptive statistics.

	Median [IQR]; Mean (SD)
30-day Pain Intensity	5.48 (1.51)
Frequency of Pain Flares	5 [0, 12]
Frequency of Pain Episodes	23 [2, 28]
Pain Catastrophizing t0	35.52 (12.80)
Pain Catastrophizing t1	33.13 (12.63)
Pain Sensory	23.94 (6.49)
Pain Affective	7.94 (3.37)

Results: High levels of pain catastrophizing significantly escalated endometriosis pain over four weeks, influencing average pain intensity, frequency, and flares over 30 days. Pain catastrophizing also adversely affected sensory and affective dimensions. These factors partially mediated the effect of baseline pain catastrophizing on week five, revealing a bidirectional relationship. While the affective dimension was positively associated with subsequent pain catastrophizing, the sensory dimension showed a contrasting negative association.

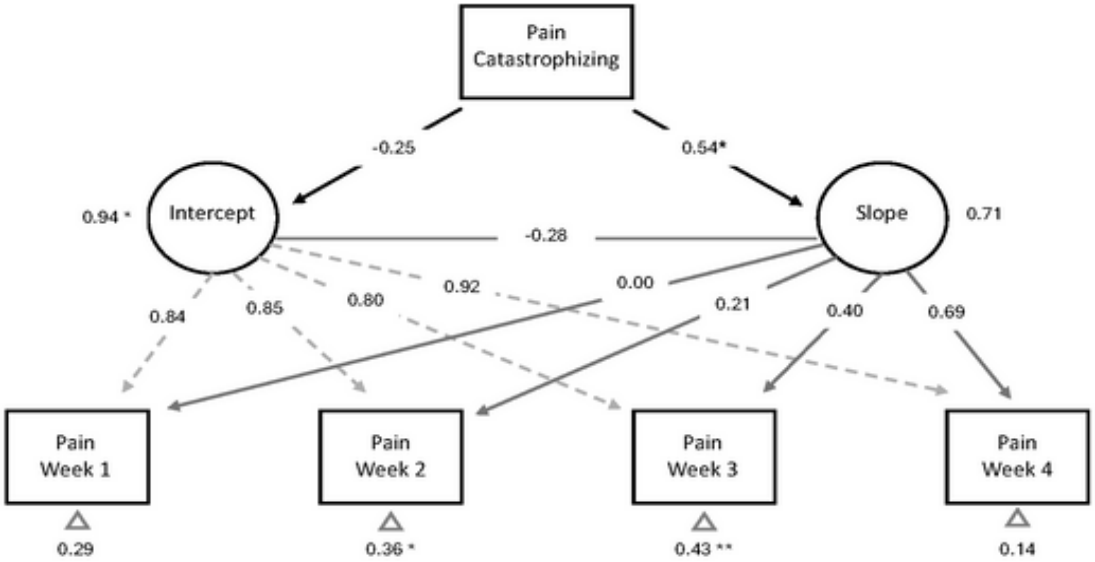

Figure 1 **Longitudinal Growth Curve Model (LGCM) of Endometriosis Pain Trajectories.**
This figure illustrates the LGCM of endometriosis pain trajectories over four weeks, with pain catastrophizing as a categorical predictor (low level as reference). The latent variables "Intercept" and "Slope" represent the baseline level and change in endometriosis pain intensity, respectively. The line connecting the Intercept and Slope shows their estimated covariance, with numbers on the sides indicating their variances. Paths from the Intercept and Slope to each endometriosis pain week represent the factor loadings, while triangles at each week indicate the variances of pain intensity. All paths are standardized estimates. The model fit indices suggest a good fit: $\chi^2(5) = 3.89$, $p = 0.565$, CFI = 0.980, RMSEA = 0.000. Significance levels are denoted by stars: *p < 0.05, **p < 0.01, ***p < 0.001.

Conclusions: The study underscores the bidirectional interplay between pain catastrophizing and various aspects of endometriosis-related pain. Sensory and affective dimensions exhibit distinct roles, offering insights for targeted interventions.

III-A.34

PSYCHOLOGICAL PROFILES IN PATIENTS WITH PAINFUL ENDOMETRIOSIS

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Background and aims: Endometriosis is a debilitating disease affecting around 10 % of women of reproductive age. Interoception underlies the experience of both physiological and psychological states and relates to pain perception and regulation. Earlier research suggests more and less adaptive pathways in certain interoceptive skills and pain-related outcomes. However, more knowledge on psychological factors underlying the disease burden in endometriosis is needed. We aim to answer this need by identifying different psychological profiles concerning pain-related well-being in patients with endometriosis.

Methods: 120 endometriosis patients filled out questionnaires on interoceptive awareness (MAIA), health-related quality of life (EHP-30), symptoms of anxiety/depression (HADS), pain catastrophizing (PCS), childhood adversities, and resilience (RS-14). We used hierarchical clustering (Ward method) to identify different profiles with psychological and pain-related factors.

Results: We found four profiles with varying combinations of different interoceptive skills and other psychological and pain-related factors. Out of these, in *resilient-trusting* group, we found high interoceptive skills relating to *Not worrying* and *Trusting,* low catastrophizing and symptoms of depression/anxiety, and high health-related quality of

life (HRQoL). In *anxious-worrying* group, we found lower interoceptive skills relating to *Not worrying* and *Trusting*, as well as higher catastrophizing and symptoms of depression/anxiety, and altogether lower HRQoL.

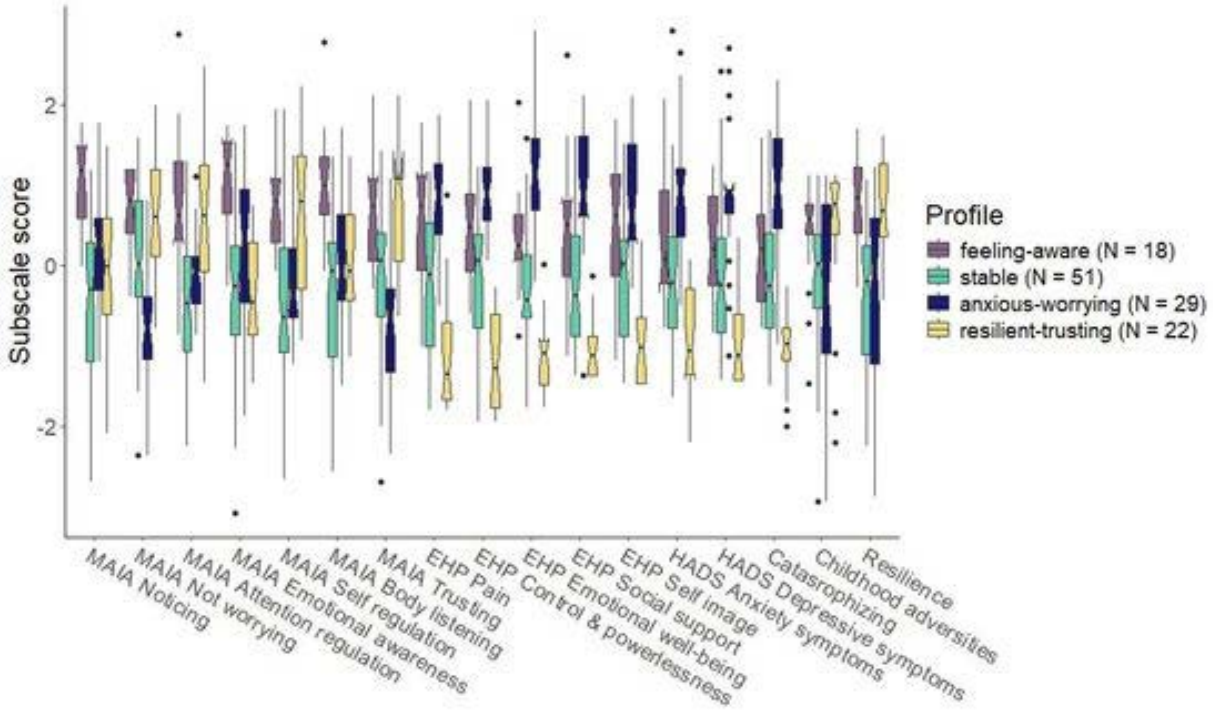

Figure 1. Psychological profiles in patients with endometriosis (N = 120). Higher points indicate lower HRQoL in EHP-questionnaire.

Conclusions: Our findings suggest different psychological profiles in endometriosis patients. Our results help identify potential risk- and protective factors affecting the disease burden and quality of life in patients with endometriosis.

III-A.36

ACUTE CARPAL TUNNEL SYNDROME CAUSED BY A THROMBOSIS OF A PERSISTENT MEDIAN ARTERY: A CASE REPORT

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Background and aims: Carpal tunnel syndrome (CTS) is a common peripheral neuropathy caused by mechanical compression of the median nerve at the wrist. It leads to pain, nocturnal paresthesias, and weakness. CTS can be idiopathic or result from factors like fractures, arthritis, infections, pregnancy, or hypothyroidism. Acute cases may arise from trauma, infections, hematomas, or burns. We report a case of acute CTS due to thrombosis of the persistent median artery.

Methods: This case report presents a patient who presented at our outpatient clinic with an acute onset of pain in the median nerve territory.

Results: A 32-year-old right-handed male with a history of Kallmann-Morsier syndrome, presented with the sudden onset of pain in the right upper hand, which began 2 months prior. The pain initially localized to the anterior aspect of the first digit and subsequently radiated to the anterior aspect of the wrist and elbow, accompanied by edema and sensation of cold on the anterior wrist. Clinical examination revealed positive Phalen's and Tinel's signs but no sensory or motor deficits in the median nerve territory. Initial management included prescribing a wrist splint, NSAIDs. Electromyography (EMG) was normal, but a color doppler ultrasound revealed thrombosis of a persistent median artery. Additional prescription of aspirine and statins led to improvement of pain by 75%.

Conclusions: An acute presentation of carpal tunnel syndrome in the absence of obvious traumatic cause should suggest the diagnosis of thrombosis of the persistent median artery. Color Doppler ultrasound should be performed as the first-line investigation.

III-A.37

MULTIDISCIPLINARY MANAGEMENT OF POSTHERPETIC NEURALGIA OF THE TRIGEMINAL NERVE, OPHTHALMIC BRANCH: A CASE REPORT

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Background and aims: Herpes Zoster's (HZ) most common complication is postherpetic neuralgia (PHN). Ophthalmic distribution occurs in 2.5% to 20% of people with HZ. This clinical presentation has a higher risk of developing PHN compared to other locations.

PHN causes physical disability, emotional distress, sleeping problems and interferes with daily activities.

The aim of this clinical case is to demonstrate the relevance of multidisciplinary teams (Ophtalmologist, Pain Management and Palliative Care), and mental health specialty interventions in pain management.

Methods: Clinical Case Report

Results: A 71-year-old woman, diagnosed with stage IIIA lung adenocarcinoma (pT1b, pN2), underwent a lobectomy. While undergoing adjuvant therapy, she developed ophthalmic HZ complicated by herpetic encephalitis, featured with difficult-to-manage pain. The patient experienced morphine intoxication, leading to radiofrequency ablation of the Gasserian ganglion and peripheral nerve blocks. She is currently undergoing pharmacological treatment with Eslicarbazepine, Pregabalin, Sertraline, Dexketoprofen, and transdermal Fentanyl. Furthermore, a psychologist is following her for anticipatory anxiety related to pain and breathing techniques during crises.

Conclusions: In this clinical case, pharmacological therapy helped us control the baseline pain. But, most importantly, we observed how self-control pain methods using breathing techniques during crises influenced the relief of breakthrough pain. Additionally, these breathing techniques improved her experience, alleviating pain by addressing anticipatory anxiety.

III-A.39

PERIPHERAL NEUROPATHY ASSOCIATED WITH METRONIDAZOLE THERAPY: A CASE REPORT

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Background and aims: Metronidazole is an antibiotic commonly prescribed for anaerobic and protozoan infections. Despite its good safety profile, it may cause well-known side effects, most commonly reported gastrointestinal disturbances (i.e., nausea, abdominal pain, diarrhea), while neurotoxicity has also been reported rarely. We describe a case of metronidazole-induced peripheral neuropathy.

Methods: A 70-year-old male patient came to the pain clinic because of neuropathic pain, that appeared 4 years ago, when he underwent sigmoidectomy due to acute diverticulitis, and was treated with metronidazole 500mg thrice daily for 1 month. He felt severe pain in the lower extremities, mainly localized in the plantar region, with neuropathic symptoms, which was still present until his visit, 4 years later. The electromyography showed sensory axonal polyneuropathy, which was attributed to the long-term metronidazole intake (> 4 weeks) and its total amount (> 45gr). The patient underwent numerous tests and the diagnosis was made by exclusion. He visited various specialties and received various medicinal regimens, as well as invasive treatments, including neurolysis with radiofrequencies, spinal cord neurostimulation, etc.

Results: A medication regimen including gabapentin, venlafaxine, tramadol with paracetamol and medicinal cannabis was administered and after dosage adjustment, there was a 30% reduction in his symptoms, increased satisfaction and quality of life improvement.

Conclusions: Metronidazole-induced peripheral neuropathy is difficult to treat and is not always reversible with treatment discontinuation.

III-A.40

WHAT DO PATIENTS WITH SPINE-RELATED LEG PAIN (A.K.A. SCIATICA) SEARCH ONLINE? WHAT ANSWERS DO THEY GET FROM DR. GOOGLE? AN ANALYSIS OF ITALIAN WEB-BASED DATA

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Background and aims: Spine-related leg pain (SRLP) is a complex clinical presentation characterized by many unanswered questions. Nowadays, patients search for information online to find rapid answers not provided by their clinicians. This work aimed to collect the main questions and keywords searched by the Italian general population related to SRLP, analyze the content of the most clicked landing web pages, and assess their credibility and readability.

Methods: SEMrush was used to collect questions, keywords, search volumes, and the five most clicked web pages per question. Credibility was assessed by two independent authors through the QUality Evaluation Scoring Tool (QUEST). Readability was assessed through the Gulpease index. A thematic analysis was performed and integrated with ATLAS.ti.

Results: The main keywords and questions included all sorts of remedies for sciatica, information about the sciatic nerve, and its daily management, with monthly search volumes ranging from 4400 to 33100 (Figure 1). QUEST values ranged from 1 to 14, resulting in a low to moderate credibility of analyzed web pages. Readability scores of these web pages ranged from 20 to 47, yielding low readability for people with elementary and medium education. Common themes among questions highlighted the roles of medications and physiotherapy, the value of doing effortless activities, and the importance of sleep (Figure 2).

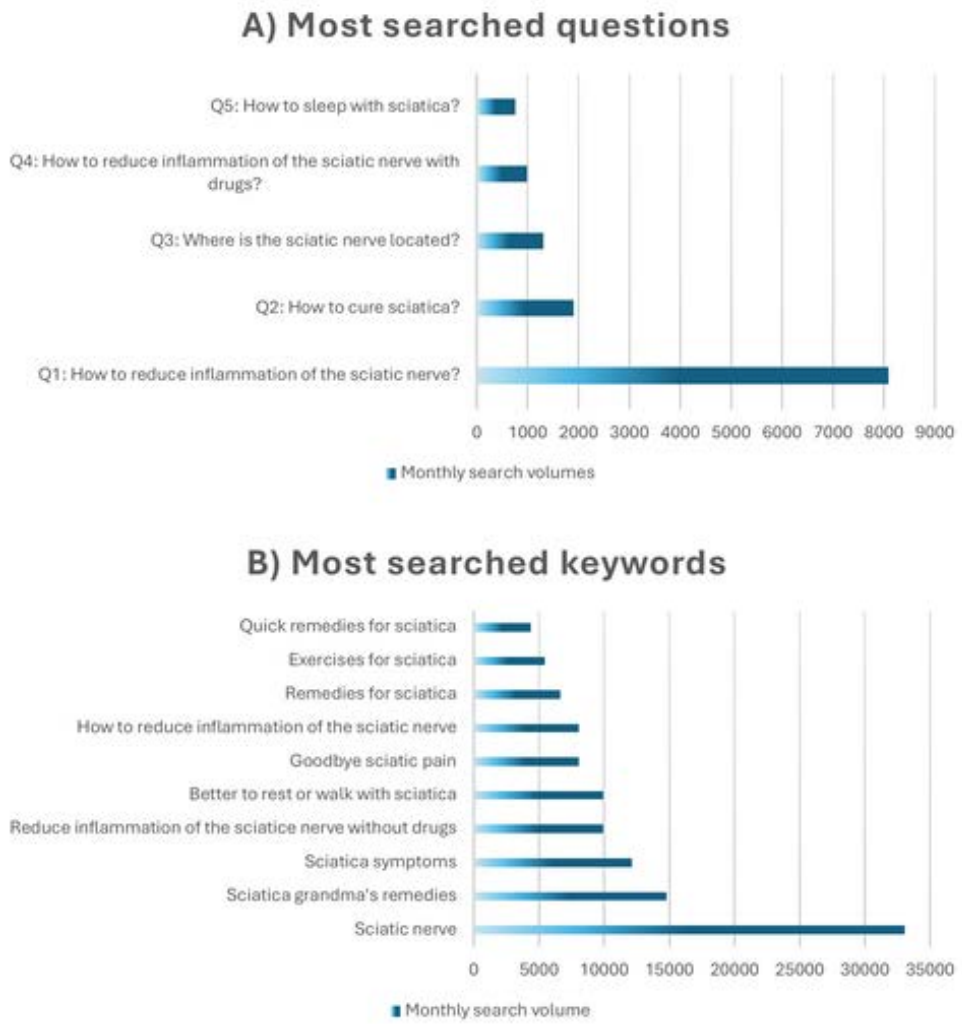
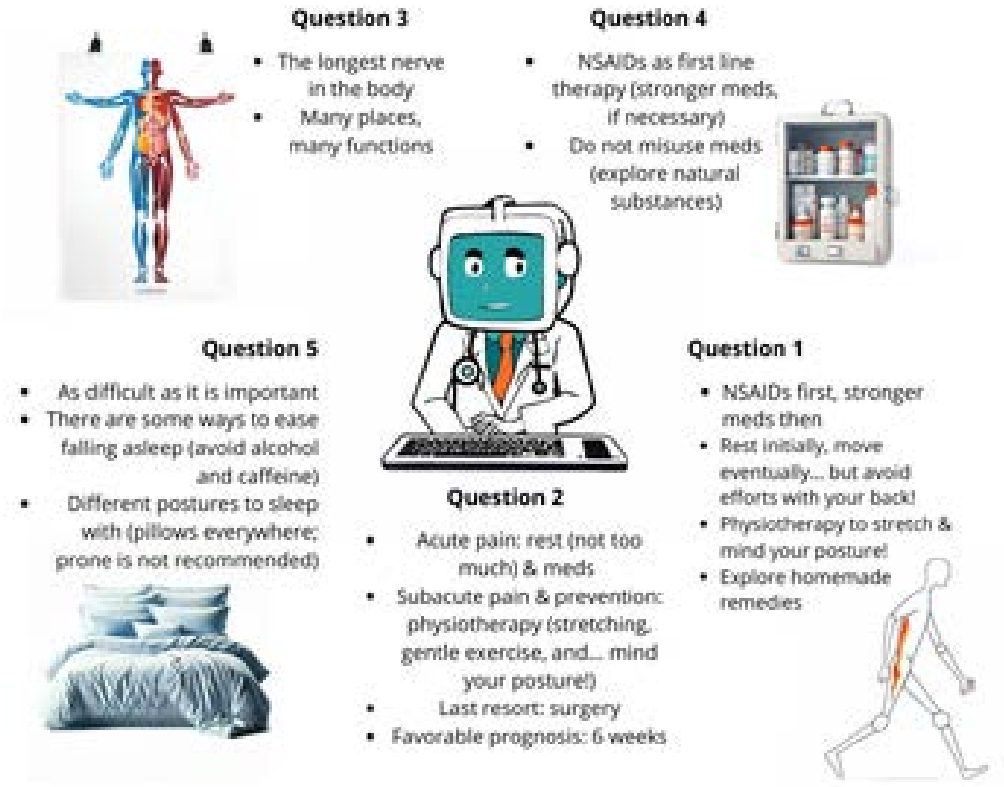


Figure 1. Graphical representation of the most searched questions (panel A) and keywords (panel B) related to sciatica and their respective search volumes.



Conclusions: Clinicians are now more aware of the questions asked by their patients to Google and the answers it provides about SRLP. Low levels of credibility and readability highlight the need for clinicians to support patients with their understanding.

III-A.41

INVOLVEMENT OF MEMBRANE REMODELING IN BORTEZOMIB-INDUCED PERIPHERAL NEUROPATHY

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Background and aims: Bortezomib, a proteasome inhibitor, is an anticancer drug causing chemotherapy-induced peripheral neuropathy side effect (CIPN). CIPN negatively impacts quality of life and can even threaten patient survival due to dose reduction or interruption of treatment. Therefore, identifying new therapeutic targets is crucial and these could be found through the study of the study of membrane composition and functioning, known as membrane remodeling. The aim of this study is (1) to study membrane remodeling in a rat model of CIPN induced by bortezomib, and (2) to establish the neurotoxicity mechanisms using ND7/23 cell line.

Methods: Lipid composition of the spinal cord from neuropathic SD rats treated with bortezomib (HPTLC) and protein composition (Western blot). Bortezomib neurotoxicity was investigated using MTT, ATP and LDH assays, C11-Bodipy and lysosome labeling.

Results: Our preliminary work in vivo has demonstrated a possible alteration in the structure of lipid rafts which could be linked to a potential modulation of the content of several lipids, including cholesterol, as well as on proteins. A supplementation with specific lipids or iron depletion not only blocks neurotoxicity in vitro but also prevents lipid peroxidation and accumulation of lysosomes in cells.

Conclusions: These preliminary findings suggest that CIPN is linked to a membrane remodeling in vivo. Ferroptosis could be connected to the neurotoxic mechanism in line with existing literature. Further experiments are needed to confirm these initial results.

III-A.42

CHARACTERISTICS OF NEUROPATHIC PAIN IN PATIENTS WITH DIABETIC PERIPHERAL NEUROPATHY

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Background and aims: To determine characteristics of neuropathic pain (NP) in patients with diabetic peripheral neuropathy (DPN) who do not have other significant comorbidities.

Methods: We examined 180 patients with DPN. According to the criteria of Haanpää et al. (2011), 62 patients (34,4%) had a clinical diagnosis of NP. These patients were tested with three questionnaires for the diagnosis of NP: Douleur Neuropathique en 4 questions (DN4), Pain Detect Questionnaire (PD-Q) and Leeds Assessment of Neuropathic Symptoms and Signs (LANSS). We selected 48 patients who were positive on all three questionnaires (experimental group) and 48 patients with DPN who were negative on all three questionnaires (control group). Patients with other significant comorbidities were excluded from the study.

Results: The presence of allodynia was the most significant characteristic that points to NP in DPN. In addition to allodynia, a reduced sensation of pinprick was found in the DN4 questionnaire. A tingling sensation was common in patients with DPN and NP, but it often occured as an isolated symptom in patients with DPN without NP. According to the PD-Q the current and average pain in patients with NP was of moderate intensity. It was mainly persistent pain with slight fluctuations. The spread of pain to other parts of the body was present in two thirds of patients, significantly more often in patients with NP.

Conclusions: The most important feature of NP was allodynia, followed by hypoesthesia to pinprick. So-called positive sensory symptoms were more frequent than so-called negative sensory symptoms.

III-A.43

FGFR3 AUTOANTIBODIES INDUCE SENSORY NEURON HYPEREXCITABILITY AND PAIN

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Background and aims: Antibodies against fibroblast growth factor receptor 3 (FGFR3) are found in patients with small fiber neuropathies and define a subgroup of patients with a high prevalence of sensory neuronopathy, peripheral neuropathy, pain and paresthesia. While clinical studies suggest a direct role of FGFR3 autoantibodies in the etiology of small fiber neuropathies, the expression and function of FGFR3 in pain signaling remains unexplored.

Methods: To isolate the effect of serum autoantibodies, samples were taken from patients positive for anti-FGFR3 IgG and was used *in vivo* and *in vitro* followed by measurement of mechanical allodynia using Von Frey filaments, immunohistochemistry, and whole cell-patch clamp recordings of sensory neuron excitability. FGFR3 expression was detected by RNAscope in human DRG tissue obtained from Mid-America Transplant.

Results: The ongoing studies demonstrate that FGFR3 IgG bind to an extracellular epitope of FGFR3 directly acting on DRG neurons to induce a hyperexcitability phenotype. In vivo, autoantibodies injected in the paw of rats induce mechanical hypersensitivity, a phenotype akin to neuropathic pain. Peptides designed on the extracellular domain of FGFR3 prevented increased neuronal excitability induced by FGFR3 autoantibodies, highlighting their potential as novel therapeutic agents for autoantibody-induced neuropathic pain.

Conclusions: Our translational study reveals that human anti-FGFR3 autoantibodies bind to their target in DRG resulting in heightened sensory neuron excitability and pain behaviors in rats. Beyond their role as biomarkers for SFN, we suggest that FGFR3 autoantibodies participate in the heightened pain sensitivity reported by patients, presenting a potential target for therapeutic intervention.

III-A.44

AOEN OF RELIEF: CRMP5 GENETIC MANIPULTION REDUCES PAIN SENSITIVITY

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Background and aims: Neuropathic pain results from nerve damage and often leads to allodynia, where non-painful stimuli cause pain. CRMP5 is a protein involved in axonal growth, highly expressed during the development of the central nervous system but absent in adults except in sensory neurons of the dorsal root ganglia. In the search for novel proteins involved in chronic pain, we investigated the role of CRMP5 in pain behaviors in naïve rats and in a model of chronic neuropathic pain.

Methods: We used methods to transiently or permanently knockdown and overexpress CRMP5 in dorsal root ganglia and spinal cord using siRNA, CRISPR/Cas9 gene editing or lentiviruses expressing CRMP5. We investigated the impact of CRMP5 knockdown in naïve animals on mechanical and thermal nociceptive thresholds. In neuropathic pain rats, we evaluated if CRMP5 expression can alleviate pain symptoms.

Results: In naïve rats with spinal CRMP5 knockdown, we observed decreased mechanical thresholds, indicating increased sensitivity to mechanical stimuli. In neuropathic pain, CRMP5 expression was severely decreased and re-expressing CRMP5 rescued mechanical thresholds. We additionally evaluated the impact of CRMP5 expression on nociceptive sensitivity to mechanical, thermal hot and cold stimuli. These findings demonstrate that CRMP5 expression modulates nociceptive sensitivity across mechanical, heat, and cold modalities.

Conclusions: The expression of CRMP5 in dorsal root ganglia and spinal cord neurons is fundamental for maintaining normal pain thresholds. Restoring CRMP5 expression in neuropathic pain alleviated reflexive hypersensitivities, highlighting its potential as a target for developing non-opioid therapeutics for pain management.

III-A.45

THE DYNAMIC BALLET OF NAV1.8 TRAFFICKING IN CHRONIC PAIN

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Background and aims: In chronic pain, increased function of the voltage gated sodium channel NaV1.8 facilitates sensory neuron firing. We identified the axonal guidance protein Collapsin Response Mediator Protein 5 (CRMP5) as a novel trafficking regulator of NaV1.8 acting as choreographer orchestrating internalization, degradation or recycling of the channel. We unravel how CRMP5 regulates NaV1.8 trafficking, contributing to chronic pain.

Methods: Immunoprecipitation experiments demonstrated that CRMP5 interacts with NaV1.8 in vivo both in the spinal cord and the dorsal root ganglia (DRG). Using a peptide array, we mapped a unique, overlapping, binding domain for CRMP5 and a deubiquitinase on NaV1.8 intracellular loop 1. Both regulators compete to bind on the channel to decide its fate. Conversely, CRMP5 binding to NaV1.8 facilitates the recruitment of E3 ligases to the C-terminal domain of the channel.

Results: In DRG neurons, pharmacological and genetic inhibition of the CRMP5/NaV1.8 interaction led to increased NaV1.8 membrane localization. In vivo, injecting a CRMP5/NaV1.8 blocking peptide in rats decreased mechanical thresholds which were reversed by the NaV1.8 blocker A-803467. This mechanical hypersensitivity is observed in rats injected with a CRMP5 siRNA. RNAscope analysis performed on human DRGs revealed sex differences and fiber specificity in the expression of NaV1.8 E3 ubiquitin ligases and deubiquitinase.

Conclusions: Our results identify CRMP5 as a master trafficking regulator of NaV1.8, as an adaptor for E3 ligases and as a competitive inhibitor for deubiquitinase. These findings establish CRMP5 as a pivotal regulator of NaV1.8 trafficking, providing new insights into the molecular mechanisms driving chronic pain and identifying potential therapeutic targets.

III-A.47

INVASIVE TREATMENT OF POSTAMPUTATION PAIN

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Background and aims: Now in Ukraine there are 70 000 military patients with the amputations.

If first-line drugs are ineffective, it becomes necessary to use second-line opioids for a long time, which can lead to serious side effects.

One of the innovative approaches in the treatment of chronic neuropathic pain is the use of specialized interventions in the form of injections of botulinum toxin A (BoNT-A), which is due to its unique mechanism of action, namely blocking cholinergic transmission in neuromuscular synapses, which leads to inhibition of acetylcholine release.

Methods: There are the following methods of injection: into the neuroma, into the triger point, subcutaneously. The target is to diagnose a neuroma using an ultrasound. The injection of Botulinum neurotoxin/Incobotulinum neurotoxin A is performed under the navigation control of an ultrasound device, using a linear sensor (frequency 5-15 MHz), in-plane or out-of-plane method of visualisation, depending on the depth of the neuroma.

Results: Statictics: 42 patients were injected BoNT- A, treatment results devided into 3 groups (depending on the treatment method), the greatest effect of pain reduced - decreased from 7,7 until 3,6 points on the scale of VAS resulted from the combination of BoNT-A + physical therapy + and antidepressant + anticonvulsant. Efect was stable and lasted for 3 months.

Conclusions: The injection of BoNT- A has been shown to be highly effective in the treatment of various types of neuropathic pain. Moreover, this treatment technique allows the patient to almost completely get rid of pain for a long time.

III-A.49

MODULATION OF IMMUNE RESPONSE AND GLIAL ACTIVATION BY THE OLIGODEOXYNUCLEOTIDE IMT504 IN A MODEL OF COLITIS

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Background and aims: Altered immune responses are key in chronic pain conditions including visceral pain, with limited treatment options. Peripheral and central immune cells mobilization and glial activation reshape the neuronal microenvironment, causing pain pathway hyperreactivity. Targeting this environment may be a promising strategy. IMT504, a non-CpG immunomodulatory oligodeoxynucleotide (ODN), initially developed to activate B lymphocytes and plasmacytoid dendritic cells, has shown anti-hyperalgesic effects linked to immune cell remodeling.

Our aim is to bring novel insights in the mechanism of action of IMT504.

Methods: Visceral inflammation was induced in C57Bl6j mice with 2% dextran sulfate sodium (DSS) in drinking water for 5 days, and IMT504 (20mg/kg, subcutaneous) was injected daily between day 3 and 5. Colon and lumbosacral DRGs were harvested to assess macrophages polarization (flow cytometry) and satellite glial cells (SGCs) activation (immunofluorescence). *In vitro*, calcium imaging experiments was conducted to evaluate the effect of IMT504 (7µg/mL) on the activation of SGCs cultures challenged with ATP (10µM) and previously sensitized with Lipopolysaccharide (LPS) (20ng/mL).

Results: IMT504 treatment changes macrophages phenotype within the colonic wall of DSS-treated mice towards an anti-inflammatory (Macrophages type 2) profile. Glial fibrillary acidic protein (GFAP) staining of lumbosacral DRGs increased with DSS treatments. This activation tended to decrease after IMT504 injection. Calcium imaging suggested IMT504 directly prevents hyperactivation of LPS-sensitized SGCs.

Conclusions: IMT504 appears to modulate both immune response and SGCs activation in a model of colitis. Further works are now needed to better understand how these mechanisms influence neuronal transmission of visceral pain signal.

III-A.50

IMPACT OF A GASTROINTESTINAL INFECTION WITH ENTEROBACTERIACEAE ON THE „WELL-BEING“ OF THE HOST: INVOLVEMENT OF TRYPTOPHAN METABOLISM

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Background and aims: Irritable Bowel Syndrome (IBS) is a gastrointestinal disorder linked to an imbalance in the brain-gut-microbiota axis. Chronic abdominal pain is the major symptom, associated to cognitive-emotional comorbidities. It can occur after a gastrointestinal infection and named post-infectious IBS (PI-IBS). The pathophysiological mechanisms are unknown, and current treatments are only symptomatic, with a low level of efficiency. A mouse model using a transient gastrointestinal infection by *Citrobacter rodentium* replicates some patient symptoms and shows colonic disturbances in tryptophan metabolism.

Methods: Our study aimed to validate the chronicity of symptoms in both males and females, and examine associated changes in brain tryptophan metabolism. Behavioral analyses and RT-q-PCR analysis of enzymes in the kynurenine/IDO pathway were conducted, along with metabolomics analysis of tryptophan pathways in the colon and various brain regions (prefrontal cortex, hippocampus, striatum, and amygdala) involved in depression, anxiety, and cognitive disorders.

Results: Our research confirmed symptoms chronicity without sexual dimorphism in the model. It highlighted short-term variations in tryptophan metabolites in different brain regions and the colon. Gene expression changes, such as KYNU, were noted in the prefrontal cortex, linked to anxio-depressive behavior. Long-term results showed a persistent decrease in KYNU and KAT expression in the prefrontal cortex and striatum, related to cognitive disorders.

Conclusions: These findings suggest that the kynurenine/IDO pathway of tryptophan metabolism may be involved in the psychological comorbidities of PI-IBS. Future longitudinal studies using brain microdialysis in areas identified by this work will be set up to confirm these results.

III-A.51

MATRIX METALLOPROTEINASES DIFFERENTIALLY MODULATE SENSORY NEURONS VIA PAR1

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Background and aims: Visceral pain is a leading cause of morbidity in people with colitis. The mediators and mechanisms response for this are not fully understood, however data from our recent single cell RNAseq study of transcript expression in colonic nociceptors (Hockley *et al* 2019) coupled with transcriptomic profiling of tissue from people with inflammatory bowel disease (IBD) (Higham *et al* 2024) suggests a possible role for matrix metalloproteinases (MMPs) acting via proteinase-activated receptor 1 (PAR1).

Methods: To explore this possibility, we examined changes in intracellular Ca^{2+} concentration within sensory neurons isolated from dorsal root ganglion (DRG: T12-L6) of WT C57BL/6 male mice using the Ca^{2+} sensitive dye Fluo-4-AM.

Results: Studies revealed a marked concentration dependent increase in the proportion of sensory neurons stimulated by MMP-3, -8, or -9. These effects were abolished by pre-treatment with the selective PAR1 antagonist vorapaxar consistent with the ability of MMP-3, -8, -9 to cleave PAR1 at its canonical thrombin site. Furthermore, although MMP-2 given alone had no effect on Ca^{2+} mobilization in sensory neurons, pre-treatment with MMP-2 significantly attenuated the activation of sensory neurons to subsequent application of MMP-3 or the PAR1 agonist TRAP6. These findings highlighting how MMP-2 which acts at a different cleavage site to MMP-3 inhibits canonical PAR1 signalling.

Conclusions: This study demonstrates the differential effect of MMPs on PAR1 mediated sensory neuron activation and highlights how MMPs may contribute to pain during colitis.

III-A.52

EXPLORING PAIN AND OPIOID MISUSE AMONG PATIENTS WITH SICKLE CELL ANEMIA: ASSOCIATIONS WITH HEALTH LITERACY AND PAIN CATASTROPHIZING

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Background and aims: Sickle cell anemia (SCA) patients often suffer from chronic pain, frequently managed with opioids, which raises concerns about potential misuse.This study aimed to investigate pain characteristics, opioid misuse prevalence, and the relationship between health literacy and pain catastrophizing in SCA patients.

Methods: A cross-sectional study was conducted among SCA patients in Oman. Validated tools were used to assess pain (Brief Pain Inventory), health literacy (HLS-Q12), opioid misuse (Current Opioid Misuse Measure), and pain catastrophizing (Pain Catastrophizing Scale).

Results: The study included 169 SCA patients with an average age of 34.4 (SD = 12.9) years, of whom 51.5 % were female. A total of 79.3% reported experiencing pain, with an average total pain score of 3.8 (SD = 2.6). Additionally, 74% were identified as being at risk for opioid misuse. Opioid misuse was positively associated with pain catastrophizing (r=0.302, p<0.001) and negatively associated with health literacy (r=-0.220, p=0.005). Pain severity and pain interference were also linked to opioid misuse. Sociodemographic factors, such as age, gender, and education, showed no significant association with opioid misuse.

Pearson Correlation Coefficient Test of Total Opioid Misuse Score with Interval Variables.

		Age	Monthly Income	Total Pain catastrophizing	Total Health literacy	Total Pain	Total Pain interference
Total score of Total Opioid Misuse	**r**	.155	-.052	.302	-.220	.334	.169
	P value	.065	.534	<.001	.005	.003	.012
	N	166	166	165	165	161	163

p-value is significant at < 0.05,

Comparative Analysis of Demographic Characteristics with The Total Opioid Misuse Using Independent T-tests.

Variable		Mean (SD	df	t	p-value	95% CI
Gender	Male Femal	18.8 (11.6) 16.6 (11.2)	164	-1.26	.209	-5.73 to 1.26
Marital status	Not Married Married	17.6 (11.9) 17.8 (10.9)	164	-1.30	.896	-3.76 to 3.29
Education level	Secondary School or less Diploma and above	18.3 (11.9) 16.7 (10.7)	164	.875	.383	-1.99 to 5.16
Duration of opioid use	Less than 1 year One year and more	19.8 (10.5) 16.8 (11.7)	164	1.54	.125	-0.84 to 6.85
Employment	Emplyoed Unemployed	18.1 (11.9) 17.4 (11.2)	164	-.385	.701	-04.24 to 2.86

Conclusions: SCA patients face high rates of chronic pain and a considerable risk of opioid misuse. Psychological factors, particularly pain catastrophizing, and lower health literacy were strongly associated with misuse risk, while sociodemographic factors had less impact. The findings underscore the importance of targeted interventions focusing on psychological support and health literacy to mitigate opioid misuse in SCA patients.

B | BASICS IN PAIN

I-B.01

HISTORY OF PAIN: A 5000-YEAR NARRATIVE REVIEW THROUGH ANCIENT CIVILIZATIONS' CONTRIBUTIONS TO MODERN PAIN THEORIES

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Background and aims: Pain and its management have been a predominant and recurring issue since the dawn of humanity. The objective of this review is to trace the historical evolution of the concept of pain through the ages and to present how modern theories of pain represent a legacy of ancestral knowledge.

Methods: We conducted a comprehensive review of primary and secondary sources across 6 major historical periods – including Prehistory, Antiquity, the Middle Ages, the Renaissance, the Modern and Contemporary eras – utilizing academic databases, specialized libraries, and historical archives.

Results: During ancient civilizations notably Egyptian, the conception and treatment of pain oscillated between religious beliefs and medical advances. Greco-Roman societies made significant contributions to the understanding of pain mechanisms and management. The theory of humours by Hippocrates lasted until the Renaissance. Contrary to popular belief, significant advances were made during the Middle Ages despite the impact of religions. Exchanges between the Europe and Eastern civilizations are driving a major dynamic in the translation and dissemination of knowledge. During the Renaissance, religious influences waned through a new way of thinking, freer from religious dogma, and secular medicine made significant progress. The development of pain theories marked the 19th century, accompanied by important technological advances.

Conclusions: Long considered an expression of internal suffering, pain has fascinated humanity throughout history. This historical review demonstrates that the conception and treatment of pain have evolved over centuries, and that our understanding of pain in Western society is largely rooted in the legacy of ancient civilizations.

I-B.02

HLA-REGION GENETIC ASSOCIATION ANALYSIS OF BREAST CANCER PATIENTS WITH AND WITHOUT CHRONIC POSTSURGICAL NEUROPATHIC PAIN

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Background and aims: Surgical nerve injuries lead to persistent neuropathic pain in 30-70% of the patients. Among many other factors, also polymorphisms in the human leukocyte antigen (HLA) genes have been suggested to contribute to the development of neuropathic pain.

Methods: We performed a genetic association analysis of HLA class I and class II alleles in women who had been operated for breast cancer. Patients had a surgeon-confirmed perioperative nerve injury and were examined 4-9 years after their surgery. Patients with painful (n= 27) and painless (n= 30) intercostobrachial nerve resection were

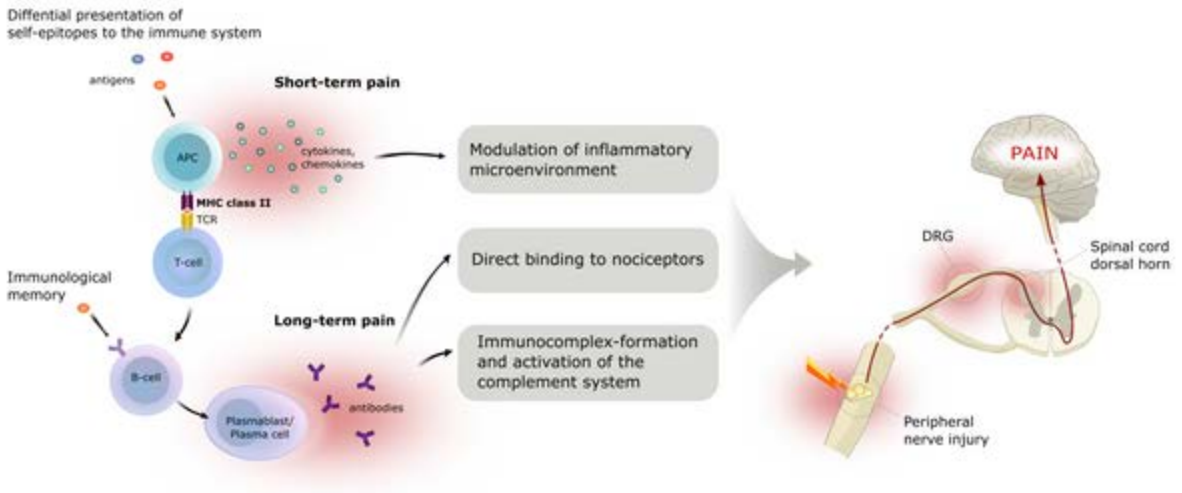
studied. Neuropathic pain was diagnosed by stepwise neuropathic grading criteria. Whole-genome single nucleotide polymorphism data were produced and HLA class I (HLA-A, -B, -C) and class II (HLA-DRB1, -DQA1, -DQB1 and -DPB1) alleles were determined by imputation.

Results: HLA-DRB1*03:01, DQA1*05:01, and DQB1*02:01 alleles were associated with painful nerve injury after breast cancer surgery (nominal p=0.007 for all, FDR corrected p>0.07). These alleles comprise the DR3-DQ2 haplotype, which is part of the ancestral haplotype AH8.1. The extended haplotype including B*08:01 allele did not show nominally significant association.

Table 1. Description of patient with and without persistent post-surgical neuropathic pain.

	Pain	**No pain**	**p-value**
Patients n	27	30	
Age at surgical nerve injury, years, mean (SD)	53.9 (6.1)	57.4 (7.8)	0.061
Age at follow-up, years, mean (SD)	60.3 (5.8)	64.0 (7.5)	**0.044**
Time from nerve injury to follow-up, months, mean (SD)	77.5 (13.5)	78.1 (14.6)	0.874
BMI at surgical nerve injury, mean (SD)	25.2 (4.3)	23.8 (3.5)	0.190
BMI at follow-up, mean (SD)	26.0 (4.2)	23.6 (3.7)	**0.027**
Type of breast surgery, number (%)			
BCS	11 (40.7)	10 (33.3)	0.563
Mastectomy	16 (59.3)	20 (66.7)	
Type of axillary surgery, number (%)			
SLNB	1 (3.7)	5 (8.8)	0.111
ALND	26 (96.3)	25 (83.3)	
Chemotherapy, number (%)	23 (85.2)	25 (83.3)	0.848
Docetaxel	22 (81.5)	23 (76.7)	0.656
CEF	23 (85.2)	24 (80.0)	0.607
Trastuzumab treatment, number (%)	1 (3.7)	5 (16.7)	0.111
Radiotherapy, number (%)	20 (74.1)	19 (63.3)	0.384
Endocrine therapy, number (%)	24 (88.9)	25 (83.3)	0.547
Tamoxifen	19 (70.4)	19 (63.3)	0.574
Aromatase inhibitor	20 (74,1)	23 (76.7)	0.820

Student's t-test was used for continuous and Chi square test for the categorical variables. P-values <0.05 are shown in bold letters. ALND, axillary lymph node dissection; CEF, cyclophosphamide-ebirubicine-5-fluorouracil; SD, standard deviation; SLNB, sentinel lymph node biopsy.



Conclusions: Our results provide further evidence for the role of HLA genetic variation in the development of persistent post-surgical neuropathic pain, which indirectly implies mechanism involving immunological memory in this process.

I-B.03

RELATIONSHIP BETWEEN SCAPULA POSITION AND PAIN, RANGE OF MOTION, MUSCLE STRENGTH AND UPPER EXTREMITY PERFORMANCE IN CHILDREN WITH THORACIC HYPERKYPHOSIS

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Background and aims: The increased thoracic kyphosis angle causes sensitivity in the spine, neck, back, and shoulder pain. In addition, hyperkyphosis disrupts the normal position of the scapula by causing protraction and downward rotation, which may negatively affect upper extremity range of motion, strength, and performance. In light of this information, our study aims to examine the relationship between scapula position, pain, and upper extremity range of motion, strength, and performance in children with thoracic hyperkyphosis.

Methods: Pain(numerical rating scale), kyphosis angle(flexicurve ruler and wall-occiput distance), upper extremity range of motion(with digital goniometer), upper extremity muscle strength(digital myometer), scapula position(Lateral Scapular Glide Test) and upper extremity performance(Closed Kinetic Chain Upper Extremity Stability Test, Upper Extremity Y-Balance Test and Medicine Ball Throwing Test) were evaluated.

Results: 15 children with thoracic hyperkyphosis and 15 healthy children aged 7-14 were included in our study. There was a significant difference between the groups in terms of pain($p<0.05$), but there was no significant difference in terms of range of motion and muscle strength($p>0.05$). There was a significant difference between the groups in the lateral scapular glide test and upper extremity performance tests, except for the medicine ball throwing test($p<0.05$). Additionally, the angle of hyperkyphosis was found to be associated with pain and upper extremity performance.

Conclusions: The increased angle of hyperkyphosis is associated with pain. Hyperkyphosis negatively affects upper extremity performance by affecting the position of the scapula. Therefore, it is important to manage this deformity at a young age.

I-B.04

BEYOND THE BIOMEDICAL: UNVEILING CHRONIC PAIN THROUGH AUTOPATHOGRAPHIES. EXPLORING CONTEMPORARY PAIN EXPERIENCES

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Background and aims: Chronic pain transcends the biomedical framework, affecting and being shaped by social, political, and economic domains. This research investigates chronic pain as an intersubjective phenomenon embedded in socio-cultural-historical contexts, aiming to explore its multidimensionality beyond the biomedical gaze. By examining 36 contemporary autopathographies — chronic pain bearers' narratives— the study seeks to identify elements intersecting with and shaping chronic pain experiences.

Methods: The study adopts an interdisciplinary and artistic research approach guided by Ann-Françoise Schmid's philofiction methodology. The autopathographies are examined through artistic reasoning, prioritizing their first-person perspectives to reveal painmorphic acts—expressions that uncover the complex entanglements of pain beyond the subjective ones. The research invites diverse disciplines, such as medical anthropology, neuroscience, consciousness studies, and virtual reality technologies. It also welcomes attention economy, enactivism, and proprioception to participate as needed, fostering a comprehensive understanding.

Results: The research reveals that chronic pain experiences vary according to factors such as social class, ethnicity, gender, life trajectory, spiritual beliefs, and genetic disposition. Additionally, literacy, capitalism, and access to technology significantly influence how pain is perceived and treated. Chronic pain is reinterpreted as a temporal and spatial phenomenon shaped by intersubjective elements and multidimensional domains.

Conclusions: This study demonstrates that by integrating artistic reasoning and interdisciplinary perspectives, new ways of addressing the complexity of chronic pain may emerge. It offers a novel understanding of chronic pain as an entangled phenomenon, highlighting its socio-cultural, emotional, and cognitive dimensions alongside its biomedical aspects.

I-B.05

ISOLATING BRAIN REGIONS THAT MODULATE THE PAIN EXPERIENCE THROUGH EMOTION AND COGNITION

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Background and aims: Numerous neuroimaging studies have identified brain regions whose activity is associated with the modulation of pain perception through cognitive and emotional tasks. This study aims to identify a potential common brain network underpinning the increase (hyperalgesia) or decrease (hypoalgesia) of experienced pain through these types of tasks.

Methods: a two-step review of neuroimaging studies regarding the cognitive and/or emotional modulation of pain perception was carried out through keyword-based search on PubMed/MEDLINE, Cochrane and Web of Science databases, followed by identification of additional records through reference tracking. In parallel, we applied Multivariate Pattern Analysis (MVPA) to fMRI data from 88 subjects receiving constant nociceptive stimulation, while undergoing cognitive and emotional tasks modulating pain perception.

Results: Keyword-based search and reference tracking identified a total of 133 records, of which 35 fulfilled completely the selection criteria (888 participants). Analysis of the activation peak coordinates revealed a recurrent but inconsistent participation of the anterior and mid-insulae, mid and anterior cingulate cortices, orbitofrontal cortex and caudate during hypoalgesia as well as hyperalgesia. Some of those regions were also shown to have a role in predicting pain modulation in a preliminary MVPA model based on data from 36 participants, with a significant correlation coefficient between predicted and true pain ratings ($p<0.001$).

Conclusions: Brain regions associated to emotional/cognitive pain modulation are not primarily sensory areas but multimodal structures integrating important information from the context, highly interconnected with higher order networks. They can modulate how we perceive a constant noxious stimulus and may represent interesting neuromodulation targets.

I-B.06

TEMPORAL CONTRAST ENHANCEMENT DURING AUDITORY AND THERMAL STIMULATION: AN EXPERIMENTAL STUDY

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Background and aims: Offset analgesia is a procedure that is used to assess endogenous pain inhibition. Offset analgesia – or temporal contrast enhancement (TCE) - is characterized by a disproportionately large reduction in pain following a small decrease in a heat stimulus. It is not clear whether TCE can also be elicited independently of the nociceptive system and therefore be generalized to other sensory perceptions or whether the stimulus requires pain sensation. Hence, this study aimed to ascertain whether a TCE effect could be elicited by both thermal and auditory stimuli and to determine the correlation between these two modalities.

Methods: Healthy participants (n = 29) were asked to evaluate the sensation of different auditory and thermal stimuli on an electronic visual analogue scale. Both the auditory and thermal stimuli were using individually calibrated intensities for the application of a TCE paradigm - offset trials and constant trials.

Results: The average intensity used to stimulate was between 46.7°C (SD 0.7) and 47.7°C (SD 0.7) and between 90.4dB (SD 7.8) and 95.0dB (SD 7.1). Comparing the TCE effect for each sensation a significant TCE effect was shown for auditory stimulation ($p = 0.002$) and thermal stimulation ($p < 0.001$). Regarding the TCE effect there was no correlation between the two modalities ($r = 0.23$; $p = 0.26$). Fin

Conclusions: Preliminary results indicate the absence of a correlation between thermal and auditory stimulation in inducing a TCE effect. This suggests that distinct mechanisms may underlie the induction of a TCE effect for different sensory modalities.

I-B.07

CHARACTERIZATION OF THE FIRST AND SECOND PAIN SENSATION IN OFFSET ANALGESIA

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Background and aims: Offset analgesia (OA) is defined as a disproportionate reduction in pain perception following a small reduction in noxious stimulation. However, the underlying mechanisms of this phenomenon are still unclear, with debates focused on peripheral vs. central influences. The aim of this experimental study was to distinguish between the first and second pain perception during the OA paradigm and thus to investigate a fiber-specific influence of A-d and C-fibers in OA.

Methods: Thirty healthy participants were asked to distinguish between a double pain sensation (first and second pain) and to assess pain intensity using an electronical visual analogue scale, pain quality descriptors related to A-d and C-fibers and response times of brief noxious heat stimuli during offset and constant trials.

Results: No significant differences were found between the offset and constant trials in the perceived double pain sensation or pain descriptors ($p > 0.05$). Nevertheless, it was observed that there were significant differences in reaction times between the offset and constant trials, with participants reacting more slowly during the offset trials ($F(1,29) = 5,51$, $p = 0.026$).

Conclusions: The results demonstrate that the subjective characteristics of A-d and C-fibers are not influenced by OA, indicating a minor peripheral role in OA. Further investigation is required to elucidate the delayed response in OA. In this context, mechanisms such as activity-dependent central processing and predictive coding may contribute significantly to the processing of OA.

I-B.08

AN EXPLORATORY APPROACH ON THE NEURONAL PROCESSING OF THE TEMPORAL DERIVATIVES OF PAINFUL STIMULI INDICATE INVOLVEMENT OF THE SUBCALLOSAL AREA

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Background and aims: The neuronal basis of temporal filtering mechanisms, existent in phenomenon such as offset analgesia (OA) (Grill & Coghill, *J.Phys*. 2001), is not well-known.

Using an exploratory approach, we investigated which brain regions might inform about the temporal derivative of painful stimuli. Based on previous findings on the modulation of pain processing (e.g. Eippert et al., *Neuron* 2009), we expected the periaqueductal gray (PAG) to be involved in the process.

Methods: During 3 sessions of fMRI, thermal heat was applied to the volar forearm of 30 healthy participants, with maximal temperatures calibrated individually to a VAS-rating of 70 on a scale from 0 to 100.Applying 2 extreme temperature rates of in- and decrease (2°C/sec and 60°C/sec) provided 4 ramps of continuous stimulation (Fig. 1). In a GLM, we included 1 parametric modulator reflecting the temperature-ramp (Temp) and one reflecting the temporal derivative of temperature-ramp (Deriv) (Fig. 1), allowing to model any asymmetry with respect to the rise and fall dynamics.

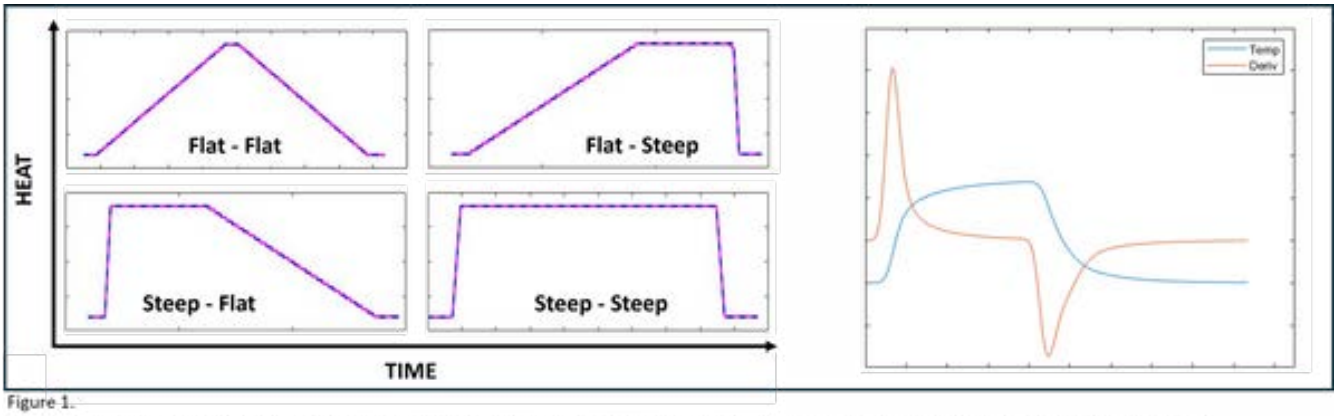

Figure 1.
Left: Applying 2 extreme temperature rates of in- and decrease (2°C/sec and 60°C/sec) provided 4 different ramps of continuous thermal heat stimulation.
Right: Example of the shape of the parametric modulators '*Temp*' and '*Deriv*' for the condition '*steep-steep*' as entered in the general linear model.

Results: Our paradigm reliably activates neuronal representations of thermal pain in pain processing areas such as dorsal posterior insula (Fig. 2).As for the derivatives of temperature we observe significant activations at $p < 0.05$ (FWE-corrected) in parts of the subcallosal area (Fig. 3), which previously has been reported to be involved in the processing of pain stimulation (e.g. Bingel et al., *PAIN* 2007).

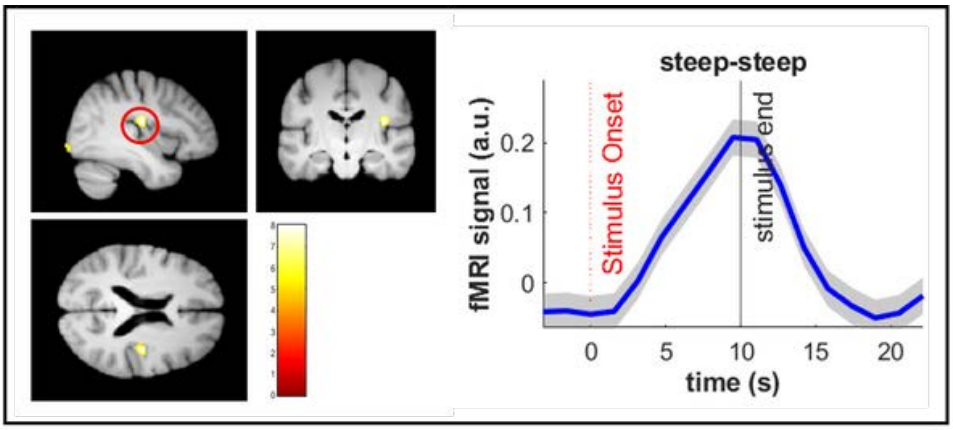

Figure 2. As an example, the modeled parametric modulator '*temperature*' in the condition '*steep-steep*'.
Left: Peak activation, in dorsal posterior insula (XYZ, MNI 39/-16/19, FWE-corr $p < 0.05$, T = 8.02)
Right: Signal change across time.

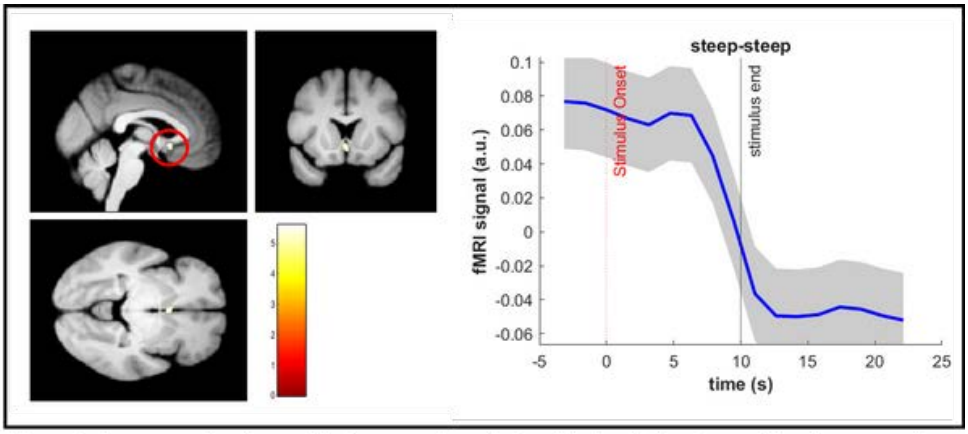

Figure 3. As an example, the modeled parametric modulator '*derivative*' in the condition 'steep-steep'.
Left: Peak activation, in subcallosal area (XYZ, MNI -2/14/-6, FWE-corr p < 0.05, T = 5.59)
Right: Signal change across time.

Conclusions: While our results do suggest some neuronal temporal filtering mechanism by the subcallosal area, the exploratory nature of our study requires replication in an independent sample.

I-B.09

SEX DIFFERENCES IN OXYTOCINERGIC NEURON PROJECTIONS TO THE AMYGDALOID COMPLEX IN MALE AND FEMALE MICE SUBJECTED TO THE HYPERALGESIC PRIMING MODEL

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Background and aims: Oxytocin is a neuropeptide synthesized in the hypothalamic paraventricular (PVN) and supraoptic (SON) nuclei, playing a crucial role in modulating both responses to stress and pain. Studies highlight the amygdaloid nuclei as potential targets for the analgesic effects of oxytocin. This study aims to investigate oxytocinergic projections to the amygdala and their role in mice subjected to the hyperalgesic priming model.

Methods: The experiment involved female and male Swiss Webster mice, which underwent stereotaxic surgery for the injection of 0.06 µL of a neuronal anterograde tracer (fluoro-Ruby - Termofisher) into the PVN. Animals were then assigned to either the naïve or hyperalgesic priming group. The amygdaloid complex were evaluated by immunofluorescence assay for the ΔFOSB expression. Data were analyzed using one-way ANOVA with Duncan's post hoc test. Funding: FAPESP (2024/01917-0 and 2022/04387-6)

Results: The microscopy analyses confirmed the presence of neurotracer in the amygdaloid complex. The immunofluorescence results showed differences in the expression the ΔFOSB only in the basolateral nucleus (BLA) ($F_{3,13}$=5,53, p<0.05) between females naïve and those experiencing hyperalgesic priming. Post-hoc revealed decreased ΔFOSB in the BLA of female mice experiencing pain compared to naïve females. No statistical differences were observed in ΔFOSB expression within the central and medial nuclei or in the amygdaloid complex of male mice.

Conclusions: Preliminary results indicate that the amygdaloid complex receives projections from the PVN. Furthermore, the BLA of female mice experiencing pain exhibits decreased activation compared to that observed in naïve female mice.

I-B.10

MECHANISMS UNDERLYING LONG-TERM PAIN SENSITIVITY INDUCED BY NEONATAL REPETITIVE PINPRICK STIMULATION

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Background and aims: Early-life pain exposure is known to impact pain processing in adulthood, but the mechanisms through which this occurs remain unclear. This study aimed to investigate the activity of pain-related neural pathways and the role of neurotransmitters in rats subjected to neonatal repetitive pinprick (PP) stimulation. Specifically, we examined serotonergic and noradrenergic neuron activity and assessed the effects of serotonin (5-HT) and noradrenaline (NA) reuptake inhibitors on neuropathic pain sensitivity in male and female rats.

Methods: The study was divided into two parts: 1) confirmation of increased neuropathic pain sensitivity in adulthood following neonatal PP stimulation, alongside the evaluation of serotonergic neuron activity in the dorsal raphe nucleus and noradrenergic neuron activity in the locus coeruleus (n = 6-8 per group); and 2) assessment of the impact of fluoxetine (a selective 5-HT reuptake inhibitor) and desipramine (a NA reuptake inhibitor) on pain sensitivity after nerve injury in PP-exposed rats (n = 8 per group).

Results: Results showed that neonatal PP stimulation heightened adult sensitivity to neuropathic pain and was associated with reduced activity of 5-HT and NA neurons. Pretreatment with 5-HT and NA reuptake inhibitors significantly mitigated the increased pain response. These findings indicate that early-life PP stimulation alters pain processing by modulating serotonergic and noradrenergic pathways.

Conclusions: In conclusion, neonatal pain exposure impacts long-term pain sensitivity by reducing serotonergic and noradrenergic neuron activity. This study provides insight into the mechanisms behind increased pain susceptibility following early-life noxious stimulation and highlights potential treatment strategies for managing chronic pain linked to early pain experiences.

I-B.11

PAIN CATASTROPHIZING ATTENUATES ENDOGENOUS PAIN INHIBITION BY REWARD

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Background and aims: Pain catastrophizing is a critical factor that influences pain sensitivity and predicts the risk of developing chronic pain. As a cognitive control strategy, it shapes how individuals react to pain as a signal of actual or potential threat. By top-down modulation of nociceptive input, catastrophizing may alter the experience of both pain and its relief. Pain and relief are important signals that guide behavior, and engaging in active decision-making can modulate their perception. This study aimed to investigate whether enhanced catastrophizing affects the modulation of relief perception during active decision-making.

Methods: A novel, interview-based approach was used to induce enhanced pain catastrophizing and its effectiveness was assessed using the Pain Catastrophizing Scale (PCS). In a within-subjects design, human volunteers completed a probabilistic relief-seeking task (a „wheel-of-fortune“ gambling task) to evaluate modulation of pain relief from tonic heat pain under both catastrophizing and neutral conditions.

Results: PCS scores confirmed successful induction of an enhanced state of pain catastrophizing in the experimental condition. Active relief-seeking enhanced relief perception in the neutral but not in the catastrophizing condition and relief modulation during active decision-making was significantly smaller in the catastrophizing condition.

Conclusions: These findings demonstrate that the extend of catastrophic thinking about pain can be experimentally manipulated. Catastrophic worry attenuated the modulation of relief perception during active decision-making, highlighting the role of value-based decision-making as a potential link between cognitive distortions and altered pain perception. These insights could inform future interventions aimed at mitigating the effects of catastrophizing in clinical settings.

I-B.12

PAIN IN PARKINSON‘S DISEASE: THE INFLUENCE OF THE BASAL GANGLIA OVER THE DESCENDING INHIBITORY PAIN PATHWAY

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Background and aims: Central neuropathic pain and chronic pain in Parkinson’s disease (PD) have been suggested to be due to a dysfunction in the inhibitory pain control pathway originating in the Periaqueductal Gray nucleus (PAG). However, the functional state of the PAG has never been experimentally investigated in the context of PD.

Methods: Using both female and male PD mouse models and their controls, we first behaviorally assessed the activity of the descending inhibitory pain pathway using the Diffuse Noxious Inhibitory Control test. We then recorded PAG neurons using in vivo extracellular electrophysiology in anesthetized mice.

Results: In the DNIT, we found a decreased efficiency of this pathway in PD female mice only. We then found that the ventro-lateral PAG, known to be the main locus of the descending pathway, exhibits exacerbated nociceptive responses as well as increased firing rates in both PD male and female mice. A similar alteration was found in the lateral PAG while the dorsal part of the PAG were not affected. We specifically identified the PAG cells part of the descending pathway and found that the abnormal nociceptive responses and firing rates were more pronounced in neurons involved in the descending pathway.

Conclusions: These findings indicate that the PAG is indeed impacted in the context of PD, with exacerbated nociceptive responses, especially within the descending pathway. Further experiments are now required to link our findings with the development of pain symptoms observed in PD patients.

I-B.13

LATENT CLASS ANALYSIS REVEALS SUBGROUPS OF INHIBITORY CONDITIONED PAIN MODULATION ACROSS PATIENT COHORTS AND CONTROLS

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Background and aims: Conditioned pain modulation (CPM) effects, indicating descending pain modulatory capacities, vary across individuals. Subgrouping chronic pain patients based on their CPM effects has been proposed to guide mechanism-based treatment decisions. However, previous subgrouping studies have not accounted for the variability within pain-free controls and frequently, investigated only one chronic pain condition. The present study explored whether subgroups with different CPM effects could be identified in a diverse patient and control sample.

Methods: One hundred and forty participants (patients: 53 non-specific chronic low back pain, 15 complex regional pain syndrome [CRPS], 14 neuropathic pain after spinal cord injury; 58 age- and sex-matched controls) were included. CPM was assessed in a pain-free, sensory-intact area using pressure pain thresholds (PPT) as test stimulus and a cold water bath as conditioning stimulus. Latent class linear mixed models were used to detect CPM subgroups showing different PPT trajectories throughout CPM testing.

Results: The three detected subgroups were best described as 1.) „low PPT & strong CPM effect“ (N=8), 2.) „low PPT & small CPM effect“ (N=115), and 3.) „high PPT & moderate CPM effect“ (N=17). No subgroup with deficient CPM was detected. All subgroups comprised participants of all cohorts except for CRPS patients which were not included in the first subgroup. The subgroups did not differ in demographics, psychological factors, or pain characteristics.

Conclusions: The detection of three CPM subgroups lacking distinctive clinical features highlights the need for further exploration of CPM variability. The absence of a homogeneous subgroup with deficient CPM questions its importance for chronic pain.

I-B.14

CORTICAL EXCITABILITY MEASURED BY EEG APERIODIC EXPONENT SHAPES THE BRAIN‘S RESPONSE TO PAINFUL LASER STIMULATION

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Background and aims: Pain evoked by the activation of the nociceptive system can be regulated via descending pain modulatory pathways. Since the prefrontal cortex (PFC) plays a key role in this process, its state likely influences the response to painful stimuli. The level of cortical activation and functional integration is governed by the excitation (E) and inhibition (I) ratio. E/I ratio can be estimated from the electroencephalogram (EEG) frequency spectrum, specifically from the slope of its aperiodic component defined by the power-law exponent β. This study aimed to determine whether the PFC E/I, approximated by β, can predict cortical activity (laser-evoked potentials, LEP) and pain intensity elicited by laser stimuli.

Methods: 45 healthy volunteers received 60 painful laser stimuli to two body areas (both hands, both feet, hand and foot), providing pain intensity ratings after each stimulus (visual analogue scale). EEG was recorded with a 63-active-electrode system. At the single-trial level, amplitudes and latencies of three LEP components were estimated using multiple linear regression. β was extracted from the source-projected pre-stimulus EEG, using an average PSD from 16 PFC-labelled sources. An average from 16 visual cortex sources was included as a control.

Results: Our final analysis revealed a significant association between β and LEP measures. However, this relationship is not specific to the PFC.

Conclusions: A steeper slope of the aperiodic component presumably reflects a shift towards inhibition. Our findings support this claim, linking a larger β measured across different cortical areas to slower latencies and smaller amplitudes of LEPs.

I-B.15

OSCILLATORY DYNAMICS UNDERLYING REWARD-INDUCED PAIN MODULATION: AN MEG ACCOUNT

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Background and aims: Induced neuronal activity is thought to play a key role in pain perception and pain modulation. However, from a time-frequency perspective, evidence of the involvement of induced oscillatory dynamics in pain modulation is sparse and often not assessed in source-space. To specifically investigate induced oscillatory activity associated with reward-induced pain modulation, we used a task-based Magnetoencephalography (MEG) approach. We aimed to characterize oscillatory dynamics underlying pain inhibition and facilitation at the level of the cortex.

Methods: 24 healthy volunteers took part in a probabilistic card-gambling task during MEG. Participants had to gamble to avoid punishment by pain increase and to gain reward by pain relief, administered through a contact thermode (as in Desch & al. 2023). Data was co-registered with individual anatomy and projected into source space using LCMV-Beamforming. Epochs were decomposed into time-frequency representations using Morelet wavelets for a series of regions involved in reward and pain processing (the primary and secondary Somatosensory cortices, parts of the Orbito- and Prefrontal- cortices, the Insula and the Anterior Cingulate).

Results: Actively winning pain relief and losing by getting punishment enhanced the perception of both the decrease and increase of pain, respectively. Pain inhibition and facilitation appeared associated with decrease in Beta and Gamma signalling across all regions. Pain inhibition was further associated increased theta oscillations mainly in prefrontal areas.

Conclusions: Our preliminary results suggest an involvement of theta oscillations in pain inhibition and the known involvement of gamma and beta oscillations. This possibly reflects different temporal-spectral characteristics for pain inhibition and facilitation.

I-B.16

THE INFLUENCE OF THE SPATIO-TEMPORAL CONFIGURATION OF NOCICEPTIVE INPUT ON SPATIAL SUMMATION

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Background and aims: Spatial summation of pain (SSp) refers to the nonlinear, disproportionate amplification of pain perception as the area of stimulation increases. However, the underlying mechanisms remain poorly understood. The aim of this study was to examine SSp in temporally dynamic context and capturing its' progression in real time.

Methods: Electrical noxious stimulation was applied via 5 electrodes attached to the foot, forming a continuous line-like pattern along the foot. Each participant (N=10) was exposed to four different trials. Each trial lasted 25s and was based on different spatial patterns of electrodes' activation: ascending (activation from one up to five electrodes together), descending (from five to one), random (random selection of the number of electrodes activated), or control condition with stimulation of single, random electrode. Participants rated pain continuously on computerized VAS.

Results: Substantial SSp was observed, as indicated by a significant effect of the number of electrodes activated ($p < 0.001$). However, the pattern of SSp varied depending on the type of trial ($p < 0.001$). Ascending trials were more painful compared to descending trials ($p < 0.001$) and control trials ($p < 0.01$). Conversely, descending trials were less painful than random trials ($p < 0.05$). Interestingly, random trials were equally painful as control trials, in which only a single electrode was activated.

Conclusions: This study demonstrated that a dynamic SSp paradigm effectively evoked robust SSp. The observed variations in pain intensity across trial conditions suggest the involvement of inhibitory mechanisms of unknown origin.

I-B.17

THE ECONOMIC ANALYSIS OF THE OVERLOOKED RECURRENT LOW BACK PAIN – THREE YEARS OF OBSERVATION

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Background and aims: Recent redefinitions of pain emphasize the importance of the previously overlooked recurrent low back pain (LBP). Understanding the direct medical cost for recurrent LBP cases based on the cost per visit is crucial economically. Comparative analysis of the cost per visit for LBP and recurrent LBP, including the impact of gender and type of medical service, estimating the approximate annual cost of recurrent LBP.

Methods: Data on LBP categorized according to ICD-10 codes (G54, G55, M45, M46, M47, M48, M49, M51, M53, and M54) from the Polish National Health Fund (NHF) and Opolskie Rehabilitation Center (OCR) were analyzed based on the recurrent state as outlined in the new chronic pain definition.

Results: In OCR, a recurrent LBP was confirmed for 22.78% of patients, of which 59.72% were female (p<.001). The mean value of a single procedure for recurrent LBP was 110.56 EUR, it was significantly higher for males (135.35 EUR) than for females (92.94 EUR) (p=.008). Recurrent LBP generated a higher cost per visit for medical services than LBP (p<0.001), except for physiotherapy. Additionally, males had more inpatient admissions and females utilized more physiotherapy services for both LBP and recurrent LBP. The average annual cost of LBP-related medical services in Poland was €243,861,639.

Conclusions: Recurrent LBP accounts for 5% of total direct LBP costs and has a higher cost per visit than LBP, excluding physiotherapy services. Gender significantly affected per-visit costs, with males having more inpatient admissions and females utilizing more physiotherapy services for both LBP and recurrent LBP.

I-B.18

EVALUATION OF THE STRUCTURAL AND CONSTRUCT VALIDITY OF THE PAIN UNDERSTANDING AND CONFIDENCE QUESTIONNAIRE FOR ASSSSING THE PAIN MANAGEMENT COMPETENCE OF PHYSIOTHERAPISTS

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Background and aims: The Pain Understanding and Confidence Questionnaire (PUnCQ), developed in 2020, comprises two parts: the first assesses clinical judgments based on contemporary pain knowledge, and the second consists of items querying confidence in pain management for the presented vignette. Contrary to existing measures, PUnCQ surpasses general pain knowledge assessment, focusing on the capacity to make appropriate clinical decisions within a specific vignette. Thus, PUnCQ may be a promising measure to assess the clinical competence of physical therapists in pain management. This study evaluated the structural and construct validity of PUnCQ.

Methods: Eligible participants were two cohorts of physical therapists managing patients with pain. PUnCQ and Knowledge and Attitudes of Pain (KNAP) data were collected using an anonymous survey. Confirmatory factor analysis was conducted for both parts of the PUnCQ, and an exploratory factor analysis was conducted when multidimensionality was suspected. Construct validity was assessed with the hypothesis that Pearson's r values to KNAP scores, indicating knowledge about modern pain science and biopsychosocial attitudes toward pain, were expected to be 0.3–0.5 in part one and >0.5 in part two.

Results: Data from 112 participants were analyzed. Part one of the PUnCQ fully satisfied predetermined criteria for unidimensionality, but part two did not. Part two demonstrated a 2-factor structure, while Cronbach's alpha was 0.98 across all items. Statistically significant construct validity correlations were detected with the KNAP in each part of the PUnCQ (r=0.26 in part one and r=0.41 in part two).

Conclusions: PUnCQ has structural validity and an aspect of construct validity.

I-B.19

KNOWLEDGE AND ATTITUDE ON THIRD YEAR NURSING STUDENTS REGARDING PAIN MANAGEMENT AT UBT COLLEGE

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Background and aims: Nurses‘ understanding and perspectives on pain independently influence their practice effectiveness. At UBT College, nursing students undergo a three-year program that incorporates pain management education. This research aimed to assess the knowledge and attitudes of third-year nursing students concerning pain management.

Methods: A quantitative approach was used, employing a structured questionnaire to evaluate the knowledge and attitudes of third-year students on pain management. Data collection was conducted using the Nurses‘ Knowledge and Attitude Survey Regarding Pain (NKASRP) tool. The data were analyzed using SPSS version 26.

Results: A total of 147 students completed the questionnaire. The mean score for knowledge and attitude was 47.2% with a standard deviation of 11.5. The analysis revealed that students‘ knowledge and attitudes were at an average level.

Conclusions: Third-year nursing students at UBT College possess poor to average knowledge of pain management. It is recommended that the nursing school seriously consider revising the curriculum to include comprehensive, evidence-based information on the evaluation and management of pain.

I-B.20

PHYSIOTHERAPISTS’ USAGE AND NEEDS REGARDING PAIN NEUROSCIENCE EDUCATION. AN ONLINE SURVEY

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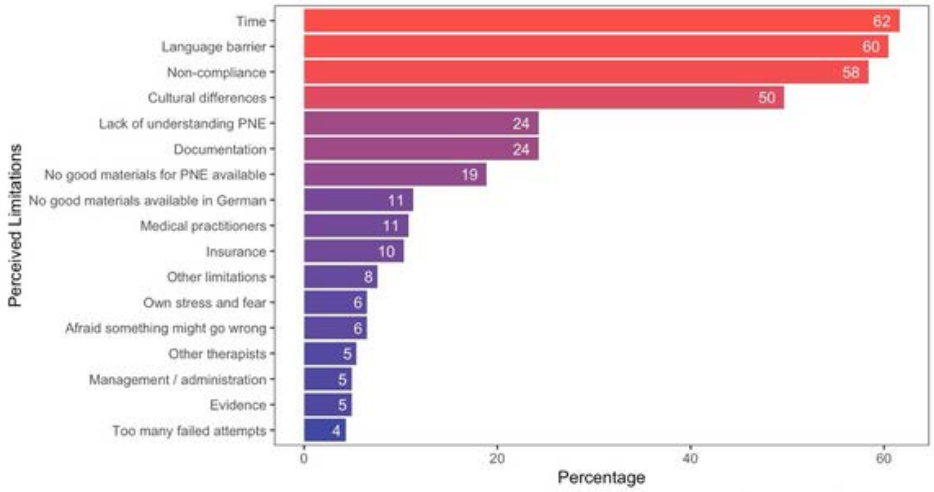
[1]Bern University of Applied Sciences, Bern, Switzerland, [2]University of Zurich, Zurich, Switzerland

Background and aims: Pain Neuroscience Education (PNE) is an effective tool for the management of persistent pain, in which patients are taught about pain science. However, no one has investigated how many physiotherapists actively integrate PNE into their clinical practice in Switzerland, nor whether there are unmet needs regarding materials.

Methods: An online survey investigating the usage of PNE and the needs regarding materials was sent to over 400 physiotherapists in Switzerland. The responses were analysed via RStudio with descriptive analyses and *t*-tests.

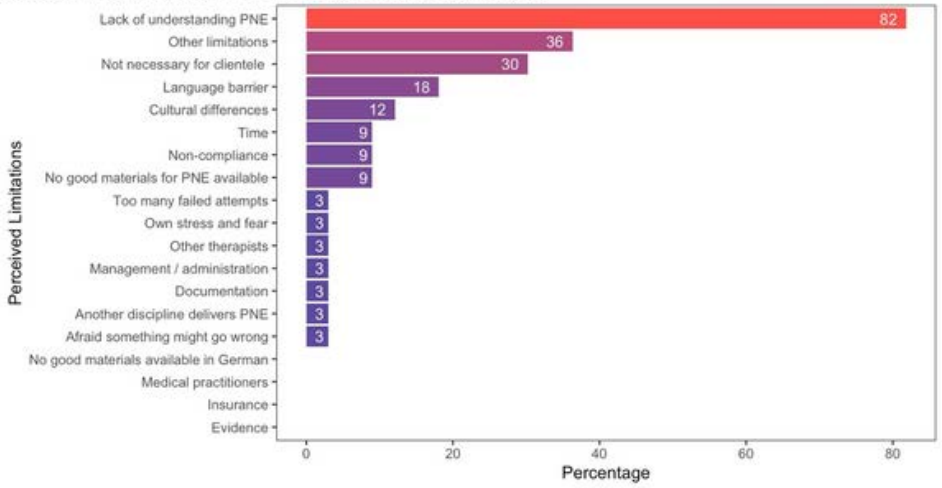
Results: Of the 358 participants almost 70% did know of PNE, while only 39% felt confident to apply it in their clinical practice. The most frequently mentioned limitations to usage were time and a language barrier, while 26% felt that they did not know PNE well enough. Indeed, only 21% were taught about PNE during their undergraduate studies and materials that dove deeper into the topic of PNE were only known to a fraction of participants. Existing materials were noted to be received well but a need was highlighted for materials in a variety of languages. Bridging the gap between knowing the neurophysiology and teaching it to patients was an issue raised by several participants.

Figure 1
Limitations to the Usage of PNE for Users of PNE



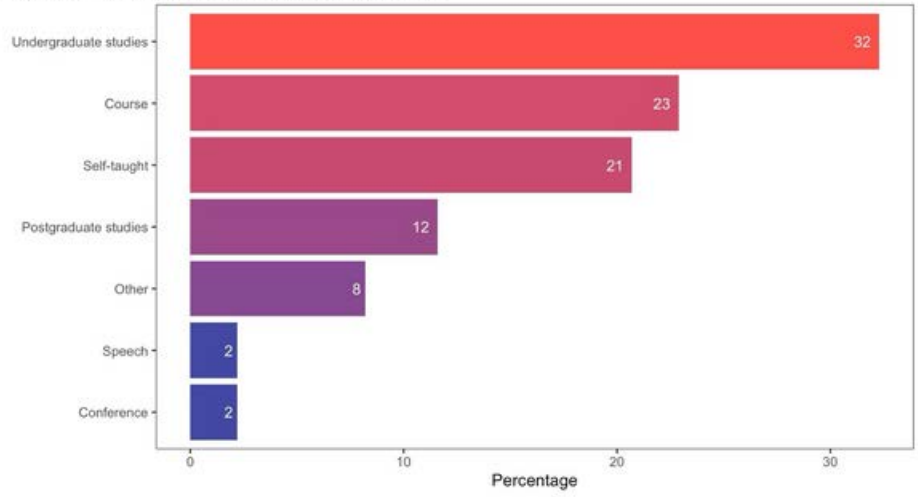
Note. In this figure, the limitations perceived by physiotherapists using Pain Neuroscience Education (PNE) in their practice are displayed in order of occurrence (n = 185, 48% of the whole sample, 85% of therapists who knew PNE). Written within the bar is the percentage of occurrence.

Figure 2
Reasons for Therapists to not use PNE Despite Knowing it



Note. This figure shows the reasons why physiotherapists do not use Pain Neuroscience Education (PNE) in clinic despite knowing of it (n = 35, 9% of whole sample, 15% of physiotherapists who knew PNE). The reasons are in a decreasing order of occurrence. The percentage is written within the bar.

Figure 3
Ways by Which Physiotherapists Did Learn PNE



Note. This graph shows how the participants learned Pain Neuroscience Education (PNE). It is ordered by percentage, which is written within the bar. The percentage refers to participants who knew of PNE (n = 220) not to the whole sample (n = 385).

Conclusions: Despite PNE being proven to be effective for pain management only a minority of physiotherapists are taught PNE in undergraduate training. This calls for an evaluation of curricula. There seems to be no need for further materials, but for those which already exist to be translated into various languages.

I-B.21

THE ROLE OF FAMILY DOCTORS IN PAIN MANAGEMENT

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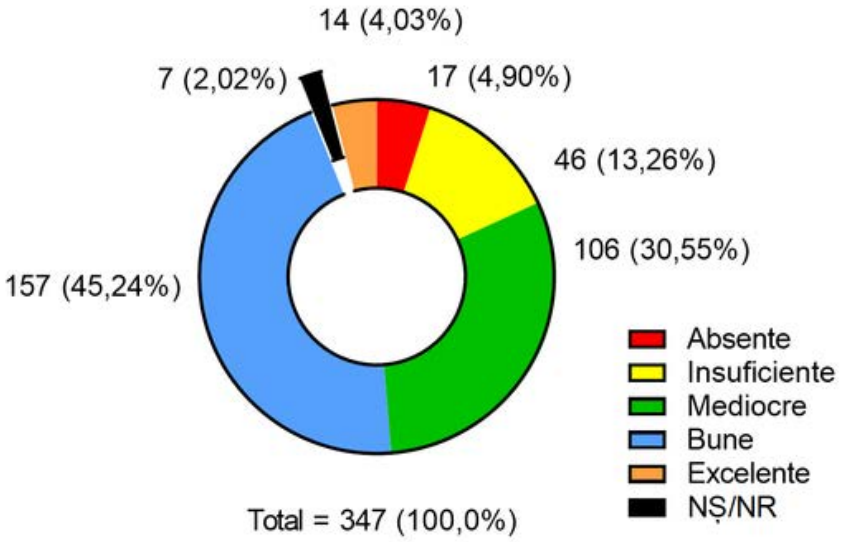
Background and aims: In the absence of pain specialists in Moldova, the responsibility for managing chronic pain patients falls on family doctors.

Evaluation of family physicians' self-perception regarding their role in managing chronic pain patients and evaluating their knowledge of chronic pain management is crucial for future educational activities.

Methods: This cross-sectional, descriptive mixed study was conducted from December 2023 to February 2024, gathering 347 data sets from family doctors. Statistical analyses were performed using GraphPad Prism, version 8, employing descriptive statistics.

Results: Most of the family doctors consult patients with chronic pain daily (55.04%) or weekly (37.75%), with an average follow-up duration of over 12 months for these patients. The most frequent pain assessment tool is VAS/NRS (43.80%). Some family doctors hesitate to prescribe opioids even if it's indicated - with hesitation rates of 12.1% for postoperative pain and 4.3% for oncological pain. Almost half of the respondents rate their knowledge in pain management as „good" or „excellent," while a significant number rate it as „mediocre" (30.55%), „insufficient" (13.26%), or „absent" (4.9%).



Tipuri de durere	Da	Nu	NȘ/NR	Total
Migrenă	36 (10,4%)	0 (0,0%)	311 (89,6%)	347 (100%)
Lumbalgie cronică	85 (24,5%)	166 (47,8%)	96 (27,7%)	347 (100%)
Miofascială	70 (20,2%)	164 (47,3%)	113 (32,5%)	347 (100%)
Postoperatorie	**239 (68,8%)**	**42 (12,1%)**	**66 (19,1%)**	**347 (100%)**
Dentară	39 (11,2%)	186 (53,6%)	122 (35,2%)	347 (100%)
Oncologică	**308 (88,8%)**	**15 (4,3%)**	**24 (6,9%)**	**347 (100%)**
Neuropată	100 (28,8%)	145 (41,8%)	102 (29,4%)	347 (100%)
Fibromialgie	61 (17,6%)	158 (45,5%)	128 (36,9%)	347 (100%)

Conclusions: 90% of family doctors in the Republic of Moldova consult patients with various chronic pain conditions weekly or more frequently. However, several factors hinder patients' access to quality medical services, including the shortage of family doctors in rural areas, busy work schedules, and insufficient specific knowledge. Family doctors lack the necessary knowledge and tools for the proper diagnosis and treatment of chronic pain. To effectively treat chronic pain and enhance the quality of medical services, a systematic and multidisciplinary approach is needed.

I–B.22

THE FEASIBILITY, FACILITATORS, AND BARRIERS OF THE 'PAIN IN PRIVATE PRACTICE' PROFESSIONALIZATION COURSE: A QUALITATIVE PILOT STUDY

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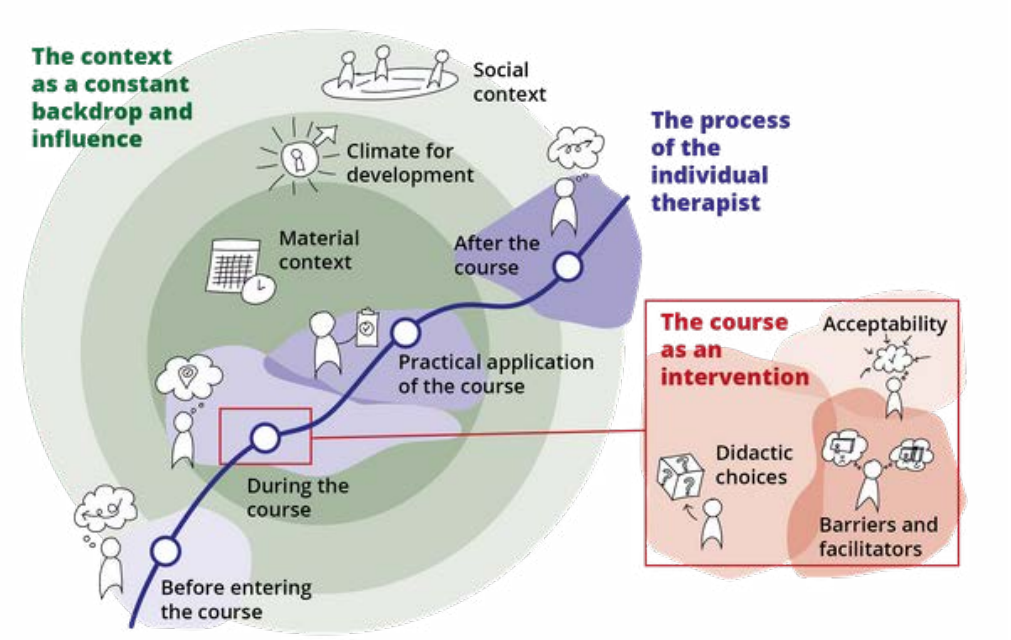
Background and aims: Chronic musculoskeletal pain is best addressed from a biopsychosocial (BPS) perspective. Despite physiotherapists' awareness of this approach, translating it into practice remains a challenge. A three-month post-graduate course was designed to facilitate physiotherapists in private practice to implement the BPS approach through experiential learning, workplace facilitation, and home assignments. This study evaluates the feasibility of the course and identifies barriers and facilitators to its uptake and application in clinical settings.

Methods: We adopted a qualitative approach, using interviews of the first thirteen participants, and applied a thematic content analysis to investigate feasibility, barriers, and facilitators.

Results: Three interrelated themes pertaining to the feasibility of the course were found: 1) the process of the individual therapist; 2) the course as an intervention; 3) the context as a constant backdrop and influence. Although each participant had their own journey, they agree on the change in attitude and confidence they experienced, as well as feeling more comfortable in using communication strategies and psychology informed movement interventions. Learning with and from peers and experiential learning are important facilitators. Social and material factors influence the implementation of learned knowledge and skills.



Conclusions: Findings from this study show that it is feasible to train physiotherapists working in private practice to implement a BPS approach by using a course that contains experiential learning, workplace facilitation, and home assignments. Valuable insights into key barriers and facilitators will inform the refinement of course design, and support understanding of the use of educational strategies for promoting new practice behaviors.

I-B.23

PRE- AND POST-EDUCATIONAL COURSE EVALUATION ASSESSING EVIDENCE-BASED KNOWLEDGE OF LOW BACK PAIN AMONG PHYSICAL THERAPISTS IN SPAIN

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Background and aims: Low back pain (LBP) is the most prevalent musculoskeletal disorder worldwide, with physiotherapists being primary healthcare professionals in its assessment and treatment. However, the extent of scientific knowledge regarding LBP management among physiotherapists remains largely unknown. This study aimed to evaluate the level of evidence-based knowledge among Spanish physical therapists in LBP management and to assess the improvement in knowledge following an e-learning course.

Methods: This single-arm pre-post study involved 1,350 physical therapists practicing in Spain who enrolled in an 8-hours e-learning course that provided state-of-the-art knowledge on LBP management. Participants took a 22-question test on evidence-based LBP knowledge in a randomized order before and after the course.

Results: 857 physical therapists out of the 1,350 participants completed the full course. Initial test results indicated that those who completed their education over ten years ago, had lower scores compared to those who graduated withing the past decade (P<0.001). After participating in the course, there was a notable improvement in knowledge among the participants, which helped bridge the previous gaps in error rates across different questions. Three months post-course, 474 participants responded to a satisfaction survey, with 93.9% expressing contentment with the course. Additionally, 87.6% reported gaining new skills that they could implement in their practice.

Conclusions: Significant gaps remain in the evidence-based knowledge of LBP management among Spanish physical therapists, despite the existing evidence, which may impact the quality of patient care. However, the e-learning course was effective in enhancing their evidence-based understanding and knowledge of LBP.

I-B.24

LEVERAGING MEMORY STRUCTURES IN PAIN PERCEPTION: A LATENT CAUSE PERSPECTIVE ON PLACEBO ANALGESIA

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Background and aims: The ability to generalize across experiences is critical for adaptive behavior. The Latent Cause Model suggests that organisms infer hidden structures (latent causes) from past experiences to predict future outcomes (Gershman & Niv, 2012; Gershman et al., 2013). Applied to pain perception, this framework proposes that prior pain experiences are organized into latent causes to anticipate future pain intensity. While extensively studied in cognitive domains, its role in placebo analgesia and nocebo hyperalgesia remains unexamined. This study explores whether latent cause inference modulates pain perception by shaping expectations and perceptual shifts in response to ambiguous pain cues.

Methods: Participants learned associations between visual stimuli (faces, houses) and high/low pain intensities. A morphed stimulus (VAS 50 pain level) was introduced, resembling the low-pain stimulus in the placebo block and the high-pain stimulus in the nocebo block. We hypothesized that participants would integrate the morph into the most similar latent cause, leading to placebo hypoalgesia or nocebo hyperalgesia.

Results: Across three studies, behavioral pain ratings of the morphed stimulus shifted toward the inferred latent cause, supporting our hypothesis (Study 1: n = 50, p< 0.001, d = 0.52; Control Study: n = 46, p< 0.01, d = 0.42; fMRI Study: n = 53, p< 0.01, d = 0.41). These findings indicate that pain perception of an identical stimulus was modulated by latent state inference, demonstrating that categorization based on prior experience alters subjective pain intensity.

Conclusions: These results suggest that latent causal structures shape pain perception, highlighting the role of expectation-based mechanisms in pain modulation.

I-B.25

AN ANALYSIS OF SERBIAN NURSES' APPROACH TO PATIENTS' PAIN

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Background and aims: Poorly controlled acute pain is correlated with poor patient satisfaction, increased the length of stay in the hospital, increased cost, and it can progress to chronic pain. The aim of the study was to explore the knowledge and practices of nurses in the surgery unit in a tertiary care hospital in Serbia.

Methods: A cross-sectional study involved randomly-chosen nurses worked in the surgery unit in CBC"Dr. Dragiša Mišović" in Belgrade.The data were obtained using the unstandardized questionnaire regard to pain.

Results: The mean duration of experience at the clinics was 15.2 years. In everyday practice about 34.1% of nurses do not record pain. Only 7.3% nurses report pain in special pain list. About 30% of participants consider that fentanyl in form of patch is use for acute or both acute and chronic pain. About 66% of participants believe that ``coxibe often cause ulcerations in stomach.`` For 56.7% nurses hepatotoxicity is a side effect of ibuprofen or acetylsalicylic acid. About 12.2% of nurses believe that adjuvant analgesics are used only for the treatment of severe pain, and about 10% of nurses consider that in postoperative pain analgesics should be given only when a patient request or when a nurse estimate pain.

Conclusions: Current results indicate that it is necessary to develop education on pain treatment for health professionals in Serbia. This is results of the pilot study. It is important to continue this research and expand it to a larger number of nurses,Development of multidisciplinary pain teams could be beneficial for patients with pain.

I-B.26

TRENDS IN EDUCATION OF PAIN MEDICINE

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Background and aims: Although fifty years passed since the IASP was founded, chronic pain still burdens societies, stays unresolved in primary care. One of reasons might be insufficient pain medicine education and lack of implementation into practice. The aim of presentation is to analyze last trends in pain medicine education in Europe and predict changes.

Methods: European pain medicine education, including status of pain management services, was analyzed by data from the European pain management review (2018) covered population of 740 million in 37 countries. Data collection was carried out for the following targets: 1) undergraduate pain medicine studies; 2) postgraduate general educational events; 3) pain specialists training; 4) pain medicine certification; 5) pain medicine services. Positive response was scored as one point, and total scores for 37 countries were calculated. Lithuania was separately presented.

Results: Undergraduate pain medicine studies did show score 16/37, postgraduate general educational events – 37/37; pain specialists training – 20/37; pain medicine certification – 18/37; pain medicine services – 32/37. Pain medicine education in Lithuania covers more 20 years duration of undergraduate training, regularly held pain conferences, 5 years of pain specialists courses, 20 years history of pain clinics network, but without certification of pain specialists.

Conclusions:

1. Pain medicine education in Europe is well organized for all healthcare professionals but with shortcomings in undergraduate training and postgraduate for subspecialty doctors.
2. Pain medicine services cover more 85 percent of countries however, pain subspecialty certification remains not completed in half.
3. Since chronic pain problem remains an unsolved further pain education developments oriented to primary physicians are necessary.

I-B.27

MEETINGS ON PAIN IN PORTUGAL: WORLD CAFE FOR EDUCATION AND SHARING EXPERIENCES

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Background and aims: The importance of communication between health care professionals and the patient in pain management is increasingly recognized. Research suggests that communication difficulties represent a barrier to helping patients. The persistence of communication challenges led the Portuguese Society of Health Literacy, the Coimbra City Council and the Portuguese Association of General and Family Medicine to organize the event "Meetings on Pain". This research aims to show its results.

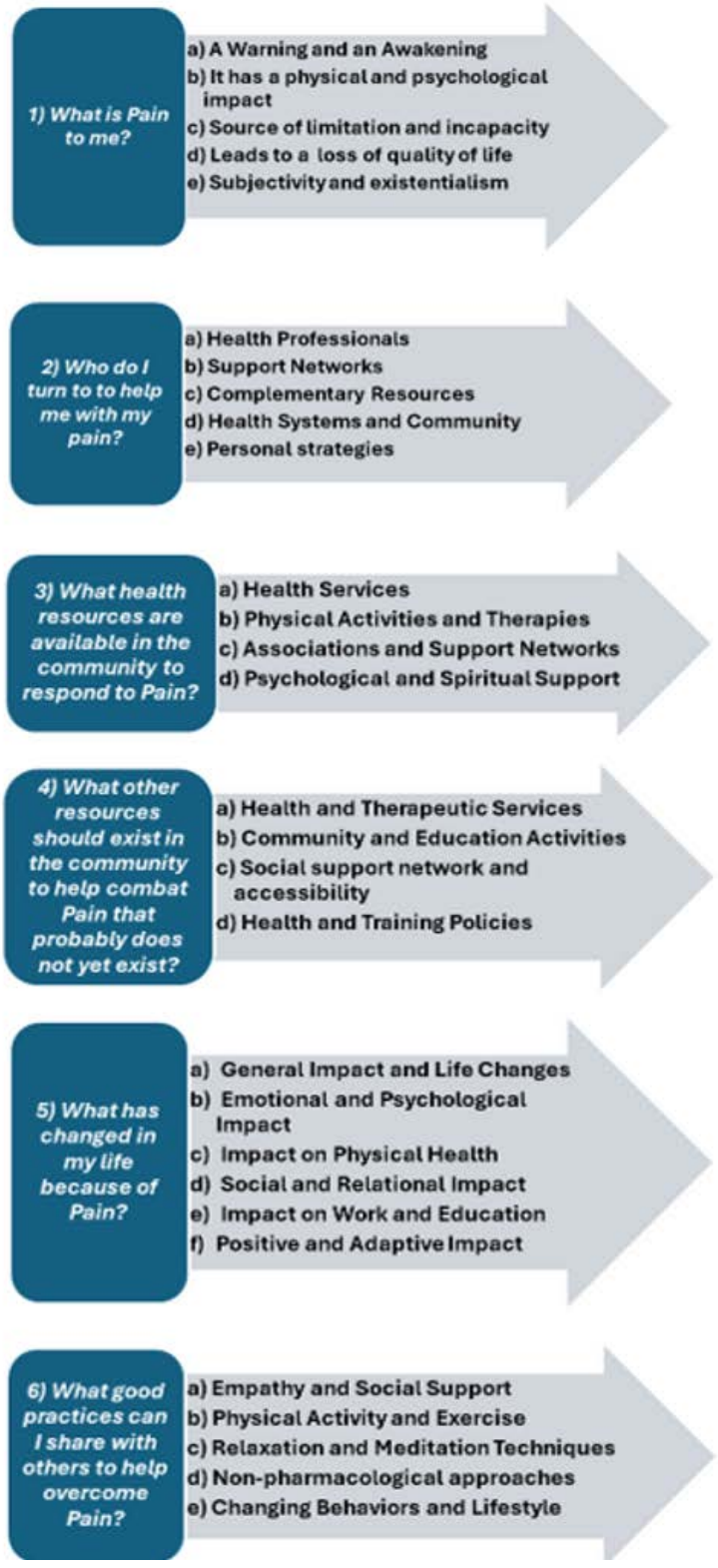
Methods: The event was held in May 2024 in Coimbra, Portugal, to provide learning about pain. Participants had an active voice and shared ideas and experiences in a collaborative environment about knowledge and strategies for pain: World Cafe. For the group dialogue, 06 questions were used (Table 1). Participants wrote or drew on paper. Content analysis was performed, and the data were organized by categories.

Table 1. Questions discussed in World Café

Table	Question
1	***What is Pain to me?*** • Explain the meaning you attribute to pain from a physical, psychological, social or other point of view.
2	***Who do I turn to for help with my pain?*** • List the most important stakeholders in this support in responding to pain.
3	***What health resources are available in the community to respond to Pain?*** • Mention these answers and classify them qualitatively.
4	***What other resources should exist in the community to help combat Pain that probably doesn't yet exist?*** • Discuss relatively what to do in terms of prevention, diagnosis, treatment and monitoring.
5	***What has changed in my life because of Pain?*** • Explore what you stopped doing because of the pain at different levels, such as professional, family, social or others.
6	***What good practices can I share with others to help overcome Pain?*** • Share positive experiences in pain management.

Results: More than 50 health and social security, university professors and students, associations, caregivers and chronic patients participated. This event was a milestone in the approach to pain in Portugal by bringing together different stakeholders to collaborate in the search for more effective solutions (Image 1).

Image 1. Response categories answered by participants.



Conclusions: Participants in the “Meetings on Pain” shared their perceptions of meaning of pain and revealed new perspectives. The responses provide a comprehensive and multifaceted picture of pain, which can be analyzed to guide health policies focused on pain management. Effective communication and education can increase autonomy and empower people to make decisions related to their health. It is hoped that these contributions will influence the improvement of support for people with pain in Portugal.

I-B.28

NURSING PRACTICES FOR EARLY DETECTION OF OPIOID-INDUCED VENTILATORY IMPAIRMENT (OIVI): A FOCUS ON SEDATION SCORING AND DOCUMENTATION

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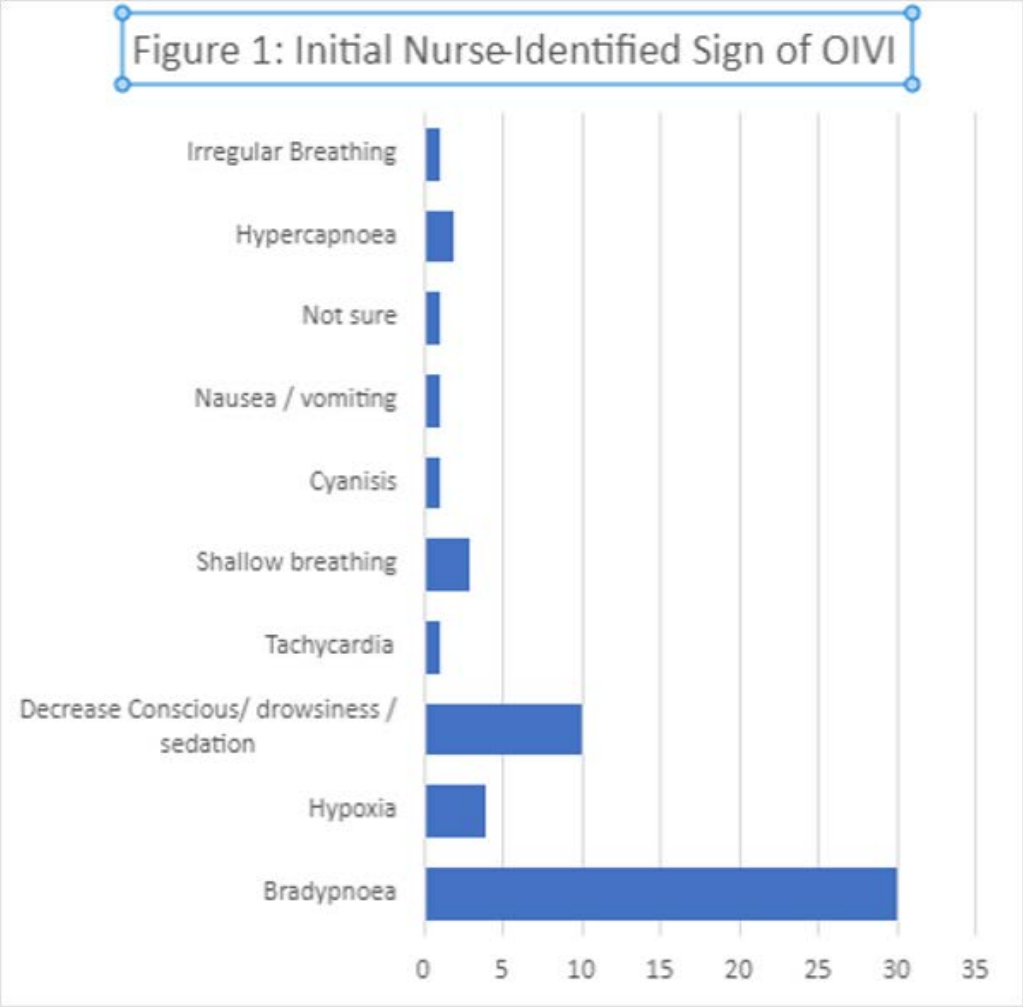
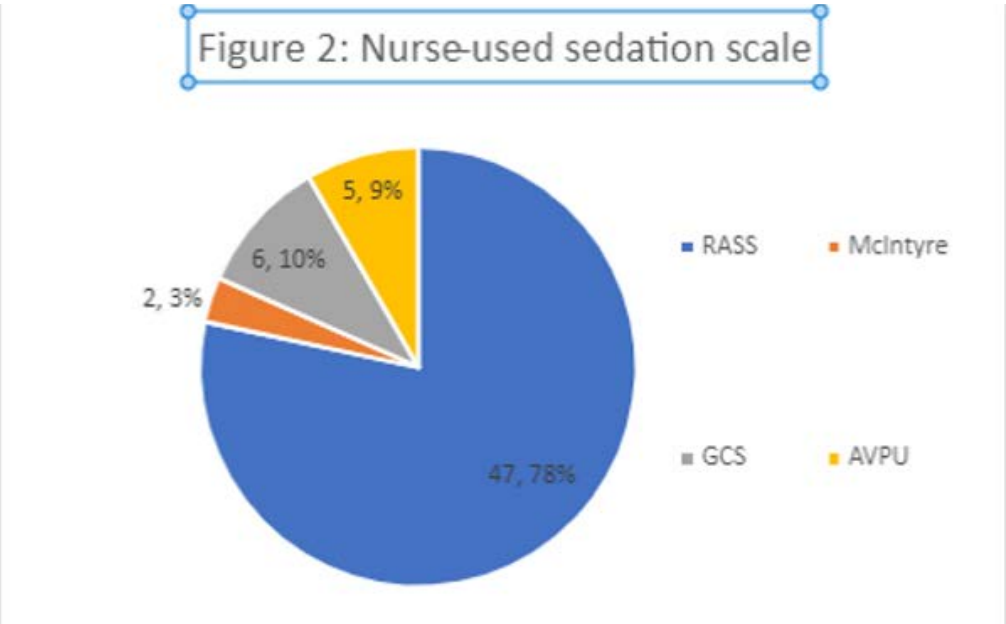
Background and aims: Opioids are vital for managing moderate-to-severe pain but can depress the central nervous system, causing sedation and Opioid-Induced-Ventilatory-Impairment (OIVI), which increases morbidity and mortality risks [1]. Insufficient monitoring and communication are key contributors. The McIntyre Sedation Scale (MSS), recommended by ANZCA, aids in early OIVI detection [2,3]. This project aimed to evaluate nursing documentation and knowledge of opioid-induced sedation assessment to ensure consistent standards for monitoring and early OIVI detection in postoperative care.

Methods: Institutional approval was obtained for a four-month (Jun–Sept 2024) retrospective review of OIVI-related naloxone administrations across two hospitals, analysing sedation scores (MSS and Richmond Agitation and Sedation Score (RASS)) and nursing notes prior to naloxone administration. An anonymous survey (Oct–Nov 2024) assessed nurses‘ knowledge of opioid sedation management in post-anaesthetic, critical care, and surgical wards.

Results: The data demonstrated that sedation scores were documented prior to naloxone administration in 62% of patients, mostly using RASS (51%) vs. McIntyre (19%). RASS scores ranged from +1 (agitation) to -4 (unrousable), while McIntyre scores spanned 0 (awake) to -1 (mild sedation). Key survey results are shown in figure 1, and 2.





Conclusions: Most nurses use RASS for sedation assessment, though McIntyre (2011) highlights staying awake as key to detecting OIVI. The RASS "drowsy" score may underestimate CNS depression than realised. Documentation consistency and familiarity with OIVI's early signs are limited. Our findings emphasise the need for enhanced education across our two hospital sites on OIVI detection and the importance of appropriate sedation scoring to improve postoperative opioid safety.

Table 1: References
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I-B.29

CO-DESIGNING PAIN EDUCATION FOR SCHOOLS IN SWITZERLAND

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Background and aims: Approximately 26% of adolescents experience chronic pain. Pain science education may help adolescents better understand their own and others' pain. Co-design of pain education is needed to improve implementation and target public needs. This study aimed to co-design pain science education material for Swiss 9th-grade with teachers, students, and experts.

Methods: The four phases of the Double Diamond Framework structured the co-design process. Two groups were formed: 1) three pain education experts and one anthropologist; and 2) three teachers and four students from Central Switzerland. Guided by two facilitators, the groups participated in eight iterative online workshops using design thinking methods, such as persona creation and role-play. Co-designers provided feedback using the Public and Patient Engagement Evaluation (PPEE) tool.

Results: Co-designers developed a toolbox comprising five 'modules': i. Pain is a common sensation, and each experience is unique; ii. Pain has many causes and is influenced by various factors; iii. The experience of pain can help protect us; iv. Our brain and body are bioplastic; v. I can influence my pain and others' pain. Learning outcomes, teaching content, and assessment methods were developed for each module.

Conclusions: Students, teachers, and researchers successfully co-designed a pain science curriculum for Swiss schools. Future exploratory studies will test the curriculum's effects.

Acknowledgements: We acknowledge the valuable work of the co-designers: N. Lutz, G. Cerletti, A. Hürlimann, F. Schuhmacher, A. Waser, N. Näf, and S. Aellen.

I-B.30

AN EVALUATION OF A ONE-DAY PAIN SCIENCE EDUCATION EVENT IN A HIGH SCHOOL SETTING TARGETING PAIN-RELATED BELIEFS, KNOWLEDGE, AND BEHAVIOUR: A MIXED-METHODS, NON-RANDOMISED CONTROLLED TRIAL

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Background and aims: Public understanding of persistent pain features misconceptions. Pain education in schools may improve public understanding long-term. This study aimed to evaluate the impact of a 1-day Pain Science Education (PSE) public health event delivered within a 16-18 years old school setting.

Methods: This was a multi-site, non-randomised controlled, mixed-methods study with 3 data collection points, baseline, post intervention, and three months. Participants were high school students ≥16 years old. Pain beliefs, knowledge, and behavioural intentions were assessed with the Pain Beliefs Questionnaire (PBQ [organic and psychological subscales]), Concepts of Pain Inventory (COPI-Adult), a case vignette; and reflexive thematic analysis of semi-structured interviews.

Results: 30 intervention (mean age 16.6 years, 37% female, 63% male) and 24 control group participants (16.9 years, 63%) were recruited. Attending the pain education event was associated with reductions in Organic beliefs [mean difference [-4.4 (95% CI, -6.0, -1.9)] and Psychological beliefs [4.6 (2.7, 6.4)] compared to the control group. This represents a shift away from biomedical beliefs in the intervention group compared to the control group. This reduction was partially sustained at 3 months. A similar pattern was seen for the COPI-Adult and case vignette assessments. Semi-structured interviews (n = 13) identified an increased awareness of chronic pain and varying degrees of reconceptualisation of pain towards a biopsychosocial understanding.

Conclusions: Attendance at a 1-day PSE public health event was associated with improved pain knowledge, beliefs, and behavioural intentions pain. This exploratory study supports the need for a robust mixed-methods RCT of pain education for school children with long-term follow-up.

I-B.31

KNOWLEDGE OF PAIN NEUROPHYSIOLOGY AMONG PRIMARY HEALTHCARE PROFESSIONALS: GAPS AND IMPLICATIONS FOR BIOPSYCHOSOCIAL CARE

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Background and aims: Chronic musculoskeletal pain affects over 20% of people, leading to reduced quality of life, disability, and significant healthcare resource use. In Spain, 25.9% experience chronic pain, leading to 22% of primary care (PC) consultations. Despite advancements, healthcare professionals often use a less effective

biomedical model rather than a biopsychosocial approach as recommended by the most recent clinical practice guidelines. Healthcare professionals' knowledge and attitudes are known to influence the treatment outcomes.

Aim: To evaluate the knowledge of the neurophysiology of pain among healthcare professionals in PC.

Methods: Descriptive cross-sectional study. Primary healthcare professionals were surveyed using the Neurophysiology of Pain Questionnaire (NPQ) between September- December of 2022. Data on demographics, job-related information, chronic pain experience and specific training in chronic pain were collected and analyzed.

Results: Out of 1265 healthcare professionals contacted, 510 (40.3%) participated, mostly women (78%), with a mean age of 49.5 years. The mean of NPQ score was 12.8±2 out of 19. Physiotherapists scored highest (14.44±2.04). Healthcare professionals with chronic pain scored less than those without, 12.48± 2.06 vs 13.03± 1.84 ($p<0.01$). The most reported areas of pain were the lumbar spine (25.29%) and neck (24.51%). No differences were found between sexes, age or working area.

Conclusions: Primary healthcare professionals demonstrate moderate levels of knowledge in pain neurophysiology, with room for improvement, particularly among those experiencing chronic pain themselves. These findings suggest a need for enhanced training in pain management, both during professional education and through ongoing professional development programs, to better align with biopsychosocial models of care.

I-B.32

PRELIMINARY REULTS FROM AN EUROPEAN SURVEY ON ONLINE INFORMATION SEEKING ABOUT MUSCULOSKELETAL PAIN

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Background and aims: Musculoskeletal pain is a significant public health concern in Europe, and with the advent of the digital age, online health information-seeking has become increasingly common. However, whilst research investigating the quality, accessibility and readability of online health information has grown substantially, there is practically no research on the online seeking behavior of musculoskeletal pain. This study aims to describe how individuals seek and interact with online information related to musculoskeletal pain.

Methods: This cross-sectional, multi-country survey-based study was conducted using the Typeform platform, targeting participants from various European countries. The centralized hosting provided access to language-specific versions (English, Spanish, German, Italian, Danish) via a single link. Participants were over 18 and had electronic device access. All data was anonymous, adhering to the FAIR principles.

Results: 421 non-health professionals and 548 health professionals participated. Around half of participants searched content "several times per month". More than 80% of non-heal professionals searched content online to explore "treatment options", "pain relief"," causes" and "symptoms" related to musculoskeletal pain. More than 80% of health-professionals searched information online to "stay updated on trends and research", and "expand professional competences". More than 80% of searches were conducted on Google and specialized websites. Regarding satisfaction, 80% of participants were either "satisfied" or "somewhat satisfied" with the online information.

Conclusions: European health professionals often seek information online to stay updated on trends and research whereas the general public want to know about the causes and the treatment options of musculoskeletal pain.

I-B.33

PREOPERATIVE PAIN HISTORY IS ESSENTIAL IN ACUTE POST-OPERATIVE PAIN ASSESSMENT AND MANAGEMENT

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Background and aims: Nearly 80% of patients experience inadequately treated pain after surgery, contributing to the development of chronic post-operative pain. Various factors have been attributed to chronic postsurgical pain, but little is known about preexisting painful conditions.

The study aimed to determine implication of preoperative pain on acute post-operative pain magnitude and severity.

Methods: Cross-sectional survey was conducted in surgical departments of tertiary hospitals in Tbilisi during 2022-2023. PAIN OUT post-operative pain questionnaire and IASP questionnaire on chronic pain were employed. Selection criteria were: age≥18 and 72 hours since operation. Pain intensity was measured by numerical rating scale (NRS). Results were processed at p≤0.05.

Results: 52 patients were enrolled. Age ranged between 27-79. The majority (84.4%) were over 50 years and females. Acute pain prevalence composed 88.5% (95.0% CI = 81.2-95.8). The vast majority of the patients indicated the worst pain within 8-10 (NRS), of those 32(61.5%) suffered with chronic pain during or over 5 years. Severity of acute post-operative pain showed no gender difference (chi-square 0.393, p-=0.5307). Likelihood of developing severe pain after surgery while having chronic pain was 0.4, however recent history of chronic pain (within 2 years) was frequent in patients with severe post-operative pain (OR=6.5; 95% CI 1.38-30.68).

Conclusions: Recent history of chronic pain is a predictive factor of severe post-operative pain and is most likely to be attributed to the development of chronic post-operative pain. Adequate preoperative assessment should be integral to surgical patient care.

I-B.34

PAIN PERCEPTION AND SELF-PERCEIVED SENSITIVITY: SEX DIFFERENCES IN ADOLESCENTS FROM THE GENERATION XXI BIRTH COHORT

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Background and aims: This study investigates whether quantitative sensory testing (QST) responses correlate with self-perceived pain sensitivity in generally healthy 18-year-olds.

Methods: We used data from 1231(49.1% females), adolescents from Generation XXI birth-cohort, born in 2005/2006 in Porto, Portugal. Lower limb computerized cuff pressure algometry was used to assess pain detection (PDT) and tolerance (PTT) thresholds and temporal summation of pain effects (TSP, changes in pain intensity to 10 phasic painful cuff stimulations). Pain Tolerance Range (PTR) was calculated as the difference between PTT and PDT. At age 18, adolescents were asked about their agreement (0-100 scale) with „In general, pain doesn't bother me as much as it does others“ ('pain bother'), "sensitive when compared to boys/girls" ('pain sensitivity') and "tolerant when compared to boys/girls" ('pain tolerance'). Linear regression models were used to estimate the associations between QST responses and self-perceived sensitivity.

Results: In our sample, higher QST thresholds indicated lower self-perceived pain bother. PDT and TSP were not associated with self-perceived sensitivity in either sex. PTT exhibited a modest association in both sexes (males: β = 0.113, 95% CI [0.007; 0.219]; females: 0.247, 0.135; 0.359). PTR showed a positive association with self-perceived pain bother among females (0.338, 0.203; 0.474), but not males. Adolescents with higher PTT rated their self-perceived pain tolerance higher than their peers of the same sex (males: 0.118, 0.034; 0.201; females: 0.133, 0.046; 0.220).

Conclusions: There is a positive correlation between QST measurements and self-perceived pain sensitivity, with sex-specific associations on pain bother and tolerance.

I-B.35

PREVALENCE OF CHRONIC MUSCULOSKELETAL PAIN AND WORK PRODUCTIVITY IN BRAZILIAN UNIVERSITY PROFESSORS

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Background and aims: Professors are highly exposed to musculoskeletal disorders, the main being chronic musculoskeletal pain. Risk factors may include psychosocial aspects associated with numerous roles of Brazilian university professors: undergraduate and postgraduate teaching, research, extension, and management positions. Chronic musculoskeletal pain can lead to presenteeism, limited of mobility and functionality. Aims: to estimate the prevalence of chronic musculoskeletal pain and assess its effect on work productivity in professors at Brazilian federal universities.

Methods: Analytical epidemiological study with a cross-sectional design, carried out virtually in 2023. Population: federal civil servants in the teaching category. Sociodemographic variables, work-related and pain-related information were collected. To assess productivity at work: Brazilian version of the Work Limitations Questionnaire (WLQ – 25). Multiple linear regression was used (confidence limit of 95% and p-value≤0.05). Ethical considerations: it was approved by the university's Institutional Review Board.

Results: 1436 professors participated. The prevalence of chronic musculoskeletal pain was 67.83%. Pain body locations: lower back, suprascapular region, cervical region, and others. Teachers reported moderate or severe pain (n=805; 82.65%). The productivity loss and work limitations for professors with chronic musculoskeletal pain were greater compared to professors without pain. The coefficient of determination R^2 was 0.12, the F test was 6.87. Professors with chronic musculoskeletal pain had increased loss of productivity by 2.23 points, working overtime increased this loss by 1.08 points.

Conclusions: The prevalence of chronic musculoskeletal pain in professors at Brazilian federal universities is worrying. Chronic musculoskeletal pain and working overtime increase the productivity loss at work. Acknowledgments: São Paulo State Research Support Foundation.

I-B.36

THE PREVALENCE OF PEDIATRIC SPINE-RELATED DIAGNOSES IN DENMARK: A NATIONWIDE REGISTER-BASED STUDY

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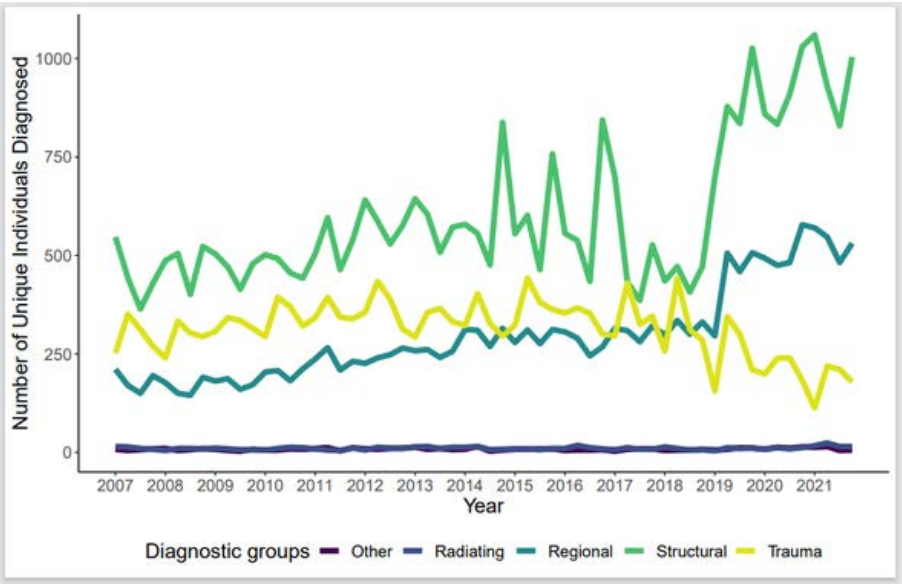
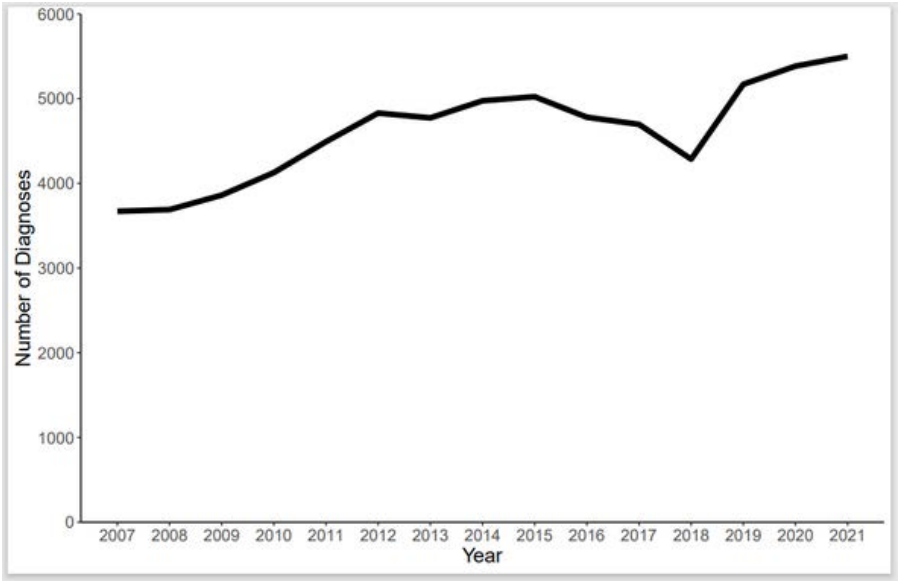
Background and aims: Preliminary evidence suggests that pediatric spinal pain may affect societal healthcare costs, but there is a lack of high-quality, large-scale studies. This study examines pediatric spine-related diagnosis trends and regional variations using national Danish data to inform resource allocation.

Methods: This nationwide register-based cohort study included individuals below the age of 18 with spine-related diagnoses from Danish hospitals between 2007 and 2021. Diagnoses were identified using ICD-10 codes and grouped into five subgroups: Radiating pain (e.g., disc herniation), Trauma (e.g., whiplash), Structural (e.g., scoliosis), Regional (e.g., local back pain), and other (e.g., biomechanical dysfunction). Linear regression analyses explored quarterly prevalence trends, geographic regional differences, and yearly prevalence rates adjusted for the number of children nationally.

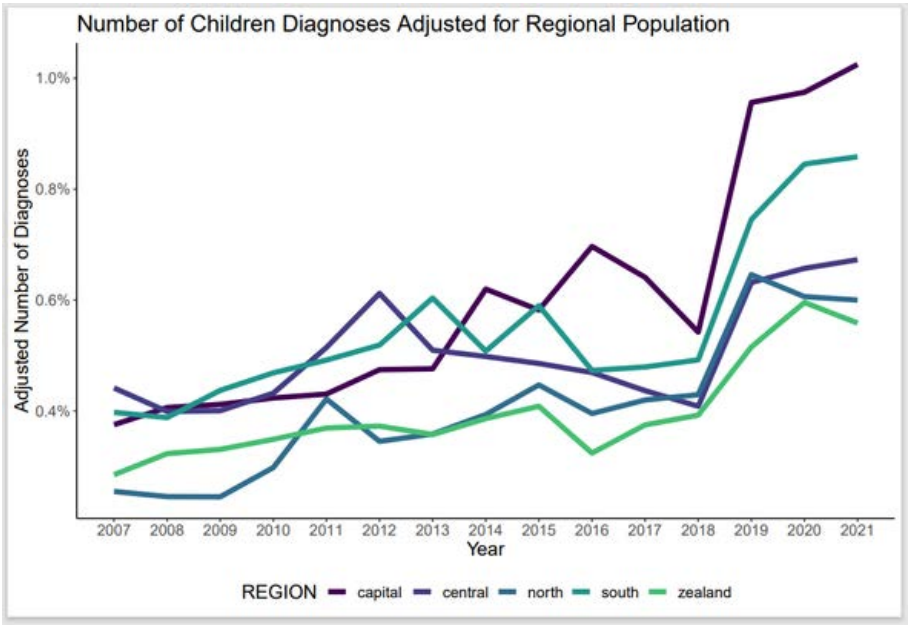
Results: Between 2007 and 2021, 49,447 children (median age: 13.7 years, 58.5% female) received 92,796 spine-related diagnoses. The most common diagnosis was S134 (whiplash syndrome). Structural diagnoses were most prevalent, followed by regional and trauma-related diagnoses (Figure 1).



The yearly prevalence of spine-related diagnoses increased from 4,432 to 5,732, (Figure 2) with the Capital Region contributing significantly to this rise (beta-coefficient = 80 [95% CI: 61-98]).



National prevalence increased from 0.4% (3,432) to 0.8% (5,732) (Figure 3).



Conclusions: Our findings indicate an increasing trend in pediatric spinal diagnoses, particularly structural types, with significant regional differences observed. This study highlights the necessity of regional-specific healthcare resource allocation and intervention strategies to address the growing issue of spinal problems among children. These results could indicate that more children experience spine-related issues. However, further data is needed to explore this.

I-B.39

MAPPING THE SPATIOTEMPORAL TRAJECTORIES OF PAIN ACROSS THE LIFESPAN

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Background and aims: The primary goal of our study is to delineate the progression and presentation of chronic pain across different stages of human development, from adolescence to senescence. Utilizing a normative modeling approach, we aim to chart the spatiotemporal trajectories of pain throughout the lifespan. This project aims to incorporate data from various pain cohorts globally, including the UK Biobank (UKBB), National Health Interview Survey (NHIS), Adolescent Brian Cognitive Development Cohort (ABCD), South African Demographic Survey, among others.

Methods: Typical trajectories of pain report at primary body sites (head, neck, stomach, back, hip, and knee) across varying age groups will be charted using Bayesian linear regression in a sex-stratified manner.

Results: The Bayesian normative models, assessed using data from over 1,000,000 individuals (59% reporting pain), revealed significant age and gender-related patterns in pain prevalence. Musculoskeletal pain increased sharply after age 40, particularly among women. Headache prevalence is high in adolescence and early adulthood, peaking around age 30, then declines into older adulthood. Stomach and abdominal pain peaks in adolescence, decreases into mid-life, and stabilizes in late adulthood.

Conclusions: The findings provide evidence of distinct pain prevalence trajectories across the lifespan, influenced significantly by age and gender. These results underscore the necessity of age-specific and gender-specific approaches in pain management and healthcare planning to effectively address the dynamic nature of pain across different stages of life.

I-B.40

ASSOCIATION BETWEEN CHRONIC PAIN AND TINNITUS PREVALENCE: A POPULATION STUDY

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Background and aims: Tinnitus is often considered the auditory analogue of chronic pain, with both conditions thought to share common mechanisms. To test this hypothesis, we examined a population cohort to determine the prevalence of various chronic pain conditions in relation to (i) tinnitus occurrence (how often individuals experience tinnitus) and (ii) tinnitus severity (how distressing the tinnitus perception is).

Methods: We utilized the UK Biobank dataset, which includes information on tinnitus and chronic pain from approximately 170,000 participants. We calculated the odds ratios (ORs) for different chronic pain conditions (headache, face, neck, back, stomach, hip, and knee pain) based on tinnitus occurrence and severity. Tinnitus occurrence was rated on four levels: never had, some of the time, a lot of the time, and all the time. Severity was rated as no distress, mild, moderate, or severe distress.

Results: Globally, The ORs for chronic pain varied based on tinnitus presence, with ORs for all chronic pain conditions ranging from [.50, .78] for individuals without tinnitus and from [1.13, 1.84] for those experiencing tinnitus at least some of the time. ORs were also linked to tinnitus severity, showing a progressive increase: ORs ranged from [.49, .78] for non-distressing tinnitus, [.97, 1.03] for mild distress, [1.30, 1.75] for moderate distress, and [1.48, 2.39] for severe distress.

Conclusions: Our results demonstrate an association between chronic pain and tinnitus. Further research is needed to identify the potential environmental and biological factors underlying this association.

I-B.41

EXPLORING THE ASSOCIATION OF WOMEN'S EMPOWERMENT WITH SYMPTOMS OF CHRONIC MUSCULOSKELETAL PAIN AND DEPRESSION AMONG WOMEN IN CYPRUS

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Background and aims: Women have historically experienced repression that resulted in feelings of powerlessness. Despite the fact that life expectancy of women in the European Union and more specifically in Cyprus is longer than men, this advantage is not necessarily accompanied by a better state of health. Women tend to experience chronic pain more often than men, in many cases coupled with impairment of daily activities and accompanied by depressive symptoms that significantly affect their quality of life. Empowerment, on the other hand, is a multi-dimensional construct that could positively influence both physical and mental health. The aim of this study was to explore the association between empowerment and women's health, specifically in association with chronic musculoskeletal (MSK) pain and depression.

Methods: A survey was conducted among women above 40 years of age in Cyprus. The questionnaire, consisted of demographic data, a developed questionnaire measuring empowerment based on the Personal Progress Scale Revised (PSS-R), general health (SF-12), self-assessed pain and depression by CES-D.

Results: A total of 604 women participated in the survey covering a broad age range, mostly from urban areas (84%), the majority of them being married (75%). Categorical characteristics by gender were compared using a Chi-squared exact test, continuous characteristics using t-test, and for ordinal variables Kruskal-Wallis test. The study documented an association between empowerment and chronic MSK pain and depression that were statistically significant.

Conclusions: Lack of empowerment among women in Cyprus, appears to be significantly associated with chronic MSK pain and depressive symptoms.

I-B.42

THE IMPACT OF ADVERSE CHILDHOOD EXPERIENCES ON SENSORY THRESHOLDS IN ADULTS LIVING WITH MULTIMORBIDITY AND/OR CHRONIC PAIN (THE ACE-MAP STUDY): AN OBSERVATIONAL FEASIBILITY STUDY

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Background and aims: Adverse childhood experiences (ACEs) are linked to poor long-term health outcomes, including multimorbidity and chronic pain. Psychophysical testing methods, such as quantitative sensory testing (QST) and conditioned pain modulation (CPM), may provide insights into potential mechanisms. We aimed to evaluate a study design that would aim to test whether exposure to ACEs is associated with altered QST/CPM parameters in adults with multimorbidity and/or chronic pain.

Methods: We recruited from the Scottish Health Research Register and Biobank (SHARE) database, local chronic pain clinics, online advertising on university/research platforms, and word of mouth. Participants completed a series of questionnaires, including on ACEs, chronic pain, and long-term conditions, followed by QST and CPM assessments. The primary study outcomes were measures of feasibility and acceptability of the proposed study design.

Results: Eighty-three individuals were approached about the study, from which we enrolled 42 participants at a rate of 2.7 participants per week. Thirty (71%) were female and the median age was 49.5 (range 19-73). All participants completed the full study protocol. Participants reported that the study was either "acceptable" (n=4, 10%) or "completely acceptable" (n=38, 90%). QST/CPM data were generally within predicted ranges.

Conclusions: Our study protocol was both feasible and acceptable to participants, and this is reflected in a high recruitment proportion, high recruitment rate, and positive participant reports on study acceptability. The next step is to perform a larger definitive study, using the preliminary data to inform refinements to the study design and to determine the appropriate sample size.

II-B.01

BIOPSYCHOSOCIAL DIFFERENCES IN ALCOHOL AND CANNABIS USE AMONG ADOLESCENTS WITH CHRONIC PAIN

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Background and aims: Cannabis and alcohol are the most common psychotropic substances used by adolescents. However, biopsychosocial factors linked to use of these substances in adolescents with chronic pain are not well understood. This study examined differences among adolescents with chronic pain using no substances (No-SU), alcohol (AU), cannabis (CU), and both alcohol and cannabis (BAC).

Methods: From September 2021 to May 2024, with IRB approval, we surveyed patients from a pediatric pain clinic in the Northeastern United States. Cross-sectional group differences in substance use behaviors and biopsychosocial factors were examined using ANOVA, Mann-Whitney U, and t-tests.

Results: Among 244 adolescents (mean age=16.9, 68% female), 61.94% reported No-SU, 12.7% AU, 5.7% CU, and 19.7% BAC. Groups differed significantly by age, depressive symptoms, and sleep impairment (*ps*<.05). Adolescents endorsing BAC were older (*p*<.001), more depressed (*p*<.001), stressed (*p*=.01), and school avoidant (*p*<.01) than those with No-SU. Adolescents with BAC further reported more lifetime and past-year drinking (*ps*<.01), past year and month drunkenness (*ps*<.05), and increased likelihood of future alcohol use (*p*<.05) than AU. Adolescents endorsing CU reported greater pain interference (*p*<.05) and functional disability (*p*<.01) than AU, with 93% reporting using cannabis for symptom relief and 79% using cannabis for pain.

Conclusions: Adolescents with chronic pain engaging in BAC experience higher stress, depression, and risky alcohol use, complicating pain management. Cannabis use, often for pain relief, is linked to increased functional disability. Tailored biopsychosocial interventions addressing psychological distress, pain, and substance co-use risks are critical to improving outcomes in this vulnerable population.

II-B.02

DO PARENTAL MUSCULOSKELETAL PAIN AND USE OF PRESCRIPTION OPIOIDS INFLUENCE THE RISK OF OPIOID USE IN ADOLESCENTS AND YOUNG ADULTS?

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Background and aims: It is common knowledge that opioids are not recommended for young people, although they are often prescribed. Several individual factors are associated with frequent opioid use, such as multisite pain and psychological challenges. However, the role of parental factors has not been extensively investigated. This family study examined if parental chronic musculoskeletal pain and parental use of prescription opioids is associated with the risk of opioid use in adolescents and young adults.

Methods: Prospective study including 21,470 adolescents and young adults of the population-based HUNT Study in Norway and their parents. Opioid prescription data were obtained from the Norwegian Prescription Database until August 2023. Cox regression was used to estimate hazard ratios (HRs) with 95% confidence intervals (CIs) of opioid prescriptions in young people.

Results: At follow up, 39% of adolescents and young adults received at least one opioid prescription and 5% received opioid prescriptions in at least three quarters of the year (i.e., persistent use). If one or both parents

reported chronic musculoskeletal pain, the HRs for persistent use was 1.50 (95% CI 1.17-1.91) and 2.14 (95% CI 1.61-2.83), respectively, compared to those whose parents did not report pain. Similarly, if one or both parents used prescription opioids, the HRs for persistent use in young people was 1.65 (95% CI 1.43-1.91) and 1.74 (95% CI 1.22-2.49), respectively.

Conclusions: Parental chronic musculoskeletal pain and use of prescription opioids increase the risk of persistent opioid use in adolescents and young adults, suggesting that these factors should be evaluated when managing pain in young people.

II-B.03

CHRONIC PAIN IN OLDER ADULTS WITH PSYCHIATRIC DISORDERS: THE DOCPPA STUDY PROTOCOL

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Background and aims: Background: Chronic pain (CP) and psychiatric disorders (PD) are common in older adults, and they both may significantly impact patients' functioning and quality of life. However, research on the prevalence and impact of CP in people with PD remains limited – especially in older adults – and psychiatric care often neglects somatic comorbidities.

Objectives: The main objective of the DoCPPA study is to determine the prevalence and characteristics of CP in older adults with PD followed-up in psychiatric services. Our secondary objective is to estimate associations between CP and various clinical indicators related to physical, cognitive, and mental health, as well as quality of life.

Methods: Setting: Department of Aging Psychiatry of Le Vinatier Hospital Center (France, Lyon Bron), inpatient and outpatient psychiatric services.

Method/design: Cross-sectional monocentric study with 430 patients with PD under psychiatric care. The inclusion period will be 36 months. The patients will be evaluated using validated scales and neuropsychological assessments.

Results: Although the study is still in progress and we are unable to present results, we will be able to present cross-sectional associations between pain and length of hospital stay (analysis of retrospective data from our population).

Conclusions: This study aims to contribute to improving care in aging psychiatry, a field where a major challenge lies in the management of multiple chronic conditions.

II-B.04

ASSESSING BARRIERS TO OPIOID-BASED PAIN MANAGEMENT IN ARMENIA: AN EMPIRICAL REVIEW OF ACCESS, POLICY, AND HUMAN RIGHTS IMPLICATIONS

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Background and aims: Armenia has taken steps to reform its regulations on opioid prescriptions, simplify administrative requirements, increasing palliative care providers. However, critical gaps persist, including limited availability of opioids, territorial access issues, illegal oversight by law enforcement.

Research aims to assess the effectiveness of Armenia's policies on opioid access and identify gaps in patients' right to pain management.

Methods: It used qualitative data from NGO monitoring reports, quantitative data from the state on opioid quotas, import data, patient access metrics. It analyzed the availability of pain relief medications, regulatory compliance among healthcare providers, territorial accessibility, police interference in medical prescription processes.

Results: The availability of palliative care providers increased, the actual quantity of opioids imported was below WHO's recommended levels. Armenia's need for opioid painkillers in 2023 was estimated at 24.7kg. The state

approved a quota of 8.5kg, of which 2.1kg was imported, 1.9kg was consumed. Many patients face violations of their right to physical access to medication and experience territorial access problems. In regions of Armenia, there're few medical organizations, pharmacies with the necessary licenses to store and dispense drugs. There's a lack of awareness among doctors regarding the latest standards in pain management, opioid prescription, legal regulations. Police monitoring prescriptions breaches privacy, causing further distrust among patients.

Conclusions: It underscores the need for policy adjustments to improve access to opioid medications, palliative care services, protect patient rights. Key recommendations include aligning opioid import quotas with international standards, enhancing territorial accessibility, increasing healthcare provider training, establishing legal protections against police interference.

II-B.05

ETHICAL ASPECTS OF PAIN MANAGEMENT IN TURKEY

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Background and aims: Pain management (PM) is a multifaceted issue where ethical considerations are integral to delivering equitable and effective care. While international literature highlights numerous ethical challenges in PM, comprehensive studies on this subject are lacking in Turkey. This research, part of Sevim Coskun's doctoral thesis, aims to identify ethical problems encountered by pain medicine specialists/ algologists in Turkey and evaluate them within the framework of medical ethics.

Methods: This descriptive nationwide study uses a mixed-methods approach:

1. Quantitative Component: An online survey was distributed to all pain medicine specialists across Turkey (universe: 221), with 112 completing it. The survey explored ethical challenges in PM, systemic barriers, and the perceived need for an ethical guideline.

2. Qualitative Component: Semi-structured interviews were conducted with 17 specialists who voluntarily participated. Additional interviews are ongoing to gain deeper insights into specific challenges.

Results: Quantitative findings show that 96% of participants emphasized the need for an ethical guideline in PM in Turkey. Key challenges identified include systemic barriers such as socio-cultural factors, limited resources, strict regulatory frameworks, opiophobia and insufficient training in PM ethics. Vulnerable populations (e.g., children, elderly, cognitively impaired) were frequently highlighted as requiring special attention. Qualitative data will provide further insights into cultural and systemic contributors to these challenges.

Conclusions: The findings highlight the need for a standardized ethical framework for PM in Turkey. Comprehensive solutions include health policies, improved training, integrated ethics education and culturally sensitive approaches.

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II-B.06

SPEED AND VOLUME OF WALKING AND RISK OF CHRONIC LOW BACK PAIN: LONGITUDINAL DATA FROM THE HUNT STUDY, NORWAY

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Background and aims: Although the health benefits of walking are well established, few studies have examined whether walking is effective in preventing chronic low back pain. This study aimed to examine the separate and joint association of device-measured walking volume and walking speed with risk of chronic low back pain.

Methods: The study included 11174 adults (mean age 55.3 years [SD 15.1], 58.7% women) who reported no chronic low back pain at baseline in 2017-19. Occurrence of chronic low back pain was assessed at follow-up in 2021-23. A Poisson regression model was used to calculate adjusted risk ratios (RRs) with 95% confidence intervals (CIs). All models were adjusted for age, sex, education, income, occupational physical activity, smoking and symptoms

of depression. Volume and speed of walking (i.e., slow [≤4 km/h], moderate [4.1-5.4 km/h], and brisk [≥5.5 km/h]) were determined by a machine learning classifier applied on accelerometer data recorded for seven days.

Results: At follow-up, 1654 (14.8%) participants reported chronic low back pain. Compared to the lowest third of walking volume (<420 min/week), participants in the highest third (>840 min/week) had 29% reduced risk for chronic low back pain (RR 0.71, 95% CI 0.61-0.83). Similarly, the third who accumulated ≥300 min/week with moderate/brisk walking speed had about 19% reduced risk of chronic low back pain compared to the third who accumulated less than <150 min/week (RR 0.81, 95% CI 0.71-0.93).

Conclusions: Increased walking volume and walking speed are both associated with reduced risk of chronic low back pain.

II-B.08

INTERDISCIPLINARY PAIN CLINIC OF THE FEDERAL UNIVERSITY OF SÃO CARLOS – BRAZIL: NURSING ACTIONS

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Background and aims: Chronic pain is a multidimensional condition involving dynamic interactions between biological mechanisms and psychosocial factors that influence each other; therefore, a biopsychosocial and interprofessional approach must be considered for its management. Aim: Report the experience of nursing students and professors in an interdisciplinary pain reference center.

Methods: Experience report.

Results: The “Reference Center for Interdisciplinary Pain Care: Pain Clinic” at the Federal University of São Carlos (UFSCar) - Brazil provides interprofessional assistance, based on the biopsychosocial model to adults and elderly people with chronic non-oncological pain and promotes teaching interdisciplinarity to undergraduate and postgraduate students. Areas: Nursing, Physical Education, Physiotherapy, Gerontology, Medicine, Psychology, and Occupational Therapy. Nursing actions: evaluate people with pain through valid and reliable pain-assessment tools, provide pain neuroscience education, promote health education, prevent health complications especially in complex cases with comorbidities, prevent and manage common adverse effects associated with pharmacological pain treatment and polypharmacy, perform effective collaboration as a member of the interprofessional team, identify barriers to effective pain assessment and management related to the patient, their family, healthcare professionals, and the organization and teach techniques of pain self-management. When appropriate, based on identified risk factors for problems in other health conditions, propose nursing consultations and develop care plans.

Conclusions: Nursing professors and undergraduate and postgraduate students play a fundamental role in the interdisciplinary team. The nurse‘s actions in a pain clinic are constantly evolving and must be considered and discussed within the nursing area itself, as well as within the interdisciplinary team.

II-B.09

IMPLEMENTATION OF A NEW MUSCULOSKELETAL MULTIDISCIPLINARY PATHWAY AND REDUCTION IN PAIN INTERVENTION WAITING LISTS

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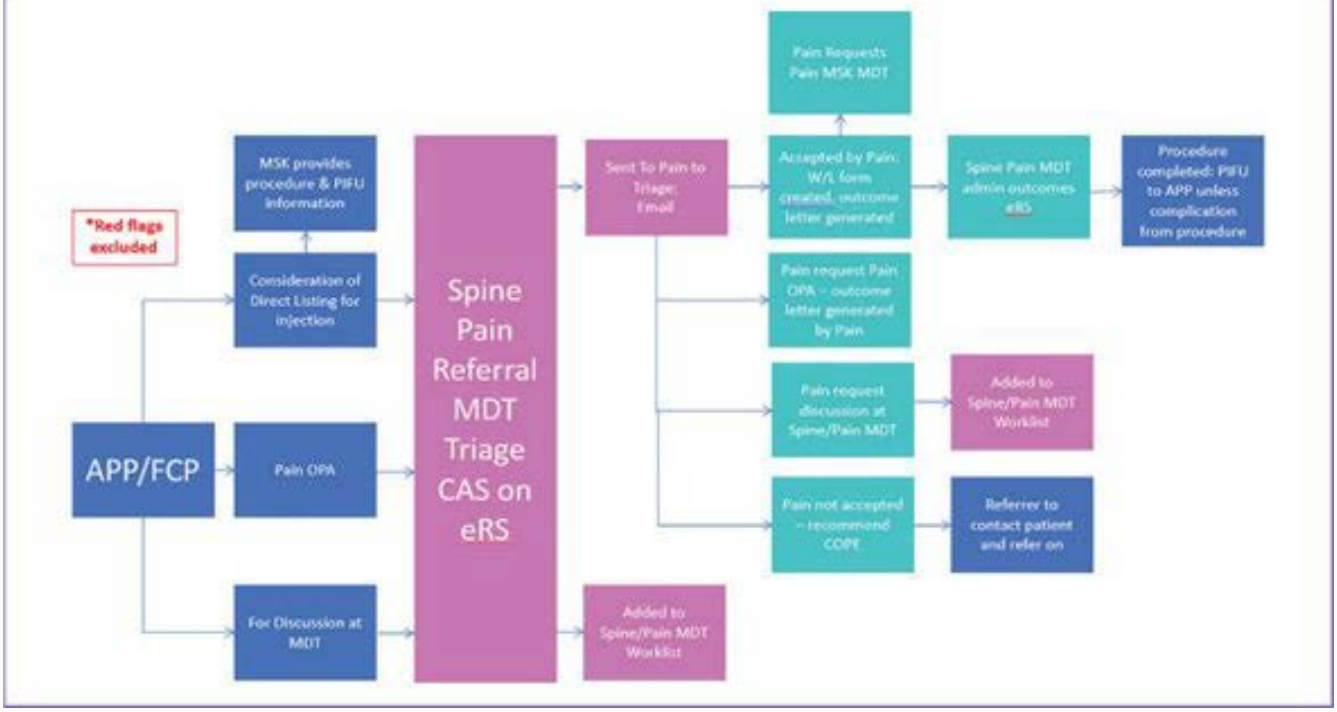
Background and aims: Non-specific low back pain is the leading cause of disability, associated with high healthcare expenditure and poor quality of life. Whilst diagnosed clinically, non-responders to conservative measures face record waiting lists for interventional management, prolonging suffering. Alongside high numbers of inappropriate referrals, in July 2022 our Trust introduced a referral pathway and MDT (physiotherapists, orthopaedic surgeons & pain physicians), directly triaging cases to the most appropriate management (Fig 1). Community-based Advanced Physiotherapy Practitioners act as a single point-of-access and have greater agency in patient management. A retrospective audit was undertaken to determine the effect on referral-to-treatment (RTT) times and wider pain service.

Figure 1. Musculoskeletal MDT pathway.



Methods: Clinically relevant standards were set. Pre and post-pathway data sources included Trust surgical performance statistics, clinic/theatre lists, patient surveys, departmental audits and regional Pain & MSK network data.

Results:

No.	Standard	Target (if applicable)	Pre-Pathway Result		Post Pathway Result	
			Median	Range	Median	Range
1	Percentage of patients achieving national target RTT time of <18 weeks (%)	92%	58.9	(52.7 - 75.0)	91.7	(86.5 - 94.2)
2	Mean patient RTT time (wks)	18 wks	20.3	(16.6 - 22.2)	8.4	(7.1 - 9.0)
3	Clinic (non-admitted) waiting list size (no. of patients)	n/a	383.5	(349 - 502)	21	(18 - 28)
4	Intervention (admitted) waiting list size (no. of patients)	n/a	379.0	(296 - 509)	168.5	(149 - 187)
5	Comparison of total referrals and source (no. of referrals)	General Medical Practitioner	64		35	
		eRS Referral	216		334	
		Referral Management Centre (GP)	12		18	
		Referred from other clinician (Internal)	74		54	
		Referred from other clinician (External)	26		35	
		Referred from Primary Care (Other)	23		31	
		Not Specified / Other	17		2	
		Total	432		509	

No.	Standard	Target (if applicable)	Pre-Pathway Result	Post Pathway Result
6	Comparison of total procedures and procedure type (no. of procedures)	Radiofrequency Denervation to Facet Joint (RFD-FJ)	147	56
		Pulsed Radiofrequency (PRF) to Peripheral Nerve (PN)	15	11
		PRF to Spinal Nerve Root (NR)	1	0
		Injection to PN	205	202
		Injection to FJ	5	0
		Injection to Spinal NR	18	2
		Epidural (all)	34	26
		Intramuscular Injection of Local Anaesthetic	15	17
		Injection into Joint	18	2
		Other	17	19
		Total	475	335
7	Comparison of total patient satisfaction survey scores (no. of responses)	Very Good	26	39
		Good	5	5
		Poor	0	2
		Very Poor	2	0
		Total	33	46

RTT wait times improved (58.6%) against national targets and significantly reduced clinic (94.5%) and intervention (55%) waiting lists (Fig 2 & 3).

Figure 2. Percentage of patients achieving 18-week RTT target. Comparison of pre- and post-pathway introduction.

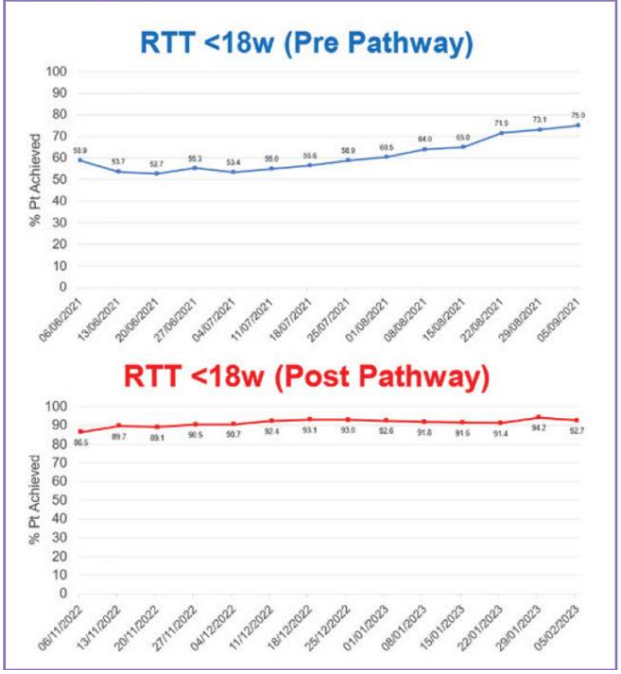


Figure 3. Waiting list size for Pain Clinic. No. of patients awaiting outpatient appointment. Comparison of pre- and post-pathway introduction.

Improved triage efficiency reduced backlog partly caused by COVID-19 measures. Introducing patient-initiated follow up (PIFU) post-procedure decreased clinic workload and patient satisfaction improved. Total interventions decreased 29.5%, with proportionally more diagnostic interventions. Incidentally, pain management programme & total referrals increased whilst nursing workload reduced.

Conclusions: • MDT decisions facilitate timely, effective management, following "Getting It Right First Time" principles.

• Community-based practitioners with greater patient ownership can improve secondary care access by optimising conservative management before considering interventions.

• Appropriately managed, PIFU can improve patients' autonomy and satisfaction with treatment, whilst reducing clinic workload. This can increase patient numbers within a service.

II-B.10

PATIENTS AND CLINICIANS HAVE DIFFERENT PRIORITIES WHEN DISCUSSING PAIN IN THE IBD CLINIC

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Background and aims: Pain in inflammatory bowel disease (IBD) does not always get the attention that it deserves, particularly in ulcerative colitis, and communication about pain can be suboptimal. The current study juxtaposes clinicians' reports of how they conceptualise and approach patients' pain with patient narratives. The aim was to inform the development of a pain reporting tool and provide guidance for better communication about IBD pain.

Methods: In-depth semi-structured interviews with 13 IBD clinicians in the United Kingdom: gastroenterologists (n = 5), colorectal surgeons (n = 2), specialist nurses (n = 4), and psychologists (n = 2). Primary analysis of these data and secondary analysis of earlier interviews about pain in IBD with clinicians (n = 12) and patients (n = 71) followed principles of reflexive thematic analysis.

Results: While clinicians may intend to provide comprehensive evaluation and management of pain in the clinic, patients frequently feel pain is not adequately addressed and that inquiries about pain are superficial. This discrepancy is compounded by time constraints and systemic issues within healthcare systems, leading to frustration for both patients and clinicians. Moreover, power imbalances can complicate pain management and communication in IBD, alongside the tendency of clinicians to attribute IBD pain to irritable bowel syndrome where there is no evident inflammatory or structural cause. Some patients are reluctant to express discomfort or pain, further complicating the situation.

Conclusions: The study emphasises the importance of improved communication regarding pain: patients should voice their pain, and clinicians should proactively inquire about it.

II-B.11

PAIN IN PATIENTS WITH COGNITIVE COMORBIDITIES, HOW TO ASSESS? SYNTHESIS OF EVIDENCE FOR OBSERVATIONAL OR DIGITAL PAIN INSTRUMENTS

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Background and aims: Cognitive comorbidity often leads to severe communication impairment, which hampers self rating of pain. People with Dementia, Huntington's Disease, Parkinson's disease, Korsakov disease and Aphasia are therefore prone to poor management and monitoring of their pain. Observational pain scales have been there for decades, and digital assessment options such as automated facial recognition, electrodermal sensoring and other types of digital phenotyping has been there for several years. The aim of this study was: What is the evidence of using pain observation scales or digital tools to improve pain management for these vulnerable groups?

Methods: Scoping review. A literature search was done.

Patients: Dementia, Huntington's Disease, Parkinson's disease, Korsakov disease and Aphasia.

Intervention: pain observation scales or digital pain measures, automated facial pain recognition, electrodermal sensoring etc.

Outcome: quality and quantity of pain management, prevalence of pain, quality of life.

Results: There was a plethora on literature on pain observation in Dementia, some in Parkinson's, and few on Huntington's, aphasia and Korsakov. Studies on pain observation scales predominantly focused on reliability and validity, or implementation in clinical practice (which was usually disappointing). There were some studies on feasibility of automated facial recognition, such as in care homes, or other forms of digital phenotyping. No studies were found that could provide evidence that these alternative pain assessment methods improved pain management practice.

Conclusions: Little studies have been performed on the impact of using alternative assessment strategies, such as pain observation and digital phenotyping, although communicating pain in cognitive comorbidities is a serious and huge problem.

II-B.12

TRANSITIONAL PAIN SERVICES IN THE NETHERLANDS, A SURVEY OF TASKS AND RESPONSIBILITIES

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Background and aims: Preventing the transition to chronic pain and opioid misuse has become important. Implementing a transitional pain service (TPS) includes preoperative risk screening, supporting self-management with nonpharmacological interventions, and follow-up in pain management and opioid tapering. This study investigated the current organisation, tasks, and responsibilities of TPS in the Netherlands.

Methods: In this cross-sectional study, all hospitals in the Netherlands were contacted. TPS representatives completed an online questionnaire on organisation, disciplines involved, tasks, patient category, training requirements, research, education and bottlenecks. A subsample of representatives was also interviewed. Quantitative and qualitative data were analysed using descriptive statistics.

Results: Completed questionnaires were received from 77 hospitals (83.7%), with 5 (6.5%) having a fully established TPS and 10 (13.0)% a partial TPS. Commonly cited tasks within complete TPS include the pre- (60%) and post-operative (80%) identification of patients at risk (80%). In addition, complete(100%) and partial (70%) TPS teams assist patients with post-discharge with tapering of opioids (Table 1). Further interviews highlighted significant variations in the organisation, roles, responsibilities, staffing, and training of TPS teams. TPS teams experience a lack of knowledge about the organisation and approach of TPS.

Table 1: Tasks of complete TPS (N=5) and partial TPS (N=10) in the Netherlands reported by a representative of the individual hospitals

	Complete TPS (N, %)	Partial TPS (N, %)
Preoperative identification of patients at risk*	3 (60.0)	1 (10.0)
Postoperative identification of patients at risk*	4 (80.0)	5 (50.0)
Preoperative guidance in reducing and stopping opioids	1 (20.0)	0 (0.0)
Preoperative interdisciplinary consultation about the patient	3 (60.0)	0 (0.0)
Preoperative pain education to patients	3 (80.0)	2 (20.0)
Periodic follow-up after discharge (e.g. every week)	5 (100.0)	5 (50.0)
Calling the patient once after discharge	1 (20.0)	3 (30.0)
Contacting general practitioner (GP) about pain management	5 (100)	1 (10.0)
After the patient is discharged, contacting the main practitioner (surgeon)/GP about pain management	2 (40.0)	2 (20.0)
Post-discharge, interdisciplinary consultation about the patient	2 (40.0)	0 (0.0)
Post-discharge, providing guidance on tapering and discontinuing opioids	5 (100)	7 (70.0)
Post-discharge, screening for the development of neuropathic pain	4 (80.0)	2 (20.0)
Post-discharge, providing guidance on reducing and discontinuing opioids, facilitated by the pharmacy	2 (40.0)	1 (10.0)
Post-discharge management of (repeat) prescriptions for pain medication	3 (60.0)	5 (50.0)
Post-discharge, referring patients to specialised clinics, such as pain management centres or addiction treatment facilities	4 (80.0)	7 (70.0)
Other	2 (40.0)	1 (10.0)

TPS= transitional pain service

** Type of surgery where a percentage of patients are known to develop chronic postoperative pain and/ or risk on long-term opioid use*

Conclusions: While the number of TPS teams in the Netherlands remains limited, many hospitals are in the process of implementing or preparing to implement them. TPS teams feel a strong sense of urgency to address the prevention of severe pain and the appropriate use of opioids, and to exchange knowledge and experience regarding the organisation and approach to TPS tasks.

II-B.13

"LET'S AVOID HAVING TO CHOOSE BETWEEN THE PLAGUE AND CHOLERA": CRITICAL DISCOURSE ANALYSIS OF BELGIAN POLICY REGARDING OPIOID PRESCRIPTION FOR CHRONIC NON-CANCER PAIN

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Background and aims: Chronic pain, defined as pain lasting over three months, affects one in four Belgian adults. Because the term encompasses a wide range of clinical conditions (e.g., fibromyalgia, migraine, or long-term pain states without known causes), treating chronic pain poses major challenges for both clinicians and patients. In addition, evidence on opioid prescription increasingly suggests their limited efficacy in chronic non-cancer pain management, leading to critical policy shifts away from opioid use. This study examines how Belgian policy documents represent patients, healthcare providers, and therapeutic relationships in the context of opioid use for chronic non-cancer pain.

Methods: A critical discourse analysis of 32 Dutch-language Belgian policy documents was conducted, using Fairclough's framework, to explore policy discourses on opioid prescriptions for chronic non-cancer pain. Fairclough's framework examines how language use in texts both reflects and shapes social power dynamics and ideologies.

Results: Three discourses were identified:

(1) a medical authority discourse,

(2) a patient empowerment discourse, and

(3) a high-risk medication discourse.

Although all discourses are grounded in the biopsychosocial pain model, they reflect differing priorities and recommendations in chronic pain management. The high-risk medication discourse emphasizes the addictive potential of opioids, while the medical authority and patient empowerment discourses focus on the agency of healthcare providers and patients, respectively.

Conclusions: The identified discourses represent different implications for clinical practice and patient-provider dynamics. Our findings contribute to a deeper understanding of how opioid-related stigma and therapeutic relationships are discursively (de)constructed in Belgian policy documents.

II-B.14

A FEEDBACK REPORT FROM A PAIN CENTER SPECIALIZED IN MENTAL HEALTH

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Background and aims: Psychiatric issues are often intertwined with chronic pain, but can sometimes be difficult to manage in traditional pain centers. For this reason, in 2019, a center for the evaluation and treatment of pain specialized in mental health was established within a psychiatric hospital in Lyon.

Methods: The care pathway begins with an initial consultation conducted by a dual specialist team (algologist/pain specialist and psychologist or psychiatrist). During this session, a comprehensive evaluation is carried out to understand the patient's physical and psychological condition, with an emphasis on how these factors interact and contribute to chronic pain. Based on the findings, a personalized treatment plan is developed. This plan may include various interventions such as medication management, psychological therapies, and complementary practices aimed at improving both pain management and mental health. The treatment approach is tailored to each patient's specific needs to ensure optimal outcomes.

Results: The multidisciplinary team meets several times a week to adjust the treatment program, ensuring care for complex clinical situations (schizophrenia, mood disorders, psycho-trauma, addictions) that go beyond the capabilities of traditional pain centers.

Conclusions: After 15 years of existence, this center is recognized by its regional partners (general practitioners, city specialists, mental health facilities, other pain centers) as an important part of the care pathway aimed at reducing medical wandering, promoting non-pharmacological approaches, and restoring the patient's sense of agency despite their psychiatric disorders.

II-B.15

CRITICAL REFLECTIONS ON ESTABLISHING PUBLIC INVOLVEMENT FOR A CHRONIC PAIN RESEARCH CONSORTIUM

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Background and aims: The Consortium to Research Individual, Interpersonal and Social Influences in Pain (CRIISP) is a collaboration of eight UK universities investigating the psychosocial aspects of chronic pain. This work is supported by UKRI and Versus Arthritis through the Advanced Pain Discovery Platform. A public involvement (PI) workstream, co-led by people with lived experience, is working alongside researchers in all workstreams of CRIISP throughout the 4-year programme. We critically reflect on strategies used to ensure public contributors are fully integrated into the programmes of work.

Methods: Feedback about establishing the PI network was collected from: (1) survey of public contributors inviting them to reflect on their experience of the recruitment process, (2) public contributor self-report following PI activities and, (3) research team meeting notes. In Year 3, an online workshop will provide opportunity for public contributors to feedback experiences of PI to inform decision-making for final stages of work including dissemination activities and future grant applications.

Results: Achieving diversity of public contributors was challenging despite reaching out to a broad range of community groups. Clear communication with public contributors was crucial to maintain engagement, for example, via secure MS Teams channels, regular email updates and bespoke research tutorials. Retention of public contributors benefited from an individualised and flexible response to changing circumstances. Regular team meetings and 1:1's provided the opportunity to manage any problems and challenges encountered.

Conclusions: PI is a collaborative process, embedded throughout all workstreams in CRIISP. A continuous cycle of feedback has been adopted to maintain public contributor engagement.

II-B.16

PAIN AND COGNITIVE FUNCTIONING: THE ROLE OF EFFORT

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Background and aims: Pain is an alarm signal that captures attention and therefore interferes with cognitive functioning. However, there is substantial variability between and within persons in how pain affects cognitive task performance, which cannot be adequately explained by existing theoretical models. These models often fail to consider that humans are not passive receivers of stimuli, but rather active decision-makers. More specifically, when pursuing goals, people decide to either exert or withhold effort based upon a continuous and dynamic weighting of possible costs (expected effort) and benefits (anticipated reward). With the current study, we aim to examine whether chronic pain affects this cost-benefit analysis, and thereby the effort-based decision-making processes.

Methods: An online study was conducted, including 83 individuals who reported experiencing chronic pain and 81 individuals reporting no pain. They completed a cognitive effort discounting task and questionnaires regarding their pain. We analysed their behavioural outcomes in relation to the pain indicators.

Results: Our analyses suggest that people who report chronic pain show an increased willingness to exert effort (F(1, 100) = 4.21, p = .043). Furthermore, higher pain intensity (F(1, 100) = 6.03, p = .016), more pain interference in daily activities (*F*(1, 100) = 4.56, *p* = .035) and a higher pain level during the cognitive task (F(1, 100) = 5.47, p = .021) were associated with an increased willingness to exert effort.

Conclusions: This novel perspective aims to advance our understanding of the underlying mechanisms of pain-related cognitive interference. Moreover, it has the potential to provide new routes for intervention strategies.

II-B.17

THE ROLE OF PAIN EXPECTANCY AND ITS CONFIDENCE IN PLACEBO HYPOALGESIA AND NOCEBO HYPERALGESIA

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Background and aims: Placebo hypoalgesia and nocebo hyperalgesia, which exemplify the impact of expectations on pain, have recently been conceptualised as Bayesian inferential processes, yet empirical evidence remains limited. Here, we explore whether these phenomena can be unified within the same Bayesian framework by testing the predictive role of expectations and their level of precision (i.e., confidence in the expectation) on pain, with both predictors measured at the metacognitive level.

Methods: 60 healthy volunteers underwent a pain test (i.e., 8 noxious electrical stimuli) before (T0) and after (T1) receiving a sham treatment associated with either hypoalgesic (placebo), hyperalgesic (nocebo) or neutral (control) verbal suggestions, depending on group allocation. Trial-by-trial expectations, their precision, and perceived pain were measured. Skin Conductance Response (SCR) was also recorded as an autonomic response marker.

Results: Bayesian Linear Mixed Models (BLMM) analyses revealed that pain, both for placebo and nocebo, was predicted by the interaction between expectations and their precision and that the discrepancy between expected and perceived pain was predicted by expectations precision (i.e., greater alignment between expected and perceived pain when precision was higher), indicating that both placebo and nocebo responses are well described by a Bayesian perspective. A main effect of time for SCR was observed, suggesting habituation to painful stimuli.

Conclusions: Our data provide important evidence indicating that both placebo hypoalgesia and nocebo hyperalgesia can be unified within the same Bayesian framework in which not only expectations but also their level of precision, both measured at the metacognitive level, are key determinants of the pain inferential process.

II-B.18

THE DYNAMICS OF COPING WITH CHRONIC PAIN – A THEORETICAL MODEL AND SYSTEMATIC REVIEW

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Background and aims: Living with persisting pain requires the use of coping strategies to manage pain in everyday life. However, the process by which individuals cope with chronic pain and why some experience better outcomes is not clearly understood. Pain experiences are influenced by factors that change over time, which is not captured by current models. Here, we present a systematic review of current frameworks of coping relevant for chronic pain and propose a new dynamic model of coping in chronic pain.

Methods: A systematic search was conducted in three databases (Medline, Embase, Web of Science) on October 4th 2023. We included original peer-reviewed articles that presented a novel theoretical model focused on coping in health-related stress or pain, written in English, and which described human research. Articles on communal models of coping were excluded. A total of 1381 articles were identified (including duplicates) and 12 articles were included.

Results: Common themes in the coping models included appraisal (of threat or coping abilities), adaptive and maladaptive coping, and problem- and emotion-focused coping. No models were specific to chronic pain. Based on these results, we developed a new dynamic model that described how five factors of controllability, predictability, salience, personal resources, and motivation interact dynamically over time.

Conclusions: This systematic review shows how previous models have conceptualised the coping process. Common factors were identified across models and used to produce a new model of coping in chronic pain. This model shows the interplay between momentary factors and previous experiences, and how these relationships may change over time.

II-B.19

USING FREE ASSOCIATION METHODS TO ELICIT UNCONSTRAINED ACCOUNTS OF VISCERAL PAIN

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Background and aims: Qualitative interviews or focus groups are very often based on topics selected by the researcher. Neither publishing interview protocols nor positionality statements overcomes the problem of qualitative content being overdetermined by the researchers' biases.

Methods: We used the Grid Elaboration Method (GEM) to interview people with a range of visceral disease-related pain, such as endometriosis. The GEM asks the interviewee, in a 2 x 2 grid, to provide 4 drawings or words or phrases representing the topic of interest: their pain. Then the interviewee is invited to talk further about each of these 4 in turn, with the researcher doing no more than responding to participant responses. This elicits the most salient implicit responses with minimal researcher bias, thus making the content truly participant-determined, and it allows contradictions and idiosyncrasies to emerge. Responses are analysed thematically.

Results: Words and phrases were used more than drawings, but all provided rich elaborations on visceral pains: endometriosis, inflammatory bowel disease, and polycystic kidney disease. Themes expressed physical dimensions of pain, emotional toll of chronic pain, restrictions imposed by pain, social impacts, and adverse experiences with healthcare that worsened pain. No participant had any difficulty completing the grid or elaborating on it.

Conclusions: Results detailed a rich tapestry of the pain experience in patients with visceral diseases. The GEM is a valuable tool for gathering qualitative data that minimises bias of the researchers, and is very acceptable to participants.

II-B.20

EMPATHY AND PROSOCIAL RESPONSES TO HUMAN AND NON-HUMAN ANIMAL SUFFERING: THE ROLE OF PAIN CUES AND PSYCHOSOCIAL FACTORS

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Background and aims: Identifying contextual/dispositional traits influencing how we recognize and respond to others' pain can enhance understanding of pain empathy. There is a research gap in how humans perceive and respond to animal pain, lacking measurement tools. We designed/validated the first image-based task to assess perceptions and responses to human and animal pain, identifying psychosocial predictors.

Methods: The task included 36 images of wounded (pain cues) and unwounded (no pain cues) humans and animals (pets: cats/dogs, food animals: pigs/cows). After validation, 407 university students rated each image on inferred pain and willingness to help and completed questionnaires on pain, empathy, altruism, and prejudices. T-tests and stepwise regressions identified differences and predictors.

Results: Participants perceived animals as being in more pain and were more willing to help them than humans ($T's>2.2, p's<.02$). Without pain cues, food animals were perceived as more in pain and received more help than pets. With explicit pain cues, the opposite pattern was observed ($T's>4, p's<.001$). Negative pain experiences and beliefs and personal distress predicted pain inferences in all species. These factors, altruism, and empathic care predicted prosociality ($F's>10, p's<.001; T's>2.4, p's<.017$).

Conclusions: We observed an empathic bias towards animals, possibly due to perceived vulnerability. Without pain cues, empathy was higher for food animals, likely due to awareness of their living conditions. With pain cues,

empathy shifted towards pets, possibly due to cognitive dissonance about food animals' suffering. Pain-related variables influenced pain sensitivity and response to all species. Distress influenced perceived pain, both distress and care influenced prosociality.

II-B.21

MECHANISMS OF MOTIVATED ENDOGENOUS PAIN MODULATION

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Background and aims: Painful events often need to be endured to achieve positive outcomes. While prior studies have shown an influence of pain on decision-making, and effects of reward on pain, the role of motivation to obtain reward on pain perception has so far been insufficiently investigated. This study introduces a novel motivation-decision-task to investigate how motivation and the decision to engage in a painful action affect pain experience.

Methods: Twenty-two healthy individuals (12 female) participated. Each trial began with a monetary offer (low, medium, high) followed by a moderate or high-intensity noxious heat stimulus. After rating the stimulus intensity, participants decided to accept or decline the offer. They then received a second painful stimulus. Upon accepting, participants had to exert 30% of their maximal grip force for half the task duration to obtain the reward in half of the trials. Accepting the offer led to a stimulus of the same intensity, while declining reduced the stimulus intensity but yielded no reward.

Results: Participants reported less pain when accepting an offer than when declining it. Moderate pain was rated as less painful after accepting an offer compared to declining it. The pain reduction effect was significant only for medium or high, but not low offers.

Conclusions: Our findings suggest that motivation influences pain processing. The decision to engage in a painful action combined with moderate to high reward expectation induces motivated hypoalgesia. Future studies will use a double-blind pharmacological intervention fMRI study with naloxone to explore the role of the endogenous opioid system in these effects.

II-B.22

EXPLORING COMMUNICATION IN CLINICAL ENCOUNTERS: A LONGITUDINAL QUALITATIVE STUDY OF ADOLESCENTS WITH NON-TRAUMATIC KNEE PAIN ATTENDING IN SECONDARY CARE

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Background and aims: Effective communication is essential for building trust, reducing diagnostic uncertainty and supporting adolescents with knee pain. The experiences of the adolescents during the clinical encounter can influence their pain acceptance, beliefs and engagement in self-management. Few studies have explored the patient-clinician exchanges during the clinical encounter and how this influences youth in the days following. We explored the communication between adolescents with non-traumatic knee pain and orthopedic surgeons to understand how these interactions influence adolescents understanding of their pain condition and self-management.

Methods: We recruited adolescents aged 10-19 years experiencing non-traumatic knee pain. We video-recorded consultations with adolescents attending first appointments with an orthopedic surgeon. We conducted two follow-up interviews with the adolescents, 1-3 and 14-17 days after their initial consultation. Data were analyzed using inductive reflexive thematic analysis. The findings from all time points were synthesized, forming the basis for the longitudinal analysis.

Results: Nine adolescents with non-traumatic knee pain were included. The consultations lasted between 11 and 17 minutes. Adolescents struggled to understand messages about their knee pain, leading to uncertainty about the diagnosis, management plan, and pursuit of further examinations. They also found it difficult to recall what was

discussed during the clinical encounter. This meant that some paused their activities, faced challenges continuing their self-management and were left waiting for much-needed clarity.

Conclusions: The study illustrated the complexity of patient-clinician communication. We observed a significant loss of information and continued uncertainties during and after the clinical encounter. More research into how health information is understood by adolescents is needed.

II-B.23

VLPAG-SST NEURONS CONTROL PAIN DESCENDING PATHWAY IN A PHYSIOPATHOLOGICAL CONTEXT

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Background and aims: Pain is an adaptive and primordial aspect of mammal's physiology whose role is to warn against potential harmful situations and prevent aggravation of actual physical damages. However, many patients suffer from chronic pain, which overpasses pain's adaptive trait becoming pathological. Nociceptive signal transmission is first relayed by the spinal cord before reaching the brain through ascending pathways. The control of descending spinal integration is orchestrated by the periaqueductal gray (PAG) and rostral ventromedial medulla (RVM). In the RVM, ON, OFF and neutral cells, are respectively activated, inhibited or unchanged during nociceptive responses. Moreover, the somatostatin neurons of the ventrolateralPAG (vlPAG) are known to be involved in spinal hypersensitivity to nociceptive inputs but their underlying circuits in normal and chronic pain are still unknown. We hypothesize that vlPAG-SST neurons targeting the RVM control pain sensitivity in a physiopathological context.

Methods: We coupled electrophysiology and optogenetic tools to manipulate and record this pathway during nociceptive stimulation in freely moving animals.

Results: Our results first confirm that vlPAG-SST terminal activation in the RVM induces mechanical allodynia and thermal hyperalgesia, while in a chronic pain model (spared nerve injury), the same manipulation alleviates mechanical allodynia. During optostimulation, OFF and neutral cells activity are mostly unchanged while ON cells connected to vlPAG-SST/Glutamatergic neurons are activated during innocuous stimulation. Surprisingly, this same subpopulation becomes non-responsive to noxious stimulation in neuropathy.

Conclusions: This work points out ON cells crucial role in neuropathic pain, and vlPAG-SST/Glutamatergic neurons as principle descending pathway controls on this population in a physiopathological context.

II-B.24

THE EFFECT OF VERBAL SUGGESTION ON THE RESPONSE GENERALIZATION OF THE NOCEBO EFFECT

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Background and aims: Although research indicates that appropriately formulated verbal suggestion can increase symptom sensations (nocebo effect), it is unclear whether this effect is limited to the symptom directly suggested or extends to other, similar symptoms. This experiment examined whether inducing nocebo hyperalgesia through verbal suggestion would also increase the sensation of paresthesia.

Methods: Ninety volunteers were randomly allocated to control (n = 30), placebo (n = 30), and nocebo (n = 30) groups. Mechanical stimuli were applied using a blood pressure cuff to induce pain and paresthesia, which participants rated in real-time using computerized Visual Analogue Scale (COVAS) sliders. The experiment included a pretest and posttest phase with identical pressure parameters, separated by a 15-minute break. In the nocebo group, participants received a verbal suggestion indicating increased compression strength and thus expected pain; the opposite suggestion was given in the placebo group.

Results: A General Linear Model (GLM) analysis on pain ratings revealed significant effects of "phase" ($p < .001$) and a "group × phase" interaction ($p < .05$). Within-group comparisons indicated a significant increase in pain from

pretest to posttest in the nocebo group but not in the placebo ($p < .01$) and control ($p < .05$) groups. Analysis of paresthesia ratings also showed significant effects of "phase" ($p < .001$) and a "group × phase" interaction ($p < .05$), with post-hoc tests revealing that only the nocebo group experienced significant increases in paresthesia over time.

Conclusions: These findings suggest that nocebo-induced hyperalgesia may extend to other sensations, such as paresthesia.

II-B.25

TO INVESTIGATE PERSONALITY AND PAIN RATINGS OF EXPERIMENTAL PAIN IN HEALTHY SUBJECTS: TOWARDS THE ELUCIDATION OF FACTORS THAT CAUSE DIFFERENCES IN THE EXPRESSION OF PAIN

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Background and aims: A study of patients with chronic pain has indicated that those with a pronounced tendency towards neuroticism are more likely to exhibit a heightened level of preoccupation with their pain. It remains unclear whether the chronic pain is a consequence of this preoccupation or whether it is a result of an inherent personality disposition. In this study, we investigated the personality tendency in accordance with the Big5 theory and the expression of pain in healthy subjects.

Methods: The study was conducted with 453 healthy subjects who had provided written consent according to the approved documents by the Ethics Review Committee of the Graduate School of Frontier Biosciences, Osaka University (FBS2020-13, FBS2021-10). Following the administration of the NEO-PI-R, the subjects received experimental heat pain program using the TSA2 thermal stimulator (Medoc, Israel) twice in succession. The pain experienced at each thermal range was evaluated using a visual analogue scale (VAS). The significance level was set at 5% using JMP17.0.

Results: Upon examination of the correlation between the pain rating (average VAS value) and each Big 5 item, a negative correlation ($p < 0.05$) was identified for the sub-dimension of openness, „fantasy" and positive correlations ($p < 0.05$) were observed with neuroticism and its sub-dimensions, namely depression, self-consciousness, impulsiveness and vulnerability.

Conclusions: In subjects without history of chronic pain, a correlation was identified between the fantasy and neurotic tendencies, and the assessment of pain. The results suggest that there may be personality traits that make people more susceptible to chronic pain.

II-B.26

THE INTERACTION OF CHRONIC PAIN AND PSYCHIATRIC DISORDERS

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Background and aims: Chronic pain is a highly prevalent, debilitating disorder. Studies have indicated as many as two-thirds of individuals with chronic pain have a co-occurring psychiatric disorder, implying shared behavioural and biological mechanisms. Due to the high prevalence of comorbidity of chronic pain and psychiatric disorders and the limiting understanding of their overlap, we aimed to explore the complex interactions between these disorders.

Methods: To further understand their relationship, we used the UK Biobank (UKB), a comprehensive biomedical database, to examine the association between chronic pain-associated conditions and ten psychiatric disorders.

Results: In line with existing literature on nociplatic pain's heavy implications with psychological disturbances, various nociplastic pain conditions showed positive association with psychiatric disorders. Irritable bowel syndrome (IBS) demonstrated a positive association with all of the explored psychiatric conditions (OR: 2.72-4.21, $p<0.001$). Headaches (non-migraine) were positively associated with eight of the ten psychiatric conditions (OR: 2.29-3.95, $p<0.001$) and fibromyalgia with five of the ten psychiatric conditions (OR: 3.11-5.44, $p<0.001$).

Conclusions: These results strengthen our understanding of the positive association of psychiatric conditions and nociplastic pain conditions. Examining the association between comorbid chronic pain and psychiatric disorders builds a foundation for understanding the underlying mechanisms of chronic pain. Gaining insight into the overlap between chronic pain and psychiatric disorders can better define these disorders' etiology and better target pharmacological approaches commonly used to manage pain and psychiatric disorders.

II-B.27

A LONGITUDINAL EXPLORATION OF THE ROLE OF STICKINESS AND EXECUTIVE FUNCTION IN CHRONIC PAIN

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Background and aims: Individuals' experience of chronic pain is variable and dynamic; pain can worsen or improve over time. For some, pain is maintained indefinitely and can feel 'stuck'. To explore this, we proposed 'stickiness', encompassing three psychological domains: repetition and fixation, openness and alternatives, and attentional flexibility. Stickiness may manifest in specific ways, such as reduced expectation change, and be underpinned by executive function abilities.

Methods: 1000 adults with chronic pain recruited via Prolific online crowdsourcing platform will complete questionnaires capturing stickiness and pain characteristics (e.g., severity, impact), general and pain-specific expectation change paradigms, and cognitive tasks to assess lower and higher order aspects of executive function (e.g., inhibition, decision making). Data collection for Timepoint 1 concluding Dec 2024. Participants will be invited approximately 6 months later (June 2024) to repeat stickiness measures and pain characteristics.

Results: We will explore relationships between stickiness, executive function, and expectation change. We predict poorer performance on executive function tasks will be related to greater stickiness and reduced expectation change. We utilize longitudinal design, to explore how baseline stickiness and executive function relate to pain at follow up. It is anticipated that higher levels of stickiness, impaired executive function, and expectation change will be related to greater pain impact, severity, and interference.

Conclusions: The proposed research aims to establish the novel stickiness concept and its role in chronic pain, focussing on pain changes over time and the contribution of executive function. Stickiness represents a potential explanatory mechanism for differences in chronic pain outcomes and may inform future interventions.

II-B.28

SUPPORTING EMPLOYEES WITH CHRONIC PRIMARY PAIN TO BE IN WORK: EXPERIENCES OF SUPPORT AMONG EMPLOYEES AND EMPLOYERS IN SMALL-TO-MEDIUM-SIZED ENTERPRISES

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Background and aims: Chronic primary pain (CPP) affects 43.5% of the UK population, often leading to sickness absence. Little is known about the support needs of employees with CPP that could help them to remain in work, particularly employees working in small to medium enterprises (SMEs) (<250 employees) that represent the majority of UK businesses. The aim of this study was to identify what support is needed for employees with CPP to stay at work from the perspective of SME employees with CPP and SME managers.

Methods: Semi-structured interviews with seven SME employees with chronic primary pain, and eight SME managers underwent reflexive thematic analysis.

Results: Six themes were identified for SME employees with chronic pain: Unpredictable pain affects all aspects of life and work; I can, and will adjust to pain; Talking depends on personal preferences and others' awareness; Support: Do you have it? Do you know how to? What else is out there?; Understanding chronic pain helps empathise and feel recognised; The pros and cons of working in a small company. Four themes were identified for SME employers: If I know what it is and who has chronic pain, I can help; Finite resources: How to balance employee wellbeing and

business needs; The battle for open communication and trust within work culture; Offering proactive, not reactive, internal and external tailored support.

Conclusions: Supporting employees with CPP to stay at work is facilitated by a proactive manager offering flexible support and establishing open communication between employees and managers about pain at work.

II-B.30

NEW METHODS FOR EXPLORING DYADIC CONNECTEDNESS IN PAIN: A STUDY PROTOCOL

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Background and aims: Although pain is known to be influenced by the social environment, how social interactions affect pain remains poorly understood. Biobehavioural synchrony is a possible mechanism that operates within dyads. It is the alignment of physiological and emotional responses and seem to enhance relationship satisfaction and emotional well-being. We therefore explore whether alignment within non-romantic dyads impacts on pain perception. This poster describes the development of new methods to explore closeness and physiological alignment during shared pain-related experiences.

Methods: Physiological synchrony was defined by heart rate and skin conductance alignment during a shared task (conversation about pain). Participants are also asked to retrospectively rate shared positive and negative emotions during the task. Closeness was defined as a belief in mutual emotional support. Pain induction using heat pain and pressure pain is to be used to measure pain thresholds, temporal summation and conditioned pain modulation.

Results: Pilot work has been conducted on 10 non-romantic dyads to develop and refine methods. Preliminary data analysis has been conducted using Python-based correlation techniques. This revealed a positive relationship between closeness and biobehavioural synchrony, supporting the effectiveness of the study paradigm.

Conclusions: Our protocol and pilot work suggests we have a novel approach for examining closeness within dyads, which we can use to better understand how social contexts shape pain. The next step is to conduct the full study and explore whether synchrony between dyads effects pain sensitivity.

II-B.31

CAN MODELS AND THEORIES OF GRIEF HELP US BETTER UNDERSTAND THE EXPERIENCE OF LIVING WITH CHRONIC PAIN? A BEHEMOTH-FRAMED SCOPING REVIEW

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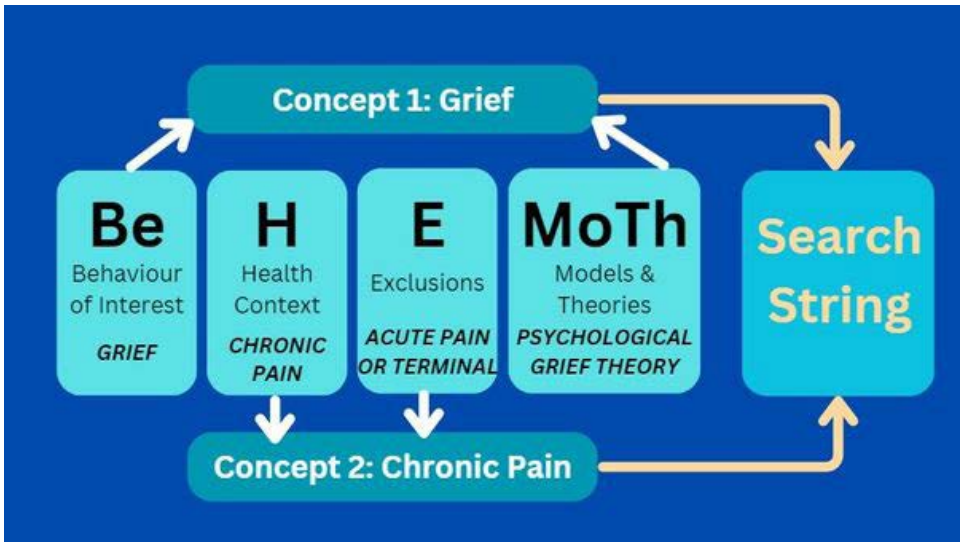
Background and aims: Living with chronic pain may precipitate a cascade of 'bio-psycho-social', even spiritual-existential losses. While grief theory may provide insight into similar health conditions, the extent to which the experience of living with chronic pain has been studied through the lens of grief is unclear. We aim to examine the existing literature for evidence of grief in the context of chronic pain, to determine the scope of coverage of this concept. Within the larger research project, this will elucidate whether grief theory might promote a better understanding of the experience of living with chronic pain.

Methods: A PRISMA-guided systematic scoping review was designed to search PsycInfo, Embase, Medline and CINAHL, framed using BeHEMoTh. Behaviour of interest(Be), grief, was defined as a response to major loss, considered in health context(H) chronic pain (≥3 months), excluding(E) acute pain (<3 months) or terminal diagnosis, examining models/theories(MoTh) pertaining to loss & grief.



Results: Having identified 8252 records, screened 282 full-texts, and chosen 25 articles for inclusion, we investigate how loss and grief have been understood in the chronic pain context. We query how thoroughly the potential explanatory power of grief theory has been studied by mapping, reporting and discussing varying definitions and interpretations, distinguishing between implicit and explicit framing.

Conclusions: By identifying existing grief theory-informed approaches to therapeutic psychological chronic pain care, we will clarify gaps in the research. Our findings will help determine what research questions we pursue in subsequent qualitative and quantitative studies, seeking to better understand the experience of living with chronic pain.

II-B.32

PAIN INTERFERENCE IN INDIVIDUALS WITH CENTRAL SENSITIVITY SYNDROMES: THE ROLE OF TYPE OF TRAUMA AND RESILIENCE

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Background and aims: People affected by “Central Sensitivity Syndromes” (CSSs) experience widespread pain, psychological symptoms, a history of trauma and increased pain interference. Resilience could be a protective variable for these people. This study aimed to analyse whether the relationship between health-related symptoms common to CSSs and pain interference is influenced by resilience and the type of trauma suffered.

Methods: The study sample comprised 305 participants with CSSs (86.9% female; mean of age = 52.33, SD = 8.99). A t-test was used to analyse differences between people who have experienced interpersonal vs non-interpersonal trauma, and the moderated mediation of resilience and type of trauma was examined.

Results: Participants with interpersonal trauma exhibited more health-related symptoms common to CSSs. The full moderated mediation model explained 41% of the variance in pain interference. The effect of resilience on CSS symptoms was significant. Both the direct effect of resilience on pain interference and the effect of CSS symptoms on pain interference were significant. The effect of the interaction between CSS symptoms and type of trauma on pain interference was not significant. As CSS symptoms increased, pain interference also increased but not as a function of the type of trauma.

Conclusions: Considering resilience in people with CSSs and trauma could be crucial when addressing the interference that pain causes. If these results are confirmed, resilience could become an important factor in the treatment of individuals with CSSs.

II-B.33

THE EFFECT OF NOCEBO VERBAL SUGGESTION ON BODY IMAGE

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Background and aims: This project tested whether body image changes after manipulative nocebo verbal suggestion provided by a health care professional in an experimental setting.

Methods: This experiment was designed as a between – and within – subjects' comparison. The study was conducted on 78 healthy volunteers, randomly allocated to one of two groups. Participants were assessed regarding their body image twice: before the experimental manipulation (pretest), and after the experimental manipulation (post-test). Following the pretest assessment, a postural test (Adams test) was performed in both groups. The postural test was conducted by the health care professional in an experimental setting. According to the group allocation, participants in the nocebo group were be informed about the results of physical examination either that their back is lopsided, fragile and prone to injury, therefore extra-caution is advised, or received no verbal feedback (no manipulation) in the control group.

Results: Body image assessed via Fremantle Back Awareness Questionnaire, revealed significant difference in body image alteration in the NOCEBO group $F(1,76)=12,656$, $p<0,001$. Post-hoc analysis confirmed observed differences between the NOCEBO group and control group. Individual compliance was positively correlated with body image distortion ($r=0,38$, $p=0,016$) in the nocebo group.

Conclusions: The perceptual dimension of body image, assessed by the Fremantle Questionnaire, was distorted after the nocebo suggestion. Individual compliance was associated with a more distorted body image elicited by the nocebo suggestion.

II-B.34

PAIN PREVALENCE RATES AND THE MEDIATING ROLE OF NEGATIVE AFFECT IN ADULTS REFERRED TO PERSONALITY DISORDER TREATMENT: A CROSS-SECTIONAL STUDY

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Background and aims: Personality disorders (PDs) are prevalent among individuals with chronic pain, but less is known about the prevalence of pain in the PD population. This study therefore sought to explore the prevalence of current or everyday pain among individuals referred to outpatient PD treatment, and further explore the mediating role of negative affect in the relationship between PD severity and current pain.

Methods: Data was retrieved from the Norwegian Network for PDs' quality register which included 4361 participants. Pain was operationalized using the EQ-5D-3L "pain or discomfort" item and four SCL-90-R pain-related items ("pain bothersomeness"). Rates of self-reported pain were explored both pre and post treatment to determine the persistency of the pain-related symptoms. The role of negative affect in the relationship between PD severity and pain was investigated by linear regression analysis.

Results: A substantial burden of pain-related symptoms was demonstrated, as 71% and 80% reported moderate to extreme pain or discomfort and pain bothersomeness, respectively. Muscle soreness was the most common pain (59%) followed by headache (48%), low back pain (46%), and heart or chest pain (34%). Moderate to extreme pain or discomfort was persistent for 77% of the participants who provided end of treatment data (mean treatment duration was 82 weeks). Negative affect mediated the relationship between PD severity and pain.

Conclusions: This is the first large-scale study on everyday pain in patients with PDs. The findings reveal that moderate to extreme pain is prevalent among persons with PDs and that this co-occurrence is driven by negative affect.

II-B.35

THE IMPACT OF ANXIETY, DEPRESSION AND STRESS ON THE INTENSITY OF ACUTE POSTOPERATIVE PAIN IN PATIENTS AFTER UROLOGY INTERVENTIONS

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Background and aims: Psychological distress is considered to be a strong predictor of moderate to high intensity of postoperative pain in most surgical interventions. The aims of this study were to establish the correlation between stress, anxiety and depression and the level of postoperative pain and the postoperative morphine consumption after urology interventions, respectively.

Methods: This is a prospective cohort study which included 23 patients, scheduled for nephrectomy, radical cystectomy and radical cystoprostatectomy. Preoperatively and postoperatively, the level of stress, anxiety and depression was estimated by DASS 21 questionnaire. The intensity of acute postoperative pain in movement and at rest was measured by VAS. Also was measured the postoperative morphine consumption.

Results: There was no significant difference between DASS21 scores preoperatively and at discharge. The middle value described as median was decreased from 20 to 16 (significance =0,265, Wilcoxon Signed Ranks Test).

There was no significant correlation between preoperative DASS21 score and the intensity of pain in movement and at rest ($VAS_{max\ at\ rest}$, r=0.224, p=0.304; $VAS_{max\ in\ movement}$, r=0.232, p=0.288). There was also no significant correlation morphine consumption and DASS21 score (morphine consumption, r= - 0.067, p=0.763).

Conclusions: There is a growing interest in impact of anxiety, depression and stress on the intensity of acute postoperative pain. We did not establish this correlation, or the correlation between those three domains on postoperative morphine consumption. However, our study is still ongoing. We hope that future research with a larger sample will show a statistically significant association in patients after urology interventions.

II-B.36

PROTOCOL FOR DEVELOPMENT OF A QUESTIONNAIRE MAPPING GENDER AND PAIN DYNAMICS

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Background and aims: Binominal sex differences have been extensively examined in pain research, revealing a trend wherein individuals categorized as female exhibit heightened sensitivity to pain compared to those categorized as male. However, the gender context model of pain proposes several intrapersonal relationships between pain and gender (i.e. attitudes, feelings and behaviors) as well. Hence, it is important that comprehensive tools are developed to map these interactions.

Methods: An English questionnaire will be developed containing statements regarding gender conceptualization, gender identity and gender roles in pain, which are scored on a Likert scale. Based on preliminary considerations the authors will develop a first version of the questionnaire, which will be revised based on the input of an international multidisciplinary expert committee. Afterwards, online sequential funnel- based focus groups existing of participants with different profiles will go back and forth with the expert committee, to revise until data saturation is achieved. This finished questionnaire will then undergo preliminary pilot testing in a small group of respondents. Finally, the questionnaire's reliability and validity will be tested.

Results: The result will be a questionnaire with items that can be organized into various continua which we hypothesize to be interrelated. In a data-driven approach we will then be able to construct different profiles related to intrapersonal gender and pain dynamics.

Conclusions: This new assessment tool will be useful for clinical pain practice and pain research and has the potential to provide valuable insights into the underlying mechanisms of the interaction between pain and gender.

II-B.37

UNVEILING THE IMPACT OF EXPECTATIONS AND THEIR PRECISION ON CHRONIC PAIN: AN ECOLOGICAL MOMENTARY ASSESSMENT STUDY

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Background and aims: Ecological Momentary Assessments (EMA) have been used to monitor pain fluctuations in chronic pain patients, identifying important predictors like anger and anxiety. Despite the well-established modulatory effect of patients‘ expectations on pain and recent evidence suggesting a role of expectation precision (i.e., confidence in expectations), no EMA study has yet examined expectations as a predictor of pain. Here, we investigate the temporal dynamics between momentary expectations and their precision on perceived pain in chronic pain patients, while considering the potential influence of external situational factors.

Methods: In this intensive longitudinal EMA study, 40 chronic pain patients provided ratings 5 times daily over 14 days on their momentary (1) expectations of subsequent pain, (2) confidence in these expectations, (3) situational adversity and negativity, and (4) actual pain intensity.

Results: Hierarchical Generalized Linear Mixed Models tested the predictive power of expectations, expectation precision, situational adversity, and negativity on pain perception. Results identified previous expectations and present situational negativity as predictors of pain, while no effects were found for expectation precision or adversity.

These findings underscore the role of expectations in predicting subsequent pain perception in chronic pain patients and reveal that situational negativity during pain assessment also predicts pain, emphasising the influence of both internal (expectations) and external (situational negativity) factors in pain modulation.

Conclusions: Overall, our study identified expectations and situational negativity as key factors in pain modulation, paving the way for future research to explore their potential as targets for therapeutic interventions.

II-B.38

THE ROLE OF TYPE OF TRAUMA AND STRESS IN THE RELATIONSHIP BETWEEN HEALTH-RELATED SYMPTOMS COMMON TO CENTRAL SENSITIVITY SYNDROMES AND PERCEIVED PAIN INTENSITY

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Background and aims: Trauma and chronic pain are two variables that frequently co-occur and, particularly in individuals with „Central Sensitivity Syndromes (CSSs)“. Stress is also implicated in these conditions. The present study aimed to analyse the predictive role of health-related symptoms common to CSS and stress in the level of perceived pain in people who suffer from CSSs and have suffered one or more traumatic events, examining the differential impact of interpersonal and non-interpersonal trauma.

Methods: A total of 477 participants completed a battery of questionnaires. Linear regression analysis was performed to evaluate the contributions of health-related symptoms common to CSSs, type of trauma and stress to the prediction of perceived pain intensity and to determine whether either or both moderated the effects of CSS symptoms on perceived pain intensity.

Results: Type of trauma contributed significantly and independently to the prediction of perceived pain intensity. CSS symptoms had a significant and direct effect on perceived pain intensity. A moderating effect of stress on the association between CSS symptoms and perceived pain intensity was identified.

Conclusions: In the perception of pain among individuals with CSS and trauma, it may be important to consider the type of traumatic event experienced and how it interacts with their stress levels. Interpersonal trauma may be associated with increased CSS symptoms and perceived stress, which, in turn, may predict greater pain perception.

II-B.39

PAIN PERCEPTION IS RELATED TO DIFFERENCES IN ALEXITHYMIA AND INTEROCEPTIVE SENSIBILITY

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Background and aims: Previous research contributed to our knowledge of a pain-sensitizing effect of negative emotions. However, the relationship between personality variables, interoceptive sensibility and pain perception has remained controversial. The aim of the present study was to examine whether personality variables, e.g. alexithymia and interoceptive sensibility, are associated with pain perception.

Methods: We investigated a large sample of healthy young adult volunteers (n = 158), assessing alexithymia using the Toronto Alexithymia Scale (TAS-20) and interoceptive sensibility using the Multidimensional Assessment of Interoceptive Awareness (MAIA), and pain perception experimentally assessed with electrical stimulation.

Results: As interoceptive sensibility was found to be related to the alexithymia subscores, a regression analysis was performed for pain threshold and tolerance. The main findings were that, regarding pain thresholds, the alexithymia facet Difficulty Describing Feelings (DDF) and the MAIA subscale Attention Regulation were associated with higher pain thresholds, whereas the alexithymia facet Difficulty Identifying Feelings (DIF) and the MAIA subscale Not-Distracting were associated with lower pain thresholds. For pain tolerance, only the DIF alexithymia subscale was associated with lower pain tolerance scores, whereas the MAIA Not Distracting, Attention Regulation and DDF Alexithymia subscales were associated with higher pain tolerance scores.

Conclusions: The results suggest that different facets of alexithymia, as well as interoceptive abilities, are differentially related to pain perception and should thus be examined in more detail in clinical samples in the future.

II-B.40

RESILIENCE OR VULNERABILITY TO PAIN IN CLIMBERS: A SURVEY EXPLORING THE RELATIONSHIPS BETWEEN PSYCHOLOGICAL FLEXIBILITY, PSYCHOLOGICAL INFLEXIBILITY, AND PAIN CATASTROPHIZING

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Background and aims: Pain catastrophizing (PC) is linked to chronic pain presence and acute pain intensity. However, application of the psychological flexibility (PF) model to chronic pain is increasing. PF, and its counterpart psychological inflexibility (PI), refer to the ability/inability to adaptively respond to challenges while maintaining value-driven behaviors. PC and PI could be associated by worsening pain and promoting vulnerability to negative health outcomes, but this requires further investigation. Climbers are frequently exposed to pain/injuries, providing a unique context for this investigation.

Methods: This cross-sectional online survey recruited climbers (>18 years, ≥3 years climbing), and analyses were pre-registered (https://osf.io/bcy5m/). The multidimensional PF inventory (MPFI-24, including PI), pain catastrophizing scale (PCS), demographics, injury history, pain status, and climbing-specific variables were assessed.

Results: For 648 valid responses (mean age 38.6 years), PC correlated negatively with PF (R=-0.15, p<.01) and positively with PI (R=0.34, p<.01). The PF-PC relationship was strongest in acute pain (R=-0.27, p<.01, 15.4% of respondents), weaker in chronic pain (R=-0.18, p<.01, 38.7%), and absent in pain-free individuals (R=-0.07, p>.05, 45.8%). PI-PC correlations were present in all three pain-states, but strongest in chronic pain (R=0.39, p<.01). Stratifying for sex-at-birth, correlations were still present in females (PC-PF: R=-0.25, p<.01; PC-PI: R=0.33, p<.01; 53.4% of respondents), while in males (46.1%), PC correlated with PI (R=0.35, p<.01) but not PF (R=-0.054, p>.05).

Conclusions: PC and PI were associated irrespective of pain-state or sex-at-birth, while PC-PF showed associations only for females and acute or chronic pain-states. Insights from climbers enhance understanding of pain-related resilience and vulnerability in active, injury-prone populations.

II-B.41

ENDOGENOUS OPIOID MODULATION OF SAFETY LEARNING IN HUMANS – PRELIMINARY DATA

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Background and aims: Chronic pain is characterized by disrupted safety learning and bias towards threat - where fear- and pain-related information cannot be effectively suppressed in favor of safety information. Preclinical research suggests endogenous opioids underpin core mechanisms facilitating safety learning and inhibition of fear learning, but evidence in humans is limited. Here, we investigate for the first time whether endogenous opioids blockade with naltrexone (50mg) affects human safety learning.

Methods: The randomized, double-blind, between-subject study was conducted over 2 sessions in 80 healthy participants. In session 1, participants underwent fear conditioning (learning to predict a painful stimulus), followed by drug/placebo administration. At drug peak, participants underwent a safety learning phase, where the pain-predictive cue was presented without pain. Participants returned after a 1 week drug washout for session 2 to assess the impact of naltrexone vs. placebo on safety memory retention. Fear-potentiated startle served as the primary outcome measure.

Results: While we remain blinded to drug conditions, initial analyses revealed no significant drug effect during extinction (p=.059). However, there was a significant main effect of drug (p=.01) and a drug*time interaction (p=.005) during retention, consistent with preclinical findings. This effect appears modest, as learning was not entirely disrupted.

Conclusions: Preliminary analyses show an effect of drug on the retention of safety information one-week post-safety learning. While the direction of effect is pending unblinding, the size of effect aligns with existing research on opioid antagonist effects in stress, reward, and fear acquisition, implying a modest contribution of endogenous opioids to safety learning.

III-B.01

SHAPING AND CHANGING PAIN EXPECTATIONS THROUGH ONLINE INTERVENTIONS

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Background and aims: Negative expectations can exacerbate symptoms, posing challenges in clinical settings, particularly among chronic pain patients. This study investigates potential of online operant conditioning to induce nocebo expectancies in pain-free individuals and chronic pain patients, and whether online verbal modeling can reduce nocebo expectancies and maintain these effects over time.

Methods: Study involves pain-free individuals and chronic pain patients, divided into two experimental and two control groups. During operant conditioning, participants watch videos of individual receiving electrocutaneous stimuli to forearm with/without a placebo ointment. Participants evaluate observed person‘s pain, with experimental groups rewarded for estimating placebo trial pain (with ointment) as stronger than control trial pain (without ointment) and punishments for opposite estimation. Participants in control groups receive rewards and punishments in non-contingent manner. These are delivered through experimenter videos expressing approval or disapproval. This phase aims to elicit nocebo expectancies.

During following verbal modeling, participants from experimental groups are presented with pain ratings indicating others assessed placebo trial pain as lower than control trial pain. While control groups are presented with pain ratings in non-contingent manner. This phase aims to reduce nocebo expectancies. Efficacy of verbal modeling is assessed immediately and after a delay.

Results: Pilot study results indicate significant differences between trials with cream (M=6.45;SD=1.63) and without cream (M=4.36;SD=1.36) in testing 1 (t(10)=3.94,p=.003).

Conclusions: Online operant conditioning is effective in eliciting nocebo expectancies.

Note: pilot study included only a pain-free individuals in operant conditioning procedure. Data collection for main experiment is ongoing and results will be presented on the poster.

III-B.02

NOCEBO HYPERALGESIA IN THE DIGITAL WORLD: INDUCTION AND MODIFICATION

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Background and aims: Nocebo hyperalgesia, an increase in pain following an inert intervention, can be transmitted through online observation. Social media often spread health-related information, including patients' negative treatment experiences, potentially inducing nocebo effects. This study examines effectiveness of symbolic and verbal modeling via social media in inducing nocebo hyperalgesia and verifies if classical conditioning can modify this effect.

Methods: Participants are assigned to one of four groups: symbolic modeling; verbal modeling, two control groups. During Induction, symbolic modeling group watches TikTok videos showing participants demonstrating increased pain during placebo device activation, while verbal modeling group reads forum comments indicating similar effects. Control groups receive no manipulation. Inactive TENS electrode, with cues indicating its activation/deactivation, serves as placebo. In Testing 1, moderate pain is applied with and without placebo to assess nocebo hyperalgesia occurrence. During Modification, experimental groups undergo classical conditioning of hypoalgesia by pairing high/low pain with placebo deactivation/activation cues, respectively. Control group 1 undergoes same conditioning; control group 2 has no manipulation. Testing 2 is similar to Testing 1 and examines modification of nocebo hypoalgesia.

Results: No significant differences were observed in mean pain rating (placebo activation vs. deactivation) during Testing 1 (p=.93). A trend toward significance was observed in control group 1 during Testing 2 (p=.17) with higher pain reported during placebo deactivation (M=4.33; SD=1.73) than during activation (M=3.95; SD=1.34), indicating potential effectiveness of classical conditioning.

Conclusions: Preliminary sample size appears insufficient to detect significant effects of Induction and Modification procedures. Data collection is ongoing; updated results will be presented on poster.

III-B.03

MEDICATION USE AND ITS RELATIONSHIP WITH PAIN SEVERITY, PHYSICAL FUNCTIONING, DISABILITY AND WELLBEING IN INDIVIDUALS WITH CHRONIC NON-CANCER PAIN

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Background and aims: Chronic pain affects approximately 1 in 4 Belgian adults, with around 10% receiving opioid treatment. While opioids have long been regarded as a cornerstone for pain treatment, evidence increasingly questions their long-term efficacy for managing chronic non-cancer pain (CNCP). Compounding this challenge, the opioid crisis in North America has amplified stigma surrounding opioid use, complicating the challenges faced by individuals with CNCP. The present study explored medication use among individuals living with CNCP and its association with pain severity (RQ1), wellbeing and functioning outcomes (RQ2), and stigma experiences (RQ3).

Methods: A secondary analysis was conducted using data from an online survey in Belgium completed by 337 participants. Following WHO guidelines, participants were categorized into 4 different groups: (1) no medication, (2) non-opioids, (3) mild/weak opioids, or (4) strong opioids. Pain grades were assigned using the Graded Chronic Pain Scale. Bivariate correlations were applied for RQ1, while ANOVA was used for RQ2-3.

Results: Participants classified in higher pain grades were more likely to use stronger opioids. ANOVA revealed significant differences in wellbeing and functioning, with the strongest opioid group reporting the highest levels of disability, social isolation, and stigma (enacted and internalized), alongside lower physical functioning and participation in social roles and activities. No differences were observed in depressive symptoms, anxiety or anticipated stigma between medication groups.

Conclusions: This study highlights the nuanced relationship between medication use and various biopsychosocial outcomes in individuals with CNCP, emphasizing the need for addressing opioid-related stigma to improve patient care and wellbeing.

III-B.04

LAMINAR PROFILE OF PAIN LEARNING

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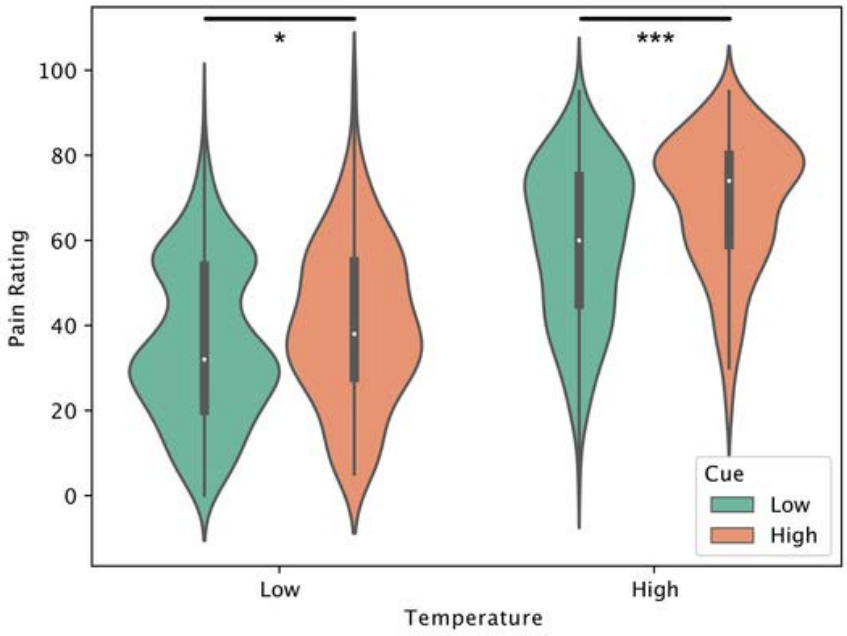
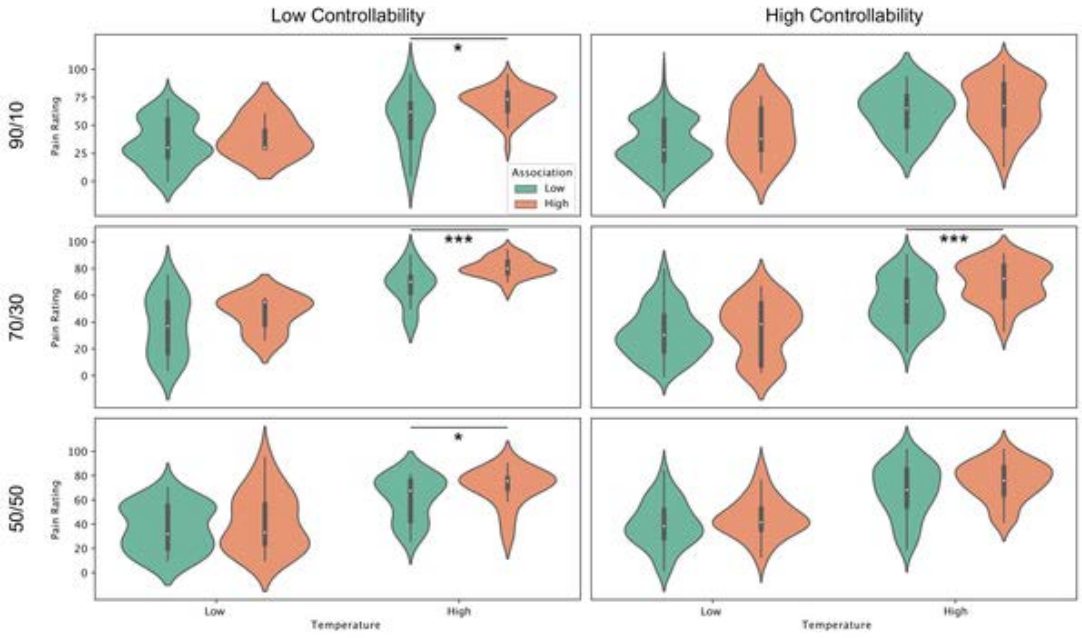
Background and aims: The Reinforcement Learning (RL) model of pain suggests that pain perception is optimised to minimise future pain. This is thought to be processed in layer dependent hierarchy within the insula. This study aims to elucidate the layer specific circuitry of pain learning using a novel pain learning task and high-resolution fMRI. We hypothesise that pain perception will align with expectations during periods of high certainty and low controllability. Additionally, we expect to see activation in the dorsal posterior insula during pain assimilation and deep layers of the anterior insula during contrast.

Methods: Participants pick between two cues that control thermal stimulation to learn their associations. Associations vary in baseline certainty (odds of delivering pain) and controllability (free/forced choice). High-resolution 2D-EPI BOLD during task completion.

Results: Currently 21 participants have been recruited. Participants demonstrated biases toward prior learning (high-cue x low-pain: Cd=0.56, p=9.97x10^{-9}, low-cue x high-pain: Cd=0.25, p=0.011) which increased with lower controllability and higher certainty. Neuroimaging pilots have been performed with activation present in middle layers of the posterior insula in response to painful stimulus, full results of neural correlates of learning are forthcoming.





Conclusions: This research proposal integrates theoretical models of brain function with advanced neuroimaging techniques to probe the intricate mechanisms of pain perception and learning. By examining how the brain integrates sensory stimuli with past experiences and expectations to generate the experience of pain, this study aims to advance our understanding of the neural underpinnings of pain and its modulation.

III-B.05

INVESTIGATING THE RELATIONSHIP BETWEEN PAIN-RELATED ATTENTION BIAS AND GENERALIZATION OF PAIN-RELATED FEAR AND AVOIDANCE BEHAVIOR: A VIRTUAL REALITY (VR) STUDY

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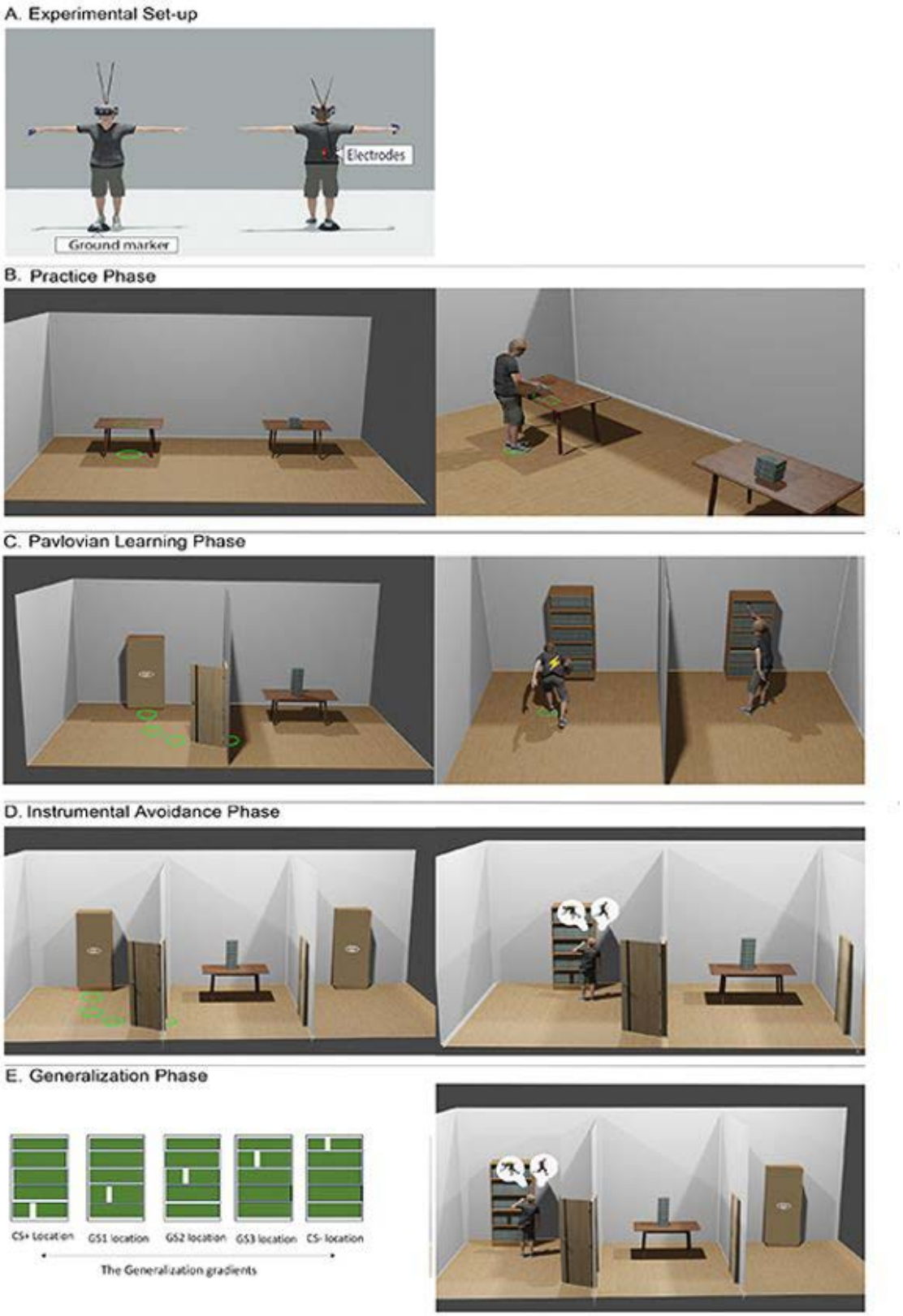
Background and aims: Contemporary pain models identify pain-related attention bias and excessive avoidance as key factors in the transition from acute to chronic pain, yet their roles remain unclear. To fill this gap, this study investigates the relationship between these two factors in a novel VR-based ecologically valid avoidance-conditioning paradigm.

Methods: Healthy volunteers (N=60) were instructed to place books on lower or upper shelves in a VR environment. In the Pavlovian learning phase, one movement (CS+, e.g., bending) was paired with pain, while another (CS-, e.g., stretching) was not. During the instrumental avoidance phase, participants could learn to avoid pain by leaving the room requiring a CS+ movement and entering a safe room. In the generalization phase, books could also be placed on middle shelves by performing novel generalization movements (GS1–GS3; varying between the CS+ and CS-) that were never followed by pain. Attention processing (eye-tracking), pain-related fear (self-reported fear and expectancy, pupil dilation), urge to avoid, and avoidance behavior were recorded.



Results: In the avoidance phase, participants were more afraid of and avoided the CS+ related movement more than the CS- related movement, but attention was not biased towards the CS+ location. Greater attention towards the CS+ was associated with reduced avoidance. Self-reported fear, but not avoidance behaviour, is generalized to the novel movements following a generalisation gradient.

Conclusions: Our novel VR paradigm seems a promising tool to investigate pain-related attention and avoidance behaviour concurrently within a dynamic real-life environment, in varying contexts (e.g., competing goal pursuit).

III-B.06

THE ROLE OF PAIN IN ADOLESCENTS' SELF-REPORTED ATTENTIONAL CONTROL

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Background and aims: Pain and pain problems have been inversely associated with executive functioning and, more specifically, attentional control. Poor attentional control and negative beliefs about own level of attentional control relate to difficulties in emotion regulation and can impede everyday tasks, including school performance. Yet, individual differences in attentional control are not well-understood in the context of pain. The current analyses aimed to examine whether musculoskeletal pain predicts self-reported attentional control over time in a large sample of older adolescents. We also explored the role of psychological distress and rumination within this relationship.

Methods: Data from the two last waves of a five-year longitudinal study (2014–2018) of Swedish high school students was used, with one year between waves. The analytic sample includes 2513 adolescents aged 17-18 years (50.8% girls) who participated during both waves. Questionnaire measures of musculoskeletal pain, attentional control (focusing and shifting), psychological distress, and rumination were used.

Results: Greater levels of pain predicted lower attentional control (focusing) one year later. Anxiety, but not depressive symptoms or rumination, moderated the relationship between pain and attentional control. Depressive symptoms showed predictive value for future attentional control.

Conclusions: The results highlight the importance of considering pain as a factor explaining individual differences in beliefs in own attentional control abilities, at least in older adolescents. These results are discussed in relation to recent views concerning the association between (chronic) pain and cognitive function. *Acknowledgments.* This work is based on the Master's thesis of Oscar Anjou and Tobias Ingvarsson, under supervision of the first author.

III-B.07

SHORT-TERM IMPACT OF PREPARATORY SUGGESTIONS ON PAIN IN THE CONTEXT OF NONPHARMACOLOGICAL ACTIVITIES: A SYSTEMATIC REVIEW WITH META-ANALYSES OF RANDOMIZED CONTROLLED TRIALS

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Background and aims: In healthcare, practitioners often prepare patients for activities by suggesting that their pain may increase or decrease during or after the activities, thereby potentially setting expectations about pain. Several RCTs have investigated the short-term effects of preparatory suggestions on pain in the context of nonpharmacological activities, but the findings have been inconsistent. To address this, we conducted a systematic review with meta-analyses to investigate whether positive preparatory suggestions reduce pain and negative preparatory suggestions increase pain during and shortly after nonpharmacological activities compared to no or neutral preparatory suggestions, and if so, to what extent.

Methods: In alignment with our preregistered protocol (PROSPERO ID: CRD42024587230), we searched the bibliometric databases EMBASE, MEDLINE, PsycINFO, and CENTRAL, as well as Google Scholar, using search terms related to suggestions, pain, expectations, and an RCT filter. Two researchers independently screened the potentially eligible studies in Covidence based on predefined eligibility criteria and assessed the risk of bias and certainty in the findings for the eligible studies.

Results: A total of 13,274 potentially eligible studies underwent title/abstract screening, from which 324 proceeded to full-text screening. We synthesized data from the eligible studies both narratively and through meta-analyses. For the meta-analyses, we employed a restricted maximum likelihood mixed-effects model and reported effect sizes for continuous and binary outcomes as standardized mean differences and relative risks, respectively.

Conclusions: The review offers insights for developing strategies aimed at enhancing placebo responses and mitigating nocebo responses in healthcare, which can ultimately improve patient experiences.

III-B.08

A MISSED PSYCHIATRIC DIAGNOSIS MEANS MISSED OPPORTUNITIES AMONG PATIENTS WITH CHRONIC PAIN

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Background and aims: Patients with chronic pain often suffer from comorbid mental pathology. A special group consists of patients with undiagnosed mental disorders who have an initial appointment with specialists involved in the treatment of pain syndrome. Failure to identify mental pathology leads clinicians down the wrong path, aggravating the course of pain symptoms.

Methods: We describe a patient who survived more than 8 years from the chronic pelvic pain. A 28-year-old woman came to our hospital having experience in treatment by urologists, undergoing radiofrequency ablation procedures, neurostimulation and other interventional methods of pain treatment. In our department she was examined by a psychiatrist. A diagnosis was made of a mental disorder that the patient had suffered from since she was 8 years old. Mental pathology served as a trigger for the development of pain syndrome.

Results: The lack of timely diagnosis and treatment of mental disorder led to a deterioration in the patient's somatic condition and further intervention methods for pain treatment, which were ineffective.

Conclusions: It is necessary to conduct an adequate assessment of the mental status of patients suffering from chronic pain syndrome. We describe possible "red flags" that serve as an indicator for referral to a consultation with a psychiatrist or psychologist.

III-B.09

MEMORY DYSFUNCTION AND ITS CAUSES IN CHRONIC PAIN

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Background and aims: Chronic pain patients frequently report memory difficulties. Beyond these subjective complaints, numerous studies have demonstrated objectively impaired performance in working and long-term memory tasks, compared to healthy controls.

Methods: We investigated the nature and possible causes of memory dysfunction in patients with chronic pain, focusing on strategy use, depression, and fatigue. We recruited 31 patients with chronic pain disorder (F45.41) and 31 age-matched control participants.

Participants were asked to memorize object pairs, followed by a recognition test for both the individual objects (item memory) and their combinations (associative memory). In the first task block, participants could use any strategy they chose and were retrospectively queried about their mnemonic strategies. In the second block, participants were instructed to apply an effective mnemonic strategy: To imagine the two objects interacting ("interactive imagery"). Participants also completed questionnaires assessing depressive symptoms and fatigue.

Results: Chronic pain patients exhibited poorer memory performance, and this deficit was more pronounced for associative than for item memory. While patients were less likely to report using effective encoding strategies in task block 1, their associative memory performance strongly benefited from the encoding strategy in task block 2. Patients were hence able to compensate for memory difficulties via strategy instruction. In mediation analyses, we additionally investigated the role of depressive symptoms and fatigue in the memory deficits in the patient group.

Conclusions: These findings shed light on the complex cognitive challenges faced by chronic pain patients and highlight the need for wholistic interventions that include a perspective on cognition.

III-B.10

WHAT CONSTITUTES VALIDATION AND INVALIDATION BY CLINICIANS IN CONSULTATIONS FOR CHRONIC PAIN? A QUALITATIVE EXPLORATION

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Background and aims: Validation is the communication of understanding, acceptance, and legitimacy of a person's experience, and is a core component of patient-centred care for chronic pain. However, there is no large-scale analysis of validating and invalidating clinical experiences, or exploration of how validation may differ across different populations (e.g., pain conditions, gender, ethnicity). Therefore this study aimed to qualitatively explore experiences of validation and invalidation in clinical encounters for people with chronic pain.

Methods: 372 adults with chronic pain were recruited via prolific.com to participate in an online study investigating clinician validation and recall. Participants were randomised to recount either a validating or invalidating clinical experience, and write about this in detail in a free-text box. Responses were analysed using thematic analysis.

Results: Analysis is ongoing. 93% of participants had experienced both validating and invalidating consultations. Initial findings show that key tenets of validation are active listening, making eye contact, being compassionate, and explaining assessment and treatment options. Conversely, clinicians describing pain as ‚normal', dismissing patient concerns, excessively focusing on the computer, and having ‚cold' body language were associated with participants feeling invalidated.

Conclusions: Validation is an important part of communication between clinicians and people with chronic pain. When patients are validated, they report feeling less distressed and more motivated to engage in assessment and treatment strategies. Invalidation however, is associated with suffering.

III-B.11

INTERACTION OF PAIN, BODILY CONSCIOUSNESS AND RELATIONAL PROCESSES IN WOMEN VICTIMS OF VIOLENCE AND THE ROLE OF ADAPTED KARATE TRAINING

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Background and aims: Experiences of violence constitute a high risk factor for the development of psychopathological and somatic disorders. Previously, we have shown improved mental health in female victims of violence practising karate within a multidisciplinary health program. Here, we follow up investigating the interaction of pain, bodily consciousness and relational processes, and the potential role of adapted sports in helping women moving from dysregulation towards balance.

Methods: A mixed quantitative-qualitative study is currently being conducted on fifty women practising adapted karate as part of their multidisciplinary (medico-psycho-social and legal) care at one of six Woman Centers in France. Pain and bodily connection are assessed using visual analogue scales, bodily consciousness (MAIA-2) and attachment styles (RSQ-fr) via autoquestionnaires. Bodily and relational perceptions are further investigated in a subgroup using semi-directed interviews, analysed using interpretative phenomenological analysis (IPA).

Results: Correlational analyses on quantitative data from 25 and qualitative data from 15 participants are presented. We found a high prevalence of chronic pain (64%), and high pain correlated positively with insecure-avoidant attachment (r=0.52, p=0.05). By contrast, karate influences certain aspects of bodily consciousness positively, leading to more emotional consciousness (r=0.30, p=0,17) and less worry about bodily symptoms (r=0.30, p=0.16). However, it does not lower pain. Qualitative analyses show a variety of coping strategies as a function of attachment style and growing accessibility of bodily consciousness through karate, towards less ignoring pain and more listening to interoceptive signals in general.

Conclusions: Adapted physical activity, via improved bodily consciousness helps coping with trauma and pain.

III-B.12

IMPULSIVITY, PSYCHOLOGICAL FLEXIBILITY AND INFLEXIBILITY AS PREDICTORS OF OPIOID MISUSE IN CHRONIC PAIN

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Background and aims: The prescription of opioid medication is a frequent therapeutic approach in chronic noncancer pain, as it is misuse of prescribed opioids. There is previous evidence on the association between person variables such as impulsivity and opioid misuse. Psychological flexibility and inflexibility (PF and PI) have also been associated with pain-related outcomes and opioid misuse. The aim of this study was to examine the combined role of a dispositional variable (impulsivity) along with psychological factors (PF and PI) in pain outcomes and opioid misuse.

Methods: The sample comprised 155 people with chronic noncancer pain. The hypothetical model was tested using correlation and structural equation modelling analyses.

Results: The results show significant associations between impulsivity and PF, PI, and opioid misuse. PF and PI were related to pain intensity, interference, and opioid misuse. The structural equation modelling showed significant associations between impulsivity, PI and pain interference, and opioid misuse. The association between PF and pain interference and opioid misuse was nonsignificant. These results support the hypothesis that impulsivity and PI are factors that contribute to pain interference and opioid misuse, but do not support the hypothesis that PF reduces opioid misuse.

Conclusions: It is recommended to assess these psychological aspects prior the prescription of opioid medication, and, if necessary, Acceptance and Commitment and Mindfulness Based Therapies would be desirable

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III-B.13

BODY POSTURE INFLUENCES EVOKED PAIN

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Background and aims: Orthostatic (standing) and clinostatic (lying-down) maneuvers alter blood volume distribution, affecting baroreceptor loading. Given the anti-nociceptive effect of baroreceptor stimulation, posture changes may influence pain perception. This study aimed to explore the effects of lying and standing on pressure-evoked pain.

Methods: Fifty university students were assessed using pressure algometry applied to the right middle finger's nail with a 1 cm² probe. Pain threshold and tolerance were measured with a 1 kg/s increase in pressure, while pain intensity and unpleasantness (0-10 VAS) were recorded for stimuli ranging from 1.5 to 4 kg. Assessments were repeated during sitting, lying-down, and standing.

Results: Pain threshold and tolerance were higher while lying down. However, pain intensity and unpleasantness ratings were also higher in this posture.

Conclusions: These results suggest that lying down is associated with higher pain threshold and tolerance, likely due to increased baroreceptor stimulation reducing pain sensitivity. However, intensity and unpleasantness ratings also increased during lying, indicating a dissociation between behavioral pain indicators (threshold and tolerance) and emotional evaluations of pain. Future research should examine the significance of this dissociation. The posture used for pain assessment in clinical and experimental settings should be considered carefully.

III-B.15

REFLECTION OF SIP PORTUGAL ON THE ISSUE OF CHRONIC PAIN: HOW TO PUT THE SOCIETAL IMPACT OF PAIN ON THE POLITICAL AGENDA

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Background and aims: Although Portugal decided to have a National Day against Pain in 1999 and published a National Program in 2001, updated in 2008, we have constraints in access to pain treatment and a high prevalence of chronic pain.

The aims are to publicize SIP, documents, and a set of proposals to improve the current situation.

Methods: The Executive Committee appreciated national research and the SIP Europe documents, such as Digital Health, ICD 11, Mental Health, book of evidence, developed a Reflection with the SIP members. The document delivered by e-mail, called about one hundred entities for meetings, key decision-makers, political parties, deputies, healthcare professionals, stakeholders, sponsorship, health, work, and societal organizations. The references were the studies, the documents cited, SIP PT website. The proposals were quality training for professionals, patient and public education and literacy, dedicated groups to funding, monitoring services, digital health, access, policies. Before the meetings, three members of SIP PT shared the presentation of data from surveys and testimonials utilized to support our case in policy briefings.

Results: At the end of 2024, we started the meetings, with a debate with all participants of each organization and the definition of means of mutual collaboration to improve pain management, literacy, quality of life, fight stigma, reduce costs, to implement ICD11. SIP Members knew the results in a final report approved by the EC with conclusions of all briefings.

Conclusions: This advocacy strategy, with benefits for patients, will put the societal impact of pain on the political agenda, during 2025.

III-B.16

FUNCTIONAL CONNECTIVITY BETWEEN CORTICAL NETWORKS AS A PREDICTOR OF AROUSAL TO NOXIOUS STIMULI DURING SLEEP

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Background and aims: The probability for a phasic noxious stimulus to induce an arousal is modulated by the prestimulus phase-coherence between sensory and higher-level cortical areas, and the post-stimulus (but pre-arousal) occurrence of a 'cognitive' wave ("P3") reflecting the activation of a widespread cortical network. The aim of this study, performed with intra-cerebral electrophysiological signals, was to characterize the post stimulus cortical network underlying sleep disruption.

Methods: Data were obtained in 13 epileptic patients receiving thermo-nociceptive stimulations during all-night sleep. Spectral-phase coherences of the iEEG signals between sensorimotor areas (post. insula, somatosensory cortex S2, mid cingulate) and high-order areas (dorso-lateral prefrontal, posterior parietal, orbitofrontal, precuneus, posterior and perigenual anterior cingulate cortices) were compared according to presence or absence of a stimulus-elicited arousal during sleep N2 and paradoxical (or REM) sleep (PS). Analyses were performed in two time-windows, 100-400 and 400-700 ms post stimulus.

Results: In case of arousal there was a significant increase in phase-coherence between nociceptive sensory regions (posterior insula) and high order brain areas, which was observed in both time-windows during PS (0.244±0.009 vs 0.145±0.007; $p<0.0001$), and only in the first time-window during sleep N2 (0.331±0.01 vs 0.226±0.014; $p=0.002$).

Conclusions: Enhanced functional connectivity between sensory and high-order areas may facilitate information transfer of nociceptive stimulation, reflected in scalp EEG by a ‚P3' wave and leading to arousal and conscious perception. The prolonged connectivity between sensorimotor and higher-level areas during PS than during sleep N2 may reflect a more complex processing of nociceptive stimuli during this sleep stage.

III-B.17

NEURONAL CIRCUIT MECHANISMS OF PAIN-ANXIETY COMORBIDITY IN THE MOUSE ANTERIOR CINGULATE CORTEX

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Background and aims: Pain is a complex experience arising from the interplay of sensory, emotional, and cognitive processes. Maladaptive forms of pain can induce comorbid mental dysfunctions, such as anxiety, potentially due to morphological and functional alterations in neuronal representations. The anterior cingulate cortex (ACC) is crucial for both emotional processing and pain perception, but the neural mechanisms underlying its role in the development of anxiety in chronic pain remain poorly understood. This study aimed to characterize the representation and functional attributes of pain- and anxiety-activated neuronal ensembles in the mouse ACC

Methods: Multiple techniques were used to investigate ACC neuronal ensembles: TRAP, cFos staining, miniscope imaging, DREADD receptor expression, and behavioral tests (EPM, cold and tactile stimuli application). This approach examined functional attributes and interactions of pain- and anxiety-activated ensembles under various conditions.

Results: In healthy mice, pain- and anxiety-activated ensembles were functionally distinct. In chronic neuropathic pain, increased overlap between supramodal and anxiety ensembles was observed. Inhibiting the supramodal ensemble in neuropathic animals reduced acute anxiety and attenuated responses to cold allodynia, suggesting complex pain-anxiety interactions in the ACC during chronic pain.

Conclusions: Neuronal alterations in chronic neuropathic pain may explain anxiety development. A specific neural ensemble contributes to both nociceptive processing and affective disturbances. Enhanced overlap between anxiety-related and supramodal ensembles plays a role in pain-anxiety comorbidity within the ACC, though insufficient to fully reverse the anxiety phenotype in chronic pain.

III-B.18

SENSORY THALAMUS SOMATOTOPY: INPUTS FROM DIRECTIONAL DEEP BRAIN STIMULATION IN CHRONIC PAIN PATIENTS

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Background and aims: The sensory ventroposterior (VP) thalamic nuclei display a mediolateral somatotopic organization (respectively head, arm, leg) in subjects without chronic pain. We studied this somatotopy using directional VP deep brain stimulation (DBS) in patients treated for chronic neuropathic pain.

Methods: Six patients with central (4) or peripheral (2) neuropathic pain were treated by VP DBS using directional leads in a prospective study (clinicaltrials.gov NCT03399942). Lead-DBS toolbox was used for leads localization, visualization and modelling of the volume of tissue activated (VTA). Bipolar stimulation was delivered in each direction, 1 month after surgery and correlated to the location of stimulation-induced paresthesias. The somatotopy was modelled by correlating the respective locations of paresthesias and VTAs.

Results: We recorded 48 distinct paresthesia maps corresponding to 48 VTAs (including 36 related to directional stimulation). We observed that, in a single patient, respective body representations of the trunk, upper limb, lower limb and head were closely located around the lead. These representations differed across patients, did not follow a common organization and were not concordant with the previously described somatotopic organization of the sensory thalamus.

Conclusions: Thalamic reorganization has been reported in chronic pain patients compared to non-pain patients in previous studies using intraoperative recordings and micro-stimulation. Using a different methodology, namely 3D representation of the volume of thalamic tissue activated by the directional postoperative stimulation through a stationary electrode, our study brings additional arguments in favor of a reorganization of the sensory thalamic nuclei somatotopy in patients suffering from chronic neuropathic pain of central or peripheral origin.

III-B.19

ACID-SENSING ION CHANNEL 3 (ASIC3) IN COLD SENSATION

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Background and aims: Acid-Sensing Ion Channels (ASICs) are cationic excitatory ion channels expressed in neuronal pain pathways. Extracellular pH variations are the main activating/gating signal of ASICs. However, ASICs are modulated by others factors, including temperature. The aim of this study is to explore the regulation of ASIC3 activity by temperature as well as its physiological consequence in cold perception.

Methods: *In vivo* cold sensitivity was measured in WT and ASIC3$^{-/-}$ mice using an acetone behavioral tests. ASIC3 activity was assessed by patch clamp recordings and calcium imaging in cultured DRG neurons. The C-fiber sensitivity to cold temperature was measured in nerve-skin experiments in both WT and ASIC3$^{-/-}$ mice. ASIC3 expression in mice DRGs was evaluated using RNAscope multiplex fluorescent assays.

Results: ASIC3$^{-/-}$ mice show reduced cold sensitivity compared to WT mice. *Ex vivo* nerve-skin preparations showed a reduced firing of C-fibers in response to cold ramps. Calcium response of ASIC3$^{-/-}$ DRGs in primary culture does not explained this loss of cold sensitivity. Low temperatures increase the amplitude of acid-induced ASIC3 currents with a slow-down of their inactivation kinetics. However, ASIC3 does not appear do be directly activated by cold. RNAscope experiments show a very weak or no overlap of ASIC3 transcripts with those of the well-known cold sensors TRPM8 and TRPA1.

Conclusions: These data demonstrate an involvement of ASIC3 to cold sensitivity in mice, which is most probably related to the positive modulation of its activity by cold temperature, although the channels do not appear to behave as a direct cold sensor.

III-B.21

THE DEVELOPMENT OF THE PAIN THRESHOLD DURING A LONG-DISTANCE RUN

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Background and aims: Running longer distances is commonly associated with pain. Pain sensitivity might be assessed using exercise-Induced Hypoalgesia (EIH), Conditioned Pain Modulation (CPM), and Temporal Summation of Pain (TSP). It is currently unknown how these mechanisms are affected during long-distance running. This study aimed to investigate the temporal changes in EIH, CPM and TSP during long-distance running.

Methods: Thirty participants completed a single session of 15km of treadmill running. Pain sensitivity was measured by Pressure Pain Threshold (PPT) at the deltoid at baseline, 1, 2, 3, 4, 5, 7.5, 10, 12.5, and 15km, and pressure cuff Algometry was assessed at baseline, 5, 10, and 15km. Additionally, Borg Rate of Perceived Exertion and heart rate was collected. In addition, trajectories of pain sensitivity were mapped at an individual level for explorative purposes. The study is approved by the local ethical committee (N-20230064).

Results: No statistical difference was observed for PPT or cuff PPT from 0-15km. A significant reduction in pain sensitivity, ie, reduced TSP, was found from 0-10km and 0-15km ($P<0.05$). Likewise, CPM was significantly increased comparing baseline and 5km ($P<0.05$) but not at 10 and 15km. Individual pain sensitivity trajectories were consist (pro- or anti-nociceptive) throughout the run.

Conclusions: The current study found no statistical difference in pressure pain thresholds when assessed during a 15km run. TSP was decreased comparing baseline to 10km and 15km, and CPM was increased comparing baseline to 5km. These data indicate that pain sensitivity might be modulated during a 15km run. Individual trajectories should be explored in future studies.

III-B.22

NEURAL NETWORKING: INVESTIGATING BRAIN COMMUNICATION AND WIND-UP PHENOMENON IN ACUTE LOW BACK PAIN PATIENTS

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Background and aims: The wind-up phenomenon, characterized by heightened sensory perception from repeated sensory stimulation, significantly contributes to the persistence of low back pain (LBP). To optimize intervention, it's crucial to enhance understanding of sensorimotor processing and pain modulation mechanisms in acute LBP.

Methods: Using functional MRI, we have demonstrated that lumbar spine stimulation activates brain regions, serving as a proxy for anticipatory postural control. This explorative fMRI study applied pain-free mechanosensory stimulation to the lumbar spine. We examined functional connectivity resulting from this stimulation and its correlation with the clinically assessed wind-up phenomenon. Pinprick stimulation was administered bilaterally on the lower back, and the subsequent wind-up was quantified.

Results: The study included 19 participants experiencing acute LBP, with a mean moderate pain intensity of 4.5/10 and mild associated disability. Within the salience network, functional connectivity within opercular regions correlated positively with the wind-up phenomenon. In the sensorimotor network, strong correlations were observed between the postcentral-opercular cortex connectivity and the wind-up phenomenon. Within the limbic network, a correlation was found between the wind-up phenomenon and the hippocampus-frontal gyrus and supramarginal gyrus associations.

Conclusions: The present results revealed the association of the wind-up phenomenon with regions involved in sensory processing, pain modulation, and affective pain perception. This refined understanding should empower clinicians to leverage this knowledge to prevent potential symptom persistence and exert control over these mechanisms.

III-B.23

TREK1-POSITIVE NEURONS ARE INVOLVED IN CHLOROQUINE-INDUCED ITCH IN MICE

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Background and aims: The TREK1 potassium channel is implicated in polymodal pain perception but its role in itch sensing has never been explored. Our aim is to study the involvement of TREK1-expressing cells in itch transduction and sensation.

Methods: We used chemogenetics to silence the activity of TREK1-positive neurons in mice thanks to TREK1-Cre driven expression of the hM4Di inhibitory receptor. The hM4Di ligand JHU37160 was administered systemically in mice before induction of pruritus using chloroquine injection in the nape. After evaluation of the scratching behavior, c-fos immunohistochemistry was performed in the cervical spinal cord to evaluate neuronal activation. In parallel, the contribution of TREK1-expressing neurons to itch transduction was studied using calcium imaging in DRG (Dorsal Root Ganglia) neurons exposed to chloroquine.

Results: Chemogenetic inhibition of TREK1-positive cells led to a strong increase in scratching while c-fos staining was similar between TREK1^{hM4Di} and control mice. *In vitro*, JHU37160 did not affect the response of DRG neurons to chloroquine.

Conclusions: TREK1-expressing neurons are involved in itch sensing. Peripheral transduction of itch appears to rely on a different cell population, suggesting a role of central TREK1 channels in chloroquine-induced pruritus. To further explore this hypothesis, we are studying the effect of TREK1 conditional knock-out in the spinal cord and DRGs on itch perception. We will present the development of an automated method for itch scoring in animals using deep learning.

III-B.24

ANALYZING THE EFFECT OF CARDIORESPIRATORY FITNESS LEVELS ON EEG-BASED PINPPRICK-EVOKED POTENTIALS

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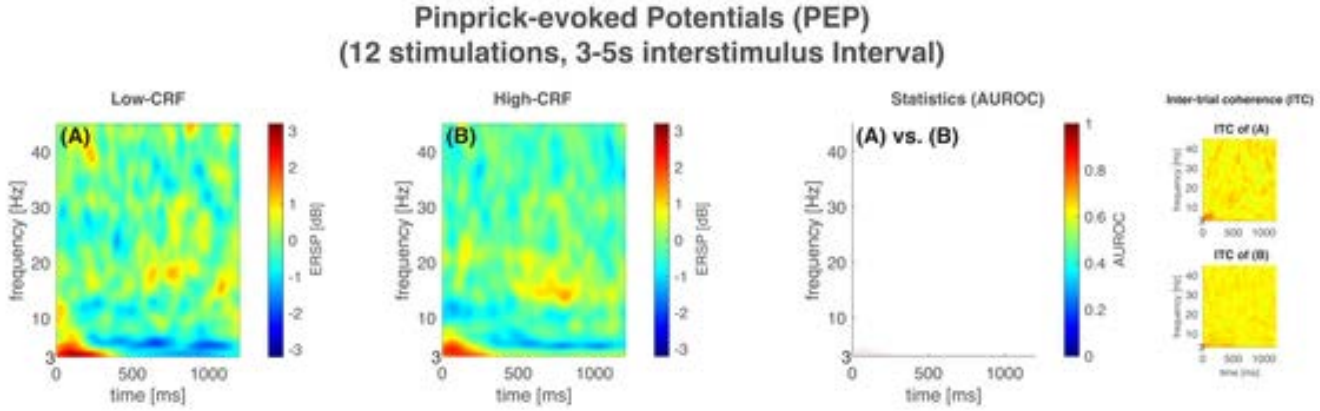
Background and aims: Exercise might be a valuable measure in treating various pain syndromes. Previous research on the effects of exercise on pain has yielded heterogeneous results, likely due to methodological differences, a focus on subjective measures, and potential biases resulting from studying elite athletes. Electroencephalography (EEG) offers an objective means to assess the central somatosensory processing of noxious stimuli and may help clarify the effects of exercise on pain modulation processes. The aim was to identify differences in event-related spectral perturbations (ERSP) following mechanical stimulation, depending on the objectively measured cardiorespiratory fitness (CRF) level.

Methods: Using a 32-channel active EEG, pinprick-evoked potentials (PEP) during twelve mechanical stimulations (3-5 seconds inter-stimulus interval) were recorded in 32 healthy adults. CRF was assessed using spiroergometric testing. Participants were divided into high and low CRF groups (< / > 45.6 mL/kg/min for men and < / > 39.5 mL/kg/min for women).

Results: The high CRF group exceeds a median VO2max of 49.60 [mL/kg/min], and our low CRF group a median VO2max of 39.20 [mL/kg/min]. The primary earliest response to the mechanical stimulation with a high degree of phase lock was observed between 0 and 300 ms and 3 to 10 Hz. In this area, no significant differences in the ERSP graphs between the groups were found.



Conclusions: Although we observed a quantitative difference (+/- 2dB) in the ERSP between our groups, the CRF level, as an indicator of training- and activity levels, did not induce central sensitization or sensory-neuronal deficits in response to mechanical noxious stimulation in our participants.

III-B.25

SLOW RECOVERY OF PRURICEPTOR FUNCTION FOLLOWING CAPSAICIN-INDUCED SKIN DENERVATION

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Background and aims: Administration of 8% capsaicin (Qutenza®) induces skin denervation that resolves within 12 weeks, but mechanical and heat pain sensitivity recovers within 3 weeks. Qutenza® patches are used to treat chronic neuropathic pain and itch. We explored the temporal recovery of histaminergic and mast-cell derived itch following 8% capsaicin.

Methods: The volar forearm skin of 20 healthy volunteers was treated with 8% capsaicin patches (1.5cm²) for 4 days. Itch (NRS, 0-10) and axon reflex flare upon iontophoretically (30mC) applied histamine (1%) and codeine (1.8% to degranulate mast-cells) was assessed in Qutenza® and untreated (contra-lateral) skin sites at day 1,4,7, and then weekly for 3 months.

Results: Qutenza® abolished histamine-and codeine-induced itch and flare within 4 days. Responses remained absent for at least 4 weeks. Mechanical and electrical C-nociceptor pain was only reduced but not completely absent and returned to baseline levels after 1 to 3 weeks. It took about 5 weeks until a faint sensation of pruritus and incipient flare development was recorded after capsaicin. Heat transduction, mechanical impact and electrical C-nociceptor pain were completely restored at this time. No differences were observed between histamine- and codeine-induced itch and axon reflex flare reactions.

Conclusions: Itch transduction in chemo-sensitive pruriceptors required more time than in polymodal nociceptors to regain function after 8% capsaicin denervation. This delayed sensory recovery for itch indicates that itch transduction is uniquely dependent on the complete restoration of the sensory nerve endings. Itch and flare recover in parallel, a link that is not as clear in chronic pruritus patients.

III-B.26

SPATIAL AND TEMPORAL DIFFERENCES BETWEEN HEAT, MECHANICAL AND C-FIBER SELECTIVE ELECTRICAL PAIN SENSITIVITY IN CAPSAICIN DENERVATED HUMAN SKIN

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Background and aims: Previous studies have shown that topical 8% capsaicin abolishes heat transduction but still allows activation of C-nociceptors by sinusoidal electrical pulses. This study aimed to evaluate: (i) The sensitivity of C-nociceptors to mechanical impact stimuli; (ii) Sensitization to C-fiber stimuli outside the capsaicin-denervated skin area; (iii) The temporal recovery of capsaicin-induced abnormalities.

Methods: Two Qutenza®-patches (8% capsaicin, 1 cm apart) were applied to the volar forearm skin of healthy human volunteers (n = 15) for 4 consecutive days. Subjects were assessed weekly over 84 days for pain NRS and axon reflex flare (Moor LDI) after electrical, thermal, and mechanical impact stimulation. “Polymodal” and “silent” C-nociceptors were activated by single sinusoidal (0.5 s, 1 Hz) and continuous sinusoidal (4 Hz, 2.5 and 60 sec) electrical stimuli, respectively.

Results: Capsaicin had a negligible effect on mechanical impact pain, in contrast to the electrical sinusoidal pain and flare response, which showed a steep decline and a slow recovery after capsaicin application. Acute secondary punctate hyperalgesia was reported for pin-prick stimuli by some subjects, however no hyperalgesia to selective C-nociceptor stimuli was found in the secondary zone of the capsaicin patch.

Conclusions: As opposed to electrical sine wave pulses, transduction of mechanical impact pain seems less affected by capsaicin application, potentially suggesting further mechanisms to compensate the impaired transduction. Slowly depolarizing electrical sinusoidal stimuli appear to more specifically detect the loss of capsaicin-sensitive axons in the skin. However, we observed no C-nociceptor sensitization in the secondary zone of the capsaicin patch.

III-B.27

THE THERMAL GRILL ELICITS PRIMARY AND SECONDARY HYPERALGESIA

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Background and aims: It remains unknown if paradoxical pain from the thermal grill illusion (TGI) results from the activation of peripheral nociceptors, or if the inputs are integrated in the central nervous system. Should peripheral nociceptors be activated, we would expect primary hyperalgesia. If integration occurs in the spinal cord, secondary hyperalgesia will occur. If wide dynamic range neurons are involved, we would expect brush allodynia to occur. Finally, if integration occurs in supraspinal regions, there would be no sensitization.

We aim to determine whether the thermal grill (TG) elicits peripheral and/or central sensitization. We hypothesize that phasic TG primary and secondary hyperalgesia, but not brush allodynia.

Methods: All participants consented to procedures approved by the University of Toronto ethics board. In a first session, participants received a phasic thermal grill paradigm. Participants were then randomly assigned to a group to receive either phasic innocuous cool, innocuous warm, noxious heat, or noxious cold stimulation. We measured primary and secondary hyperalgesia, as well as brush allodynia, after each stimulation session. We determined whether each stimulation type elicited sensitization, and whether the extent of sensitization significantly differed between groups.

Results: None of the stimulations elicited brush allodynia ($p>0.05$). TG, noxious heat, and noxious cold elicited primary mechanical hyperalgesia ($p<0.05$). All stimulations elicited secondary hyperalgesia, with no significant differences between groups ($p=0.987$).

Conclusions: TGI induces both primary and secondary mechanical hyperalgesia, indicating activation of both primary and second-order nociceptors. TG did not elicit brush allodynia, eliminating the contribution of wide dynamic range neurons.

III-B.28

MOLECULAR INSIGHTS INTO SEX DIFFERENCES IN HUMAN SENSORY NEURONS

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Background and aims: Sex differences in pain perception and chronic pain prevalence are well-documented, yet the molecular underpinnings in human sensory neurons remain largely unexplored. To address this gap, we assembled a collection of human dorsal root ganglia (DRG) tissues comprising 28 individual samples from male and female donors. Utilizing spatial transcriptomics, we analyzed selectively the transcriptome of TRPV1 positive nociceptors and KCNS1 positive proprioceptors.

Methods: Human DRG were obtained from Mid America Transplant in Saint Louis, MO, fixed in formalin within 30 minutes after extraction before embedding in paraffin (FFPE). Over two years we collected 28 tissues with 13 females and 15 males. DRG were assembled as tissue arrays with 7 punches (1 per donor) each. TMA were stained with RNAscope against TRPV1 and KCNS1 before processing in the GeoMx Digital Spatial Profiler with the GeoMx Human whole transcriptome atlas to analyze the transcriptome of nociceptors and proprioceptors in human DRG.

Results: Our analysis reveals sex-segregated profiling of ion channels, G protein-coupled receptors, and transcription factors in nociceptors and proprioceptors. Notably, we identify sex-exclusive gene expression patterns in human DRG neurons, shedding light on sex-specific molecular pathways.

Conclusions: This is a new comprehensive characterization of sex differences in human DRG which will advance our understanding of how sex influences sensory neuron function. This work lays the foundation for future studies exploring sex-specific therapeutic targets for chronic pain management.

III-B.29

ANTIPRURITIC AND ANTI-INFLAMMATORY EFFECT OF TOPICAL KETAMINE, AMITRIPTYLINE AND THEIR COMBINATION ON HISTAMINERGIC AND NON-HISTAMINERGIC ITCH

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Background and aims: In very limited studies, the NMDA receptors antagonist Ketamine has been found to have itch-relieving properties in addition to its pain-relieving effects. Often ketamine is available in conjunction

with amitriptyline, which may enhance the analgesic effects of ketamine by preventing axon depolarization via the blockage of voltage-gated sodium channels. This study aimed to evaluate the effect of ketamine cream on itch and if amitriptyline could enhance its effects.

Methods: Four squared areas on the forearms of 15 participants were treated for 1½ hours with ketamine, amitriptyline, ketamine+amitriptyline and vehicle creams, followed by histamine and cowhage application. After pruritogen application, itch intensity was assessed with a visual analogue scale (VAS) for 10 minutes, followed by measurement of superficial blood perfusion (SBP). From VAS data, peak, area under the curve (AUC), have been extracted. From FLPI data, mean and peak of SBP, and the flare area have been extracted.

Results: No differences in itch intensity induced by either pruritogen were observed across the four areas ($p=0.455$). Regarding the SBP, the combination of ketamine+amitriptyline significantly reduced the flare area and the mean compared to ketamine alone (flare: $p<0.01$; mean: $p<0.001$) and vehicle cream (flare: $p<0.01$; mean: trend, $p=0.073$). Ketamine cream alone reduced the mean SBP compared to vehicle ($p<0.05$), while the flare area was reduced at the amitriptyline application site, compared to ketamine ($p<0.01$) and vehicle (trend, $p=0.066$).

Conclusions: This pilot study confirms the anti-neurogenic inflammatory effect of ketamine+amitriptyline cream, though the antipruritic effect requires a larger sample size to be evaluated.

III-B.30

CRITICAL CONTRIBUTION OF $NA_V1.7$ AND $NA_V1.9$ TO ACTION POTENTIAL UPSTROKE IN MECHANOINSENSITIVE C-FIBERS

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Background and aims: The voltage-gated sodium channels $Na_v1.1$- $Na_v1.3$ and $Na_v1.5$- $Na_v1.9$ are crucial for sensory neuron excitability. Mutations in $Na_v1.7$ are linked to pain syndromes like paroxysmal extreme pain disorder (PEPD) inducing resurgent currents. We combine experiments and computational modeling to study the contribution of Na_v isoforms to subthreshold depolarization and action potential (AP) properties in mechanoinsensitive C fibers (CMi) and Aδ fibers for disease modeling.

Methods: We propose a computational model, which includes $Na_v1.1$- $Na_v1.3$, $Na_v1.5$- $Na_v1.9$ at sensory nerve fiber-specific expression levels. The model - based on modified Hodgkin-Huxley equations - accounts for Na_v specific kinetics and is parameterized based on patch-clamp experiments. For PEPD-associated mutations we perform high-throughput patch-clamping with the $Na_v\beta4$ peptide included in the intracellular solution. We extend the model to account for resurgent currents.

Results: For CMi- and Aδ fibers our simulations suggest a critical contribution of $Na_v1.7$ and $Na_v1.9$ to the AP upstroke, whereas $Na_v1.8$ is important for the overshoot. In our model $Na_v1.9$ is the main contributor to the shoulder of the AP in both fiber types. Reducing $Na_v1.9$ gradually flattens the shoulder and the fast upstroke. Enhancing $Na_v1.7$ conductivity or shifting its activation to more hyperpolarized potentials reduces the threshold for AP generation.

Conclusions: Our work suggests a critical contribution of $Na_v1.9$ to AP upstroke and shoulder in CMi- and Aδ fibers. $Na_v1.7$ conductivity and shifted gating kinetics increase the excitability and may play a key role in neuropathic pain.

III-B.31

DYSREGULATION OF THE SYNAPTIC TRANSCRIPTOME ORCHESTRATES CHRONIC PAIN

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Background and aims: Neuropathic pain is associated with synaptic plasticity within the spinal cord. Increased local translation supports sustained firing of nociceptor terminals. However, the nature of the mRNA transported

to the synapse and how this process is dysregulated in neuropathic pain remain unexplored. We hypothesize that *neuropathic pain relies on sustained modification of the synaptic transcriptome to support nociceptive plasticity.*

Methods: We extracted synaptosomes from the dorsal part of the spinal cord of rats from which we obtained total RNA. The quality and quantity of the RNA were sufficient for RNA sequencing (Illumina) after ribosome depletion. We used rats with the spared nerve injury model of neuropathic pain.

Results: The top represented transcripts showed an enrichment in genes involved in synapse function. We found typical synapse genes and genes preferentially expressed in sensory neurons and subpopulations of sensory neurons. A side-by-side comparison of the naïve synaptic transcriptome from female versus male rats revealed 35 differentially represented transcripts including several ion channel subunits. A similar comparison from ipsilateral versus contralateral sides revealed 70 differentially represented transcripts. Transcripts such as Pink1, Fez1 and Ahnak1 with enriched expression in sensory neurons, were found.

Conclusions: This shows we were able to obtain pre-synaptic terminals from primary afferents, that there is a diversity of synaptic terminals in the spinal cord and that some of this synaptic diversity reflects the variety of sensory neuron transcriptomic landscape. This work also adds to the existing literature showing sex-specific mechanisms of pain with the added complexity that even the synaptic transcriptome is sexually dimorphic.

III-B.32

INVOLVEMENT OF NEUROPEPTIDE RECEPTORS NPFFR1 AND NPFFR2 IN NEUROADAPTATION ASSOCIATED WITH CHRONIC MORPHINE AND INFLAMMATORY PAIN

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Background and aims: The growing use of opioids is responsible for almost 100,000 deaths per year in the USA due to their adverse side effects. Previous work suggests that Neuropeptide FF receptors (NPFFRs) are involved in the modulation of opioid analgesia and persistent pain, however the respective role of both NPPFR1 and NPFFR2 is poorly understood. Here, we studied their respective involvement in the modulation of morphine-induced hyperalgesia, analgesic tolerance and withdrawal syndrome as well as inflammatory pain by using genetically deficient mice.

Methods: Mechanical and thermal nociceptive thresholds of WT, NPFFR1 and NPFFR2 KO and naltrexone-precipitated withdrawal symptoms were measured upon chronic morphine. Nociceptive thresholds of WT, NPFFR1 and NPFFR2 KO mice was also evaluated after CFA and carrageenan administrations in the tail of the animals. Edema induced by inflammatory agents was followed by measuring the circumference of the tail.

Results: Our data show that: hyperalgesia induced by morphine administrations was reduced in NPFFR1 KO animals only in the thermal modality, and absent in NPFFR2 KO mice. Analgesic tolerance was aggravated in NPFFR1 KO mice in the TIT and reduced in NPFFR2 KO animals in both nociceptive modalities. Hyperalgesia induced by CFA or carrageenan was similar in WT and NPFFR1 KO animals while it was completely absent in NPFFR2 KO mice. Edema was significantly increased in NPFFR1 KO animals than in WT and NPFFR2 KO mice.

Conclusions: Our data suggest that NPFFR2 but not NPFFR1 is critically involved in the modulation of adverse effects associated with chronic morphine and inflammatory pain.

III-B.33

DELAYED P300 LATENCIES AFTER AUDITORY FEEDBACK TO A PAINFULLY OPERANTLY CONDITIONED COGNITIVE TASK

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Background and aims: Operant conditioning shape behavior by influencing learning through reward (e.g., pain relief) or punishment (e.g., pain). Event-related potential (ERP) latencies (e.g. P300), are delayed in chronic pain patients, indicating impaired cognitive processing of reinforcement learning. This study employed painful operant conditioning to investigate if such ERP delay can be mimicked in healthy subjects.

Methods: 29 healthy participants completed a Hearing-In-Noise-Test, while experiencing tonic pressure pain, and were exposed to two operant conditioning 1) Negative Reinforcement (NR; correct answers, reduced pain; incorrect answers, maintained pain) and 2) Positive Punishment (PP; correct answers, maintained pain; incorrect responses, increased pain). Electroencephalography was recorded during the task, and auditory feedback was given for correct or incorrect response and ERP latencies were extracted from the Cz electrode.

Results: For P100 and P200, higher latencies in auditory feedback ERPs to an incorrect, compared to correct, answer was observed ($p< 0.001$). Additionally, the P100 latencies were slower in the PR condition compared to the NR condition ($p< 0.001$). A significant condition×answer interaction was found for P300 ($p< 0.008$), and posthoc analyses showed longer latencies when answering incorrectly in both the PP ($p<0.001$) and NR ($p=0.004$) conditions.

Conclusions: Participants exhibited longer ERP latencies in P100/200 when answering incorrectly, and in the PP condition for P100. Significantly longer P300 latencies were found for both PP and NR when answering incorrectly.

III-B.34

SRC MEDIATE THE INTRACELLULAR NMDAR AND PANX1 INTERACTION IN THE SPINAL CORD OF A NEUROPATHIC PAIN MODEL IN MALE RATS

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Background and aims: N-methyl-D-aspartate receptor (NMDAR) is a crucial spinal receptor for developing chronic pain. In the same way, the pannexin 1 (Panx1) channel has been described as participating in initiating and maintaining neuropathic pain, driving nociceptive signals dependent on spinal NMDAR through unknown mechanisms.

Methods: Using behavioral, pharmacological and molecular approaches, we study, in the spinal cord, the intracellular interaction between NMDAR and Panx1 in neuropathic models of male rats.

Results: Our data revealed that: (i) Neurons located in spinal cord laminae I and II express functional Panx1 channels in both neuropathic and sham rats. The Panx1 channels open (evaluated by YOPRO-1 uptake) in response to intrathecal administration of NMDA; (ii) intrathecal NMDA increased expression of pSrc and pPanx1 in dorsal horn neurons. This elevation exacerbates the existing mechanical hyperalgesia in nerve-injured rats; (iii) inhibition of Src with intrathecal PP2 or blockade of Panx1 (^{10}Panx) mitigates NMDA-induced effects and reduces the spontaneous mechanical hyperalgesia of nerve-injured rats. Notably, while ^{10}Panx successfully alleviates hyperalgesia, it does not alter pSrc expression; and (iv) NMDA-stimulated YOPRO-1 uptake in neurons of laminae I-II of spinal cord slices were prevented by the NMDAR antagonist D-AP5, the Src inhibitor PP2 (but not PP3), as well as with ^{10}Panx and carbenoxolone.

Conclusions: Therefore, disrupting the NMDAR-Panx1 communication may offer a valuable strategy for managing some forms of chronic pain.

III-B.35

INVESTIGATING THE TIME COURSE OF NOCICEPTIVE MAPPING WITH CONTACT-HEAT EVOKED POTENTIALS

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Background and aims: To respond effectively to bodily injury, it is necessary to correctly localize pain. Nociceptive inputs can be mapped using a somatotopic reference frame corresponding to a neuronal representation of the skin surface. However, that map can be ineffective because it does not consider the relative position of the body's limbs. Recent behavioral studies showed that nociceptive inputs can also be mapped according to a spatiotopic reference frame, i.e, by integrating proprioceptive feedback and taking external space as a reference. This experiment explores the neurophysiological mechanisms of this dual mapping of pain.

Methods: Contact heat stimuli were applied in pairs, one on each participants' hand, with different and random time intervals, including simultaneous trials. Participants judged which of the two hands they perceived as first

stimulated, with the hands in either an uncrossed or crossed posture. The crossed hand posture is intended to create a conflict between the somatotopic and spatiotopic representations and therefore highlight the dual mapping of nociceptive inputs. Using electroencephalography, event-related brain potentials (ERPs) will be recorded in response to simultaneous heat stimuli.

Results: Despite participants performed the task more difficultly with their hands crossed, magnitudes of the vertex N2 and P2 components of the ERPs were not significantly different between the two task conditions. Other brain responses evoked by contact heat stimuli will be analyzed in more detail.

Conclusions: This experiment highlights the complexity of the spatial localization of pain, a topic still poorly investigated.

III-B.37

HUMAN A-BETA NOCICEPTORS BECOME BRUSH-RESPONSIVE DURING INFLAMMATION: IMPLICATIONS FOR TACTILE ALLODYNIA

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Background and aims: In humans, cutaneous Aβ afferents traditionally signal only discriminative touch, while Aδ and C afferents signal pain. However, we have shown that a class of Aβ brush insensitive mechanoreceptors with high indentation (von Frey) thresholds contribute to acute pricking pain in humans (Nagi et al. 2019, Science Adv). Additionally, a subset of Aβ nociceptors express PIEZO2 (Yu et al. 2024, Nature Neurosci) and signal ultra-sensitive pain upon single hair pull (Bouchatta et al. 2024, bioRxiv). In the current study, we aimed to explore the role of Aβ nociceptors in conditions resembling chronic pain.

Methods: We conducted ultrasound-guided single-unit axonal recordings (microneurography) from the radial, antebrachial, and superficial peroneal nerves in awake, healthy participants. An experimental model of localized skin heating was used to induce acute inflammation, and skin reactivity changes were quantified using optimal imaging techniques. Neural responses to mechanical and thermal stimuli were assessed at baseline and during inflammation.

Results: Our findings show that human Aβ nociceptors, typically unresponsive to brushing, become brush-responsive after inflammation. This change was accompanied by a significant reduction in their von Frey threshold to levels within the tactile range. Additionally, there was a significant increase in their response to von Frey stimulation across a range of forces.

Conclusions: We demonstrate that human Aβ nociceptors become responsive to brushing after inflammation and may be relevant for signaling tactile allodynia.

III-B.38

DEVELOPMENT AND INTERNAL VALIDATION OF A MULTIVARIABLE PROGNOSTIC MODEL TO PREDICT CHRONIC PAIN AFTER A NEW EPISODE OF NON-SPECIFIC, NON-TRAUMATIC NECK PAIN IN PRIMARY CARE.

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Background and aims: To develop and internally validate a prognostic model to predict chronic pain after a new episode of acute- or subacute nonspecific idiopathic, non-traumatic neck pain(NSNP) in patients presenting to physiotherapy primary care, emphasizing modifiable factors.

Methods: A prospective cohort study with a 6-month follow-up. Patients with a new presentation of NSNP, with a duration lasting no longer than 12 weeks from onset. Candidate prognostic variables were age and sex, neck pain symptoms, work-related factors, general factors, psychological and behavioural factors, and the remaining factors: therapeutic relation and healthcare provider attitude.

Outcome: Pain intensity at 6 weeks, 3 months, and 6 months on a Numeric Pain Rating Scale (NPRS) after inclusion. A NPRS score of ≥3 at each time point defined chronic neck pain.

Results: Sixty-two (10%) of the 603 participants developed chronic neck pain. The prognostic factors in the final model were sex, pain intensity, reported pain in different body regions, headache since and before the neck pain, posture during work, employment status, illness beliefs about pain identity and recovery, treatment beliefs, distress, and self-efficacy. The model demonstrated an optimism-corrected Area Under the Curve (AUC) of 0.83 and a corrected R^2 of 0.24. Calibration was deemed acceptable to good, as indicated by the calibration curve. The Hosmer-Lemeshow test yielded a p-value of 0.7167, indicating a good model fit.

Conclusions: This model has the potential to obtain a valid prognosis for developing chronic pain after a new episode of acute—and subacute NSNP. It includes mostly potentially modifiable factors for physiotherapy practice.

III-B.39

CAN THE SPREAD OF PAIN BE DETERMINED BY CLASSICAL CONDITIONING?

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Background and aims: Mechanistic insights into chronic widespread remain limited. Many chronic pain states are characterized by perplexing phenotypes of pain that spread unilaterally or even contralaterally. Given evidence that pain intensity can be modulated by classical conditioning, it was hypothesized that this learning mechanism also contributes to how pain is distributed.

Methods: Healthy participants were randomly assigned either to experimental group with or to one of two control groups. Participants in each of the groups were exposed to pure classical conditioning, in which large pain distribution was shaped by the activation of three electrodes. During testing, three electrodes were activated again (experience-control group, n=13), four were activated (sensitization-control group, n=7), or two were activated (experimental group, n=9). It was assumed that classical conditioning, in which pain located in one of the areas served as a conditioned stimulus for pain originating from other locations (electrodes), would affect pain distribution reports. Primary outcome in the study was pain distribution report expressed in cm^2.

Results: Preliminary analysis provided weak or inconclusive evidence for a lack of difference in pain distribution between the experimental and experience-control groups (Bayes factor BF10 = 0.55) and between the experimental and sensitization-control groups (BF10 = 0.66).

Conclusions: These preliminary findings suggest a potential role for classical conditioning in influencing pain distribution; however, current results are inconclusive, and further research with a larger sample is needed to substantiate these effects.

III-B.40

BIOLOGICAL RESPONSE TO EXPERIMENTAL PAIN USING A NON-OBSERVED CONTINUOUS BLOOD PRESSURE MONITOR

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Background and aims: It is known that during general anaesthesia the sympathetic nervous system becomes dominant due to noxious stimuli from surgical manipulation and an increase in blood pressure is observed, but there are no reports on the extent to which non-invasive blood pressure fluctuates continuously in response to experimental pain. In this study, we investigated the continuous changes in blood pressure in response to experimental thermal pain in healthy volunteers.

Methods: With permission from the Ethics Review Committee of the Advanced Telecommunications Research Institute International, we examined 30 healthy test subjects who had given written consent. Using a thermal stimulation device (TSA2, Medoc, Israel), we created a stimulation programme in which the temperature increased and decreased in stages, and we gave the same test subjects two consecutive stimulations. At the same time, a non-invasive continuous blood pressure monitor (View Phi, Miyuki Giken) was attached to the fingertip on the same side as the stimulation site to continuously measure blood pressure. The pain at the time was assessed using a continuous VAS evaluation device (CoVAS). The statistical analysis was performed using JMP17.0, with a significance level of 5%.

Results: When the difference in average blood pressure between the stimulus temperatures of Low (38 to 40 degrees), Middle (44 to 46 degrees), and High (48.9 degrees) was examined, a significant increase was observed in Low-Mid, Mid-High, and Low-High ($p<0.0001$). The correlation coefficient with the average value of VAS was 0.32. ($p=0.0025$).

Conclusions: Non-invasive, continuous measurement of blood pressure can be used as an index of pain.

III-B.41

THE INFLUENCE OF EXECUTIVE FUNCTION IN THE MAINTENANCE OF HIGH IMPACT CHRONIC PAIN: A UK BIOBANK LONGITUDINAL ANALYSIS

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Background and aims: Chronic pain affects 35-51% of the adults in the UK with the impact of this pain ranging from low to high. There is a lack of research exploring factors that cause the impact of an pain to maintain overtime .

Executive functioning, the activation of multiple cognitive processes, has been shown to predict the onset of chronic pain, however, we are yet to discover the causal role of this mechanism on the impact of chronic pain.

This study aims to use causal models to establish the causal influence of executive function in those who maintain high impact chronic pain over time, compared to those who transition from high to low impact chronic pain.

Methods: Using a directed acyclic graph (DAG) we modelled the causal relationship of interest and matched DAG variables to those collected in UK Biobank. We identified the confounders in the dataset variables and controlled for them using a propensity score model to calculate weights to adjust their effect on the chronic pain maintenance pathway. These weights were then used in the outcome model to quantify the pain transition causal effect. Finally, to accurately quantify uncertainty in the causal effect estimate, we considered bootstrapping techniques, that allowed us to formally test the significance of the causal effect.

Results: The maintenance of high impact chronic pain was not predictive by executive function but was associated with adverse life events, age and qualification level.

Conclusions: Executive function does not causally impact the maintenance of chronic pain in a subsample of UK Biobank participants.

C | DIAGNOSIS & MEASUREMENT IN PAIN

I-C.01

ORBITOFRONTAL CORTEX ENCODING OF DELAYED GRATIFICATION AND IMPULSIVITY IN NEUROPATHIC PAIN

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Background and aims: The orbitofrontal cortex (OFC) activity is essential for the accurate interpretation of contextual reward-dependent valence and temporal associations. An impulsive preference for small, immediate gains over larger, delayed gains is a hallmark of chronic pain patients. However, it remains unclear how neuropathic pain affects the neurobiological mechanisms that control the emergence of impulsive traits. This study aimed to evaluate the effects of peripheral nerve lesions on the balance of OFC activity during time-reward associations.

Methods: To investigate this, we induced the expression of the GCaMP6f-calcium sensor in OFC neurons of male CD rats to record fiber photometry activity during a delayed gratification task. Behavioral performance and OFC-

dependent activity were recorded 21 and 28 days after the onset of a persistent rodent neuropathic pain model – spared nerve injury (SNI).

Results: Our findings demonstrated that neuropathy increased the preference for small, immediate rewards across probe sessions, while control animals maintained a conservative response pattern, exhibiting a higher tendency toward delayed rewards. In both experimental groups, trials involving immediate rewards were associated with a reduction in OFC calcium transients post-response. Conversely, trials with delayed rewards revealed an increase in OFC activity in control animals following choice, an effect attenuated in SNI animals.

Conclusions: These findings suggest that neuropathy disrupts time-reward associations and alters OFC activity. The degradation of OFC activity may play a critical role in explaining the disproportionate impulsive choice patterns observed during painful syndromes.

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I-C.02

STRATEGIES FOR MEASURING NON-EVOKED PAIN IN PRECLINICAL MODELS OF NEUROPATHIC PAIN: SYSTEMATIC REVIEW

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Background and aims: The development of new analgesics for neuropathic pain treatment is crucial. The failure of promising drugs in clinical trials may be related to the over-reliance on reflex-based responses (evoked pain) in preclinical drug testing, which may not fully represent clinical neuropathic pain, characterized by spontaneous non-evoked pain (NEP). Hence, strategies for assessing NEP in preclinical studies emerged.

Methods: A comprehensive search was conducted in PubMed, Web of Science and Scopus in order to identify original articles that evaluated non-evoked pain in animal models of neuropathic pain.

Results: This systematic review identified 443 articles evaluating NEP in neuropathic pain models (mainly traumatic nerve injuries in male rodents). An exponential growth in NEP evaluation was observed, which was assessed using 48 different tests classified in 12 NEP-related outcomes: pain-related anxiety, exploratory behaviour and locomotion, paw lifting, pain-related depression, conditioned place preference, gait evaluation, autotomy, general wellbeing, facial grooming, pain-related cognitive impairment, facial pain expressions and ultras vocalizations. Most of these outcomes showed clear limitations: methodological concerns in autotomy and paw lifting; absence of differences between healthy and neuropathic groups in exploratory behavior/locomotion, general well-being, and facial grooming; and scarcely explored facial expressions or vocalizations. In this regard, our analysis suggests that conditioning-associated outcomes, pain-related comorbidities, and gait evaluation may be the most effective strategies. Moreover, only a minimal part of the studies evaluated standard analgesics, which is determinant for pain characterization.

Conclusions: The greater emphasis on evaluating NEP aligning with clinical pain symptoms may enhance analgesic drug development, improving clinical translation.

I-C.03

A NOVEL CONDITIONAL GENETIC MOUSE MODEL PROVIDES MOLECULAR INSIGHTS INTO INTERVERTEBRAL DISC DEGENERATION AND CHRONIC LOW BACK PAIN

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Background and aims: Chronic low back pain (cLBP) and associated intervertebral disc (IVD) degeneration significantly impact older adults but with no cure. We aim to determine the root cause of painful IVD pathologies. We reported that Sonic Hedgehog (SHH), a key developmental regulator, is essential for maintaining IVD in a young mouse, and its age-related decline is associated with painful IVD pathologies in mice. This study aims to test the role of SHH in IVD homeostasis of adult mice at a molecular and behavioral level.

Methods: We generated tamoxifen-inducible *Krt19*$^{CreERT/WT}$*; Shh*$^{flx/flx}$ mice (*Shh*cKO, n=29), and *Shh*$^{flx/flx}$ (WT, n=23) controls. All adult mice underwent behavioral assessments using open field, tail suspension, and allodynia before, at three- and six-months post-tamoxifen induction. Body composition was analyzed using DEXA scans pre- and post-tamoxifen. The lumbar spine was cryosectioned at the end of experiments, and molecular and structural changes in the IVD and DRGs were assessed. GraphPad was used for statistical analysis.

Results: Significant structural and degenerative changes were observed in the IVDs of *Shh*cKO mice compared to WTs. *Shh*cKO mice exhibited substantial changes in behaviors indicative of pain compared to controls. DEXA showed no changes in the body composition between cohorts. Immunofluorescence showed increased innervation (PGP9.5) and vascularization (CD31) in the IVDs and an increased prevalence of nociceptive channels, including Nav1.8, Nav1.9, and TRPA1 in the DRGs of *Shh*cKO mice compared to WT controls.

Conclusions: Results demonstrate that SHH is critical for IVD homeostasis, and its loss causes painful IVD degeneration. Age-related painful degenerative pathologies result from SHH loss.

I-C.04

CHARACTERIZATION OF NOCICEPTIVE RESPONSES IN MALE AND FEMALE MICE IN A MODEL OF PARKINSON'S DISEASE

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Background and aims: Parkinson's disease is a neurological disorder characterized by a loss of dopaminergic neurons, resulting in motor and non-motor symptoms including pain. Affecting approximately 86% of patients, painful symptoms can arise from motor issues like tremors and rigidity, but can also have a central origin leading to neuropathic pain and altered nociceptive sensitivity. Our aim was to characterize the alterations of various nociceptive modalities in a murine model of Parkinson's disease.

Methods: Male and female C57BL/6J mice underwent unilateral stereotaxic 6-hydroxydopamine (6-OHDA) injection in the medial forebrain bundle resulting in dopaminergic lesion. Three weeks after the surgery, motor and nociceptive tests were performed to respectively assess (1) locomotion and balance (open field, beam walking, rotarod, rotation bias); (2) mechanical superficial static (von Frey), superficial dynamic (brush) and deep tissue sensitivity (forceps); (3) thermal heat (hot plate, Hargreaves method), and cold (acetone, dry ice) sensitivity; and (4) chemical sensitivity (formalin).

Results: Our results show that 6-OHDA animals exhibit static, dynamic and deep tissue mechanical hypersensitivity, as well as thermal heat and cold hypersensitivity. In addition, pain symptoms during an inflammatory reaction are amplified in dopaminergic-deficient mice. These alterations are present in both sexes and sides of the body.

Conclusions: These results provide a comprehensive analysis of nociceptive symptoms in a murine model of Parkinson's disease, highlighting the model's relevance for studying pathophysiological mechanisms underlying these pain-related symptoms.

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I-C.05

THE EFFECT OF A COMBINED CAPSAICIN-DICLOFENAC-CONTAINING TRANSDERMAL THERAPEUTIC SYSTEM (TTS) IN A RAT MODEL OF CHRONIC NEUROPATHIC PAIN AND CHRONIC OSTEOARTHRITIC INFLAMMATORY PAIN

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Background and aims: The presently available pharmacological treatments are often ineffective or have a high risk of severe adverse effects. It has developed and patented a new generation transdermal patch (TTS) containing

the combination of LCC and diclofenac. We aimed to investigate the analgesic effect of this combined LCC and diclofenac-containing patch in various rat models of chronic neuropathic and inflammatory pain conditions.

Methods: The animals experienced chronic neuropathic pain after undergoing surgery to partially ligate the sciatic nerve in the right thigh. Postoperative assessments of the pain threshold were conducted on Days 7, 14, and 21, after which transdermal patches were administered. Additionally, chronic osteoarthritic inflammatory pain was induced by injecting monoiodoacetate into the right knee joint. Post-treatment assessments were carried out on days 7 and 15 following the application of transdermal patches.

Results: The study results indicate that partial sciatic nerve ligation resulted in a significant decrease in mechanical pain sensitivity on Day 14. Capsaicin and combined patches increased pain threshold significantly. MIA injection led to a significant decrease in pain threshold, with the control patch having no effect. Capsaicin and diclofenac patches increased pain threshold at specific time points, while the combined patch had the most significant effect. MIA also caused a reduction in weight bearing. Capsaicin, diclofenac, and combined patches showed varying levels of restoring weight bearing to normal.

Conclusions: Transdermal patch containing a combination of low-concentration capsaicin and diclofenac, and made with silicon polymer, could be a promising treatment for various pain conditions involving inflammation and neuropathy recovery.

I-C.06

DEVELOPMENT OF A CLINICAL DECISION SUPPORT TOOL FOR THE DIAGNOSIS AND MONITORING OF CHRONIC MUSCULOSKELETAL PAIN: A PILOT CASE-CONTROL STUDY

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Background and aims: Chronic pain is a leading cause of human suffering and disability. Although different types exist, no gold standard biomarker is available for objective diagnosis to enhance physiotherapeutic interventions. This study aimed to develop a method for detecting patterns of chronic musculoskeletal pain (MKP) in patients with long-term hip/groin and low-back pain versus healthy controls, using an integrated analysis of functional, anthropometric, and spectral variables combined with artificial neural networks (ANN).

Methods: Fourteen adults (18–45 years) with over 3 months of chronic hip/groin or low-back pain and fifteen controls underwent anthropometric evaluation, pressure sensitivity tests, serum collection, and questionnaires on physical activity, daily-pain, and QoL. Serum samples were analyzed by MALDI TOF Mass Spectrometry, and the mass spectra were evaluated by multivariate data analysis and ANN (Artificial Neural Networks). All experimental procedures were approved by the UdG Ethics Committee.

Results: Functional and spectral tests revealed statistically significant differences between groups. Correlations among functional, anthropometric, and spectral variables were evident, while principal component analysis revealed well-defined clusters. Subsequent ANN analyses provided new algorithms that achieved a classification success rate of over 85% in distinguishing MKP cases versus controls.

Conclusions: Results suggest that the combination of MALDI-TOF MS and ANN may be a suitable method for discriminating specific spectral fingerprints of chronic musculoskeletal pain, providing a promising tool for clinical decision support, not only for diagnosis but also for monitoring this condition in affected patients.

I-C.07

PUPILLOMETRY TO EVALUATE DESCENDING NORADRENERGIC CONTROLS OF NOCICEPTIVE TRANSMISSION IN AN ATTENTION DEFICIT HYPERACTIVITY DISORDER (ADHD) MOUSE MODEL

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Background and aims: Patients with attention deficit hyperactivity disorder (ADHD) often experience altered pain perception, heightened sensitivity, and difficulty effectively communicating discomfort, complicating diagnosis and

treatment. The locus coeruleus (LC) releases noradrenaline (NA), which modulates pain through descending controls to the spinal cord and influences attentional processes in the anterior cingulate cortex (ACC). This study aimed to investigate whether impaired NA modulation in ADHD-like conditions contributes to increased pain perception.

Methods: Electrophysiological recordings were conducted on anesthetized adult control mice and ADHD-like mice (induced by neonatal 6-OHDA injection). Both groups received ACC stimulation or nociceptive stimuli. Pupil-evoked response (PER) was measured to assess NA release induced by the aforementioned stimuli.

Results: In control mice, stimulation of all ACC subregions and nociceptive stimuli significantly increased pupil diameter compared to baseline. However, in mice treated with the LC-NA-specific neurotoxin DSP4, neither ACC stimulation nor nociceptive stimuli altered pupil diameter. ADHD-like mice exhibited a lower nociceptive threshold for pupil dilation than controls. Additionally, the magnitude of diffuse noxious inhibitory control (DNIC) was greater in control mice compared to ADHD-like mice.

Conclusions: This study confirms that pupillometry is a reliable method for evaluating LC-NA mediated nociceptive responses in mice. The findings suggest that both, pain perception and DNIC may be impaired in ADHD-like conditions, highlighting NA descending control as a potential therapeutic target for addressing the comorbidity of pain and attentional disorders.

I-C.08

OPTIMIZING GLIAL FIBRILLARY ACIDIC PROTEIN-LUCIFERASE TRANSGENIC REPORTER MOUSE MODEL IN TUMOR NECROSIS FACTOR-ALPHA-INDUCED NEUROINFLAMMATION MODEL

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Background and aims: Glial fibrillary acidic protein (GFAP) is predominantly expressed in astrocytes in the brain and it is upregulated in different inflammation-related neuropathologies such as chronic pain. Studying *in vivo* astrocyte activation in animal models of these diseases in a time-dependent manner is important to determine their role in the pathophysiology. In this study, tumor necrosis factor alpha (TNF-α)-induced neuroinflammation was investigated using GFAP-luciferase (luc) transgenic mice.

Methods: TNF-α (63 and 250 μg/kg) or its PBS vehicle were injected intraperitoneally (i.p.) in 8-11-week-old male and female GFAP-luc transgenic mice. GFAP expression in the brain was assessed with luciferase substrate CycLuc1 (cyclic alkylamino-luciferin, 7.5 mg/kg, i.p.)-derived *in vivo* bioluminescence imaging before (baseline) and 2, 6, 24, 48, 72 and 96 h after the treatments.

Results: Both TNF-α doses induced significant bioluminescent signal increase in the brain at 24 h compared to their self-control baseline values ($p=0.0039$ and $p=0.0499$, respectively) indicating strong GFAP upregulation without dose-dependency. However, the effect of 250 μg/kg TNF-α was also significant compared to the vehicle-treated controls at 24 (*$p=0.0198$) and 48 h (*$p=0.019$). Brain bioluminescence reached the baseline levels at 72 h in both groups.

Conclusions: TNF-α induced dose- and time-dependent astrocyte activation in the brain using the CycLuc1 substrate in the GFAP-luc transgenic mouse model. Therefore, this platform might be a useful tool to examine the dynamics and significance of cerebral astrocyte activation in chronic pain conditions.

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I-C.09

INHIBITION OF MICROGLIA/MACROPHAGES ACTIVATION REDUCES NEUROPATHIC PAIN SYMPTOMS AND INHIBITS MORPHINE TOLERANCE IN MALE BUT NOT FEMALE MICE

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Background and aims: Neuropathic pain treatment remains a challenging issue because the therapies presently used in the clinic are not sufficient enough. Moreover, the mechanism of neuropathy is still not entirely understood. Recent studies have suggested an important role of microglia and macrophages in the occurrence and maintenance of neuropathic pain and morphine tolerance. That is why the aim of this study was to test whether inhibition of the activation of these cells by minocycline could positively influence these phenomena.

Methods: In male/female Albino Swiss mice neuropathic pain symptoms were evoked by chronic constriction injury of the sciatic nerve – Bennett model. During 2 weeks period repeated, twice daily, intraperitoneal treatment with minocycline, morphine and their coadministration were performed. The drugs effect were evaluated with von Frey and cold plate tests. Moreover, measurement of nociceptive factors in the spinal cord (L4-L6) were performed using Western blot/Luminex.

Results: Minocycline administered repeatedly diminished thermal and tactile hypersensitivity in males, but not in female mice. Moreover, it inhibited the development of morphine tolerance – however also only in males animals. Our research results indicate that this is possibly related to different effects on IBA-1-positive cells and nociceptive factors like CCL2, CXCL2, TNFalpha and IL-4.

Conclusions: Inhibition of activation of microglia/macrophages appears to be an interesting approach for potential therapy of neuropathic pain, while it is necessary to take gender into consideration.

Acknowledgement: The study was funded by National Science Centre, Poland grant OPUS 22 2021/43/B/NZ7/00230 and statutory funds from the Maj Institute of Pharmacology PAS.

I-C.10

PHARMACOLOGICAL MODULATION OF THE XCL1/XCR1 AND XCL1/ITGA9 AXES DIMINSHES HYPERSENSITIVITY UNDER NEUROPATHIC PAIN - EVIDENCE FROM MICE STUDY

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Background and aims: Neuropathy is an unsolved problem for clinicians because available treatments are ineffective in about 50% of patients. That is why new therapies are urgently needed. We have focused on the XCL1 and its two receptors – the classical chemokine receptor XCR1 and ITGA9 which affinity to was discovered relatively recently.

Methods: We investigated the effect of XCL1, XCR1 and ITGA9 blockade on mechanical (von Frey) and thermal (cold plate) hypersensitivity in mice model of neuropathic pain (Chronic Constriction Injury to the sciatic nerve – CCI model) and in naive animals. Single intrathecal injections were performed at day 7 in naive/CCI-exposed mice. Behavioral test were assessed 1-98 h after drugs administrations.

Results: We have shown that together with increasing hypersensitivity to mechanical and thermal stimuli, there is an spinal increase in XCL1 level up to day 35 after injury. After the intrathecal administration of XCL1 to naive mice, we have observed the development of mechanical/thermal hypersensitivity. This hypersensitivity was then diminished by blockade of XCR1 and ITGA9, showing they are both involved in nociceptive transmission. The blockade of XCL1 by neutralizing antibodies as well as the blockade of both receptors can also reverse the pain symptoms observed in CCI model.

Conclusions: Our results suggest that XCL1/XCR1 and XCL1/ITGA9 signaling contribute to the development of hypersensitivity. Importantly, blockade of both XCL1 and the two receptors studied seems to be an interesting approach for further studies.

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I-C.11

ALLEVIATION EFFECT OF NEUROPATHIC PAIN BY ZEB1 SIRNA ENCAPSULATED PLGA NANOPARTICLES IN RAT SNL MODEL

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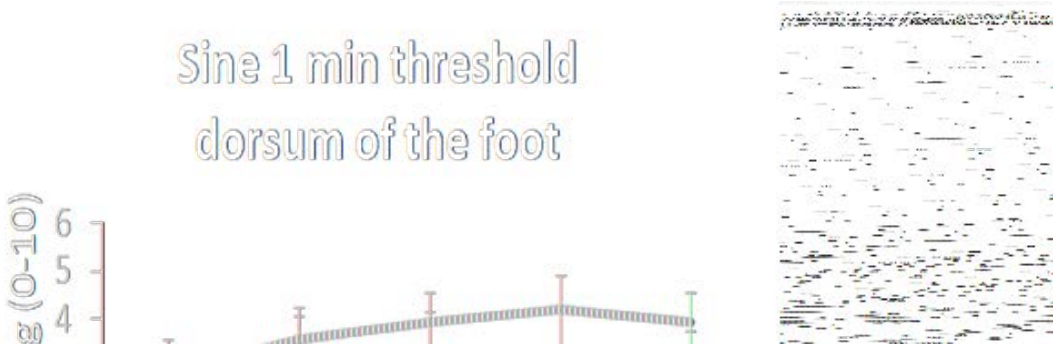
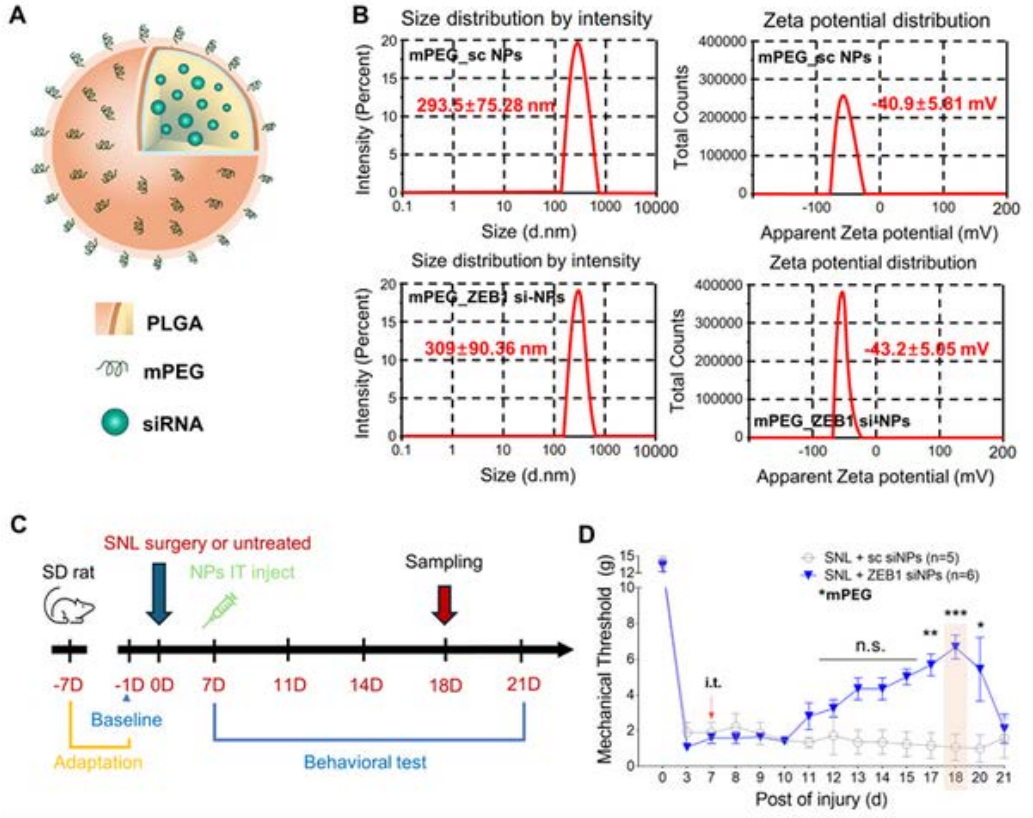
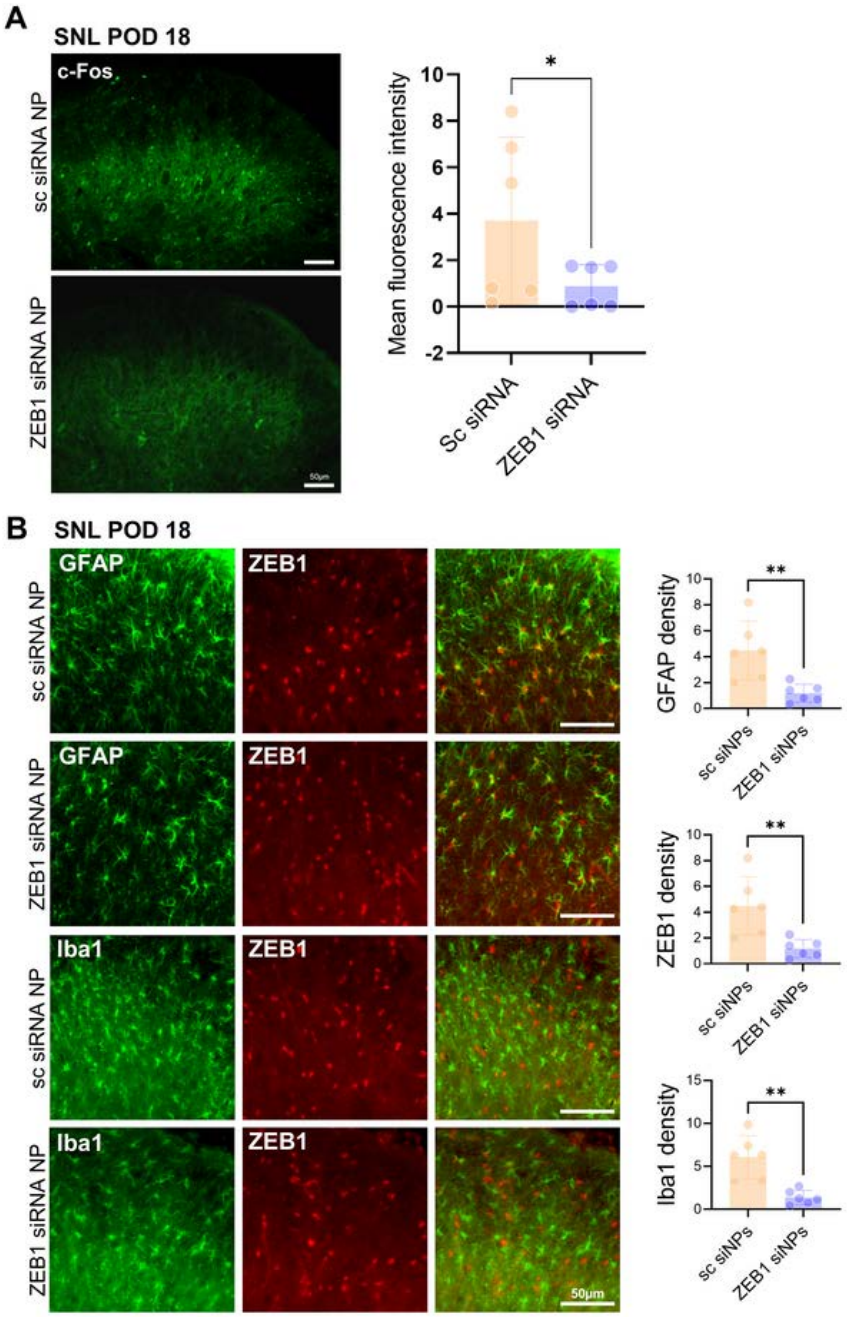
Background and aims: The zinc finger E-box-binding homeobox 1 (ZEB1) gene plays a key role in neuropathic pain development and regulation. Poly (D,L-lactic-co-glycolic acid) (PLGA) nanoparticles are advantageous for delivering small interfering RNA (siRNA), providing sustained release, enhanced cellular uptake, improved stability, and targeting spinal microglia, which contribute to central sensitization and chronic pain. Methoxy polyethylene glycol (mPEG) increases the biocompatibility and circulation time of PLGA nanoparticles, enabling them to cross the blood-brain barrier and reach brain astrocytes. This study examined the effects of intrathecal injection of PLGA nanoparticles encapsulated with ZEB1 siRNA on neuropathic pain behavior, microglial reactivity, and ZEB1 expression changes in dorsal horn neurons in a rat spinal nerve ligation (SNL) model.

Methods: A pain model was created by ligating the 5th spinal nerve in rats, and pain behavioral tests were performed to assess and record pain severity daily. Seven days after surgery, ZEB1 siRNA and control scrambled siRNA were injected into the intrathecal space by PLGA nanoparticle treatment, respectively, and the pain level was continuously assessed. Spinal cord tissues were collected on post-surgery day 18 and subjected to immunohistochemistry.



Results: The findings indicated that delivering ZEB1 siRNA via mPEG treated PLGA nanoparticles into the intrathecal space of a rat SNL model led to a substantial reduction in pain compared to the control group and a substantial decrease in c-Fos expression in neurons within the dorsal horn.





Conclusions: Based on the above findings, inhibition of ZEB1 using mPEG treated ZEB1 siRNA PLGA nanoparticles can be expected to effectively control neuropathic pain.

I-C.12

NATURAL LANGUAGE PROCESSING OF REFERRAL LETTERS FOR MACHINE LEARNING–BASED TRIAGING OF PATIENTS WITH LOW BACK PAIN TO THE MOST APPROPRIATE INTERVENTION: RETROSPECTIVE STUDY

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Background and aims: Decision support systems (DSSs) for suggesting optimal treatments for patients with low back pain (LBP) are currently insufficiently accurate for clinical application. With the appearance of electronic health

records (EHRs), additional qualitative data become available for DSSs. Currently, no decision support tools cover a wide range of biopsychosocial factors, including referral letter information to help clinicians triage patients to the optimal LBP treatment. The aim of this study was to investigate the added value of including qualitative data from EHRs and referral letters to the accuracy of a quantitative DSS for patients with LBP.

Methods: A retrospective study was conducted in a cohort of patients with LBP. Patients filled out a comprehensive quantitative questionnaire. Referral reasons and patient requests for help were extracted via natural language processing (NLP) and enriched in the data set. These data were considered independent factors for triage to neurosurgery, anesthesiology, rehabilitation, or minimal intervention. Support vector machine, k-nearest neighbor, and multilayer perceptron models were trained. The models' accuracies were evaluated via F1-scores, and confusion matrices were used to predict the referral.

Results: Data from 1608 patients were evaluated. The evaluation indicated that 2 referrals requests (to anesthesiology and rehabilitation intervention) increased the F1-score accuracy up to 19.5% for triaging. The confusion matrices confirmed the results.

Conclusions: Enriching data by adding NLP-based extraction of the content of referral letters increases the model accuracy of DSSs in suggesting optimal treatments for individual patients with LBP. Overall model accuracies were still low and insufficient for clinical application.

I-C.13

FROM LOCALIZED TO WIDESPREAD: CHARACTERIZING DISTINCT SPATIAL PATTERNS OF PAIN SPREAD BASED ON ANATOMICAL LOCALIZATION AND THEIR ASSOCIATED DIAGNOSES AND SYMPTOMATOLOGY

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Background and aims: Research has primarily focused on pain's transition from acute to chronic, but the spatial spread of pain—its progression from one site to multiple body sites—has only recently gained attention. Despite this, the spatiotemporal dynamics of chronic pain spread are still largely unexplored. This study uses machine learning to identify homogeneous subtypes of chronic pain with distinct trajectories.

Methods: We analyzed data from 81,600 individuals with chronic pain who completed the UK Biobank online pain questionnaire including pain ratings across 12 distinct body sites. To characterize pain spread, we used the unsupervised machine learning algorithm merging disease progression with clustering to obtain probabilistic spatiotemporal partitioning. Subtypes were then compared based on their pain spread trajectories, diagnoses, and non-pain symptomatology.

Results: We identified four different subtypes (S1-4) associated with distinct putative trajectories of pain spread. These trajectories were characterized based on the spread (Number of Pain Sites, R2=37-38%) and intensity (Worst Pain; R2=32-40%) of pain but could also capture the impact of pain (Brief Pain Interference; R2=25-34%). These subtypes exhibited varying predominant body sites, combinations of pain diagnoses (nociceptive, neuropathic, and nociplastic), and multi-system symptomatology (e.g., cardiological, respiratory, GI). Importantly, across all subtypes, the trajectories of pain spread were associated with greater signs of neuropathic symptoms localized at their most bothersome pain site (DN4; r=0.23-0.40).

Conclusions: In conclusion, our data-driven model shows distinct patterns of pain spread and accompanying symptomatology within COPCs. Understanding these trajectories holds the potential to inform the etiology of chronic pain and provide insights into effective pain management strategies.

I-C.14

REAL-TIME PAIN DETECTION AND COMPUTER VISION: A MODEL OF PAIN ASSESSMENT THROUGH FACIAL EXPRESSIONS USING ARTIFICIAL INTELLIGENCE

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Background and aims: Pain assessment is a cornerstone of patient care, but it often relies on self-reports and subjective experiences that can be measured inaccurately, especially in non-communicative patients. Automated Pain Assessment (APA) offers an important weapon in the field of pain management, leveraging Artificial Intelligence (AI) and Computer Vision (CV) to measure pain objectively. In this study, we propose an approach to analyzing facial expressions of pain using Action Units (AUs) defined by the Facial Action Coding System (FACS),through the implementation of the YOLOv8 algorithm used to detect in real time pain expressions.

Methods: A data-driven AI model was developed by implementing YOLOv8, which can detect pain-related expressions in real-time (Figure 1).

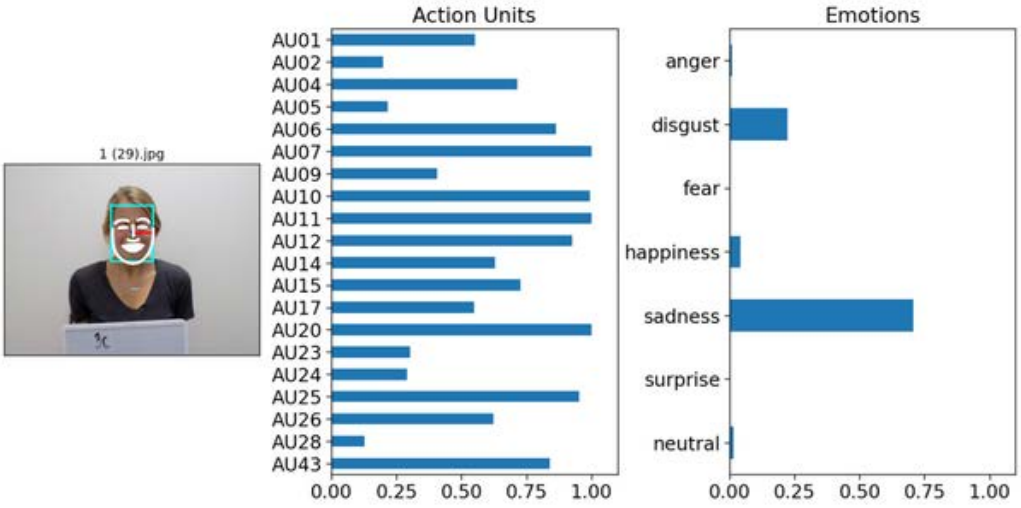

Figure.1

The model was trained on a dataset of five hundreds images (250 pain, 250 no-pain)labeled with the main AUs indicating specific pain and discomfort (Figure 2). The data engineering phase included selecting the "core" AUs based on Prkachin's framework, manually labeling them with Py-Feat scores, and using the Solomon Pain Intensity score (PSPI) to select images exhibiting significant pain expression. The model performance was evaluated by precision, recall, and mean average precision (mAP).

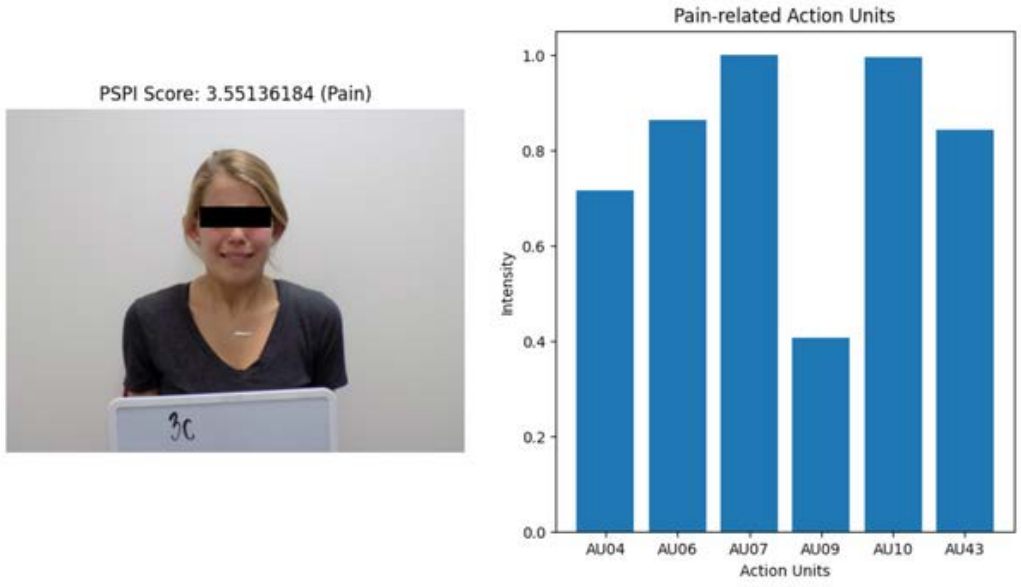

Figure.2

Results: The model demonstrated high performance, achieving 86.8% precision, 80.7% recall, and 89.3% mAP. Testing on multiple datasets confirmed its ability to generalize, although real-world variability such as different lighting and facial motion, can compromise accuracy.

Conclusions: Given a subset of AUs, we developed a robust and reliable model for identifying pain in facial expressions. Despite the challenges, the approach showed potential to be explored for clinical application.

I-C.15

MACHINE LEARNING DETECTS SUBCORTICAL VOLUME NORMALIZATION FOLLOWING SURGICAL PAIN RELIEF FOR TRIGEMINAL NEURALGIA

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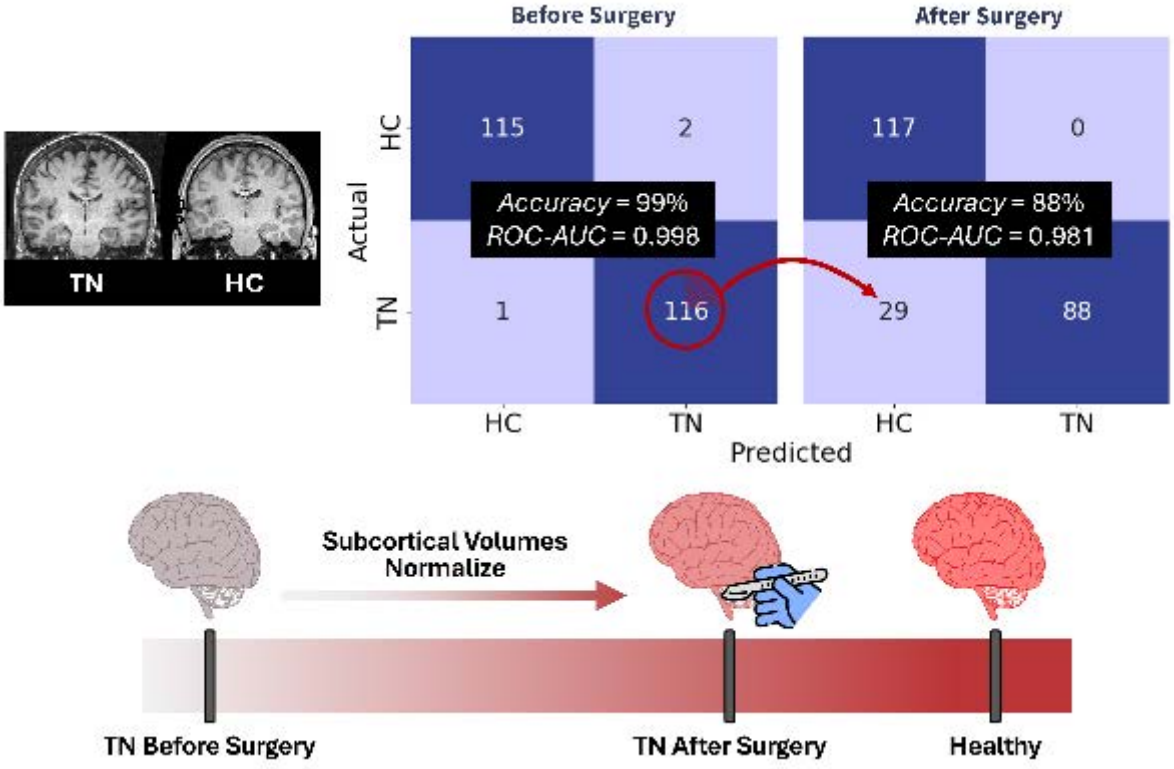
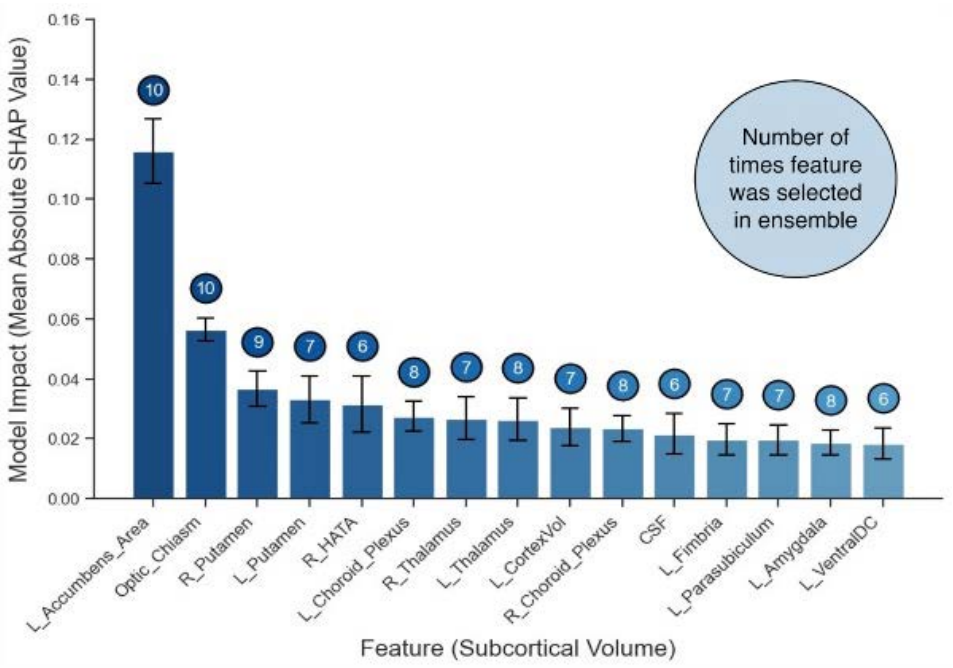
Background and aims: Trigeminal neuralgia (TN) is a neuropathic pain condition causing debilitating facial pain, and can be surgically treated. Conventional imaging of TN brains is unable to identify biomarkers that predict surgical response. However, the definition of these biomarkers is important and clinically relevant. We have previously identified brain signatures associated with TN. In this study, we explore subcortical structures; we hypothesized that these also distinguish TN brains from healthy brains, and can normalize following surgical pain relief.

Methods: Subcortical volumes were derived from MRI scans of 117 TN patients who underwent pain-relieving surgery and 1126 healthy subjects. An ensemble of classifiers was trained and optimized on pre-surgery and healthy data, and tested on post-surgery data with a holdout set of age- and sex-matched controls.

Results: Before surgery, the ensemble correctly classified 116/117 TN patients and 115/117 healthy subjects (*ROC-AUC* = 0.998, 99% *accuracy*). After surgery, a significant number of patients switched from one group to the other ($q < 0.001$). 29 patients were now classified as healthy (*ROC-AUC* = 0.981), reflecting that a substantial proportion of surgical responders had motifs highly similar to healthy brains after pain relief.





Conclusions: Our longitudinal study demonstrates that brain structure alone is enough for ML to distinguish between TN and being pain-free, and that recovery from neuropathic pain may be detectable within a year of pain-relieving intervention. These findings provide a foundation for mechanistic studies of subcortical regions in TN, many of which are related to cognition, and support the potential for ML to augment clinicians.

I-C.16

INTERPRETATION OF DISCREPANCIES BETWEEN SYMPTOMS AND CLINICAL EXAM FINDINGS IN PATIENTS WITH TEMPOROMANDIBULAR DISORDER

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Background and aims: Patients with chronic temporomandibular disorder (TMD) show distinct physical and psychosocial characteristics compared to those with acute TMD or non-TMD. However, few studies have examined these aspects in acute TMD patients. This study aims to analyze the differences in symptoms and clinical findings in acute TMD patients and determine if these differences can predict patient prognosis.

Methods: A study of 309 individuals with acute TMD analyzed physical and psychosocial factors. Out of these, 171 patients were evaluated for treatment response. Concordance value measured the agreement between self-reported painful sites and those detected through standardized palpation. Patients were categorized into concordance poor (CP), moderate (CM), and high (CH) initially, and after-treatment concordance poor (ACP), after-treatment concordance moderate (ACM), and after-treatment concordance high (ACH) in the subsequent analysis. Psychosocial factors were assessed using Axis II questionnaires of the Diagnostic Criteria for TMD (DC/TMD) and the Perceived Stress Scale (PSS). A clinical examination recorded the TMD-Pain Screener, DC/TMD Symptom Questionnaire, and results from standardized palpation.

Results: Lower concordance is associated with more parafunctional oral habits, jaw function limitations, perceived stress, chronic pain, somatic symptoms, depression, anxiety, and number of painful sites. Lower concordance also correlates with poorer treatment outcomes. Additionally, the concordance value can predict 41.2% of residual pain following treatment, indicating overall treatment outcomes.

Conclusions: This study highlights the necessity for physical, psychosocial assessment, categorization in patients presenting with acute TMD pain and the potential of concordance as a prognostic factor for treatment.

I-C.17

SOMATISATION DIFFERENTIATES FIBROMYALGIA FROM LOW BACK PAIN. A COMPARATIVE, CROSS-SECTIONAL COHORT STUDY

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Background and aims: To examine whether somatisation, depression, anxiety, fatigue, coping dimensions, pain, physical and social function, or sociodemographic characteristics can differentiate fibromyalgia from low back pain in a cross-sectional cohort setting of our Zurzach Interdisciplinary Pain Programme.

Methods: Fibromyalgia and low back pain were compared using the Symptom Checklist-90R (SCL-90R) Somatisation scale, the Quantification Inventory for Somatoform Syndromes (QUISS) Number of somatoform symptoms, and other standardised instruments. Standardised mean differences (SMDs) quantified the score differences, and binomial logistic regression modelling with various co-variates differentiated fibromyalgia from low back pain.

Results: The largest differences indicating worse health in fibromyalgia (n=131) were in somatisation on the SCL-90R (SMD=-0.971) and the QUISS (SMD=-0.960), next largest were the affective scores, and pain and coping (SMDs between -0.632 and -0.280, p≤0.007). Physical and social functioning were comparable in the two conditions (n=262 low back pain). The two somatisation scales both with odds ratios (OR)=0.966 (p≤0.002) plus female sex (OR=3.396, p<0.001) predicted 74.3% of the cases correctly (accuracy) with a positive predictive value of 65.3% and a specificity of 87.0% for fibromyalgia. In the female subsample (n=280), the model remained stable with an accuracy of 71.9%.

Conclusions: Somatisation stood out from all other somatic, psychosocial, and coping dimensions and sociodemographics as the one significant specific predictor distinguishing fibromyalgia from low back pain. The fibromyalgia phenotype is characterised by the generalisation of painful loci but equally prominently by generalised somatoform symptoms. Assessment of somatisation is recommended to ensure accurate identification and understanding of the multifaceted syndrome of fibromyalgia.

I-C.18

CLASSIFICATION OF PAIN MECHANISMS IN PARKINSON'S DISEASE BASED ON THE IASP GRADING SYSTEM AND THE PARKINSON'S DISEASE PAIN CLASSIFICATION SYSTEM

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Background and aims: The mechanisms underlying pain in people with Parkinson's disease (PD) remain unclear. This study aimed to classify pain mechanisms using the International Association for the Study of Pain (IASP) grading system and the Parkinson's Disease-Pain Classification System (PD-PCS).

Methods: Twenty-seven patients with PD who experienced pain for more than 3 months were included. In the IASP grading system, nociceptive pain was identified based on inflammatory findings and the analgesic effects of anti-inflammatory drugs, neuropathic pain was identified based on pain area and Douleur Neuropathique 4 (DN4) scale score, and nociplastic pain was identified based on widespread pain, allodynia, hypersensitivity history, and comorbidities. In the PD-PCS, nociceptive pain was identified based on myofascial, localized, off-period, dystonia-related, and peak-of-dose pain types, neuropathic pain was identified based on the DN4 results, and nociplastic pain was identified as being neither nociceptive nor neuropathic.

Results: According to the IASP grading system, 21 participants (77.8%) had dominant nociceptive, one (3.7%) had dominant neuropathic, and five (18.5%) had dominant nociplastic pain. According to the PD-PCS, 24 (88.9%) had dominant nociceptive, two (7.4%) had dominant neuropathic, and one (3.7%) had dominant nociceptive pain.

Conclusions: The two pain mechanism classification systems yielded different results. Further studies are needed to determine the most appropriate method of classifying pain in people with PD.

I-C.19

CONTRIBUTION OF NOCIPLASTIC PAIN IN FIBROMYALGIA COMPARED TO COMPLEX REGIONAL PAIN SYNDROME: FINDINGS FROM DIAGNOSTIC FLOWCHART ANALYSIS

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Background and aims: Fibromyalgia (FM) and complex regional pain syndrome (CRPS) both produce pain such as allodynia and are classified as chronic primary pain conditions in ICD11. Pathophysiologically, they are associated with altered pain signal processing in the central nervous system and present with central sensitisation. However, there may be differences in nociplastic pain mechanisms between FM, which is characterised by generalised symptoms, and CRPS, which is localised and causes intense symptoms in some areas. Therefore, this study investigates the differences in the contribution of nociplastic pain between FM and CRPS.

Methods: Patients with FM (n=25) and CRPS (n=10) were included. All patients underwent clinical interviews, imaging examinations, quantitative sensory testing, and self-reported questionnaires. Based on the flowchart reported by Kosek et al. (2021), the patients were identified for the possibility of nociplastic pain by evaluating hypersensitivity and central sensitization-related symptoms (CSS).

Results: All patients with FM presented allodynia/painful after-sensation and CSS, while patients with CRPS exhibited allodynia but few presented with CSS. Temporal summation of pain was significantly higher in CRPS compared to FM, while conditioned pain modulation was significantly lower in FM compared to CRPS.

Conclusions: This study provides findings from diagnostic flowchart analysis indicating that different nociplastic pain mechanisms contribute to FM and CRPS. These findings suggest that central sensitization in FM may be more influenced by cognitive-emotional factors rather than neurological etiology.

I-C.20

DYSFUNCTION OF CENTRAL PAIN PATHWAY IS MAIN REASON FOR CHRONIC LOW BACK PAIN

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Background and aims: The main reason for Chronic low back pain‘ is dysfunction of central pain pathways. Conventional treatment Options for chronic low back pain are acetaminophen, NSAIDs and opioids. However, they do not act at the root cause of the pain and have side effects in the long term.

Methods: A review was carried out to cover the existing clinical research on Duloxetine, a serotonin and norepinephrine reuptake inhibitor, in the therapy of chronic low back pain, including pharmacokinetics drug- drug interaction, case reports and special considerations. Our review was aimed at encompassing the bulk of Clinical research on Duloxetine, which included clinical trials, coadministration studies, case reports and cost effective studies.

Results: Highly effective in Chronic low back pain.

Study type Randomized.

Drug used: Duloxetine 60mg/ day.

Number of patients: 456 patients with pain persists for at least 6 months.

Duration: 14 weeks.

Results = 94.4% of patients more than 30% pain reduction and 82.4% of patients more than 50% pain reduction.

This ensures control of back pain.

Excellent safety in patients with chronic back pain.

Study type: 5 Randomized trials; Duloxetine 60 -120 mg/day.

No. Of patients: 625 patients with chronic low back pain.

Duration: 4 weeks.

Results = 0% incidence of gastrointestinal, renal or cardiovascular side effects.

0% incidence of durg abuse/ addiction.

Conclusions: This is safe and devoid of Side effects of NSAIDs and opioids and has anti depressant efficacy. The development of Duloxetine allows further optimisation of individual treatment strategies so as to provide more therapeutic choices.

I-C.21

OBJECTIVE MEASUREMENT OF PHYSICAL ACTIVITY PATTERNS IN CHRONIC PAIN

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Background and aims: While physical activity (PA) is an important factor in chronic pain, caregivers have difficulty in assessing PA-behavior. Moreover, associations between subjective (e.g. questionnaires) and objective measures (e.g. accelerometers) are inconsistent and no obvious differences exist in total PA in CP versus healthy controls. This emphasizes the need for detailed assessment of PA-patterns. This study aims to develop and validate a machine learning model (MLM) to convert accelerometer data to activity intensity timeseries and compare performance with a traditional method.

Methods: The MLM was trained and tested with labelled activity bouts from 30 healthy participants (HP) and 30 CPP. Each participant performed 22 classified activities (sedentary, low, moderate or vigorous) in epochs of 80 seconds with a wrist-worn tri-axial accelerometer. Performance was evaluated and compared with a conventional cut-off points approach. The resulting MLM was applied to real-life accelerometer timeseries. The output was compared with 1707 one-minute observations as a gold-standard.

Results: Accuracy and precision of the MLM for classifying activity intensity were both 0.82, while these values for the traditional cut-off point approach were 0.54 and 0.35. MLM-agreement in the four intensity classes ranged from 0.68 to 0.91. In real-life conditions accuracy was 0.72 and agreement ranged from 0.62 to 0.82 in the four classes. Barcoding was used for visualization of activity intensity timeseries.

Conclusions: The MLM accurately and precisely classified data from a wrist-worn tri-axial accelerometer in four classes of activity intensity in HP and CPP. Criterion validity was good. The MLM clearly outperformed the cut-off points approach.

I-C.22

ARE THERE ANY DIFFERENCES IN PAIN THRESHOLDS DURING MENSTRUAL CYCLE?

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Background and aims: Pain is a sensory and emotional experience, making its perception highly variable among individuals. In women, pain perception can vary with hormonal changes during different phases of the menstrual cycle (MC). Additionally, significant fluctuations in emotional status can occur during these phases. The aim of this study was to determine the difference in pressure pain thresholds (PPT) in women during different phases of the MC. The additional goal was to assess differences in emotional status.

Methods: Follicular phase (FP) and luteal phase (LP) of the MC were determined using an online ovulation calculator. The study included 95 participants (average age 27.7±7.8 years). Since only 5 of the subjects were in ovulation, we did not include them in further analysis. PPT testing was conducted on the m. extensor carpi radialis longus and the paraspinal musculature of the lumbar region using an algometer with a 1 cm² rubber tip. Depression, Anxiety, Stress Scale (DASS 21) was used to assess differences in emotional status.

Results: There were no significant differences in PPT in the forearm region (FP:33.55N/cm^2±12.15 vs LP:33.55N/cm^2±13.65N/cm^2, t=0.509;p=0.979) and the lower back region (FP:56.85N/cm^2±19.95N/cm^2 vs LP:58.93N/cm^2±21.20N/cm^2, t=0.982;p=0.619) among participants in different phases of the MC. Additionally, no significant differences were found in depression (χ^2=1016.000;p=0.392), anxiety (χ^2=972.500;p=0.243) and stress (t=-1.038;p=0.302) between participants during the MC.

Conclusions: There were no significant differences in PPT between women in the FP and LP of the MC. There were no significant differences in emotional status among women during the MC.

I-C.23

CLINICAL APPLICATION OF THE N13 SOMATOSENSORY EVOKED POTENTIALS IN COMPLEX REGIONAL PAIN SYNDROME

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Background and aims: The N13 component of somatosensory evoked potentials (SSEPs) was shown to be increased after experimentally-induced central sensitization in healthy controls, possibly reflecting enhanced dorsal horn excitability. Whether the N13 poses a useful surrogate of central sensitization in chronic pain patients with complex regional pain syndrome (CRPS) remains to be demonstrated.

Methods: Twenty individuals with hand CRPS type 1 and 20 age- and sex-matched healthy controls (HC) will be recruited for this study. Pain phenotyping and quantitative sensory testing (QST) will be performed to detect hypersensitivities within the affected arm of CRPS patients. Additionally, the peripheral N9 component, the cervical N13 component and the cortical N20/P25 complex of the SSEP will be recorded after electrical stimulation of the median nerve from both arms (affected/unaffected). Presence, amplitude and latency of SSEPs will be analyzed.

Results: Data of eight CRPS patients and seven HC have been collected so far. All eight patients with CRPS showed clear signs of mechanical hyperalgesia. Preliminary results do not show increased N13 amplitudes after stimulation of the affected hand of CRPS (1.4±0.7uV) compared to their unaffected hand (1.7±0.9uV, n.s.) or HC (2.1±0.7uV, n.s.).

Conclusions: Unchanged amplitudes of N13 SSEPs in CRPS could either imply a lack of strong spinal sensitization in our current patients or that the used method is not sensitive enough to detect spinal hyperexcitability in chronic pain patients. Additionally, factors like medication associated reduction of SSEP amplitudes or peripheral impairments could dilute detectability of enhanced dorsal horn excitability in clinical pain cohorts.

I-C.24

„HOW SHOULD SHOULDER PAIN BE LABELED?“ THE PERSPECTIVE OF SHOULDER EXPERTS. A QUALITATIVE STUDY

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Background and aims: Shoulder pain represents a prevalent musculoskeletal condition, but there is limited consensus on diagnostic labeling for cases that are not linked to frozen shoulder, instability, or osteoarthritis. This study explores physiotherapists‘ perspectives on various diagnostic labels for non-specific shoulder pain, focusing on clinical utility, patient communication, and prognostic implications.

Methods: A qualitative design using semi-structured interviews was employed. Fourteen international physiotherapists with expertise in shoulder disorders participated. Interviews were conducted in person or via Microsoft Teams, recorded, and transcribed for analysis. A descriptive phenomenological approach was used to perform thematic analysis, identifying shared patterns and unique insights regarding the terms „subacromial impingement syndrome“ (SIS), „subacromial pain syndrome“ (SPS), „rotator cuff tendinopathy“ (RCT), „rotator cuff related shoulder pain“ (RCRSP), and „non-specific shoulder pain“ (NSSP).

Results: Participants strongly supported abandoning SIS due to its outdated theoretical basis. RCT and RCRSP were considered clinically relevant and acceptable for patients, enhancing prognosis and treatment compliance. SPS and NSSP were criticized for being overly broad and lacking specificity. Physiotherapists emphasized the importance of diagnostic labels that are understandable to patients, culturally appropriate, and facilitate individualized care.

Conclusions: This study highlights the challenges of achieving consensus on diagnostic terminology for non-specific shoulder pain. While RCT and RCRSP are promising terms, the emphasis should shift from seeking a universal label to adopting a biopsychosocial framework for patient management. Effective communication tailored to patient beliefs and cultural context remains essential for enhancing treatment outcomes.

I-C.25

IDENTIFICATION OF A CLINICAL PATTERN IN PATIENTS WITH CHRONIC PELVIC PAIN: AN OBSERVATIONAL STUDY

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Background and aims: Chronic pelvic pain (CPP) is a multifactorial condition affecting 8% to 10% of women, leading to debilitating symptoms and significant impacts on quality of life. This observational study aims to identify common clinical patterns in women suffering from CPP to improve early diagnosis and therapeutic strategies.

Methods: We reviewed the clinical histories of 155 women experiencing chronic pelvic pain for over three months, focusing on pain characteristics, comorbidities, and daily life impact.

Results: Participants reported an average severe pain level of 7.5/10, with 58.7% experiencing daily pain. The most commonly affected area was the vulva (82.6%), followed by lumbar (46.5%) and abdominal pain (43.2%). Pain descriptors included stinging, burning, and aching, indicating a complex pain experience. Significant comorbidities were observed, including cervical pain (43.2%), headaches (30.3%), and gastrointestinal issues like dysuria (26.5%) and irritable bowel syndrome (21.9%). Additionally, 36% of participants reported varying degrees of allodynia, and many experienced sensory hypersensitivity to stimuli such as light and temperature.

Conclusions: This article enriches the understanding of chronic pelvic pain (CPP) by identifying distinct clinical patterns and emphasizing their implications for diagnosis and treatment.

I-C.26

GUT DYSBIOSIS IN PATIENTS WITH CHRONIC PAIN: A SYSTEMATIC REVIEW AND META-ANALYSIS

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Background and aims: The bidirectional gut-brain communication network and the occurrence of chronic pain both involve contributions of the autonomic nervous system and the hypothalamic pituitary adrenal axis. Nevertheless, the current understanding of the association between gut microbiota and chronic pain is still not clear. Therefore, the aim of this study is to systematically evaluate the existing knowledge about gut microbiota alterations in chronic pain conditions.

Methods: Four databases were consulted for this systematic literature review: PubMed, Web of Science, Scopus, and Embase. The Newcastle-Ottawa Scale was used to assess the risk of bias. Alpha-diversity, β-diversity, and relative abundance at different taxonomic levels were summarized qualitatively, and quantitatively.

Results: The initial database search identified a total of 3544 unique studies, of which 21 studies were eventually included in the systematic review and 11 in the meta-analysis. Decreases in alpha-diversity were revealed in chronic pain patients compared to controls for several metrics: observed species (SMD= -0.201, 95% CI from -0.04 to -0.36, p=0.01), Shannon index (SMD= -0.27, 95% CI from -0.11 to -0.43, p<0.001), and faith phylogenetic diversity (SMD -0.35, 95% CI from -0.08 to -0.61, p=0.01). Inconsistent results were revealed for beta-diversity. A decrease in the relative abundance of the Lachnospiraceae family, genus *Faecalibacterium* and *Roseburia*, and species of *Faecalibacterium prausnitzii* and *Odoribacter splanchnicus*, as well as an increase in *Eggerthella* spp., was revealed in chronic pain patients compared to controls.

Conclusions: Indications for gut microbiota dysbiosis were revealed in chronic pain patients, with non-specific disease alterations of microbes.

I-C.27

ROLE OF ENDOCANNABINOIDS AND CATECHOLAMINES DURING CONDITIONED PAIN MODUALTION, HYPNOSIS-INDUCED AND PLACEBO ANALGESIA

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Background and aims: Counter-irritation interventions (CI), hypnosis-induced hypoalgesia (HIH) and placebo analgesia (PA) are effective procedures to reduce pain perception. However, underlying mechanisms are yet not fully understood. Endocannabinoids (ECB) and catecholamines (CA) are involved in endogenous analgesia. The objective of this study was to determine the role of these molecules in HIH, CI and PA.

Methods: Pain-free participants (n=32) took part in 3 testing sessions, during which a different procedure (CI, HIH and PA) was evaluated. The hypoalgesic effect of each procedure was assessed using a constant heat pain stimulation performed on the forearm, applied before and after the intervention method. The CI was a conditioning stimulation performed by a cold-water bath. The HIH was an analgesic hypnotic suggestion performed by a trained experiment. The PA was a placebo effect induced by a placebo analgesia pill. A blood sample was taken before and immediately after each procedure. Concentration of ECB and CA were quantified by mass spectrometry.

Results: All procedure induced an analgesic effect (p<0.01). We observed a reduction (p<0.05) in ECB (*N-palmitoylethanolamine* and *N-oleoylethanolamine*) in the CI condition and a reduction (p<0.05) in CA (*serotonin* and *norepinephrine*) in the HIH condition. No change in ECB and CA was observed for the PA condition. Correlations between change in ECB and CA concentration and analgesia were not significative in both procedures.

Conclusions: The results suggest that hypnosis-induced analgesia appears to be mediated by changes in catecholamines levels, whereas CPM appears to involve ECBs systems suggesting that they involve two different endogenous systems.

I-C.28

THE EFFECT OF PROLONGED ISCHEMIA AND ANESTHETIC AGENTS ON OXIDATIVE STRESS PARAMETERS, POSTOPERATIVE PAIN, AND POSTOPERATIVE ANALGESIA REQUIREMENT

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Background and aims: Our primary aim was to investigate the relationship between postoperative pain and tourniquet-induced oxidative damage in adults undergoing orthopedic knee arthroscopy surgery. Our secondary aim is to observe whether the anesthetic agents used will affect tourniquet-related oxidative stress and postoperative pain.

Methods: Sixty patients aged 18-80, with ASA I-II status, who underwent knee arthroscopy were included in the study. A voluntary consent form was obtained all th e patients. After measuring the basal algometer values,

operation was performed on the patients by applying a tourniquet under general anesthesia. After the tourniquet was inflated and before the tourniquet was opened, blood samples were taken from the operated leg, and HIF1 alpha and DAF levels were measured. Postoperative 24-hour VAS and algometer measurements were taken, and the total analgesic requirement was determined. Hyperemia, reperfusion, and ischemia time were recorded using tissue oximetry (NIRS technique).

Results: The propofol compared to pentothal, tissue oxygenation decreases more slowly after the tourniquet is inflated and reperfusion time is prolonged. This situation is independent of tourniquet duration. In the Propofol Group, a statistically significant negative correlation was observed between HIF values before Tourniquet Opening and Sevoflurane Dosage values (r=-0.455 p=0.044). Anesthesia approach with sevoflurane and propofol has high protection against acute tissue hypoxia.

Conclusions: As the sevoflurane dose increases, HIF release decreases. Sevoflurane increases resistance to hypoxia and has a protective effect. This protective effect reaches its highest level when propofol and sevoflurane are combined. The balance anesthesia approach with sevoflurane and propofol has high protection against acute tissue hypoxia.

I-C.29

IMMUNE PROFILING IN CHRONIC NEUROPATHIC PAIN: INSIGHTS FROM MASS CYTOMETRY AND CLINICAL CORRELATIONS

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Background and aims: Despite the neuronal origin of neuropathic pain, significant progress has been made in understanding the crucial role immune cells play in its pathogenesis. However, the lack of objective pain measurement poses challenges in tailoring effective therapies. Traditional analyses of peripheral markers have offered limited insights into immune system changes in chronic pain patients. In this study, we employed mass cytometry to investigate the composition of peripheral blood mononuclear cells (PBMCs) in individuals with chronic neuropathic pain.

Methods: We analyzed blood samples from 20 patients (10 males, 10 females) with chronic neuropathic pain of unknown origin. Using the Helios Mass Cytometry system and the Direct Immune Profiling kit (Standard Biotools), we identified up to 35 immune cell subpopulations and integrated single-cell data analysis with clinical information gathered during patient visits.

Results: Our analysis revealed five distinct patient clusters based on clinical profiles and PBMC subpopulation differences. Variations in pain intensity, duration, and sensitization scores were linked to specific monocyte, CD4+ T cell, B cell, and NK cell profiles. Importantly, clustering patients by pain intensity revealed significant differences in CD4+CCR4+ regulatory T cell levels between groups. Additionally, a linear model indicated that each unit increase in CD4+CCR4+ T cells corresponded to a 0.53539 unit increase in average pain intensity.

Conclusions: This study highlights mass cytometry‘s value in identifying immune system changes linked to chronic neuropathic pain. Clustering patients based on clinical and immunological data offers a path toward objective biomarkers and targeted treatments, particularly focusing on the role of CD4+CCR4+ T cells in pain regulation.

I-C.30

MEMORY OF PAIN AND ASSOCIATED CONTEXT IN AN IMMERSIVE VIRTUAL REALITY PROTOCOL

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Background and aims: The aim of our study is to understand how pain conditioning can modulate

1) the perception and implicit memory of the pain associated context and

2) the long-term memory of pain.

Methods: An aversive contextual conditioning protocol was modeled in immersive Virtual Reality: a three-room apartment, each associated with a specific stimulus:

(i) painful (tonic electrical stimulation);

(ii) non-painful (aversive sounds);

(iii) no stimulation (control).

The immersed subjects (60, 30 women) had to enter each room ten times, during which the different stimulations were delivered according to their assigned room. Perception of the environment (valence) was assessed. The implicit memory of the environment's content was measured with a blurred images paradigm (reaction time for object identification). Pain and pain memory were measured using visual analogue scales on the intensity of perception. The different measures were taken short-term (the day of the experiment) and long-term (8 to 15 days later).

Results: The initial results show that both types of aversive conditioning caused a decrease in the valence of the associated room, particularly for the pain condition, up to two weeks post-conditioning. Regarding the context implicit memory, reaction time analysis shows that women identified the pain room objects faster compared to men, and this effect persists long-term. Moreover, women tend to overestimate the long-term memory of pain intensity, unlike men.

Conclusions: These results suggest that pain can modulate the long-term perception of the associated context. Furthermore, painful contextual conditioning alters the implicit memory of the environment and the memory of pain, especially in women

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I-C.31

EFFECTS OF DULOXETINE HYDROCHLORIDE ON CONDITIONED PAIN MODULATION, TEMPORAL SUMMATION OF PAIN, AND OFFSET ANALGESIA IN HEALTHY VOLUNTEERS

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Background and aims: The pain inhibitory mechanisms of duloxetine hydrochloride is considered to potentiate serotonergic and noradrenergic activity in the central nervous system. Conditioned pain modulation (CPM), temporal summation of pain (TSP), and offset analgesia (OA) reflect different aspects of central pain modulatory pathways. However, the effect of duloxetine on these mechanisms remains unclear. The aim was to investigate the effect of duloxetine on CPM, TSP, and OA.

Methods: Ten healthy volunteers (6 females, age; 46.5[39.0–47.0]) were recruited. For CPM evaluation, pressure pain threshold (PPT) was measured as test stimulus with and without a thermal conditioning stimulus. CPM effect was calculated as (PPT with conditioning stimulus/PPT without conditioning stimulus − 1) × 100 (%). TSP ratio was evaluated by pin prick and calculated as; mean VAS scores from the 8th to the 10th stimulus/mean VAS scores from the first to the fourth stimulus. OA was induced by three-heat-stimulus train (T1–T2–T3) and OA score was calculated as (maximum VAS score for T2) – (minimum VAS score for T3). CPM, TSP and OA were evaluated before (CPM_{pre}, TSP_{pre} or OA_{pre}) and 5 hours after 30mg of oral duloxetine administration. The relationships between pre duloxetine administration and increment by duloxetine in CPM, TSP and OA were analyzed with Spearman correlation coefficient (statistical significance: $p<0.05$).

Results: Significant negative correlations were observed between the OA_{pre} and increment in OA (R=-0.802, p=0.005), but not in CPM (R=0.079, p=0.838) or TSP (R=-0.588, p=0.080).

Conclusions: Duloxetine might activate central pain modulatory pathways which are featured by OA but not CPM or TSP.

I-C.33

INVESTIGATING OFFSET ANALGESIA THROUGH PUPILLOMETRY: CAN PUPIL RESPONSE REFLECT ANALGESIC EFFECTS?

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Background and aims: The autonomic nervous system responds to pain with physiological changes like pupillary dilation responses (PDR). This study investigates whether PDR can capture offset analgesia (OA), a disproportionately large reduction in pain perception after a small decrease in noxious stimulus intensity. By comparing PDR to subjective pain ratings, we aim to evaluate PDR's effectiveness as an objective measure of the endogenous pain inhibitory system.

Methods: 30 healthy participants will undergo controlled heat stimuli on the volar forearm using the following OA paradigm: (T1) 47°C for 5sec, (T2) 48°C for 5sec, (T3) back to 47°C for 20sec. PDR is continuously recorded at 1000Hz using an eye-tracking camera. Pain is rated verbally on a 0-10 numeric rating scale (NRS). The OA effect will be calculated as mean PDR and NRS change from T2 to T3.

Results: Preliminary data from four healthy participants (m = 1, f = 3, 29 ± 7 years) demonstrated a change in pupil diameter from 3.32 ± 0.46mm (T2) to 2.80 ± 0.29 (T3) during OA, resulting in an OA effect of -0.52 ± 0.67mm (-14%). As expected, pain ratings decreased from 6.8 ± 2.2 (T2) to 3.5 ± 1.3 (T3) reflecting an OA effect of -3.3 ± 2.2 NRS (-48%).

Conclusions: This study investigates PDR as an objective measure of pain modulation. Despite expected variability in PDR and pain ratings, we anticipate that PDR will capture the physiological effects of offset analgesia, complementing traditional assessments and providing deeper insight into pain processing, particularly the endogenous inhibitory system.

I-C.34

BEYOND NOCICEPTION: TOWARD AN UNDERSTANDING OF THE NETWORKS UNDERLYING THE UNPLEASANTNESS INHERENT TO PAIN PERCEPTION

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Background and aims: Pain is both a sensation and an emotion. The unpleasantness inherent to pain perception is supported by brain networks involved in the affective-motivational component of pain. To date, while the brain network processing nociception is well established the one underlying the unpleasant nature of pain, along with its functional interactions, remains to be fully described.

This protocol was designed to isolate the brain correlates underlying the unpleasantness of pain using EEG. It aims to provide a better understanding of the affective-motivational dimension of pain perception as it could lead to novel therapeutic strategies to alleviate the suffering of chronic pain patients.

Methods: Thus, sixty healthy participants were recruited and equipped with a 128-electrode EEG headset. Their brain activity was recorded during three conditions: a painful condition, a non-painful aversive condition, and a control condition. Since experimental tonic pain is more suitable for simulating the subjective properties of chronic pain due to its high level of unpleasantness, a series of painful stimuli, each lasting 40 seconds, were delivered to the left hand using an electrostimulation glove. The non-painful aversive condition, of the same duration, involved listening to unpleasant (but non-painful) sounds that were validated in the laboratory to obtain a sufficient number of sounds with a level of unpleasantness equivalent to the painful electrical sensation, without evoking pain. During the control condition, no stimulation was delivered. The experimental design allows for advanced analyses including source reconstruction, spectral analysis using Fast Fourier Transform, and connectivity analyses (imaginary coherence measures) to compare the three conditions.

Results: This project will be completed by the end of March 2025.

I-C.35

INVESTIGATING CORTICOSPINAL EXCITABILITY IN RESPONSE TO EXPERIMENTALLY INDUCED ACUTE PAIN AND ITCH

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Background and aims: Acute pain and itch evoke different motor behaviors: Pain induces withdrawal, and itch triggers scratching. While experimentally induced acute pain decreases corticospinal excitability, assessed by transcranial magnetic stimulation (TMS) through motor-evoked potentials (MEPs), the effects of itch on MEPs are unknown. We hypothesized that these sensory modalities differentially affect corticospinal excitability, MEPs decreasing during pain but increasing during itch. Additionally, we explored whether these sensations induced MEP changes in the contralateral hand.

Methods: 21 healthy volunteers completed a 2-session, cross-over study. In each session, TMS was applied to the left and right motor cortices, targeting the left and right first dorsal interosseous (FDI) muscles. MEPs were recorded before, 10 minutes during, immediately after, and 30 minutes after PAIN (hypertonic saline injection in the right FDI) or ITCH (histamine application on the skin above the FDI). TMS pulses were delivered every ~7 seconds, and participants rated sensations using a numeric rating scale (NRS) every ~30 seconds.

Results: NRS scores were higher for PAIN than ITCH immediately after application up to 120 seconds but higher for ITCH after 390 seconds ($p<0.05$). Compared to baseline, both sensations reduced right-hand MEPs ($p<0.05$), with no changes in left-hand MEPs. Correlations between MEP reductions in the right and left hand were found during ITCH ($p<0.001$) and PAIN ($p<0.05$).

Conclusions: Contrary to the hypothesis, acute pain and itch reduced MEPs, suggesting decreased corticospinal excitability may be independent of the modality type. The strongest association in MEP reductions between hands was during itch, suggesting a strong effect on bilateral motor cortices.

I-C.36

INVESTIGATING DIFFERENT NEURAL RESPONSES DURING EXPERIMENTAL ACUTE PAIN AND ITCH USING TRANSCRANIAL MAGNETIC STIMULATION COMBINED WITH ELECTROENCEPHALOGRAPHY

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Background and aims: Pain and itch show similar sensory manifestations, as allodynia and alloknesis, but evoke different motor responses. Pain triggers motor withdrawal, while itch induces scratching. The neural mechanisms underlying these different reactions are unknown. Here, we used transcranial magnetic stimulation combined with electroencephalography (TMS-EEG) to investigate evoked oscillatory cortical activity during experimentally-induced acute pain and itch.

Methods: Twenty healthy participants participated in a two-session, cross-over study. In each session, TMS pulses to the left motor cortex elicited 64-channel EEG responses at three times: before, during, and 30 minutes after either intramuscular PAIN induction in the right first dorsal interosseous muscle (via hypertonic saline) or ITCH induction (via histamine on the overlying skin). TMS-evoked EEG activity was analyzed in the 25-125 ms window for alpha (8-12Hz), low-beta (13-20Hz), high-beta (21-30Hz), and gamma (31-45Hz) frequency bands. The main outcomes were event-related spectral perturbation (ERSP) and inter-trial coherence (ITC) as connectivity measures, assessed in six clusters (bilateral frontal, central-parietal, parietal-occipital).

Results: Gamma ERSP in the right frontal cluster was higher during PAIN than ITCH ($p<0.05$). Compared with baseline, both PAIN and ITCH induced significant changes in the right centro-parietal cluster: reduced ERSP in low-beta, high-beta, and gamma ($p<0.05$) and decreased gamma ITC. Additionally, ITC was reduced in the left parietal-occipital cluster in the alpha and low-beta bands ($p<0.05$).

Conclusions: The findings suggest that pain and itch induce similar power- and phase-based cortical connectivity decreases in centro-parietal areas. However, pain significantly also induced changes in power in frontal cortical regions contralateral to the stimulus.

I-C.37

THE ROLE OF TESTOSTERONE FOR ENDOGENOUS PAIN MODULATION AND SENSORY PROFILES IN MEN (THE TESTOSENSE TRIAL)

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Background and aims: Pain perception and modulation are influenced by sex, with evidence suggesting a significant role for sex hormones. While female hormones have been extensively studied, research on male hormones remains limited. Testosterone is suggested to be associated with a reduced pain sensitivity in both sexes. This study explored the link between testosterone and sensory perception, and descending pain inhibition in male volunteers.

Methods: In fifty-seven males (18–60 y), sensory profiles assessed through Quantitative Sensory Testing (QST) and descending pain inhibition using the Conditioned Pain Modulation (CPM) were assessed; recruitment included males with suspected low testosterone levels in a specialized medicine center. The study included testosterone assays and questionnaires assessing depression, anxiety, pain, and pain catastrophizing. Statistical analyses included linear regression and group comparisons.

Results: The mean testosterone level was 14.21 (SD 7.24). Patients were categorized based on their testosterone levels to the low (<10 nmol/L; n=18, LT) or to the normal group (>14 nmol/L; n=27, NT). Testosterone levels showed no significant effect on QST or CPM. Group comparisons revealed a marginally lowered mechanical pain sensitivity in LT, who also exhibited higher depression and anxiety scores.

Conclusions: These findings indicate that testosterone's role in pain modulation in males may be limited and does not appear to affect sensory profiles or endogenous pain inhibition. Further research needs to explore the effect of testosterone levels for pain and hyperalgesia caused by an injury / sensitization processing. The observed psychological differences warrant further exploration but do not clarify a direct link to pain modulation.

I-C.38

INTERACTION BETWEEN THE NOCICEPTIVE AND CARDIOVASCULAR SYSTEM IN HEALTHY PARTICIPANTS

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Background and aims: The nociceptive and cardiovascular system share a bidirectional interaction, which is sometimes shown via a relationship between resting blood pressure and pain sensitivity, i.e., hypertension-associated hypoalgesia, or blood pressure reactivity and endogenous pain modulation. This study further investigated the intricate interaction between these two systems with distinct pain modulation paradigms.

Methods: Thirty healthy participants (9f/21m) underwent pain sensitivity testing via heat pain tolerance, while endogenous pain modulation was assessed using offset analgesia (OA, 47-48-47°C) and sequential conditioned pain modulation (CPM). CPM involved pressure pain thresholds (PPT) as test stimuli, and a cold pressor test as conditioning stimulus. Resting blood pressure was recorded continuously over a 5-minute baseline, and blood pressure reactivity was calculated as relative change during the cold pressor test.

Results: There was no correlation between resting systolic blood pressure (SBP, 128±16mmHg), and heat pain tolerance (47.7±1.3°C) (r=-0.14, p=0.54). OA was indicated by a -85.7±21.8% pain rating reduction (coVAS), while CPM capacity was -18.7±23.7% (PPT increase). Interestingly, the perception of cold-water pain (6.9±2.3 NRS) correlated with SBP reactivity (r=0.47, p=0.01), and greater SBP reactivity was linked to enhanced CPM capacity (r=-0.52, p<0.01), but not OA (r=-0.21, p=0.30). No significant relationship was found between CPM and OA capacities.

Conclusions: Our findings emphasize the importance of probing the nociceptive and cardiovascular system with a stressor to better capture their interaction. Whether alterations in this interaction facilitate the development of chronic pain and reveal potential targets for neuromodulatory pain treatment needs to be established in future clinical studies.

I-C.39

CHARACTERIZATION OF EXPERIMENTAL KNEE PAIN IN HEALTHY SUBJECTS

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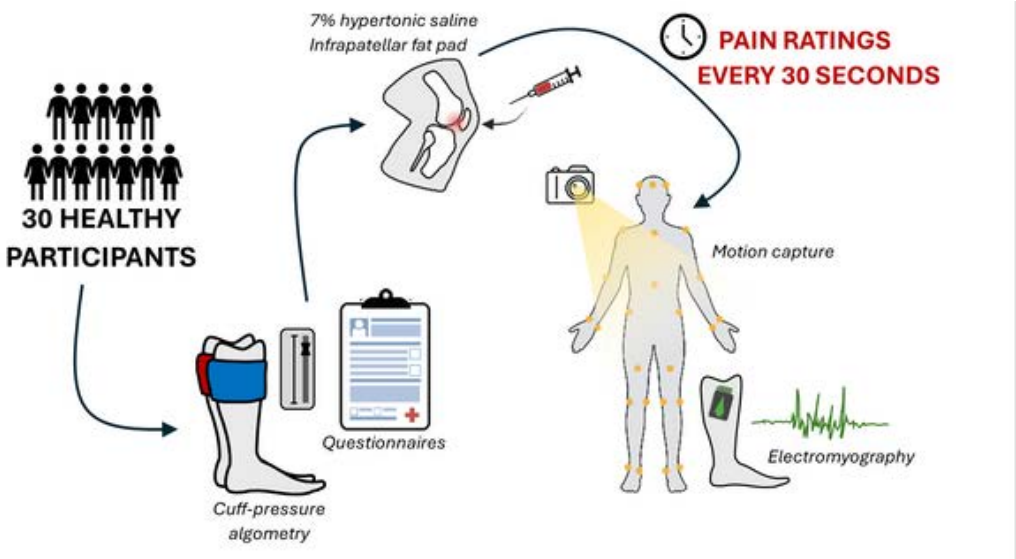
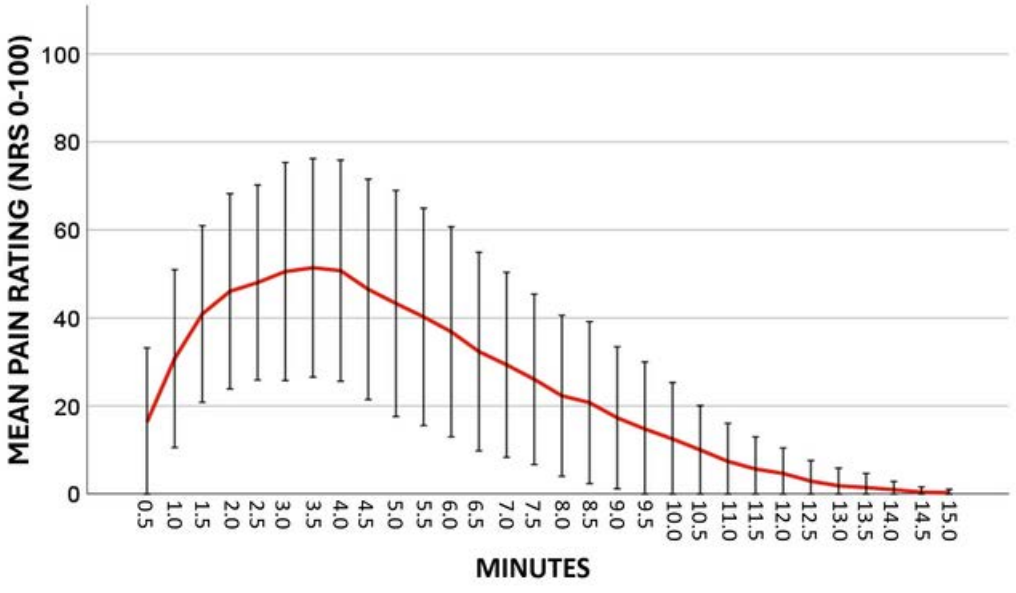
Background and aims: Knee osteoarthritis is a chronic condition hallmarked by pain, structural changes, and impacted function. Both pain and structural changes can impact function and gait patterns, but the interplay between the two is poorly understood. Experimental knee pain is utilized to investigate the interactions of gait biomechanics, psychological factors, and pain sensitivity.

Methods: This experimental study (NCT06330402) induced knee pain with hypertonic saline (7%) injections in the infrapatellar fat pad. Gait patterns were measured using motion capture and electromyography. Cuff-pressure algometry estimated pressure pain thresholds (PPT), temporal summation of pain (TSP), and conditioned pain modulation (CPM). Participants completed questionnaires about sleep quality, anxiety, depression, pain catastrophizing, and knee injury and osteoarthritis outcome scores (KOOS). Approval from the local ethical committee was granted (N-20220063).



Results: This analysis included 30 healthy participants. Participants had mean peak pain of 58.4mm (±22.6mm) and KOOS pain scores of 61.4 (±13.1). Linear regression with symptoms of anxiety and depression, pain catastrophizing, sleep quality, TSP, CPM, PPT, ground reaction forces, walking speed, and stride length as independent variables and peak pain as the dependent variable showed that symptoms of anxiety, sleep quality, TSP, and walking speed explained 47.1% ($F_{5, 22}$ = 3.9, p<0.05) of the variability in peak pain with an adjusted R^2 of 35.1% after backward selection.



Conclusions: Experimental joint pain produces knee osteoarthritis-like pain, and individual variability in knee pain can be explained by sleep quality, symptoms of anxiety, TSP, and walking speed. These factors may impact pain and functional outcomes in patients with painful knee osteoarthritis.

I-C.40

EFFECTS OF SUPPRESSED MOTOR RESPONSES ON NEURAL PAIN SIGNATURES

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Background and aims: Motor responses are integral to the protective function of acute pain. However, typical neuroimaging pain paradigms require participants to suppress natural motor responses (e.g. withdrawal), which might influence pain-related neural activity. To characterize this, we compared pain-related neural activations when motor responses to pain were either executed or suppressed.

Methods: Participants underwent fMRI scanning while receiving painful and non-painful electro-tactile stimuli on their index finger. Each trial required either withdrawing their finger upon stimulus perception or keeping it on the electrode. At trial onset, the orientation of an arrow cue indicated the specific task (movement execution vs. suppression); cue color signaled the stimulation intensity (painful vs. non-painful). Withdrawal latency and acceleration were recorded with an accelerometer. Importantly, the 100ms stimulus duration was below the minimum reaction time, ensuring identical stimulation across task conditions.

Results: We observed pain-motor-interactions in the midcingulate cortex and the cerebellum. Specifically, differential activation between painful and non-painful stimuli was greater during movement suppression than during execution. This effect was driven by higher activity for suppressed painful movement compared to suppressed non-painful movement. Moreover, withdrawal latency was shorter, and acceleration was greater for painful than non-painful stimuli.

Conclusions: Our data suggest that pain-related neural activity is influenced by the suppression of natural motor responses. As motor suppression is typically a methodological constraint rather than a variable of interest, these results should be considered when interpreting data from neuroimaging pain paradigms. Finally, the withdrawal latency and acceleration advantages for painful stimuli corroborate previous findings that acute pain can facilitate motor responses.

I-C.41

SPATIAL AND TEMPORAL SUMMATION ON HISTAMINERGIC AND NON-HISTAMINERGIC ITCH

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Background and aims: Pruriceptive itch is transmitted by two distinct pathways: histaminergic and non-histaminergic. Common activation models use histamine and cowhage, respectively. The aim of the study is to assess the spatial and temporal summation (SS and TS) of pruritic stimuli.

Methods: Measurements of SS: 3 areas were selected on the forearms of 19 healthy individuals: two areas on one arm 1 cm apart, and one area on the opposite arm. Either cowhage or histamine) were applied on one area, in two areas on the same arm (SA), and in 2 areas on different arms (DA). Itch intensity was recorded using an eVAS for 10 min. 3 days later, the same procedure was conducted using the alternate pruritogen.

Measurements of TS: 3 areas were selected on the forearms of 20 healthy subjects. Cowhage and histamine were applied one time, and re-applied after 90 and 180 seconds from the first application. Itch intensity was monitored for 15 minutes.

Results: SS: in both peak and AUC (area under the curve) itch a single application (alone) resulted lower than SA and DA applications (alone vs SA $p<0.01$, alone vs DA $p<0.001$).

TS: when the pruritogens were re-applied after 180 seconds, the AUC itch resulted higher than a single application and re-application after 90 seconds ($p<0.05$). No differences were detected across the conditions in itch peak intensity ($p=0.356$).

Conclusions: Two simultaneous applications of pruritogens in different areas (SS) increased itch intensity and duration, while two overlapped applications of pruritogens (TS) increased only itch duration compared with a single application.

I-C.42

BEHAVIOURAL CORRELATES OF SPATIOTEMPORAL THREAT PERCEPTION IN TONIC PAIN STATES

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Background and aims: Learning to avoid harm is critical for survival, with pain-related stimuli capturing attention and eliciting anticipatory and avoidance responses. Tonic pain after injuries may alter spatial perception and responses to looming threats; however, the impact of tonic pain on spatial attention is unclear. This study investigates changes in spatiotemporal predictions during tonic experimental pain.

Methods: Twenty-eight healthy participants completed a time-to-collision task in virtual reality, responding when a ball approaching towards the left or right would hypothetically collide with them. The task was performed during no pain and with tonic thermal pain on the left or right forearm. Analyses compared collision estimations across conditions (no pain vs. pain congruent vs. pain incongruent with the approach direction).

Results: While response times were significantly affected by approach speed — becoming slower and less accurate as speed increased — tonic pain (congruent or incongruent) did not modulate reaction times after multiple-comparison correction. However, individual differences influenced responses. Participants rating tonic pain as more unpleasant showed slower responses to faster-approaching objects. Similarly, higher state anxiety was associated with slower responses at faster approach speeds.

Conclusions: This study explored changes in spatial perception during tonic pain within an ecologically realistic and immersive context. Behavioural responses were primarily influenced by the speed of approaching objects, rather than tonic pain laterality. Pain unpleasantness and state anxiety affected deviations in collision estimates, suggesting altered threat sensitivity during tonic pain in a subset of participants. Findings could help elucidate mechanisms underlying the transition from post-injury to chronic pain.

I-C.43

NO GENDER DIFFERENCES IN PAIN INTENSITY, THRESHOLD, AND TOLERANCE AMONG RECREATIONAL ENDURANCE ATHLETES

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Background and aims: Gender differences in pain perception have been widely studied, but findings remain inconsistent, especially among athletes. This study aimed to determine whether gender influences pain intensity during physical activity, pain threshold, and pain tolerance in recreational endurance athletes.

Methods: In this cross-sectional study, 130 recreational endurance athletes (hikers and trail runners) participated. Pain intensity during activity was quantified using the Pain Composite Score (PCS), calculated as the mean of maximum and average pain reported during the activity. Pain threshold and tolerance were assessed using the Cold Pressor Test (CPT). Mann-Whitney U tests were conducted to compare pain measures between male and female athletes. Generalized linear models (GLMs) were employed to predict pain intensity, threshold, and tolerance, incorporating gender, age, activity intensity (measured as km-effort/hours), activity duration, and years of training as predictors.

Results: Mann-Whitney U tests revealed no significant differences between male and female athletes in pain intensity during physical activity, pain threshold, or pain tolerance. GLMs demonstrated limited explanatory power, with gender not emerging as a significant predictor of PCS, pain threshold and tolerance when accounting for age, activity intensity, duration, and years of training.

Conclusions: These findings suggest that gender does not influence pain intensity during activity, pain threshold, or pain tolerance in recreational endurance athletes. Male and female athletes may experience and process pain similarly in this context.

I-C.44

LONGITUDINAL EEG MARKERS OF THE INTENSITY OF NEUROPATHIC PAIN: A HOME-BASED PILOT STUDY

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Background and aims: Reporting pain intensity using a visual numerical scale (VNS) is highly subjective. In this study, we explore whether EEG could be used to provide quantitative measures of pain intensity.

Methods: Ten people with spinal cord injury-related Neuropathic Pain (NP) recorded EEG activity at home. EEG was recorded in the resting state with eyes opened (EO) and eyes closed (EC) on ten separate days before and after taking medications (Table 1).

ID	Age bin	ASIA/level	Aver Pain (VNS)	Descriptor	Medications
P1	45-59	B/C6	7	burning, shooting, tingling	Amitriptyline, Paracetamol
P2	60-74	B/T6	6	pulsing, sharp, gnawing, burning, stinging, freezing	Pregabalin, Gabapentin
P3	45-59	B/C5	5	burning, freezing, tingling	Pregabalin, Amitriptyline, Paracetamol
P4	45-59	D/C3	5	burning, pressing, stabbing, flashing	Pregabalin, Gabapentin
P5	45-59	A/C4	7	shooting, throbbing, hot, stabbing, tingling, pressing	Amitriptyline, Codeine
P6	60-74	C/C5	6	burning, pressing, stabbing	Amitriptyline, Pregabalin, Paracetamol
P7	60-74	A/T8	8	pulsing, throbbing, stabbing, cramping, tingling	Pregabalin, Baclofen, Paracetamol
P8	60-74	A/L1,2	7	shooting, throbbing, stabbing, sharp, hot, pulling, stinging, cramping	Amitriptyline, Pregabalin, Baclofen
P9	60-74	C/C4	6	Pulsing, stabbing, mulling, burning, tingling, pulling	Pregabalin, Baclofen, Paracetamol
P10	45-59	B/C3	5	Burning, pressure, shooting, stabbing	Gabapentin, Paracetamol, Baclofen

Table 1. Participants' demographic information. ASIA - American Spinal Injury Association Impairment Scale . Information about average pain recall, pain descriptors and medications taken during the initial assessment.

Pain intensity was assessed in each of the 200 sessions. Chi-square statistic ($p<0.05$) was used to determine changes in EEG power pre/post medications across different participants and electrode locations and the Pearson correlation coefficient ($p<0.05$) with correction for multiple comparisons, was calculated between EEG power and pain intensity.

Results: Post medications, EO theta band (4-8 Hz) power decreased in the frontal cortex and EC theta increased at the parietal and the occipital cortices. Parietal EO and central EC alpha also decreased and occipital EO beta (12-30 Hz) increased (Table 2). There was a significant positive correlation between the frontal theta band and the

intensity of pain pre-medications and theta, alpha and lower beta (6-15 Hz) band power over the frontal, central and parietal cortices and the intensity of pain post medications (Figure 1).

			Frontal	Central	Parietal	Occipital
Theta (4-8 Hz)	EO	p	**0.047**	0.288	0.146	0.141
		χ^2	**29.086**	20.829	24.297	24.439
	EC	p	0.099	0.581	**0.036**	**0.031**
		χ^2	26.026	16.163	**30.179**	**30.744**
Alpha (8-12 Hz)	EO	p	0.145	0.446	**0.047**	0.209
		χ^2	24.301	18.140	**29.108**	22.531
	EC	p	0.397	**0.046**	0.513	0.516
		χ^2	18.921	**29.182**	17.144	17.098
Beta (12-30 Hz)	EO	p	0.510	0.790	0.075	**0.043**
		χ^2	17.197	13.027	27.200	**29.477**
	EC	p	0.675	0.861	0.091	0.166
		χ^2	14.811	11.727	26.386	23.685

Table 2. Statistical significance of difference between EO before and after medication and EC before and after medications over different areas of the cortex. χ^2: Chi square statistics, and related p-value. (Significance level p<0.05).

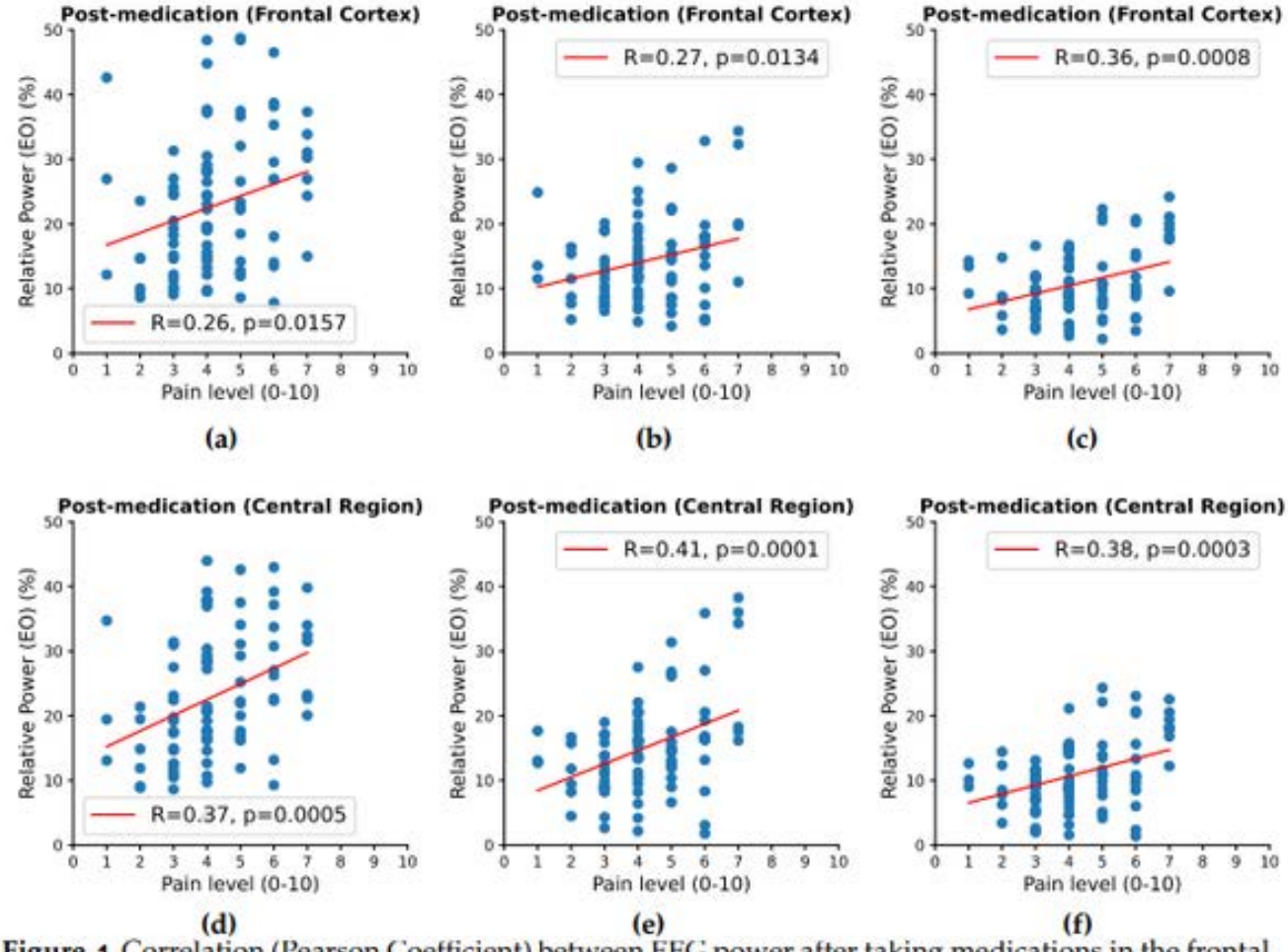

Figure 1 Correlation (Pearson Coefficient) between EEG power after taking medications in the frontal cortex for the theta/alpha (6-10 Hz), alpha (8-12 Hz) and alpha/beta (10-15 Hz) (a-c) respectively, and in the central region for the theta/alpha (6-10 Hz), alpha (8-12 Hz) and alpha/beta (10-15 Hz) (d-f) respectively. R and p values are shown in figures.

Conclusions: EEG could be used to quantify the intensity of NP to serve as a surrogate or pharmacodynamic marker. Studies with a larger number of participants and selected drugs could be used to create surrogate markers to complement pain ratings or to test the early effectiveness of new drugs.

I-C.45

BRIDGING THE GAP: A SYSTEMATIC REVIEW OF STATISTICAL METHODS IN GENDER-BASED NOCIPLASTIC PAIN RESEARCH

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Background and aims: Nociplastic pain, characterized by altered pain processing mechanisms, presents notable gender-related differences in prevalence and clinical manifestations. However, variability in the statistical methods employed across studies limits comparability and robust conclusions. This review aims to evaluate the statistical techniques used in gender-focused nociplastic pain research, identify methodological gaps, and propose recommendations for improvement.

Methods: A systematic review of PubMed, Scopus, and Web of Science databases up to October 2024 identified studies analyzing gender differences in nociplastic pain using descriptive or inferential statistical techniques. Two independent reviewers assessed methodological quality using the Joanna Briggs Institute Checklist. Statistical methods were categorized by complexity into descriptive, bivariate, and multivariate approaches, and their adequacy was evaluated.

Results: From 354 screened articles, 42 met the inclusion criteria. Descriptive statistics were the most common, appearing in 90% of studies to summarize gender differences in pain intensity and quality of life. Bivariate tests, such as t-tests and chi-square, were used in 65%, while multivariate models adjusting for confounders like age and comorbidities were employed in only 25%. Advanced techniques, including principal component analysis (PCA) and structural equation modeling (SEM), were rarely utilized (<10%). A significant limitation was the insufficient adjustment for confounders, reducing the reliability of findings.

Conclusions: This review highlights the underutilization of advanced statistical methods in gender-focused nociplastic pain research. Future studies should prioritize robust methodologies and adopt advanced tools, such as machine learning and SEM, to uncover complex gender-specific mechanisms, refine diagnostic approaches, and guide personalized treatments, ultimately improving patient outcomes.

I-C.46

COMPREHENSIVENESS AND VALIDITY OF A MULTIDIMENSIONAL ASSESSMENT OF PATIENTS WITH FIBROMYALGIA: A PROSPECTIVE COHORT STUDY

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Background and aims: The aims of this study were to investigate the multidimensionality and characteristic traits of fibromyalgia and to examine the validity of single measurement scales used in a comprehensive, multidimensional assessment conducted before and after pain rehabilitation.

Methods: Prospective cohort study using the Short Form 36 (SF-36), the Multidimensional Pain Inventory (MPI), the Symptom Checklist-90-Revised (SCL-90-R), the Fibromyalgia Health Assessment Questionnaire (FHAQ), the Fibromyalgia Impact Questionnaire (FIQ), and the 6-Minute-Walking-Distance (6MWD) and others. Comprehensiveness and overlap of the constructs were quantified by bivariate correlations, explorative factor analysis, and effect sizes.

Results: Patients (n=123) were of 48.6 years and 86.2% female. Factor analysis revealed 2 factors with explained variances of 44.5%-64.5%. Cross-sectionally, mental health and psychosocial factors loaded more strongly on the first, mental health factor, especially the 4 SCL-90-R scales (loads 0.75-0.90) than on the second, predominantly physical function factor. Longitudinally, the physical function factor was dominant, with loads of 0.61 (FHAQ), 0.66 (6MWD), and SF-36 and MPI pain (0.68 each). Cross-sectional correlations were up to 0.89 between depression and anxiety, up to 0.87 between pain and interference on the MPI, and up to 0.83 between depression and catastrophizing. Longitudinally, all scales showed improvements.

Conclusions: All 23 health parameters examined had moderate to high factor loads on at least one factor, evidence of the multidimensionality of fibromyalgia. Mental health and function were the 2 traits explaining the substantial, partially comparable variances of the clinical characteristics. A broad spectrum of constructs, including fatigue, somatization, and coping is needed to describe the fibromyalgia syndrome accurately.

I-C.47

PAIN ASSESSMENT IN IMPAIRED COGNITION 15 (PAIC15) OBSERVATION SCALE IN PERSONS WITH APHASIA: VALIDITY AND RELIABILITY

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Background and aims: The use of self-report pain scales in persons with aphasia can be challenging due to communication and cognitive problems. An observational scale may be used as an alternative. The aim of this study is to examine the validity and reliability of the observational Pain Assessment in Impaired Cognition (PAIC15) scale that was developed for people with dementia, in persons with aphasia.

Methods: In 14 Dutch nursing homes, persons with aphasia were observed during rest and transfer by two observers using the PAIC15. The PAIC15 comprises 15 items covering the three domains of facial expressions, body movements, and vocalizations. When able, the person completed four self-report pain scales after each observation. The observations were repeated within one week. For criterion validity, correlations between the PAIC15 and self-report pain scales were calculated and for construct validity, three hypotheses were tested. Reliability was determined by assessing internal consistency, and intra- and interobserver agreement.

Results: PAIC15 observations were obtained for 71 persons (mean age 75.5 years) with aphasia. Fair positive correlations (rest: 0.35-0.50; transfer: 0.38-0.43) were reported between PAIC15 and almost all self-report pain scales and, one of the three construct validity hypotheses was confirmed. Results showed acceptable internal consistency. Intra- and interobserver agreement was high for most PAIC15 items, particularly for domains body movements and vocalizations during rest and transfer.

Conclusions: Recognition of pain in persons aphasia using the PAIC15 observational scale showed mixed yet promising results in this clinical study.

II-C.01

VALIDITY AND RELIABILITY OF A LASER POINTER DEVICE FOR ASSESSING KNEE PROPRIOCEPTION IN HEALTHY ACTIVE INDIVIDUALS

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Background and aims: Knee proprioception offers valuable information about the patient's knee condition and pain, yet the validated instruments for the determination of this key feature are expensive and complex. Therefore, it would be interesting to validate faster, more affordable and easier instruments to evaluate proprioception. The general objective of this study was to estimate the validity and reliability of a laser pointer device to assess knee proprioception in healthy active subjects.

Methods: A descriptive cross-sectional study was designed. 25 healthy active individuals were evaluated by performing proprioception measurements with 15º, 30º and 50º knee flexion in closed kinetic chain (CKC) and in open kinetic chain (OKC) with a laser device and also with a digital inclinometer, by two different evaluators and in two different days.

Results: The laser pointer device shows a moderate or strong correlation with the digital inclinometer in all positions studied. It shows good inter-rater reliability (ICC=0.61) and intra-rater reliability (ICC=0.68) in the 50º knee flexion position in OKC, while it presents good inter-rater reliability (ICC=0.68) and sufficient intra-rater reliability (ICC=0.58) in the 15º knee flexion position in CKC.

Table 1. Laser pointer device correlation with the digital inclinometer

Position	Pearson correlation	Significance
CKC - 15º	0.546	0.005
CKC - 30º	0.513	0.009
CKC - 50º	0.619	0.001
OKC - 15º	0.524	0.007
OKC - 30º	0.775	<0.001
OKC - 50º	0.803	<0.001

Table 2. Inter-rater reliability of the laser pointer device

Position	Evaluator 1 Mean (SD)	Evaluator 2 Mean (SD)	ICC	Significance
CKC - 15º	1.50 (0.92)	1.53 (1.04)	0.68	<0.001
CKC - 30º	1.40 (0.85)	1.42 (1.02)	0.01	0.477
CKC - 50º	1.63 (0.91)	1.52 (0.79)	0.05	0.417
OKC - 15º	1.10 (0.92)	1.23 (0.85)	0.10	0.324
OKC - 30º	1.96 (1.41)	1.42 (1.23)	0.19	0.165
OKC - 50º	2.93 (2.33)	2.39 (1.35)	0.61	<0.001

Table 3. Intra-rater reliability of the laser pointer device

Position	Evaluator 1 Measure 1 Mean (SD)	Evaluator 1 Measure 2 Mean (SD)	ICC	Significance
CKC - 15º	1.50 (0.92)	1.56 (1.11)	0.58	0.001
CKC - 30º	1.40 (0.85)	1.20 (0.87)	0.08	0.352
CKC - 50º	1.63 (0.91)	1.42 (0.71)	0.15	0.227
OKC - 15º	1.10 (0.92)	0.80 (0.62)	0.24	0.106
OKC - 30º	1.96 (1.41)	1.48 (1.15)	0.36	0.030
OKC - 50º	2.93 (2.33)	2.86 (1.97)	0.68	CKC - 15º

Conclusions: The laser device can be considered as a valid and reliable instrument for measuring knee proprioception in healthy active subjects (knee flexion of 15º in CKC and 50º in OKC).

II-C.02

HEART RATE VARIABILITY IS NOT SUITABLE AS A SURROGATE MARKER FOR PAIN INTENSITY IN PATIENTS WITH CHRONIC PAIN

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Background and aims: The search towards more objective outcome measurements and consequently surrogate markers for pain started decades ago; however, no generally accepted biomarker for pain has qualified yet. The goal is to explore the value of heart rate variability (HRV) as surrogate marker for pain intensity chronic pain setting.

Methods: Pain intensity scores and HRV were collected in 366 patients with chronic pain, through a cross-sectional multicenter study. Pain intensity was measured with both the visual analogue scale and numeric rating scale, whereas 16 statistical HRV parameters were derived. Canonical correlation analysis was performed to evaluate the correlation between the dependent pain variables and the HRV parameters. Surrogacy was determined for each HRV parameter with point estimates between 0 and 1 whereby values close to 1 indicate a strong association between the surrogate and the true endpoint at the patient level.

Results: Weak correlations were revealed between HRV parameters and pain intensity scores. The highest surrogacy point estimate was found for mean heart rate as marker for average pain intensity on the numeric rating scale with point estimates of 0.0961 (95% confidence interval [CI] 0.0384-0.1537) and 0.0209 (95% CI 0-0.05) for patients without medication use and with medication, respectively.

Conclusions: This study indicated that HRV parameters as separate entities are no suitable surrogacy candidates for pain intensity, in a population of chronic pain patients. Further potential surrogate candidates and clinical robust true endpoints should be explored, to find a surrogate measure for the highly individual pain experience.

II-C.03

CULTURAL ADAPTATION AND TURKISH VERSION OF THE WORRY ABOUT PAIN QUESTIONNAIRE IN MUSCULOSKELETAL PAIN PATIENTS: RELIABILITY AND VALIDITY STUDY

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Background and aims: The Worry About Pain Questionnaire(WAPQ), developed by Lefebvre in 2017, is a personalized reporting scale consisting of 15 items specifically designed to assess pain-related concerns. The aim of this study is to develop the Turkish version of WAPQ and investigate its validity and reliability.

Methods: WAPQ was translated into Turkish according to the guideline created by Beaton. To determine the reliability and internal consistency, the Cronbach alpha coefficient was calculated. Test-retest reliability was determined by using intraclass correlation coefficient(ICC). In the validity step, factor structure and construct validity, content validity, and convergent validity were utilized. Content validity was calculated using the content validity index(CVI) and Kendall Coefficient. The convergent validity was tested using the Fear of Pain Questionnaire-III, Short Form McGill Pain Questionnaire, Beck Depression Inventory(BDI), Beck Anxiety Inventory(BAI), Tampa Scale of Kinesiophobia(TSK), Pressure Pain Threshold(PPT), Nottingham Health Profile(NHP).

Results: The Cronbach alpha coefficient was found 0.961. The ICC was 0.961. WAPQ was explained by 2 factors. The two factors determined in the scale explained 72.75% of the total variance. CVI was found to be 89.93%. Kendall Coefficient of Coherence, the scores given by 15 evaluators for the clarity and suitability in terms of content and language were determined. It was seen that the evaluators agreed that the items were understandable($p<0.05$). A moderate positive correlation was found between WAPQ and NHP, BDI, BAI, TSK, PPT ($r=0.219$, 0.472 and $P<0.05$).

Conclusions: Turkish version of WAPQ is valid and reliable assessment tool that can be easily used by researchers and physicians for patients experiencing pain.

II-C.04

THE RELIABILITY AND VALIDATION OF THE TURKISH VERSION OF THE KEELE START MSK TOOL FOR INDIVIDUALS WITH MUSCULOSKELETAL PAIN

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Background and aims: Musculoskeletal (MSK) pain and pain-related disability are worldwide health problems at the present time. More than 150 different diagnoses can be named under MSK diseases/conditions. The Keele STarT MSK Tool divides musculoskeletal patients into three prognostic groups for risk-stratified care. It has shown good predictive and discriminative ability in the development and validation of samples. The aim of this study is to make the cultural adaptation to improve the Turkish version of the Keele STarT MSK Tool and to investigate its validity and reliability in individuals with musculoskeletal pain.

Methods: During the translation period cross-cultural adaptation design proposed by guideline was used. 120 patients completed the Turkish version of the MSK tool and it was applied again a week later. Clinical measures included for validity testing included the 12-Item Short-Form Health Survey, the Fear-Avoidance Beliefs Questionnaire and a numerical pain rating scale, Start Back Screening Tool, Roland–Morris Disability Questionnaire, Tampa Kinesiophobia Scale, Knee Injury and Osteoarthritis Outcome Score, McGill Pain Questionnaire and The Neck Disability Index.

Results: The STarT MSK was forward and backward translated, with minor changes to ensure cultural adaptation. The test-retest reliability of the STarT MSK total score was excellent (intraclass correlation coefficient(ICC)=0.93). Internal consistency for the MSK scale was ($\alpha=0.712$). The Spearman's correlation coefficients between STarT MSK total score and the validation measures confirmed the hypotheses and were significant.

Conclusions: The Turkish translation and validation of the Keele STarT MSK suggest that it is a valid and reliable instrument. The STarT MSK discriminated low-, medium- and high-risk groups.

II-C.05

PAIN MONITORING WITH ENTROPY MODULE DURIND UROLOGICAL SURGERY

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Background and aims: The problem with antinociception during general anesthesia is complicated considering the great interindividual differences in opioid consumption. Standard signs for adequate intraoperative analgesia could not be reliable due to type of surgery, condition of the patient etc.. Potential objective information may be taken from EMG activity of facial muscles during surgical stimulation. Such an index is entropy, calculated from mathematical analysis of EEG and the difference RE (response entropy 0-47Hz) – SE (state entropy 0-32Hz).

The aim of the study is to explore the role of entropy monitoring for opioid consumption and recovery from anesthesia.

Methods: The study was held in 43 patients who underwent urological surgery. Patients were ASA III, Lee score ≥ 3.

General anesthesia was maintained with Sevoflurane and Sufentanil.

In Group A (n=22) - RE-SE entropy was monitored, in group B (n=23) – only standart signs for analgesia.

The total dose of Sufentanil, time for spontaneous breathing recovery (SBR), obeying to verbal command (OBC), VAS after extubation, frequency of adverse effects.were recorded.

Results: The total dose of Sufentanil was lower in group A (20 ±6 mcg), compared to group B (30 ±3mcg), SVR was 7 ± 4 min in group A and 12 ± 6 min in group B, OVC was 12 ± 3 min in group A and 16 ± 2 min in group B. VAS and adverse events were comparable into two groups.

Conclusions: Entropy monitoring during anesthesia leads to less opioid consumption and faster recovery after anesthesia. Entropy RE-SE difference could be used for intraoperative analgesia monitoring.

II-C.06

TEST-RETEST RELIABILITY OF VON FREY FILAMENT'S INDUCED TEMPORAL SUMMATION IN A HEALTHY POPULATION

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Background and aims: Data from the literature concerning the test-retest reliability of the temporal summation (TS) are still inconclusive. The aim of this study was to evaluate test-retest reliability of TS in healthy subjects and to determine whether there are differences between the sexes.

Methods: The phenomenon of temporal summation was examined with the help of Von Frey filaments (300g). Pain intensity (from 0-100) was recorded after the first and 10th prick. The difference in pain intensity after the 10th and after the 1st prick was considered a temporal summation (TS). Trials were performed on the dorsum of the hand, the ipsilateral pectoral area and the contralateral dorsum of the foot. A week later, a retest was conducted to assess the reliability of the previously mentioned testing protocol.

Results: Our study included 115 subjects (average age 27,6±6,13 years, 61 women and 54 men). Men were significantly older (30,5±5,8 vs 25±5,2;t=5,4,p=0,000). Retest evaluation of TS showed excellent reliability: the best was obtained for pectoral region (ICC=0,866,95%CI 0,807-0,908), then for the hand dorsum (ICC=0,828,95%CI 0,751-0,881) and dorsum of the foot (ICC=0,811,95%CI 0,726-0,869). Better reliability was observed in men for the foot (ICC=0,849, 95%CI 0,739-0,912 vs ICC=0,786, 95%CI 0,645-0,871) and hand dorsum (ICC=0,841,95%CI 0,725-0,908 vs ICC=0,814,95%CI 0,691-0,889), while for pectoral region it was better in women (ICC=0,885,95%CI 0,808-0,931 vs ICC=0,836,95%CI 0,719-0,905).

Conclusions: In a healthy population, TS can be reliably induced utilizing the Von Frey filament (300g). Even though men were significantly older, they showed better test-retest reliability of TS for extremities.

II-C.07

CROSS-CULTURAL ADAPTATION AND PSYCHOMETRIC PROPERTIES OF THE SPANISH VERSION OF THE PREVENT FOR WORK QUESTIONNAIRE

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Background and aims: Musculoskeletal pain leads to increased medical expenses, disability, and a reduced quality of life among workers. Using the Prevent for Work questionnaire (P4Wq), biopsychosocial factors which contribute to the development of persistent and disabling pain, can be assessed. This study aimed to translate and culturally adapt the original Italian P4Wq into European Spanish and evaluate its psychometric properties among Spanish workers.

Methods: The translation and cultural adaptation process utilized a forward – and back – translation methodology involving thirty workers. A total of one hundred and fifty-three volunteer and active workers completed the P4Wq, the Oswestry Disability Index (ODI), and EQ-5D-5L questionnaires. Additionally, fifty workers completed the P4Wq again after two weeks to assess test-retest reliability.

Results: After the forward and backward translation process, minor adjustments were made to ensure the Spanish version was face-valid. The final Spanish version of the P4Wq demonstrated satisfactory internal consistency according to COSMIN criteria, with Cronbach's alpha values between 0.8 and 0.9. Test-retest reliability after two weeks indicated good item response stability for all items, with weighted Kappa coefficients ranging from 0.75 to 0.96 and an excellent intraclass correlation coefficient (ICC > 0.91). The P4Wq total score showed a significant positive correlation with the ODI (r=0.4), and a negative correlation with the EQ-5D-5L (r=-0.5).

Conclusions: The Spanish version of the P4Wq is linguistically accurate and appropriate for use among workers, regardless of whether they have a history of disabling musculoskeletal pain.

II-C.08

DISABILITY PROFILE ACCORDING TO ADAPTED BRIEF ICF (INTERNATIONAL CLASSIFICATION OF FUNCTIONING, DISABILITY AND HEALTH) CORE SET IN PATIENTS VISITING MULTIDISCIPLINARY PAIN CLINIC

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Background and aims: Chronic pain affects many functions and activities/participation and is influenced by environmental factors. Altogether could be evaluated by using WHO ICF classification system. This study aims to evaluate an adapted brief ICF core set for generalized pain at multidisciplinary pain clinic by using team-based approach.

Methods: One hundred consecutive patients were evaluated by a multidisciplinary team (at least physician and psychologist/physiotherapist) according to adapted brief ICF core set for generalised pain. Creation of the adapted core set was preceded by team discussions and meetings in order to identify most relevant ICF categories. In total, 55 b-, d-, s- and e-categories were included, using the brief ICF core set for generalized pain as a main protocol. Patients were evaluated during their first visits following 1.5 year period (from autumn 2022 until spring 2024).

Results: Among 100 consecutive participants, 72% were women and the mean age of the group was 49 years (95% CI 46-52). The most impaired b-functions were energy and drive, pain (particularly in the low back), sleep (in particular, insomnia and awakenings) and sensibility. Among d-categories, the most impaired activities/participation were recreation and leisure and handling stressful situations. Almost half of the participants did not have any benefit of pharmacological treatments and a majority got a support from their family, friends and social services.

Conclusions: This is a first study using an adapted ICF core set for chronic pain, developed and managed by a team, showing that evaluation of the functions, activities and environmental factors should be used for tailored pain management.

II-C.10

ASSESSMENT OF CENTRAL SENSITIZATION IN HEAD AND NECK CANCER PATIENTS - PRELIMINARY RESULTS

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Background and aims: Head and neck cancer (HNC) is the seventh most common cancer worldwide. The prevalence of pain among HNC patients has been estimated at approximately 70%, which is significantly higher than what has been reported in other cancer patients. The aim of the study is to investigate the association between central sensitization and chronic HNC pain.

Methods: 15 patients with HNC pain admitted to the Pain Management and Palliative Centre (03.2023-10.2024) were assessed during their first visit with the use of Central Sensitization Inventory Scale.

The CSI is a two-part questionnaire, of which part A measures a full array of 25 somatic and emotional symptoms associated with CS, scored with a 5-point Likert scale from 0 to 4, resulting in a total score of 100. Scores higher than 40 indicate a higher degree of self-reported CS-related symptomatology. Part B was not included in our study.

Results: A group of 15 patients diagnosed with HNC stage III to IVC - 4 women aged 53-69 and 11 men aged 42-83 - were assessed with CSI Scale. 1 woman and 6 men, total 7 patients (46,7%) scored more than 40 points, indicating the presence of central sensitisation. 4 were diagnosed with stage IVA and 3 with stage IVB.

Conclusions: The use of CSI could be a useful self-reported instrument for HNC patients, providing better comprehension of underlying components of the pain and resulting in improved, personalized pain management. However, the number of patients included in the study was small and the topic requires further investigation.

II-C.11

PROGRESSIVE GENETICALLY CONTROLLED DOPAMINERGIC NEURONS APOPTOSIS IN SUBSTANTIA NIGRA RELATED TO SENSORY DEFICITS: RELEVANCE FOR PARKINSON DISEASE?

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Background and aims: Parkinson's disease (PD) is a neurological disorder caused by progressive degeneration of the dopaminergic neurons of the substantia nigra *pars compacta* (SNc) present chronic pain that precede the onset of locomotor deficits. The early appearance of sensory deficits questions about the link between pain symptoms and SNc degeneration. Unfortunately, early PD symptoms are difficult to study in humans asymptomatic for motor deficits. Therefore, there is a need to develop a pre-clinical model adapted to the study of PD-related pain symptoms at the onset of dopaminergic neuron degeneration.

Methods: In PD, SNc dopaminergic neurons degenerate by an increase in Caspase-3 activity. Therefore, temporally manipulating Caspase-3 activity in SNc neurons would offer an avenue to study the progressive consequences of dopaminergic neuron apoptosis. To do so, we used local adeno-associated-virus (AAV) viral approach to express a Cre-inducible autocatalytic caspase-3 enzyme (taCasp3) in the SNc of Tyrosine hydroxylase (TH)-CreERt2 genetically modified mice. By gradually inducing the expression of taCasp3 expression with increasing tamoxifen doses, we aim to demonstrate the sequential effects of dopaminergic neuron ablation on the sensory and motor symptoms.

Results: The effects of a progressive targeted dopaminergic neuron ablation with increasing tamoxifen dosage lead to a sequential appearance of somatosensory deficits, including tactile allodynia, largely before the onset of motor symptoms.

Conclusions: Potentially, this preclinical approach may offer a better way to recapitulate the course of clinical sensory and motor signs of PD and notably better asses the underlying pain pathophysiological mechanisms and potential new pharmacological treatments efficient for the distinct symptoms of PD.

II-C.12

EMBODIED INTEROCEPTION QUESTIONNAIRE (INTERO-10) IN PATIENTS WITH CHRONIC NEUROPATHIC PAIN: DIVERGENT AND DISCRIMINANT VALIDITIES

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Background and aims: The aim of this investigation is to validate the embodied interoception questionnaire (Intero-10) in chronic neuropathic pain (cNeP) patients.

Methods: cNeP patients filled the Intero-10 and established chronic pain (CP) assessment tools: visual analogue scale (VAS), brief pain inventory (BPI), neuropathic pain symptom inventory (NPSI), mood (HADS), sleep (MOS), and quality of life (SF-6D). Spearman's rho was used to divergent validity and the discriminant validity was evaluated using the Heterotrait–Monotrait Ratio (HTMT) method. Additionally, mediation analyses were performed to assess whether the association between pain interference and quality of life(QoL) might be mediated by higher interoception scores.

Results: 86 patients with cNeP were enrolled. Intero-10 total score in was 4.31±2.31 (0.50-9.60). SF-6D was 0.50±0.21 (0-0.97), BPI severity and interference scores were 7.08±1.32 (3.50-10.00) and 6.49±2.12 (0.57-10.00), respectively. HADS anxiety, depression, and total score were 6.87± 4.70 (0-21), 6.09±5.33 (0-19), and 12.96±9.17 (0-40), respectively. MOS was 43.13±16.34 (16.11-80). Intero-10 showed a negative correlation with QoL (-0.46;*P*<0.001), a positive correlation with negative mood (0.40;*P*<0.001), and a positive correlation with pain interference (0.27;*P*=0.005). Embodied interoception scores partially mediated the correlation between pain interference and QoL (β=-0.0093), in a significant indirect effect. HTMT was 0.74.

Conclusions: High embodied interoception scores correlated with lower QoL, increased pain interference, and negative mood. We found that embodied interoception partially mediated the correlation between pain interference and QoL. These findings underscored the clinical relevance of the Intero-10 and supported the idea that interoceptive dysfunction might be related to chronic pain experiences.

II-C.13

THE ASSOCIATION BETWEEN PAIN THRESHOLD AND FRACTURE RISK IN POSTMENOPAUSAL WOMEN WITH REDUCED BONE MINERAL DENSITY

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Background and aims: Bone pain is common in metabolic bone diseases. Mechanisms of pain in osteoporosis are complex. The aim of this study was to determine the difference in pain threshold and fracture risk in postmenopausal women with osteoporosis compared to healthy subjects and patients with osteopenia.

Methods: The study was conducted as a cross-sectional study, including 130 patients (average age: 63.86), 32 of whom were healthy postmenopausal women, 50 subjects with decreased BMD at the level of osteopenia, and 48 patients with diagnosed osteoporosis. Medical records, DXA diagnostics (Lunar), FRAX score, Test protocol and algometer Baseline Dolorimeter were used as test instruments.

Results: Pain threshold values measured by algometry showed significant differences between these groups, with subjects with osteoporosis and osteopenia having lower pain thresholds compared to healthy subjects. Correlation analysis indicated a relationship between the duration of menopause and the pain threshold, as well as between the duration of the disease and algometry value, with longer durations of the disease and menopause being associated with a lower pain threshold. There was no statistically significant correlation found between the 10 year risk of fractures and the pain threshold in postmenopausal women with reduced BMD.

Conclusions: The results of this study indicate that the reduction of BMD in postmenopausal women influences the decrease of the pain threshold, which can be measured by the algometry method. These findings highlight the importance of algometry in the clinical evaluation of postmenopausal women with low BMD, which may contribute to a better assessment and treatment of pain in this population.

II-C.14

ENHANCING POSTOPERATIVE RECOVERY: PATIENT EXPERIENCES WITH A DIGITAL TOOL FOR PAIN MONITORING AND REHABILITATION FOLLOWING KNEE REPLACEMENT SURGERY

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Background and aims: Patients undergoing knee replacement surgery often face severe postoperative pain and early discharge. Digital tools that enable remote monitoring of self-reported pain and the overall recovery process have the potential to improve rehabilitation outcomes and patient satisfaction. This study aimed to explore patients' experiences using Grasp, a handheld device, and a mobile application developed to monitor the recovery period following knee replacement surgery.

Methods: This was a qualitative study as part of a larger quantitative study. Over six weeks, patients utilized Grasp to register their pain by squeezing the device. They also tracked exercise duration, and completed patient-reported outcome measures (PROMs) in the app. These PROMs included ratings (0 to 100) regarding sleep quality, appetite, physical activity level, use of pain medication, and overall well-being. Collected data were visualized in the app, enabling patients to actively monitor their recovery process. To explore user experiences, semi-structured interviews were conducted, and the data were analyzed using thematic analysis.

Results: Ten participants were interviewed in the study. Three main themes emerged from the thematic analysis. 1) Grasp as a tool for understanding and managing pain, 2) Grasp as a contributor to motivation and engagement in the recovery process, and 3) Barriers to consistent use of Grasp.

Conclusions: Patients found Grasp to be a valuable tool for monitoring and managing and pain, enhancing their awareness, reflection, engagement, and motivation throughout the recovery process. However, challenges related to consistent use, particularly during knee-specific exercise, suggest a need for further refinement to better support individual rehabilitation needs.

II-C.15

NEUROPHYSIOLOGICAL ASSESSMENT OF CONDITIONED PAIN MODULATION USING THE NOCICEPTIVE BLINK REFLEX

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Background and aims: Conditioned pain modulation (CPM) is the human equivalent of diffuse noxious inhibitory control (DNIC) which is typically measured using psychophysical approaches (Kennedy et al., 2016). However, these

measures currently lack standardisation and fail to provide insight into the mechanisms of CPM. The development of new objective neurophysiological paradigms has the potential to shed light on the top-down mechanisms of CPM in humans. In this study, we aim to understand how a heterotopic tonic cuff pressure conditioning stimulus can reliably modulate the nociceptive blink reflex (BR) as a brainstem readout of CPM.

Methods: 21 healthy participants will be recruited. BRs are elicited using stimulating electrodes placed over the right supraorbital foramen and electromyography (EMG) responses are recorded from the orbicularis oculi muscle. Stimuli were delivered between 0.8 – 1.9x BR threshold at baseline which was repeated twice to establish a stable pre-CPM response. This was then repeated alongside a lower limb tonic cuff pressure stimulus delivered at 70% pressure pain tolerance to assess CPM influences over the BR stimulus response. Pain perception at 0.8x, 1.3x and 1.9x BR threshold was also recorded using a 0 – 100 numerical rating scale (NRS).

Results: Preliminary analysis of the two baseline stimulus response measures (i.e. pre-CPM) has shown there is a main effect of intensity ($F(2.7,16.7)=3.73$; $P = 0.03$, $n = 7$), but no overall main effect of condition (i.e. no difference between baseline 1 or 2; $F(1,6)=0.46$; $p = 0.52$; $n = 7$) across the two sessions. The reliability between these sessions was moderate. After splitting the stimulation intensity ranges into low (0.8-1.3x threshold) and high (1.4-1.9x threshold), the low intensity at baseline showed a reliability of 0.67 and high showed a reliability of 0.68 when using ICC(3,1). There was also no significant difference between session 1 and 2 for low intensity ($p=0.3$) or high intensity ($p=0.8$) at baseline. Further, preliminary observations in the data have indicated both an inhibition and facilitation of the BR during the cuff pressure conditioning periods. They also show moderate reliability for the CPM effect with the low intensity range showing a reliability of 0.58 and the high a reliability of 0.67.

Conclusions: Our current interim findings demonstrate that it is possible to measure low and high levels of excitability in the BR pathway at baseline with moderate reliability. We found that some participants then show facilitation or inhibition of these BR responses regardless of excitability level. These data give some early insight into the modulation of brainstem mediated facial nociceptive reflexes which can be either inhibited or facilitated. This will be further analysed at our final sample size (n=21). These neurophysiological measures of descending pain modulation at the brainstem level could provide a reliable way to assess CPM mechanisms in humans.

II-C.16

USABILITY AND CLINICAL FEASIBILITY OF ALGO(S)RITHM: A DECISION-SUPPORT APP FOR CHRONIC PAIN CLASSIFICATION

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Background and aims: Chronic musculoskeletal pain (CMP) presents significant clinical challenges due to its multifaceted nature, requiring precise assessment for effective treatment strategies. Pain phenotype classification, following International Association for the Study of Pain (IASP) clinical criteria, plays a pivotal role in personalized pain management. The „Algo(s)rithm“ eHealth app was created to facilitate clinical decision-making by assisting healthcare professionals in classifying pain phenotypes. By delivering standardized, real-time decision support, the app aims to improve diagnostic accuracy and consistency in assessment. This study examined the app's feasibility and usability within a clinical context.

Methods: The study involved 27 physiotherapists who used the Algo(s)rithm app to classify patient scenarios according to pain phenotypes. The app's usability, interactivity, and quality of information were assessed using user version of the Mobile App Rating Scale.

Results: The participants had a mean age of 31.48 years (±7.40). Overall, the app received a high usability score (4.21, SD = 0.38), with engagement (4.59), appropriateness for the target audience (4.59), and reliability of information (4.56) rated particularly well. Features like aesthetics and personalization scored slightly lower (3.74). All participants indicated they would recommend the app, and over half (55.5%) expressed willingness to pay for its use.

Conclusions: The Algo(s)rithm app demonstrates strong potential as a clinical tool. High ratings in usability, engagement, and information reliability highlight its effectiveness in supporting clinical decision-making. Moreover, continuous updates to the app can ensure it remains aligned with the evolving field of pain assessment, equipping clinicians with the most current evidence-based tools.

II-C.17

EXTRA MOTOR CORTICAL EXCITABILITY AND CONNECTIVITY METRICS BY TRANSCRANIAL MAGNETIC STIMULATION COUPLED TO ELECTROENCEPHALOGRAPHY IN ACUTE PAIN MODELS

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Background and aims: Using transcranial magnetic stimulation (TMS), corticospinal excitability (CE) is often assessed by motor-evoked potentials (MEPs) and often reduced in pain conditions. However, MEPs are the combination of cortical and spinal excitability. The assessment of the perturbational electroencephalographic (EEG) responses by a TMS pulse allows for the local CE and connectivity profile of the human brain, also in non-motor areas. Here we conducted a narrative review to investigate the current knowledge on TMS-EEG changes in acute and clinical pain.

Methods: We searched PubMED (November 2024) using search terms such as 'TMS AND electroencephalogram AND pain' and using backwards/forwards referencing.

Results: Out of 127 articles first identified, seven articles remained after screening. All studies included used healthy participants with experimentally induced pain, none clinical pain. Five of seven studies induced tonic pain using heat/cold (minutes; Che et al., 2019; Chowdhury et al., 2023; De Martino et al., 2023, 2024; Ye et al., 2022) whereas two used capsaicin-induced pain (hours; Chowdhury et al., 2024; Tan et al., 2024). The sample sizes ranged from 10-34 included participants. The targets used were M1 (n=5) and/or PFC (n=4). The most common outcome measures were TMS-evoked potentials (TEPs) and pain ratings/thresholds, however, some studies also used cortical oscillations as an outcome measure. Increased N45 peak and peak-to-peak amplitude were reported to occur in some instances of acute experimental pain.

Conclusions: Studies investigating the effects of pain using TMS-EEG could benefit from looking beyond TEPs and investigating the effects of chronic pain using TMS-EEG.

II-C.18

DETECTING POSTOPERATIVE PAIN RELIEF USING ELECTROCARDIOGRAM (ECG) SIGNALS

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Background and aims: Pain is a subjective experience, typically assessed through self-report scales, making an accurate assessment challenging [1,2]. However, an accurate assessment of pain intensity is critical for successful pain management [3]. This study investigates Electrocardiogram (ECG) signals collected after surgery, focusing on symbolic representations of the ECG signals to identify changes associated with pain management and patient pain perception.

Methods: Twenty volunteer adults (fourteen males and sixfemales), 55 ± 14 years old, undergoing elective surgery at Tondela-Viseu Hospital Center (Portugal), participated in this study. ECG was continuously recorded in the recovery room after surgery, along with assessments of self-reported pain and pharmacological interventions for pain treatment. Symbolic representations of the ECG signals were analyzed to identify patterns and pain-related information, such as indicators of pain relief. This symbolic representation reduces the dimensionality and complexity of ECG signals, making their analysis possible.

Results: The results suggest an association between pain relief, reported by the patient, and changes in the ECG signal, as noticeable alterations in the symbolic representations were observed following pain analgesic treatment for some patients.

Conclusions: This preliminary study investigates how symbolic representation analysis of ECG signals can reveal changes during the postoperative period. Our findings indicate that these symbolic representations may help detect pain relief following analgesic treatment. By developing an objective tool that integrates ECG information and patient self-reports, healthcare professionals could enhance pain management and relief and improve patient care in clinical settings.

II-C.19

DEVELOPMENT AND EVALUATION OF A CLIMBING TEST IN MICE: A NOVEL APPROACH FOR ASSESSING PAIN-LIKE BEHAVIOUR

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Background and aims: The development of new analgesics is challenged by a low translation rate from preclinical models to a clinical setting, partially due to the reliance on evoked measures, which are inherently susceptible to bias. Painful conditions often make themselves known when performing everyday tasks, altering normal behaviour. We are validating a climbing test for assessing impairment of normal function in mice, serving as a measure of non-evoked pain-like behaviour. Our goal is to increase the translational value of preclinical experiments.

Methods: We have established a climbing test, based on Santos et al. (Frontiers in Pain Research, 2023), which involves recording a mouse voluntarily climbing on a cylindrical vertical mesh grid for 10 minutes. A decrease in the frequency, duration, or distance of climbs, demonstrates the impact of pain on natural behaviour. We used the plantar incision model of post-surgical pain and evaluated if the NSAID meloxicam reinstates natural climbing.

Results: This experiment is currently being completed, and data analysis is underway, with expected finalisation well before EFIC2025. Our preliminary results suggest that the plantar incision model impairs climbing behaviour only moderately, with results pending for the mitigating effects of meloxicam.

Conclusions: The climbing test is a promising, behaviourally relevant, non-evoked test for assessing pain-related behaviour in mice, with a potential for enhancing the translational value of preclinical pain assessment. Preliminary results suggest only mild impairment from the plantar incision model, but future research will assess the outcome in other models.

II-C.20

RELATIONSHIP BETWEEN SUBJECTIVELY-RATED AND OBJECTIVELY-TESTED PHYSICAL FUNCTION ACROSS SIX DIFFERENT MEDICAL DIAGNOSES

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Background and aims: Walking is an important physical function and a regular component of various complex activities of daily living. Although the quantification of walking is central to physiotherapy and rehabilitative measures, the qualities of the various measures of walking ability are unclear. The aim of this study was to quantify the associations and the relationship between self-rated and tested assessments of walking performance and to compare the results across 6 different medical diagnoses.

Methods: Patients with whiplash-associated disorder (n = 71), low back pain (n = 121), fibromyalgia (n = 84), lipoedema (n = 27), lymphoedema (n = 78), and post-acute coronary syndrome (n = 64) were included. Walking performance/leg function was measured by the SF-36 Physical functioning (SF-36 PF) and by the 6-minute-walking-distance test (6MWD) and assessed by correlation coefficients. Across the 6 cohorts, the relationship between the two scores was compared by the ratio between the two assessments.

Results: The correlations between the two scores were mostly moderate to strong at baseline and follow-up (up to r=0.791), and weak to moderate for the differences (up to r=0.408). The ratios of the SF-36 PF to the 6MWD were 1.143 – 1.590 at baseline and 0.930 – 3.310 for the changes, and depended on pain and mental health.

Conclusions: Moderate to strong cross-sectional and moderate to weak longitudinal correlations were found between the 6MWD and the SF-36 PF. Pain and mental health should be considered when interpreting walking performance/leg function. For a comprehensive assessment, the combination of self-rated and tested physical function measures is recommended.

II-C.22

RELATIONSHIP BETWEEN UPPER EXTREMITY MUSCLE PRESSURE PAIN THRESHOLDS WITH PAIN, FUNCTION, AND SLEEP QUALITY IN ROTATOR CUFF INJURIES

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Background and aims: The shoulder is the region where the upper limb connects to the trunk. The diverse functions of the muscles in this area result in various injury outcomes. This study aims to examine the relationship between pressure pain thresholds of the muscles in the affected shoulder and pain, function and sleep quality.

Methods: Thirty-two patients (13 males, 19 females; age: 50.09 ± 6.22 years; weight: 73.47 ± 9.59 kg; height: 166.59 ± 10.90 cm) with unilateral rotator cuff injuries for at least one month were included. Diagnosis was confirmed through clinical examination and magnetic resonance imaging by a physiatrist. Pain severity was assessed using the Visual Analogue Scale (VAS), function using the Disabilities of the Arm, Shoulder and Hand (DASH) questionnaire, sleep quality using the Pittsburgh Sleep Quality Index (PSQI), and pressure pain thresholds using a digital algometer for the trapezius, deltoideus, biceps brachii, brachioradialis, supraspinatus, and subscapularis muscles.

Results: Preliminary results showed a moderate positive correlation between the deltoideus and night pain (rho=.401, p=0.023), and a moderate negative correlation between the biceps brachii and PSQI (rho=.484, p=0.005). No statistically significant differences were observed for other parameters (p>0.05).

Conclusions: Our preliminary findings indicate a positive correlation between decreased pressure pain thresholds in the biceps brachii and poorer sleep quality, as well as between the deltoideus and nocturnal pain. These results suggest that changes in pressure pain thresholds in different upper extremity muscles may differently affect pain, function, and sleep quality in individuals with unilateral shoulder pain.

II-C.23

INNOVATIVE APPLICATION OF MAGNETIC RESONANCE IMAGE SEGMENTATION OF THE PELVIC MUSCLES IN THE DIAGNOSIS OF CHRONIC LOW BACK PAIN

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Background and aims: Chronic Low back pain (cLBP) is a global problem. The 11th revision of the International Classification of Diseases highlights the necessity for new solutions in chronic pain diagnosis. The innovative method is a morphological assessment of the pelvic muscles using magnetic resonance image (MRI) segmentation towards symptomatic muscle volume changes. The time-consuming nature of measurements promotes cross-sectional area (CSA) analysis for future introduction in clinical practice.

The study aimed to assess the reliability of CSA measurement for pelvic muscle atrophy in patients with cLBP and healthy volunteers.

Methods: 71 cLBP patients and 29 healthy volunteers were examined. Two independent researchers conducted CSA measurements of the gluteal muscles (maximus, medius, minimus) bilaterally and the piriformis muscle. MRI manual segmentation was based on active tissue, excluding subcutaneous and intermuscular adipose tissue. In patients, the symptomatic side was compared to the asymptomatic, while in healthy volunteers, the right side to the left. The Mann-Whitney, binomial, and chi-square tests were used for statistical analysis. The intraclass and concordance correlation coefficients were used to assess inter-rater agreement.

Results: >50% cLBP patients ($p<0.05$) presented gluteus maximus, gluteus minimus, and piriformis muscles atrophy. In patients with left-sided pain gluteus medius atrophy occurred ($p<0.001$). All examined muscles showed symptomatic muscle atrophy (excluding gluteus maximus). The control group presented no changes. The inter-rater agreement was >95% for each muscle in patients and healthy volunteers.

Muscle	Side	Concordance Correlation	ICC	Concordance Correlation	ICC
GMax	right	0.998	0.999	0.998	0.999
	left	0.996	0.996	0.996	0.997
GMed	right	0.998	0.998	0.998	0.998
	left	0.998	0.998	0.998	0.998
GMin	right	0.955	0.955	0.955	0.955
	left	0.952	0.952	0.952	0.952
Pir	right	0.988	0.988	0.988	0.988
	left	0.989	0.989	0.989	0.989

Legend: GMax—Gluteus Maximus; GMed—Gluteus Medius; GMin—Gluteus Minimus; Pir—Piriformis; ICC, LBP—Low Back Pain.

Conclusions: The CSA measurements of MRI in patients with cLBP indicate symptomatic side atrophy of the pelvic muscles. The method is a promising biomarker in chronic state diagnosis.

II-C.24

HOW TO EXPERIMENTALLY INDUCE AND OBJECTIVELY MEASURE PAIN-RELATED FEAR OF MOVEMENT – A SCOPING REVIEW

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Background and aims: Fear significantly influences the intensity of pain experienced by individuals with chronic musculoskeletal pain and their ability to engage in daily activities. Pain-related fear of movement (PFM) is commonly assessed using patient-reported outcomes, but recent studies also proposed physical parameters to objectively quantify PFM. This scoping review aimed to identify and evaluate physiological measurements for PFM as well as paradigms used to induce a fear reaction in association with a potentially painful movement.

Methods: The review includes studies with experimental designs published in English or German language before February 2024. Participants had to either perform, imagine or observe a movement. A total of 2209 studies were screened, 31 eligible trials were included. Data including participant numbers, inclusion/exclusion criteria, PFM definition, paradigms, stimuli, description of the interventions, physical/subjective outcome measures, and results related to PFM measurement were summarized.

Results: The identified studies employed various physiological measures, such as neural correlates (fMRI), response latency/duration, decision making behavior, eye-blink startle response, and autonomic nervous system responses. fMRI studies revealed activation in fear- and pain-processing brain areas that correlated with patient-reported measurements. Other measures demonstrated significant differences between fear-inducing and neutral conditions, with heart rate variability, respiratory response, skin conductance and eyeblink-startle response exhibiting the largest effect sizes. Paradigms used to induce PFM were either an anticipated pain combined with a performed movement or the observation of a movement that could be associated to pain.

Conclusions: In conclusion, physical reactions can be measured during imagined, observed or performed movements as a proxy for PFM.

II-C.25

ELECTROMYOGRAPHIC ACTIVITY IN REFERRED PAIN REGIONS DURING PROLONGED DRY NEEDLING OF GLUTEUS MINIMUS: POTENTIAL INDICATOR OF CENTRAL SENSITIZATION

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Background and aims: Lastly, referred pain provoked by trigger points was highlighted as an essential diagnostic criterion. Hypotheses suggest autonomic, motor, and sensory disturbances in these referred pain regions for trigger points. While research indicated sensory and atypical autonomic responses, motor changes in referred pain regions are less explored. Establishing these alterations is vital, as MPS may be linked to central sensitisation processes. This study investigates the bioelectrical activity of thigh muscles in the referred pain region following extended dry needling of the gluteus minimus muscle.

Methods: Twenty-eight participants were selected based on tests for abnormal autonomic reactivity in the referred pain area. The control group (CON) had 15 of 48 healthy volunteers with negative results, while the experimental group (EXP) included 13 of 15 Polish Short Track athletes with positive results. Both groups underwent a 10-minute surface electromyography session during gluteus minimus noxious stimulation, with power spectral density analysis used to evaluate the signals.

Results: Power spectral density was found higher in the EXP group in thigh muscles but not in pelvic girdle muscles (Figure 1). The most prominent atypical bioelectrical activity was found in the vastus lateralis (.605 vs .165;p=.006), semitendinosus (1.729 vs 0.143;p=.007), and rectus femoris muscles (.545 vs 0.163;p=.009)(Table 1).

Table 1. Estimation of the power spectral density of sEMG muscles response signals in the thigh in response to *gluteus minimus* muscle noxious stimulation.
Legend: EXP- experimental group ; CON – Control group; M – median; IQR – interquartile range; U Mann-Whitney U test value; Mann-Whitney U; *, p < 0.05

	Muscle	EXP	CON	p
Power Spectral Density, M (IQR)	Gluteus maximus	0.150 (0.177)	0.107 (0.115)	0.076
	Gluteus Medius	0.347 (0.488)	0.321 (0.330)	0.240
	Semitendinosus	1.729 (2.434)	0.143 (0.130)	0.007
	Vastus lateralis	0.605 (4.369)	0.165 (0.197)	0.006
	Rectus femoris	0.545 (2.311)	0.163 (0.218)	0.009
	Biceps femoris	0.486 (1.282)	0.123 (0.343)	0.023
	Vastus medialis	0.932 (1.242)	0.120 (0.206)	0.003
	Adductor Longus	1.039 (1.983)	0.125 (0.150)	0.003

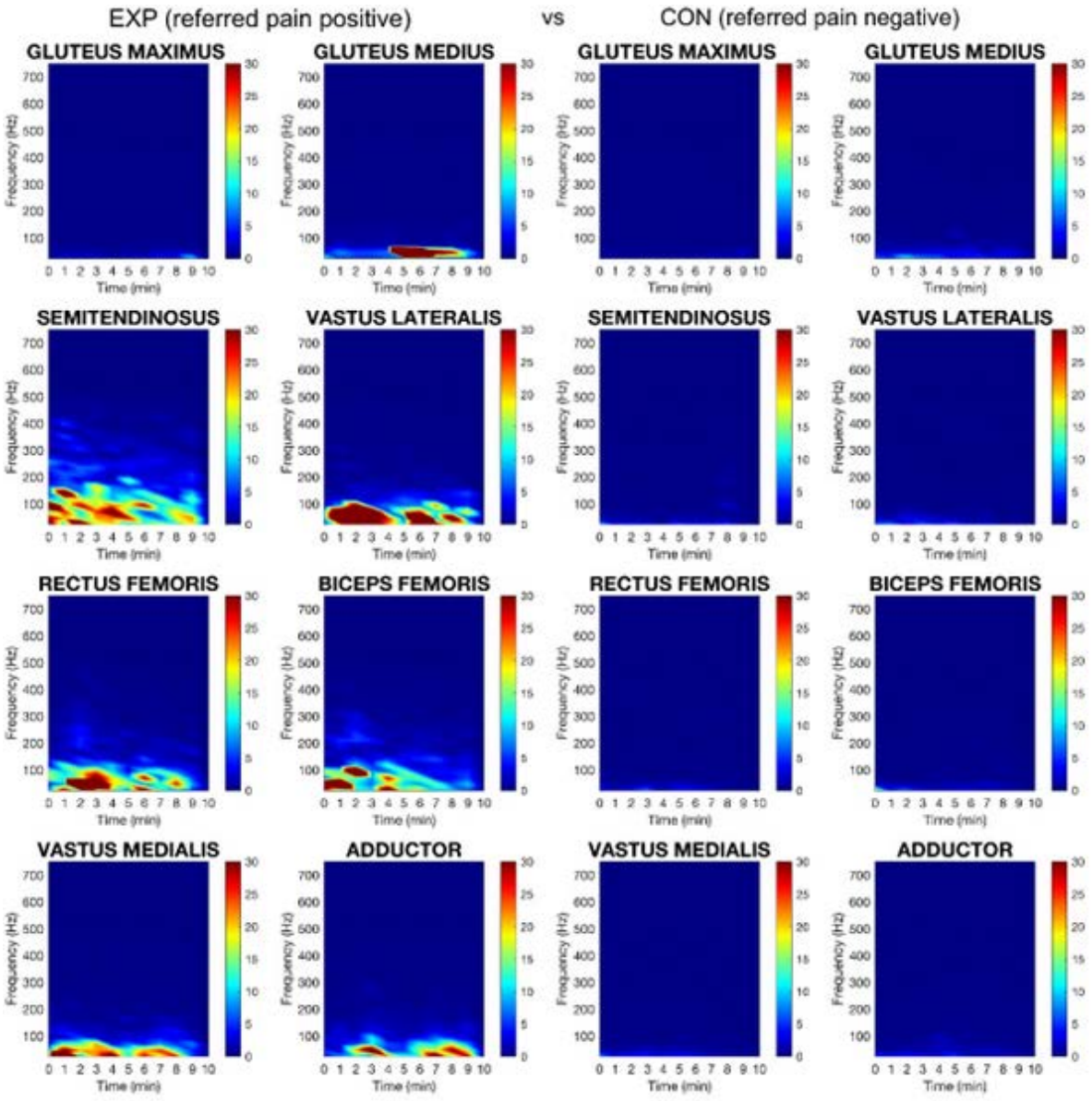

Figure 1. Power spectral density spectrograms reflected the presence of the referred motor phenomenon within thigh muscles due to long-lasting dry needling of the gluteus minimus muscle. The figure illustrates changes in the Power Spectral Density (PSD) over time in response to needle mechanical stimulation of the gluteus minimus across eight different muscles: *gluteus maximus, gluteus medius, semitendinosus, vastus lateralis, rectus femoris, biceps femoris, vastus medialis, and adductor longus.* The X-axis indicates the time of the intervention during which electromyography was conducted. A colour bar on the right side of the figure provides a scale for the PSD values, which are indicated on the spectrogram. In the experimental group (labeled EXP, which includes individuals with positive referred pain), there are notable changes in the average PSD over time. Conversely, in the control group (labeled CON, consisting of individuals without referred pain), there are minimal or no changes in the average PSD.

Conclusions: Prolonged noxious stimulation of latent trigger points in the gluteus minimus caused remote atypical electromyographic activity in thigh muscles localised in the area of referred pain distinctive for gluteus minimus, indicating potential central sensitisation. Further research is recommended to explore this phenomenon in trigger points.

II-C.26

PSYCHOPHYSIOLOGICAL CORRELATES OF PAIN INTENSITY IN HEALTHY VOLUNTEERS

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Background and aims: Pain is viewed as a complex interaction of biological, psychological, and social factors, highlighting the need to assess different aspects of it. Assessment of pain intensity is largely based on subjective scales, limiting the quality of assessments for cognitively affected populations. One alternative, novel method to assess pain is through sympathetic arousal, focusing on the electrodermal activity. Moreover, psychological aspects of pain are often overlooked. Pain catastrophizing, a known psychological modulator of pain, may influence physiological markers such as electrodermal activity. This exploratory study aims to identify pain-induced changes in electrodermal activity and examine how psychological variables, including stress, modulate these responses.

Methods: 37 healthy volunteers will perform a 3 minute cold pressor test (CPT) in 2 degrees Celsius cold water, while recording their electrodermal activity, and complete questionnaires to measure pain catastrophizing levels. Participants are randomized in two groups. Group A will go through a baseline measurement and the CPT. Group B will go through the STROOP test as a mild stressor before the CPT. Discriminant analysis will determine if we can differentiate between mild, moderate, and severe pain using electrodermal activity. Analysis is exploratory to find the associations between the psychological variables, pain intensity and electrodermal activity.

Results: Pilot testing two healthy volunteers suggest distinct patterns in EDA during pain and resting states, correlating with self-reported pain intensity (Figure 1). The study is currently recruiting.

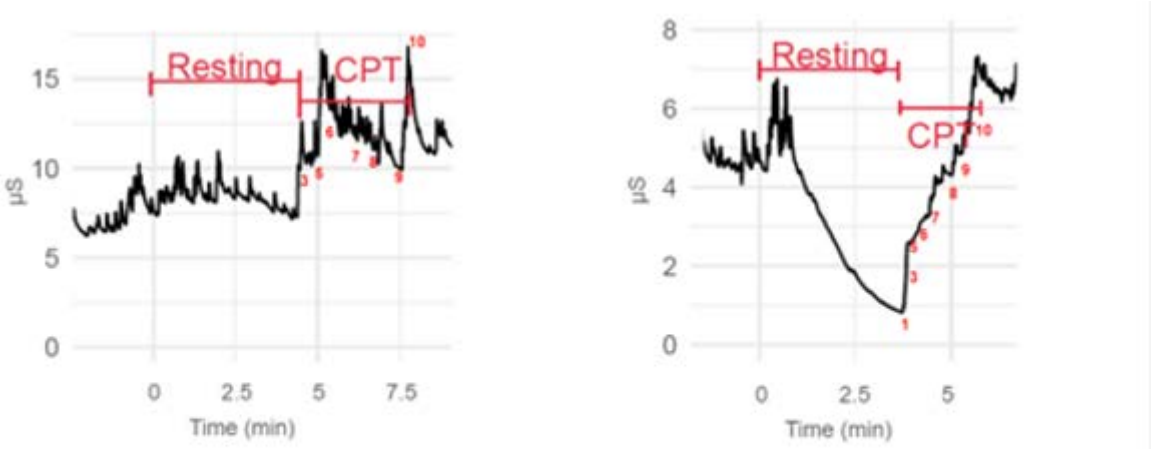

Figure 1. Electrodermal activity during a painful task (cold water test - CPT), measured in microSiemens (µS) using Movisens EdaMove4, for two different test subjects during the pilot study. The activity shows distinct changes between the resting and period and the CPT. Pain intensity is annotated from 0 to 10.

Conclusions: The findings may provide insights into psychophysiological markers of pain, with potential implications for improving pain assessment methods, particularly in populations with limited cognitive capacities.

II-C.27

THE RELATIONSHIP BETWEEN PAIN MODULATION AND PREDICTION ERRORS DURING SECONDARY HYPERALGESIC STATES: A NOVEL VIRTUAL REALITY PROTOCOL

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Background and aims: Prediction errors (PEs) are mismatches between expected and actual sensations, influencing how the brain processes signals. Current protocols disentangling effects of maladaptive PEs stemming from central sensitisation (CS) or psychological factors are lacking. To address this, we examined how visual cues delivered

through virtual reality (VR) lead to PEs that modulate pain perception, using the high frequency stimulation (HFS) model of central sensitisation in otherwise healthy individuals.

Methods: Twenty participants (mean age: 25 years) received HFS on their right forearm. Mechanical pain sensitivity (MPS) was measured using pinpricks around the electrode before and 30 minutes after HFS to assess secondary hyperalgesia (a marker of CS). Participants then received mechanical stimuli both inside and outside the hyperalgesic area, predicting and reporting pain before and after each trial. Visual cues indicating the stimulus location, either matching or mismatching the actual site, were presented through a VR headset to trigger prediction errors (PEs).

Results: MPS measures were significantly higher following HFS, indicating the presence of CS. Following matching visual cues either inside or outside the hyperalgesic area there was no significant difference between predicted and reported pain, indicating minimal PEs. Following mismatching cues, we observed significant PEs. During mismatching cues, stimuli inside of the hyperalgesic area were perceived as less or more painful following lower or higher predicted pain, respectively. The extent of pain modulation correlated with PEs.

Conclusions: We developed a novel framework to study how expectations modulate pain during experimentally induced CS, with potential future applications in assessing psychological influences on pain modulation.

II-C.28

THE IMPACT OF SARCOPENIA ON CERVICAL MECHANOSENSITIVITY AND KINESIOPHOBIA IN GERIATRIC INDIVIDUALS RESIDING IN NURSING HOMES

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Background and aims: Sarcopenia is defined as a loss of skeletal muscle mass accompanied by a decline in muscle strength and performance. This study aimed to investigate the effect of sarcopenia on cervical mechanosensitivity and the presence of kinesiophobia in elderly individuals living in nursing homes.

Methods: The study included 31 individuals residing in a Nursing Home Care Center with a mean age of 80.16 ± 9.37 years. Participants were divided into two groups based on the presence of sarcopenia, determined through handgrip strength, muscle mass (assessed via Bioelectrical Impedance Analysis), and performance evaluations (4-meter walking test and sit-to-stand test). Cervical mechanosensitivity was evaluated using a pressure algometer at the lateral points of the spinous processes of C2 and C7 and the midpoint of the upper trapezius muscle. Kinesiophobia was assessed using the Pain Catastrophizing Scale and the Kinesiophobia Causes Scale. Data were analyzed using the independent samples t-test.

Results: In the sarcopenia group, the pressure pain threshold at C2 was significantly lower ($p = 0.026$), and the level of pain catastrophizing was significantly higher ($p = 0.007$) compared to the control group. No significant differences were observed between the groups for other parameters ($p > 0.05$).

Conclusions: The presence of sarcopenia does not affect mechanosensitivity in the lower cervical region but leads to marked sensitivity in the upper cervical region. Additionally, sarcopenic individuals exhibit increased cognitive and emotional responses to pain experiences, independent of pain-avoidance behaviors.

II-C.29

PAIN INTEROCEPTION ASSESSMENT

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Background and aims: The renewed scientific interest in the topic of interoception is due to recent discoveries that establish a link between mental health and interoception, suggesting the fundamental role of bodily perception in pain management. Interoception appears to be a key factor in the mechanisms of pain perception and modulation.

The process of studying interoception focuses on the cardiac, pulmonary or gastric modality although they are not correlated with each other. Pain, on the other hand, does not have its own study protocol. Our objective is to establish a framework for quantitative measurement of the ability to perceive pain.

Methods: The protocol involves inducing painful stimulation in a subject. The subject is instructed to stop the stimulation at a defined pain threshold. The subject must also define the intensity of this stimulation compared to the previous one. This process allows for obtaining an accuracy score, a sensitivity score and a metacognitive score.

Results: Subjects are very clearly able to differentiate the 3 intensity levels requested. The accuracy score is similar depending on the levels tested but not depending on the thermal or mechanical pain modalities (less accuracy in the mechanical modality). This process reveals a clear threshold where the majority of errors are made. The precision score is correlated with the sensitivity score for subjects with high precision

Conclusions: The results obtained allow us to effectively test our initial hypothesis of quantitatively measuring our interoception of pain. This approach offers the opportunity to deepen our knowledge of both interoception and pain.

II-C.30

EVALUATION OF ASSESSMENT TOOLS FOR EARLY DETECTION OF CHEMOTHERAPY-INDUCED PERIPHERAL NEUROPATHY IN BREAST CANCER PATIENTS TREATED WITH TAXANES

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Background and aims: Chemotherapy-induced peripheral neuropathy (CIPN) is a common side effect of many chemotherapeutic agents, especially antineoplastic agents. To limit nerve damage, early detection and management of CIPN are crucial and leaves an urgent demand for reliable diagnostic tools. The purpose of the study was to examine whether different quantitative sensory tests (QST) and perception threshold tracking (PTT) were able to identify Paclitaxel-induced peripheral neuropathy.

Methods: 14 breast cancer patients undergoing standard adjuvant treatment consisting of 3 cycles of Epirubicin and Cyclophosphamide followed by 3 cycles of Paclitaxel were included. 11 experimental sessions were performed before each weekly Paclitaxel treatment and at 4-month and 3-year follow-ups. To investigate the temporal development of CIPN, QST and PTT were performed, and the symptoms of CIPN were assessed using the Common Terminology Criteria for Adverse Events(CTCAE) scale and a Quality-of-Life Questionnaire CIPN twenty-item scale (QLQ-CIPN20).

Results: CIPN emerged during Paclitaxel treatment and persisted at both the 4-month and 3-year follow-ups, as indicated by the CTCAE score and CIPN20 questionnaire. A negative correlation between the heat pain threshold and the cold pain threshold ($R=-0.43$, $p<0.001$) suggested increased pain sensitivity in addition to persistent CIPN. Furthermore, logistic regression showed that the rheobase ($OR=1.51$, $p=0.037$), small nerve fiber accommodation ($OR=4.06$, $p=0.031$), and the cold pain threshold ($OR=1.10$, $p<0.001$) were associated to the CTCAE score and therefore sensitive indicators of CIPN.

Conclusions: The results suggest that PTT measures hold promise for the early detection of CIPN. However, due to the study‘s small sample size, replication is necessary to validate these proof-of-concept findings.

II-C.31

PAIN AND FUNCTIONAL DISABILITY IN PATIENTS WITH PROGRESSIVE FORMS OF MULTIPLE SCLEROSIS

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Background and aims: In progressive forms of MS, the frequency of pain increases as the disease progresses affecting patients’ functional abilities and making the disease much more complex. We conducted a cross-sectional study to examine the association of pain with walking speed and functional abilities in patients who suffer from progressive forms of multiple sclerosis (PFMS).

Methods: The cross-sectional study was conducted at the Clinic for rehabilitation ”Dr Miroslav Zotović” in the period from January 2020 to May 2023. The research included 55 patients with PFMS consecutively admitted to this Clinic for rehabilitation. Pain intensity was assessed using *Numeric Rating Scale*(NRS). Since all patients experienced spasticity, pain was also assessed using the Pain/Discomfort(PD) subscale of the Multiple Sclerosis Spasticity Scale 88(MSSS-88). The subjective perception of gait impairment was assessed using a subscale of the same questionnaire, MSSS 88, related to walking, namely the Walk(WL). Walking speed was measured by *The Timed 25 Foot Walk*(T25FW). The functional assessment and all questionnaires were completed in the morning hours over a 24-hour period from the day patients were admitted to rehabilitation.

Results: There is a significant strong correlation between WL and P/D(rho=0. 770; p<0.001) and between WL and NRS(rho=0. 825; p<0.001). A statistically significant moderate negative correlation is between T25FW and NRS pain(p<0.001). There is no statistically significant correlation between T25FW and pain intensity measured by PD (p=0.033). There is a statistically significant correlation between EDSS and pain intensity(NRS p=0.002; PD p=0.006) either.

Conclusions: Our results showed a significant negative impact of pain on walking speed and functional disability.

II-C.32

THE USE OF YELLOW FLAG SCREENING TOOLS BY AUSTRIAN PHYSIOTHERAPISTS IN THE MANAGEMENT OF MUSCULOSKELETAL-ASSOCIATED PAIN

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Background and aims: Yellow flags (YF) contribute to the development of chronic pain. Their assessment using screening tools is recommended in the highest quality guidelines. However, it turns out that many physical therapists (PTs) do not assess them. The aim of this study was to find out which YF and which corresponding questionnaires for musculoskeletal associated pain are regularly used in Austrian physiotherapy.

Methods: A self-designed online survey with single-choice, multiple-choice, and open questions was sent to Austrian PTs via Physio Austria and university mailing lists. Only PTs working in the musculoskeletal field, regardless of the specific work setting, were included in this survey.

Results: At the end of the implementation period, 127 PTs participated in the survey. The results were: (1) 75-91% of PTs often to always surveyed key YFs like depression, persistent stress, passive coping strategies, and anxiety-oriented behavior; (2) 50% of PTs did not know any unidimensional questionnaires (e.g., TSK), and 51% did not know any multidimensional questionnaires (e.g., OMSQ). Those familiar with these screening tools used them infrequently.

Conclusions: This study reveals that while Austrian PTs regularly assess individual YFs, only 39% use targeted screening despite 94% feeling responsible for it. Due to difficulties in distinguishing flags in musculoskeletal pain, a screening tool is recommended. For standardized screening as per guidelines, PTs need to familiarize themselves with relevant questionnaires and learn to use them correctly.

II-C.33

VALIDATING THE EXPERIENCE OF COGNITIVE INTRUSION OF PAIN WHEN DRIVING SCALE (ECIP-D): A CONFIRMATORY FACTOR ANALYSIS STUDY

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Background and aims: The Experience of Cognitive Intrusion of Pain (ECIP) scale measures extent to which pain intrudes on and dominates thinking, indicating attentional capture by pain. Attentional focus is essential to driving behavior and disrupted attention can pose safety risks. This study examined construct validity of the ECIP-Driving scale (ECIP-D), designed to assess cognitive intrusion by pain while driving.

Methods: Individuals with chronic low back pain (n=307) completed the ECIP-D and pain and driving-related measures. Confirmatory factor analysis was conducted on ECIP-D items. Correlations were run to establish convergent validity.

Results: The estimated 1-factor model showed good fit according to 3 model fit indices (Comparative Fit Index = 0.985, Tucker-Lewis Index = 0.981, Standardized Root Mean Square Residual= 0.015) and adequate model fit according to Root Mean Square Error of Approximation (0.071). ECIP-D was positively correlated with pain intensity, disability, and pain intensity/exacerbation during driving. ECIP-D scores strongly correlated with Pain Catastrophizing Scale (r=.80) and Pain Anxiety Symptom Scale (r=.78) scores. Individuals with higher ECIP-D scores reported more irritability, anxiety, and distraction by pain when driving and more traffic errors/violations. Finally, individuals with recent history of collision reported higher ECIP-D scores than those without.

Conclusions: Analyses supported ECIP-D as a valid instrument to assess cognitive intrusion of pain during driving, replicating original validation and extending to driving environments. The scale's associations with pain-related factors and driving behaviors highlight its potential value in clinical and research settings, offering more specific assessment to understand the impact of pain on driving safety.

II-C.35

AN ASSESSMENT OF THE LONGITUDINAL CONSTRUCT VALIDITY OF THE PAIN BEHAVIORAL SCALE IN A SAUDI POPULATION WITH CHRONIC LOW BACK PAIN (LBP): A PRELIMINARY STUDY

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Background and aims: We examine the longitudinal construct validity of the pain behavior scale (PaBS) using convergent and known-groups approaches on LBP participants undergoing pain neuroscience education (PNE).

Methods: Participants attended two testing sessions at physiotherapy clinics in Saudi Arabia. Participant pain behavior was initially measured using the PaBS scale; participants performed standardized physical tests (e.g., repeated trunk flexion) and provided baseline demographic, clinical data, and self-reported measurements using the Modified Roland and Morris disability questionnaire (MODI), fear-avoidance questionnaire (FABQ), and pain catastrophizing scale (PCS). Then, a physiotherapist provided usual care to participants and weekly sessions of online PNE. Participants repeated the same questionnaires and physical tests with PaBS during week six. Paired t-tests compare changes in health characteristics from baseline responses to those in week six. Correlations between changes in PaBS from baseline to week six, with changes in outcome measures, were determined. To assess known-group validity, we also used a general linear model.

Results: A total of 23 participants completed the data collection. The mean change from baseline in the PaBS score was statistically significant, as were changes in MODI, FABQ, and PCS. Almost 70% of participants improved their PaBS scores over the six weeks, with PaBS scores of almost 40% of them improving by three units or more. The change in PaBS score correlated significantly with changes in the PCS-rumination subscale, supporting a proposed approach to estimate convergent validity ($r = 0.44$, $p = 0.035$).

Conclusions: The results indicate that PaBS may identify people at increased risk of developing disability.

II-C.36

EXPLORATORY STUDY OF THE RELATIONSHIP BETWEEN RESILIENCE AND MENTAL HEALTH IN BRAZILIAN PATIENTS WITH CHRONIC PAIN

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Background and aims: Chronic pain represents a significant global public health challenge, affecting millions of individuals worldwide, and can alter emotional states, favoring anxiety and depression. Studies show that resilience,

the ability to handle adversity, aids in pain management and maintaining a healthy lifestyle, lessening pain's psychological and social effects. This study explores the link between mood disorders and resilience in patients with chronic pain from various etiologies.

Methods: This exploratory study included 68 patients with chronic pain seen for the first time by the Pain Group of the Institute of Orthopedics and Traumatology at HCFMUSP between January 15 and June 28, 2024. Participants were evaluated based on sociodemographic variables, pain-related variables, and using the HAD questionnaire and the Connor-Davidson Resilience Scale. Correlations between variables were analyzed using SPSS with Pearson's test and linear regression.

Results: The sample consisted of individuals who had been living with pain for an average of 94.02 months and had a VAS average of 7.55. There was a strong negative correlation between depression and resilience (p=-0.530) and a positive correlation between anxiety and depression (p=0.546). Resilience was identified as a predictor of depression (β=-0.530; t=-5.076; p<0.0001).

Conclusions: The results highlight the crucial role of psychological factors in chronic pain, advocating for multimodal, interdisciplinary, personalized, and evidence-based pain management. Resilience is key to reducing pain severity and associated psychological conditions. The applicability is limited by the sample size and specificity, emphasizing the need for thorough patient assessments that include clinical history, comorbidities, cognitive, emotional, and behavioral traits, and social environment.

II-C.37

THE PRESENCE OF PAIN IN LOWER LIMB LYMPHOEDEMA: RELATIONSHIP WITH SEVERITY OF OEDEMA, FUNCTION, ANXIETY, DEPRESSION AND QUALITY OF LIFE

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Background and aims: The presence of pain is one of the most common and distressing symptoms in patients with lower limb lymphoedema (LLL). This study aims to investigate the relationship between pain intensity and severity of oedema, function, anxiety, depression, and quality of life in patients with LLL.

Methods: In this cross-sectional study, 48 patients diagnosed with LLL (age: 51.27±15.61 years, BMI: 30.39±7.50 kg/m²) and reporting the symptom of pain were participated. The presence/ intensity of pain was determined by the Visual Analog Scale (VAS). The severity of oedema was measured by volumetry, circumference measurement, and bioimpedance spectroscopy. The Lower Extremity Functional Scale (LEFS), Hospital Anxiety and Depression Scale (HADS), and Lymph-ICF LL were used. The relationships between variables were analysed using the Pearson correlation analysis.

Results: Significant correlations were found between pain intensity and severity of oedema ($r = 0.36$-0.41, $p < 0.05$), function ($r = -0.32$, $p = 0.027$), depression ($r = 0.34$, $p = 0.017$), and anxiety ($r = 0.36$, $p = 0.011$), Additionally, pain intensity demonstrated moderate to high significant correlations with the subdomains of the Lymph-ICF LL questionnaire ($r = 0.41$-0.68, $p < 0.05$) **(Table 1)**.

Table 1. Correlations Between Pain Intensity and Severity of Oedema, Function, Anxiety, Depression and Quality of Life in Patients with Lower Limb Lymphoedema

	Correlations with Pain Intensity (*by VAS score*)	
	Correlation Coefficient (rho)	p-value
Severity of Oedema		
Oedema volume between the feet (ml)	.362[a]	0.012
Oedema volume between the limbs (ml)	.385[a]	0.043
L-Dex value by Bioimpedance Spectroscopy	.419[a]	0.027
Lower Extremity Functional Scale		
LEFS	-.320[a]	0.027
Hospital Anxiety and Depression Scale		
Anxiety	.366[a]	0.011
Depression	.343[a]	0.017
Lymph-ICF LL Subdomains		
Physical Function	.684[b]	0.000
Mental Function	.512[a]	0.000
Household Tasks	.500[a]	0.000
Mobility Activities	.439[a]	0.018
Life and Social Activities	.413[a]	0.031
Total score	.689[b]	0.000

*VAS: Visual Analog Scale, **Lymph-ICF-LL**: Lymphoedema Functioning, Disability and Health Questionnaire, **HADS**: Hospital Anxiety and Depression Scale, **LEFS**: Lower Extremity Functional Scale, **mL**: millililter, Not normally distributed: Spearman correlation coefficient* [a] Moderate correlation. [b] Strongest correlation

Conclusions: In individuals with LEL, there is a bidirectional relationship between chronic pain and higher lymphedema severity, lower functionality, increased anxiety and depression, and reduced quality of life. The implementation of pain assessment into lymphoedema management may be promising for patients with LLL.

II-C.38

PERCEIVED PARENTING STYLES AND INCIDENCE, PERSISTENCE AND REMISSION OF CHRONIC PAIN IN MID-LIFE IN THE GENERAL POPULATION

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Background and aims: Previous research suggests that insecure attachment is a possible risk factor for later pain characteristics in clinical populations with chronic pain (CP). However, few studies have addressed this issue in the

general population. This study assessed the associations of perceived parenting styles reported for the first 16 years of life with the onset, persistence and remission of CP during a 5-year follow-up in middle-aged community-dwellers.

Methods: Data stemmed from the two first follow-up (FU1 and FU2) evaluations of CoLaus|PsyCoLaus, a prospective cohort study conducted in the general population of Lausanne, Switzerland. Parental bonding was assessed with the Parental Bonding Instrument (PBI). The 1,739 participants included in the analysis were divided into four groups according to their CP status at FU1 and FU2: (1) incident CP, (2) persistent CP, (3) remitted CP, and (4) CP free (reference group). The associations between PBI sub-scores and CP status were assessed with multinomial logistic regressions controlling for ~~a~~ series of confounding factors including lifetime major depressive disorder (MDD) and neuroticism.

Results: Higher denial of autonomy by the father was associated with a higher risk of reporting persistent CP at follow-up **(**RR 1.05; 95% CI 1.01;1.10, p=0.02). In contrast, no other significant associations were observed between parenting styles and incident or remitted CP.

Conclusions: Our results suggest that the paternal bonding style of psychological denial of autonomy reported until the age of 16 years may contribute to the subsequent risk of persistent CP in mid-life, independently of current or remitted MDD and neuroticism.

II-C.40

ASSESSING SELF-REPORTED FEAR OF MOVEMENT IN CHRONIC LOW BACK PAIN: HOW SPECIFIC SHOULD WE BE?

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Background and aims: The Photograph Series of Daily Activities (PHODA) contains photos of activities that have to be rated on perceived harmfulness. Although individual PHODA-items are considered as task-specific measures, important information impacting item-interpretation is missing. Therefore, there may be considerable variability in fear of movement (FoM) and avoidance behaviour in chronic low back pain (CLBP) patients with similar scores on a PHODA-item.

Methods: We performed a hierarchical cluster analysis in 254 CLBP patients who perceived lifting with a bent back as harmful (i.e., scores ≥70/100 on PHODA-Lift, Fig. 1). Cluster analysis was performed using scores on task-specific FoM measures, i.e., how afraid participants would be if they had to perform the PHODA-Lift 1x, 10x or 20x. To establish clinical relevance of clusters, we assessed to what extent participants felt limited in, and avoided lifting with a bent back (=task-specific disability and avoidance). To explore reasons for variability in task-specific FoM, we assessed the expected pain intensity and pain self-efficacy when participants had to perform the PHODA-Lift 1x, 10x or 20x.

Fig 1. PHODA-Lift task

Results: Five clusters were found, with increasing levels of task-specific FoM (Fig. 2). Clusters were clinically relevant, as clusters with higher levels of FoM had higher levels of task-specific disability and avoidance behaviour. Structural equation modelling showed that task-specific pain intensity was related to task-specific FoM, and this relationship was mediated by task-specific pain self-efficacy (Fig. 3).

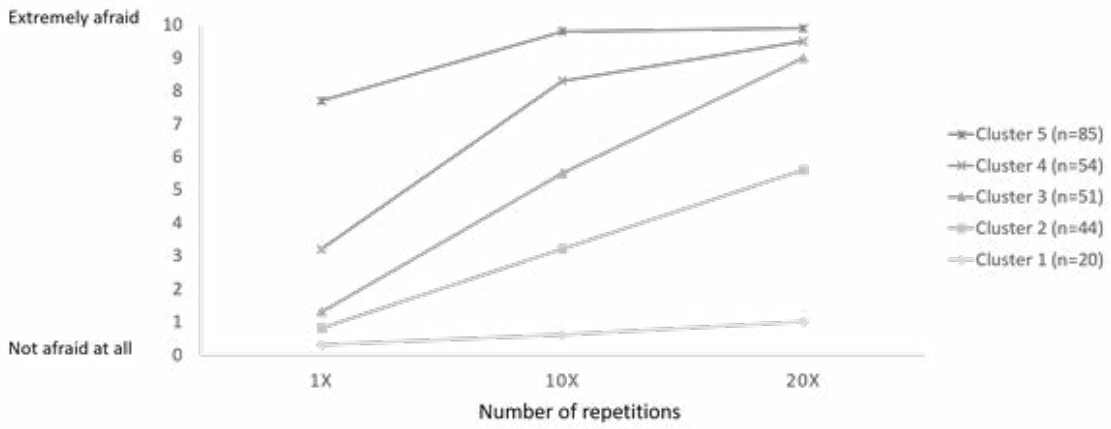

Fig 2. Clusters based on task-specific fear of movement measures. The Y-axis represents the scores on the numeric rating scale for measuring how afraid participants were to lift with a bent back. On the X-axis, the number of repetitions is presented (i.e., lifting 1x, 10x or 20x). Cluster 1 had low scores, while cluster 5 had high scores on all task-specific fear measures. Clusters 2, 3 and 4 mainly differed in how fear scores increased from Fear 1x to Fear 20x.

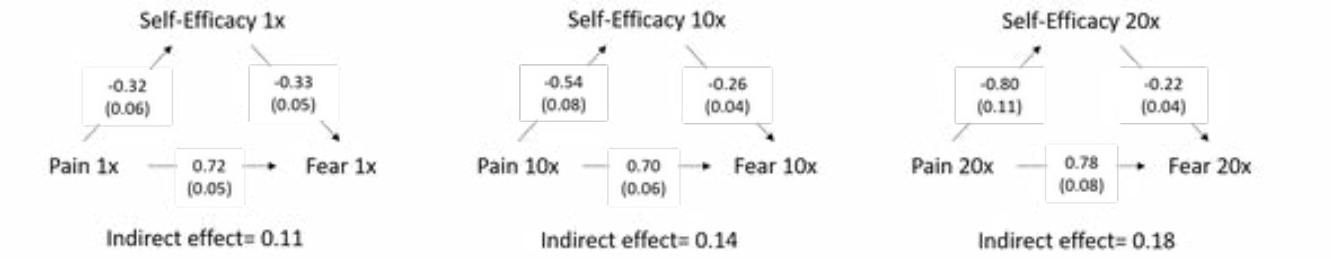

Fig. 3 – Structural equation models investigating mediation of pain-self efficacy on the relationships between pain-intensity and fear of movement.
All variables were measures on a 0-10 numeric rating scale, with higher scores indicating higher levels of task-specific pain intensity, fear of movement or pain self-efficacy. Unstandardised coefficients (SE) are shown. All effects: p< 0.001

Conclusions: In CLBP patients with similar scores on a PHODA-item, clinically relevant clusters were present based on task-specific FoM measures. Currently used FoM measures are not specific enough.

II-C.41

NOT ALL PREGNANCY-RELATED PAINS ARE THE SAME: A COMPREHENSIVE ASSESSMENT OF FACTORS ASSOCIATED WITH *DE NOVO* CHRONIC PAIN IN PREGNANCY

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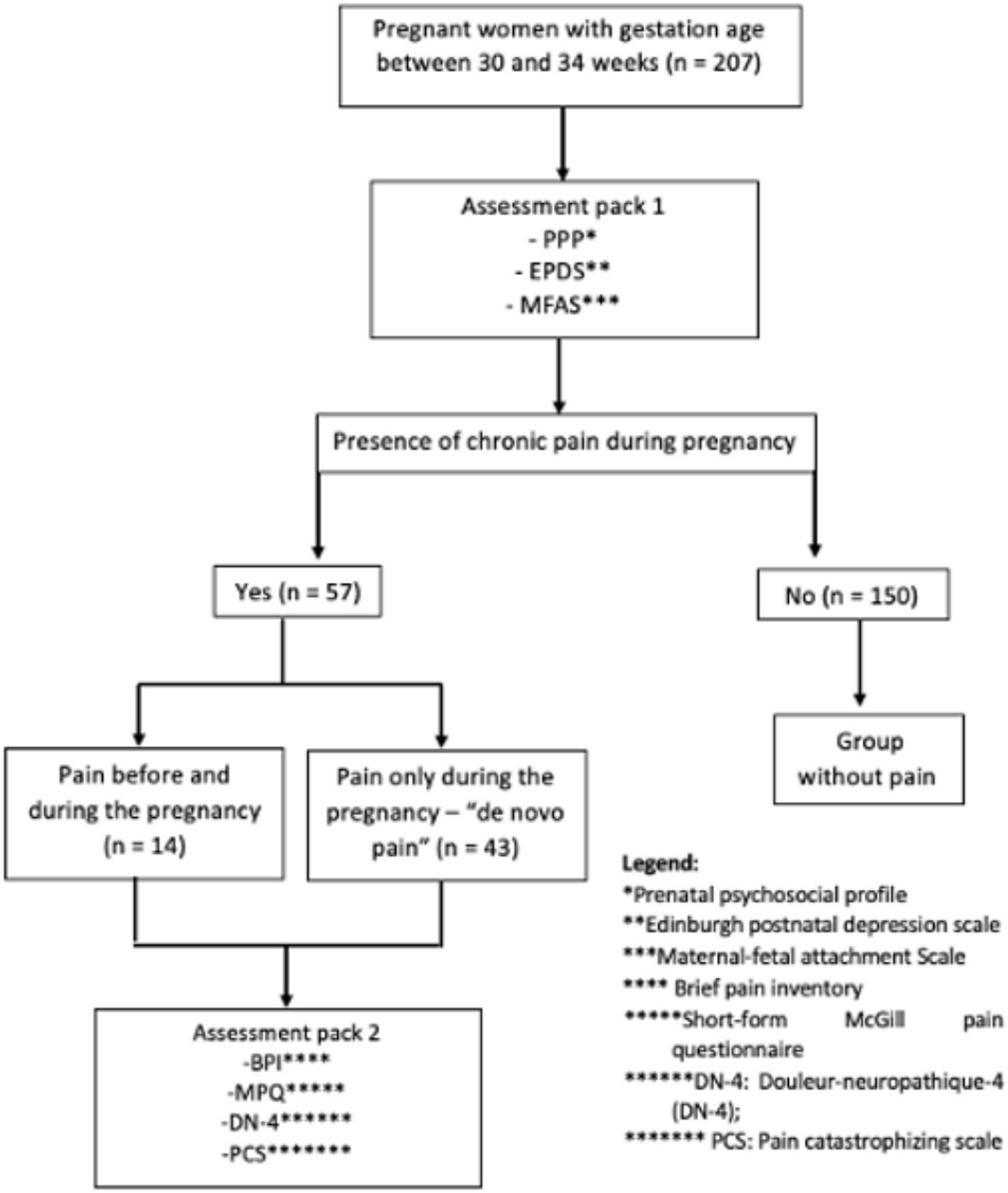
Background and aims: Chronic pain affects up to 30% of pregnant individuals globally, significantly impacting maternal well-being. This research examined the prevalence of *de novo* chronic pain in pregnancy and its association with fetal malformations, maternal conditions, maternal-fetal attachment, and depression, such as its characteristics, including intensity and location.

Methods: In a transversal design, pregnant women between the 30th and 34th weeks of gestation, who had consultations at Hospital das Clínicas of University of São Paulo, a Brazilian reference center, were included.

Participants completed questionnaires evaluating pain, depression, maternal-fetal attachment, and psychosocial factors. Patients were divided in three groups: no pain (group 1), *de novo* chronic pain (group 2), and chronic pain before and during pregnancy (group 3).

Figure 1. Study design



Results: Two hundred and seven women were included in the study. Group 1 included 150 women (72,5%), group 2 included 43 women (20,7%) and group 3 had 14 women (6,8%).When comparing groups 1 and 2 in a multivariate analysis, dysmenorrhea, depression and the mother-fetal attachment where significantly associated. In the mediation analysis, the presence of fetal malformation indirectly mediated the presence of "de novo" pain through its mediation on the presence of depression.

Figure 2. Mediation analysis model (n=187) assessing the total and direct effects of presence of fetal malformations on de novo pain, assessment of indirect effects via depression and attachment. Blue arrows highlight the indirect effects (a and b-paths), and the orange arrow highlights the direct effect (c'-path). Coefficients and bootstrapped (1000) lower and upper limit 95% confidence intervals.

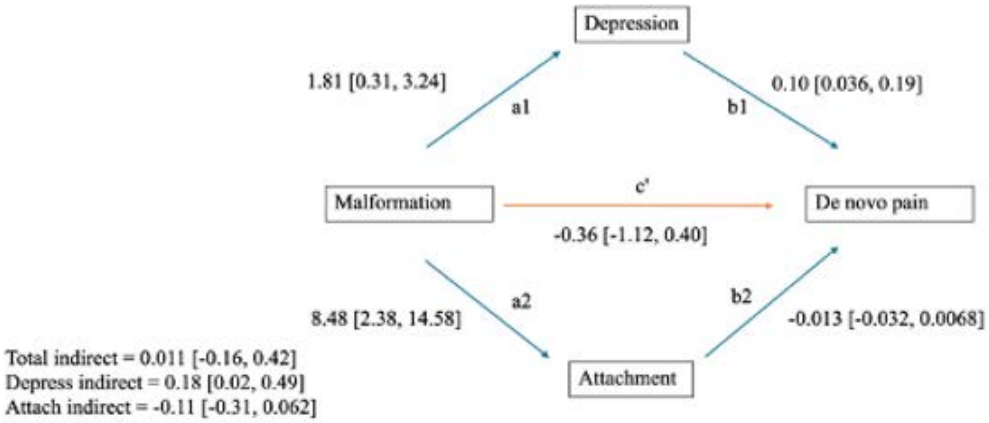
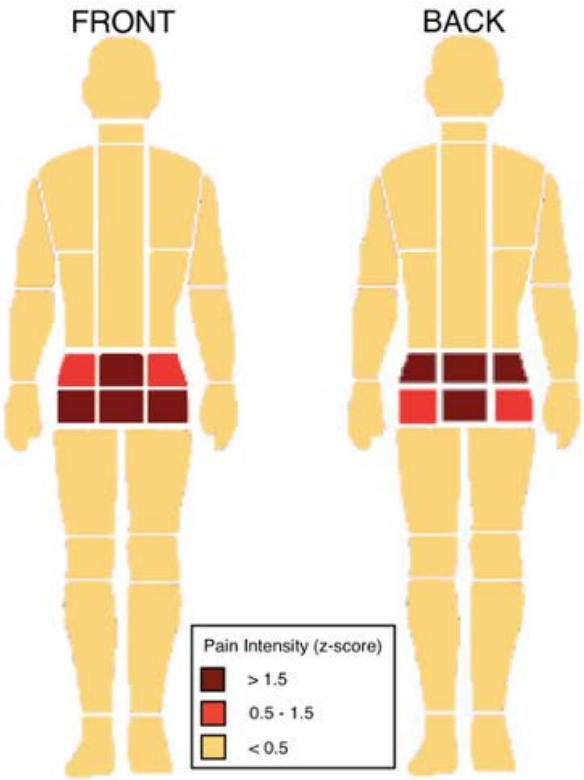


Figure 3. Diagram with pain location and intensity, by the BPI results.



Conclusions: The prevalence of *de novo* pain was 20,7%, affecting the pelvic region more intensively. Depression scores, maternal-fetal attachment scores and the presence of dysmenorrhea before pregnancy were significantly associated with the presence of de novo pain in pregnancy. The presence of fetal malformation wasn't directly associated to *de novo* pain but mediated it through higher depression scores.

II-C.43

RELATIONSHIP BETWEEN PAIN SYMPTOMS IN ADOLESCENTS AND FAMILY FUNCTIONALITY

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Background and aims: Pain in children and adolescents is a complex phenomenon in which psychosocial factors play an important role. Pain complaints are associated with higher risk of psychopathology, specially depressive and anxious disorders, problems in school, emotional distress and functional impairment in everyday life. Because of their chronicity and high prevalence there is need to gain more knowledge about pain and factors that contribute to the development and maintenance of the symptoms. As family is regarded the primary source of experiences and support for children and adolescents, dysfunctional family environment is supposed to be an important risk factor for the development of pain symptoms.

Methods: The research has been carried out in five different secondary vocational schools. Two hundred and nineteen high school students participated voluntarily in this research. They had to fill in a self-assessment questionnaire about their families SFI –Self Report Family Inventory and the Psychosomatic Scale.

Results: The results showed an association of pain symptoms with family cohesion, conflict, communication, clear structure and rules, family harmony and health. Pain was more common in girls and adolescents whose parents were divorced or unmarried. The lowest level of pain symptoms was reported by adolescents living in families with married parents.

Conclusions: Pain symptoms in adolescents correlates with disfunctional family patterns. On the basis of today‘s knowledge and gained experience, psychological, social and biological factors must all be considered when we explain and deal with pain.

II-C.44

ACCURACY OF SCREENING FOR ANXIETY IN PATIENTS WITH CHRONIC NECK AND/OR SHOULDER PAIN WITHIN PHYSIOTHERAPY PRACTICES

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Background and aims: Anxiety symptoms worsen the prognosis of chronic neck and/or shoulder pain and are associated with poor treatment adherence. They are often ignored in physiotherapy practices and the ability of physiotherapists to screen anxiety symptoms in these patients is unknown. This study aims to evaluate the accuracy of screening anxiety in patients with chronic neck and/or shoulder pain within physiotherapy practices and compares the accuracy of the Generalized Anxiety Disorder Questionnaire of 2-item (GAD-2) with the Numeric Rating Scale (NRS).

Methods: Flemish physiotherapists were recruited (N=27) to rate the anxiety level of this group of patients (N=95) using NRS and the GAD-2. Patients completed the Generalized Anxiety Questionnaire of 7 items (GAD-7) and were categorized into mild, moderate, and severe anxiety levels. Receiver operating characteristic (ROC) curves were generated to calculate and compare the accuracy of both screening methods.

Results: The GAD-2 demonstrated greater accuracy in screening anxiety compared to the NRS across all anxiety categories. Significant differences were observed in the mild and moderate categories ($p < 0.05$).

Conclusions: Physiotherapists‘ accuracy in screening anxiety in patients with chronic neck and/or shoulder pain is higher when using the GAD-2. Therefore, the GAD-2 is recommended above the NRS when screening for anxiety in this patient group within physiotherapy settings.

II-C.45

RELIABILITY AND VALIDITY OF THE DUTCH BODILY THREAT MONITORING SCALE IN BREAST CANCER SURVIVORS

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Background and aims: Breast cancer survivors (BCS) often experience side effects, including fear of cancer recurrence (FCR), fuelling vigilance towards bodily sensations such as pain. The Bodily Threat Monitoring Scale (BTMS), consists of 2 subscales (bodily monitoring (BM) and Bodily Threat appraisal (BTA)) and has been developed to assess these aspects. This study evaluates the reliability and construct validity of the Dutch version of the BTMS.

Methods: Adult BCS completed the BTMS and 2 other questionnaires at baseline (n=87) and once more after 2 weeks (n=67). *Reliability* was investigated using Cronbach's alpha and intraclass correlations. *Construct validity* was evaluated by using confirmatory factor analysis, and by evaluating the relationship between the BTMS, its subscales and other questionnaires: the Illness Attitude Scale (IAS) and the Anxiety Sensitivity Index (ASI-3).

Results: The BTMS showed good to excellent Cronbach's Alpha for the total scale (0.906) and subscales (BM=0.855; BTA=0.915), indicating good internal consistency. The ICC ranged from moderate to good (BTMS=0.811; BM=0.708; BTA=0.836), therefore test-retest reliability is considered good. Construct validity was shown for BTMS and IAS (r=0.762), but to a lesser extent for the ASI-3 (r=442). The factor-loadings suggest that the items in the subscales are reliably measuring the same construct. Nonetheless, the 2-factor structure of the BTMS failed to provide the best fit, although proven better than the 1-factor solution.

Conclusions: Good reliability and construct validity, based on the associations with other questionnaires, was found. However, the factor structure could not be confirmed.

II-C.46

THE RELATIONSHIP BETWEEN PAIN TOLERANCE AND PAIN BELIEFS IN ELITE LEVEL VOLLEYBALL PLAYERS: A PROSPECTIVE COHORT STUDY

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Background and aims: Pain is an unpleasant sensory and emotional experience linked to actual or potential tissue damage. It is shaped by various factors, causing individuals to express and perceive pain differently. Psychosocial factors, like pain beliefs, strongly affect pain perception, possibly leading to activity avoidance and increased pain. This study aims to explore pain tolerance in elite-level volleyball players during the half-season and investigate gender differences, pain beliefs, and their relationship to pain tolerance levels.

Methods: The study involved 21 elite-level volleyball players (9 male, 12 female, age 26,62±4,43). The pain tolerance values were evaluated by cold pressor test (CPT) to assess the sensory component of pain. Athletes' pain beliefs were also evaluated. The data were collected during 14 weeks in 3 measurements (week 0, week 7, week 14) to investigate these parameters' relationship over a half-athletic season.

Results: The mean scores obtained from the 1st measurement in the CPT, the pain tolerance, were statistically higher than the 2nd and 3rd measurements ($\eta 2=0.397$, $p<0,001$). There was no statistically significant difference between the groups in the CPT pain tolerance measurement; the mean score obtained from the 1st measurement was statistically higher in men than in women ($p<0.05$). In women, there was no statistically significant difference between groups ($p>0.05$). A negative statistically significant relationship exists between CPT pain tolerance and psychological pain beliefs ($p<0.05$).

Conclusions: Athletes' pain tolerance levels significantly decreased at week 7. Female athletes showed lower pain tolerance levels than male athletes. Pain tolerance levels were negatively correlated with psychological pain beliefs.

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II-C.47

HOW DOES PAIN-RELATED DISTRESS CHANGE IN THE TRANSITION FROM ACUTE TO CHRONIC MUSCULOSKELETAL PAIN?

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Background and aims: Musculoskeletal (MSK) pain is extremely common in the UK, and low mood is frequently experienced alongside it. This is commonly diagnosed and treated as depression; yet there is evidence that this may be pain-related distress. Pain-related distress is qualitatively different from depression; rather than a mental health disorder it is a normal and expected reaction to experiencing pain. Pain-related distress has been explored in chronic MSK pain, however, there has been no research exploring how pain-related distress may change in relation to pain duration.

The aim of this study is to explore how pain-related distress changes over time in people experiencing acute and chronic musculoskeletal pain.

Methods: Secondary analysis will be undertaken on two existing datasets as part of the STarT MSK programme. The Keele Aches and Pains Study (KAPS) was a cohort study of people consulting their GP for MSK pain, with follow-up timepoints at 2 months and 6 months. The Treatment for Aches and Pains Study (TAPS) was a cluster randomised controlled trial of stratified care for MSK pain, with monthly follow-ups for pain and distress for 6 months. Both datasets have data on pain intensity (0-10 NRS), duration (length of time since no pain), interference (Brief Pain Inventory), and low mood (KAPS = SF-36 Mental Component Score; TAPS = distress due to pain 0-10 NRS). Changes in pain-related distress over time will be explored using regression analyses.

Results: Data analysis was undertaken on 3101 participants in total (KAPS = 1890; TAPS = 1211). Populations were similar in average age (KAPS = 58.3 [16.1]; TAPS = 60.03 [15.3]) and gender (KAPS = 60.6% female; TAPS = 58.9% female). Results from the regression will be presented in the poster.

Conclusions: Understanding how pain-related distress changes over time is integral to providing effective and holistic care for people with pain. The results from this study will enable healthcare professionals to deliver more personal care by addressing and managing pain-related distress, meaning that people with pain will receive treatments relevant to them, leading to increased wellbeing.

III-C.01

DISTINCTIVE SALIVARY ORAL MICROBIOME IN PATIENTS WITH BURNING MOUTH SYNDROME DEPENDING ON PAIN INTENSITY COMPARED TO HEALTHY SUBJECTS

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Background and aims: Burning moouth syndrome (BMS) is a chronic pain condition similar to neuropathic pain. It is characterized by a persistent burning sensation in the oral cavity. Despite the lack of clarity regarding the etiology of BMS, recent studies have reported an association between the gut microbiome and neuropathic pain. However, few studies have investigated the association between the oral microbiome and orofacial pain, such as BMS. This study aimed to compare the oral microbial profiles of healthy controls (HC) and patients with BMS.

Methods: The BMS group was further divided into BMS_low and BMS_high groups according to pain intensity. A total of 60 patients with BMS (BMS_low, n Z 16; BMS_high, n Z 44) and 30 HC provided saliva samples, which were sequenced and analyzed for the V1 eV2 region of the 16S rRNA gene.

Results: The alpha diversity was similar among the three groups. However, a significant difference in the distribution of microbiome composition was observed between BMS_high and HC, as revealed by the BrayeCurtis distance analysis ($P < 0.01$). At the genus level, Prevotella and Alloprevotella were the most abundant genera in the BMS group. Compared to HC, BMS_high exhibited a relatively higher abundance of bacterial species. Some bacteria, including Prevotella spp., exhibit an increasing pattern with subjective pain intensity.

Conclusions: These results suggest the potential involvement of oral microbiota in BMS pathogenesis. Additionally, variations in the microbiome may occur not only in the presence or absence of pain, but also with pain severity.

III-C.02

UNVEILING THE TRANSITION TO CHRONIC PAIN AND IDENTIFYING TREATMENT TARGETS USING SPATIAL TRANSCRIPTOMICS IN A MOUSE MODEL OF ACID-INDUCED MUSCLE PAIN

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Background and aims: The mechanisms underlying the transition from acute to chronic pain remain unclear. In a rodent model of acid muscle pain, hyperalgesia priming established by the first acid stimulation is necessary for the development of persistent chronic pain induced by a subsequent acid injection within seven days. This study aims to reveal the temporal dynamics and spatial distribution of spinal cord gene expressions after transient pain stimulation and identify target genes essential for the development of chronic acid muscle pain.

Methods: Spatial transcriptomics and bulk RNA sequencing of mouse L4 spinal cords were performed at 1h, 4h, 6h, 4d, and 12d after intramuscular pH4 acid injection, compared to pH7 saline. Small molecule inhibitors/activators, antisense oligonucleotides (ASO), and AAV-carrying CRISPRa/CRISPRi for selected genes were used to evaluate their roles in chronic pain development.

Results: Spatial distributions of gene expression in the spinal cord dorsal horn, ventral horn, middle region of grey matter, and white matter were analyzed at time points associated with the maintenance (1h-4d) or loss (12d) of hyperalgesia priming. Early genes, such as Nav1.7, showed changes after 1 hour, and their ASO prevented the development of chronic acid muscle pain when applied before the first acid injection. Expressions of other genes exhibited changes persisting for at least four days post-first acid injection. Their activators or inhibitors prevented the development of chronic acid muscle pain when applied one day after the first acid injection.

Conclusions: This study identified genes important for the transition from acute pain to chronic pain.

III-C.03

MOLECULAR PATHOPHYSIOLOGY OF PAIN FOLLOWING COVID-19 INFECTION

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Background and aims: Long Covid presents a wide variety of symptoms including musculoskeletal pain with fatigue. The mechanisms behind the onset of these pain symptoms following Covid-19 remain unknown, with various proposed hypotheses. We aim to investigate epidemiologic and genomic factors contributing to pain in long Covid and identify molecular pathophysiology underlying long Covid Pain.

Methods: We analyzed the biobanque Quebecois de la Covid-19, a longitudinal biobank including patient questionnaires and multi-omics data. We calculated the odds ratios to identify risk factors of pain following Covid-19. Then we performed differential expression analysis of the transcriptome of patients experiencing pain against those without symptoms, using DeSEQ2. Lastly, we performed pathway analysis using fgsea to identify enriched pathways.

Results: We find that pain in Long Covid is prominent 12 months following recovery from Covid-19, and this pain developed between 6 and 12 months following recovery. Comparing patients with pain at 12 months against those with no symptoms, the transcriptomes during Covid-19 and 1 month after recovery did not present significant

differences. From 1 month to 3 months post infection, we identified a substantial downregulation of the inflammatory response in those who do not develop pain symptoms, not observed in pain patients. Finally, we identified a downregulation of myeloid cell activity in those with no pain symptoms, while those with pain instead presented an increased activity of myeloid cells.

Conclusions: These findings suggest that prolonged inflammation and myeloid cell activity contribute to the development of pain in Long Covid, and further investigation into these responses is needed.

III-C.04

PATIENT SATISFACTION RELATED TO PAIN MANAGEMENT

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Background and aims: By integrating satisfaction measures alongside pain-related variables, we can highlight comprehensive improvements from the patient‘s perspective. This study evaluated patient satisfaction and experiences with healthcare services, particularly focusing on pain treatment at the General Hospitals of Prizren and Gjilan.

Methods: This quantitative study analyzed data from 595 patients using a structured questionnaire that covered demographics, overall satisfaction, experiences, and acute and chronic pain. Data analysis was conducted using SPSS version 26.

Results: The study found that most participants were female (71% in Prizren and 65% in Gjilan), with a slight majority from rural areas (57% in Prizren and 58% in Gjilan). About 80% of respondents felt that the staff was sensitive to their pain, while 20% reported insufficient sensitivity. Significant dissatisfaction was noted in pain management processes, particularly in obtaining medications, with 41% of participants purchasing some medicines privately and 32% buying all their medications. Approximately 40% faced financial difficulties accessing necessary services, with 7% unable to afford it, while 53% could manage financially. Concerns about the professionalism of healthcare staff were expressed by 17% of hospitalized patients.

Conclusions: Patient satisfaction is closely related to the implementation of a self-management approach to pain. The analysis revealed that patients with severe pain expressed higher levels of dissatisfaction compared to those with less pain. Additionally, dissatisfaction was influenced by the empathy shown by healthcare professionals and the quality of information provided about pain management, including brochures and informational materials.

III-C.05

PREDICTIVE MODELING OF CHRONIC POSTSURGICAL PAIN: AN EXAMINATION OF PAIN TRAJECTORY, AREA UNDER THE CURVE AND CUMULATIVE PAIN INTENSITY IN TOTAL KNEE ARTHROPLASTY

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Background and aims: Postoperative pain intensity exhibits notable variability, prompting consideration of its assessment by pain trajectory, area under the curve(AUC), or cumulatively across a week-long period. We therefore examined postoperative pain intensity as a predictor for development of chronic postsurgical pain.

Methods: We examined 485 patients following total knee arthroplasty (TKA), calculating pain trajectory (slope and intercept) based on self-reported pain intensities on postoperative days 1, 3, 5, and 7. The AUC for the first postoperative week was determined by integrating the pain trajectory and computing the AUC. Cumulative pain intensity was the sum of daily pain scores. Using structural equation modeling, the sample was randomly split into

two sub-samples to explore the optimal predictive model for chronic postsurgical pain in the test group and validate it in the validation group. Decision tree analysis was employed to derive cut-off values for chronic postsurgical pain.

Results: The AUC model was the best predictor of pain intensity at one year post-TKA in both groups. The cut-off value for AUC was 424.5. Exceeding this value resulted in a 24.7% probability of chronic postsurgical pain (pain intensity > 30 mm) at one year. When the AUC was below 424.5 and the intercept was below 64, the probability of chronic postsurgical pain was 2.8%.

Conclusions: Among methodologies for prognosticating outcomes based on postoperative pain intensity, the AUC was suggested to be the most significant determinant of chronic postoperative pain.

III-C.06

PAIN QUALITY-BASED SUBGROUP ANALYSIS OF POST-STROKE PAIN: CLINICAL OUTCOMES AND WHITE MATTER FIBER DAMAGE

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Background and aims: Post-stroke pain (PSP) can be classified into several types (e.g., musculoskeletal pain, headaches, central post-stroke pain). These causes are closely related to the quality of pain, which varies depending on its origin. However, few studies have investigated this relationship. This study aims to analyze subgroups based on the quality of PSP and clarify the clinical characteristics of each subgroup. Additionally, lesion analysis of white matter fibers was conducted to explore pain mechanisms in each subgroup.

Methods: Eighty-five patients with PSP were included. Evaluations covered pain during joint movement, subluxation, joint range of motion limitation, allodynia, somatosensory disorders, FMA, MAS, Neuropathic Pain Inventory (NPI), PCS-6, TSK-11, and PainDETECT. Clinical characteristics of each cluster were compared, and NRS was recorded from the initial evaluation to 12 weeks later. The Lesion Quantification Toolkit (LQT) calculated %Parcel Damage and %Tract Disconnection from lesion areas in two patients with poor pain prognosis.

Results: Cluster analysis categorized patients into four clusters: [CL1] cold-induced pain and numbness (8 patients), [CL2] numbness (32 patients), [CL3] pain from skin stimulation (20 patients), and [CL4] deep pain (25 patients). Pain in CL1 and CL2 remained stable. For CL3 and CL4, pain were decreased significantly after the second week. LQT results indicated that thalamus and insular cortex damage, along with thalamocortical pathway lesions, contributed to chronic pain.

Conclusions: This study identified four distinct PSP clusters based on pain quality. Each subgroup had different prognoses, suggesting that understanding the quality of pain is crucial for planning rehabilitation strategies.

III-C.07

DEVELOPMENT AND VALIDATION OF A MULTIVARIABLE PREDICTION MODEL FOR TEMPORAL SUMMATION AND CONDITIONED PAIN MODULATION

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Background and aims: Identification of pain modulation profile in pain patients could lead to important information for their treatment. However, it is not easy to identify these profiles in clinic, with the techniques currently used in research clinical use. The aim of the present work was to develop and validate a model for estimating temporal summation (TS) and conditioned pain modulation (CPM) using easily accessible biopsychological characteristics.

Methods: We applied dynamic quantitative sensory testing to 347 pain-free volunteers (PFV) and 108 chronic pain patients (CPP) to assess TS and CPM. TS was induced with a constant heat pain stimulation, while CPM was measured via a tonic heat pain stimulation as test stimuli, with a cold pressor test serving as the conditioning stimuli. Biopsychological measures included, among others, pain catastrophizing, anxiety and depression levels,

blood pressure, weight, height, serum levels of catecholamines, endocannabinoids and sex hormones. A lasso method with cross validation was applied to identify the best model variables.

Results: Best performing model for TS was for PFV (10% of the variance explained) with pressure pain threshold, age and anxiety and depression score as main variable. The best performing model for CPM was for CPP (35% of the variance) included diastolic pressure, pain catastrophizing and epinephrine. Prediction error represents around 10% for each model.

Conclusions: This study provides further insight into the mechanisms involved in pain modulation and potentially useful proxy for the measurement of TS and CPM. However, prediction error remains high, limiting the clinical use of these models for the time being.

III-C.08

PROSPECTIVE PILOT STUDY OF A MACHINE LEARNING CLINICAL DECISION SUPPORT FRAMEWORK FOR INTERDISCIPLINARY MULTIMODAL PAIN TREATMENT (IMPT) OF PATIENTS WITH CHRONIC MUSCULOSKELETAL PAIN (CMP)

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Background and aims: IMPT machine learning models for CMP have shown promising potential to assist clinical decision support of patient outcomes and IMPT program efficiency. The aim is to assess machine learning predictive profiles to assist clinicians with patient selection and individual goal setting.

Methods: New IMPT patients were prospectively assessed using a framework of 13 machine learning algorithms developed with Centre for Integral Rehabilitation data from 2019-2021 (n=2,364). As no single reliable outcome measure exists, the stratified prognostic profile includes 10 clinical endpoints defined across 5 domains including activity, pain, fatigue, coping and quality of life, plus 3 composite metrics. The study was undertaken over 3 consecutive weeks in November 2023 to allow patient reported data to be finalized and prognostic profiles prepared for IMPT clinician assessments the following week. The pilot study examined the presentation and interpretation of prognostic profiles and investigated multiple ways of consolidating results.

Results: The prognostic patient profiles confirmed clinician assessment for all patients in the pilot study group. The proportions of patients predicted for positive (72.2%), mixed (22.2%) and negative (5.6%) outcomes are consistent with reported program results. The pilot process established a consolidated patient profile of 7 outcomes, enhanced summary indicators and an accuracy category based on true positive and true negative rates.

Conclusions: The stratified prognostic profile correctly confirmed prognostic assessment for all patients in the pilot study. This prospective testing phase provides further validation of the potential value of the framework for clinical decision support to help clinicians and patients.

III-C.09

EFFICACY OF TWO PSYCHOLOGICAL THERAPIES FOR DIFFERENT INDICES OF PAIN-RELATED OUTCOMES DERIVED FROM ECOLOGICAL MOMENTARY ASSESSMENT

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Background and aims: Average pain intensity is the most used index for assessing the effectiveness of treatments. Schneider and colleagues (2021) proposed alternative indices of pain intensity obtained through ecological momentary assessments (EMA). This study aims to compare the treatment effects of two psychological therapies—Acceptance and Commitment Therapy (ACT) and Behavioral Activation Therapy for Depression (BATD)—using six indices: Average, Maximum, Minimum, Variability, Time in High, and Time in Low. Unlike Schneider et al.'s study, our focus includes not only pain intensity but also pain interference, pain control, sleep disturbance, and depression.

Methods: EMA data were collected from a randomized controlled trial examining the add-on efficacy of ACT and BATD for Spanish patients with chronic low back pain and clinically relevant depression symptoms. A total of 82 patients (77% women, Mean age = 56 years; ACT = 23; BATD = 27; Treatment as Usual, TAU = 32) provided 5,361 EMA data points over 10 weeks (70 days).

Results: Time in Low Intensity emerged as the most sensitive index to treatment effects for depressed mood, sleep disturbances, and pain interference. In contrast, Average Intensity, the most common index in the literature, was not a relevant index across all study outcomes. Generally, the other tested indices did not provide additional value over Average Intensity. Compared to TAU, ACT and BATD seem to significantly improve more than one index of some outcomes.

Conclusions: Our findings suggest that indices such as “Time in Low Intensity” should be considered for detecting treatment effects in randomized controlled trials employing EMA.

III-C.10

PREDICTING CHRONIC POSTSURGICAL PAIN FOLLOWING VIDEO-ASSISTED THORACOSCOPIC SURGERY – AN EXPLORATORY ANALYSIS OF PREDICTORS AND PREDICTION MODELS

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Background and aims: Chronic Post-Surgical Pain (CPSP) following thoracic surgery significantly impacts patient recovery and quality of life. This study aims to explore predictors of CPSP and the influence of model selection.

Methods: The study enrolled 100 patients. Preoperatively, patients‘ pain sensitivity was analyzed, anxiety, depression, and pain catastrophizing was assesed, blood samples were analysed with Olink inflammatory panel, and patient demographics were gathered. One year after surgery, patients were contacted to assess CPSP, defined as any pain at the field of surgery persisting at follow-up.

To predict CPSP, three different models were trained: Kernel k-Nearest Neighbors (kKNN) with all predictors, kKNN with variable selection using Random Forest (RF), and a multiple linear regression with backward selection. Models were validated using Leave-One-Out-Cross-Validation and evaluated with concordance index and Cohen’s Kappa.

Results: A total of 86 patients completed follow-up, of which 24 (28%) reported CPSP.

The kKNN model with all preoperative data had a concordance index of 0.773, the kKNN model with variables selected using RF had 0.769 and the logistic model had 0.728. There was an overlap of predictors between the methods of variable selection. Backward selection only identified inflammatory markers, whereas RF also identified variables from QST and demographic variables.

All three models had fair inter-rater reliability, but the kKNN models were not in agreement with the logistic model (Figure 1).

Figure 1: Matrix of inter-rater reliability between models.

Conclusions: This study demonstrates that CPSP can be predicted with accuracy ranging from 0.728 to 0.773 with three different models, primarily using inflammatory markers.

III-C.12

PREDICTIVE MODELING FOR POSTOPERATIVE PAIN MANAGEMENT IN TOTAL KNEE ARTHROPLASTY: HARNESSING ARTIFICIAL INTELLIGENCE FOR PERSONALIZED CARE

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Background and aims: Chronic postoperative pain affects approximately 20% of patients following total knee arthroplasty (TKA). Early identification and prediction of this pain can improve treatment strategies and patient satisfaction. This study investigates severe postoperative pain and its risk factors, while presenting an artificial intelligence (AI) model to predict pain levels and progression after TKA.

Methods: PPain intensity in 1650 TKA patients was measured using a visual analog scale through a mobile app, from one week pre-surgery to 12 weeks post-surgery. Pre- and postoperative pain data, risk factors, and analgesic usage were collected. Patients were categorized into two groups at three months post-surgery: significant pain (D+, >40/100 pain score and/or level 2-3 painkillers) or pain-free (D-). Statistical analyses compared pre- and postoperative factors, while a training dataset identified patterns in pain trajectories. Prediction accuracy was determined using confidence intervals.

Results: At three months, 87% of patients were pain-free (D-), and 13% had significant pain (D+). Key predictors of chronic pain included comorbidities, high pain sensitivity, and higher preoperative rest pain ($p<0.05$). The pain trajectory slope was slower in the D+ group. The AI model predicted six-week pain with 67% accuracy at two weeks post-surgery and 84% accuracy at four weeks. It also predicted 12-week pain with 69% accuracy.

Conclusions: The AI model effectively predicts pain progression, supporting personalized patient communication and timely interventions. Its integration into clinical practice could enhance telemonitoring, improves pain management strategies, and promotes better outcomes and satisfaction.

III-C.13

VERIFICATION OF INTERVALS BETWEEN PRETEST STIMULI THAT DO NOT AFFECT EXERCISE-INDUCED HYPOALGESIA

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Background and aims: Verification of the effects of exercise-induced hypoalgesia (EIH) is typically conducted through quantitative sensory testing (QST). Among the QST, the conditioned pain modulation (CPM) and the temporal summation of pain (TSP) tests are the ones that produce pain. It has been reported that the effect of EIH is attenuated by the stimulation of painful stimuli immediately preceding it. Therefore, the purpose of this study was to determine the time interval during which pain stimulation by QST does not affect EIH.

Methods: Thirty asymptomatic healthy volunteers were recruited. The effects of EIH were compared under conditions that included pain-inducing tests and three different rest periods (0, 30, and 60 minutes), and under a condition in which no pain-inducing tests were performed. A rest period was allowed after the measurement of pressure pain threshold (PPT), TPS, and CPM. PPT and TPS were measured again after the rest period. The difference in PPT before and after exercise was considered the effect of EIH.

Results: Repeated measures analysis of variance showed no statistically significant differences between the four conditions (all $p > 0.05$).

Conclusions: The current study protocol suggests that the presence or absence of rest periods does not affect the efficacy of EIH.

III-C.14

PAIN RESILIENCE: STATE OR TRAIT ? DURATION AND RELIABILITY OF CONDITIONED PAIN MODULATION

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Background and aims: Conditioned Pain Modulation (CPM) might serve as prediction tool for intense acute and chronic pain. Numerous CPM paradigms exist, with poorly examined reliability. This study examines CPM-duration and day-to-day reliability of a pressure pain –cold-pressor sequential CPM algorithm.

Methods: In 52 healthy, medication-free adults, adhering to a healthy lifestyle for at least 5 days, CPM is assessed on three consecutive days at the same time of the day. The pressure pain threshold (PPT) is assessed on the distal rectus femoris muscle before (PPT0) and one, five, 15 and 30 minutes after cold-water bath immersion of the contralateral hand as conditioning stimulus (CS).Lifestyle- and psychological factors with impact on CPM are assessed. CPM is calculated as absolute (PPT0-PPT1) and percentage change ((PPT0-PPT1)/PPT0*100). Reliability is analyzed with intra-class correlation coefficient (ICC), standard error of measurement (SEM) and smallest real difference (SRD), CPM duration with ANOVA.

Results: Preliminary results of 16 participants suggest poor reliability for absolute and relative CPM (table 1), while PPT, CS duration and painfulness show good to excellent reliability. The duration of CPM seems short, with significant CPM at one minute after CS ($p<0.001$)

Complete results will be presented at the EFIC congress.

***Table 1: Reliability of test-, conditioning stimulus and CPM effect**. PPT, Pressure Pain Threshold; CS, Conditioning Stimulus; CPM, Conditioned Pain Modulation; ICC, Intraclass Correlation Coefficient; CI, Confidence Interval; SEM, Standard Error of Measurement; SRD, Smallest Real Difference.*

Parameter	Mean (± SD)	ICC (95% C.I.)	SEM	SRD
PPT 0 (kPa)	525 (78)	0.966 (0.912, 0.988)	11	32
PPT 1 (kPa)	576 (84)	0.955 (0.890, 0.984)	14	40
CS duration (sec)	83 (12)	0.956 (0.893, 0.985)	2	6
CS painfulness (NRS)	73 (11)	0.740 (0.367, 0.909)	3	9
CPM effect absolute change (kPa)	-50 (78)	0.290 (-0.418 to 0.725)	55	153
CPM effect relative change (%)	-13 (9)	0.356 (-0.290 to 0.751)	10	28

Conclusions: CPM measured on three consecutive days showed poor reliability and short duration. Thus, single CPM measurements might not be a useful assessment or prediction tool for the efficacy of individual descending noxious inhibition.

III-C.15

DETERMINATION OF THE OPTIMAL WAITING TIME BETWEEN REPEATED MEASUREMENTS OF THE PRESSURE PAIN THRESHOLD; PROTOCOL PRESENTATION

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Background and aims: The pressure pain threshold (PPT) measured with an algometer is harmless to the patient and has acceptable reliability and repeatability. It has been shown that to maximise the measurement characteristics, three consecutive measurements should be made and no more than seven consecutive measurements should be made. Although repeated measurements have been shown to increase accuracy, there is no study showing how many seconds should be waited between these measurements. In our study, we aimed to evaluate the waiting time between measurements.

Methods: The study will include 30 healthy volunteers without pain in the application areas. PPT measurements will be performed on the elbow flexor, ankle plantar flexor and trapezius muscles. Three consecutive PPT measurements will be taken to determine the pain threshold as recommended in the literature. All participants will undergo pressure pain threshold measurements in a total of five separate assessment sessions with 5, 10, 15, 30 and 60 seconds waiting intervals between measurements. Each session will take place on a different day. For each participant, the sessions will be performed in random order using a computer-aided programme. Comparisons will be made between measurements for each session and between sessions.

Results: The project is still ongoing. Results will be presented at the EFIC2025 congress.

Conclusions: The project is still ongoing. Results will be presented at the EFIC2025 congress.

III-C.16

DO EXPECTATIONS AND ATTENTION INFLUENCE CONDITIONED PAIN MODULATION? FINDINGS AND RESEARCH PERSPECTIVES FROM A SYSTEMATIC REVIEW AND META-ANALYSIS OF THE EXISTING LITERATURE

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Background and aims: Conditioned pain modulation (CPM) is a psychophysical experimental measure of endogenous pain inhibition in humans. Within this paradigm, one noxious stimulus, the conditioning stimulus (CS), reduces the

pain perception from another heterotopic noxious stimulus, the test stimulus (TS). Cognitive processes are known to influence pain perception and might impact the underlying mechanisms of CPM. This systematic review and meta-analysis synthesizes the existing scientific literature addressing the influence of cognitive factors, namely, expectations and attention on CPM.

Methods: A systematic review and meta-analysis was performed following the PRISMA guidelines. Four electronic databases were searched to identify relevant literature. Risk of bias and quality of evidence were assessed according to two modified Newcastle-Ottawa Scales and the GRADE approach, respectively. A random-effects meta-analysis was performed in Review Manager (RevMan) 5.4.

Results: Twenty-four articles were included (total sample n=1143), of which 7 were included in the meta-analysis. Qualitative analysis showed more efficient CPM when pain relief is expected, and an association between intrinsic attention to pain and reduced CPM. Although the evidence is not unanimous, meta-analyses showed that CPM is more efficient when attention is directed towards the CS versus the TS, and is not influenced by distraction.

Conclusions: CPM seems robust to the influence of attentional distraction. Pain expectations and attentional focus appear to influence CPM efficacy although evidence is limited and not always consistent. Recommendations are provided for further research to enhance our understanding on the mechanistic and influencing role of these cognitive factors and to prevent cognitive confounding during CPM evaluation.

III-C.17

REPRODUCIBILITY OF QUANTITATIVE SENSORY TESTING ON THE DOMINANT HAND, RIGHT FOREARM, RIGHT FLANK AND LOWER BACK OF HEALTHY VOLUNTEERS

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Background and aims: The subjective nature of pain complicates its description and treatment. Quantitative Sensory Testing (QST) aims to characterize the somatosensory phenotype using a standardized battery of tests, including thermal/mechanical detection and pain thresholds, stimulus/response-functions, dynamic mechanical allodynia and pain summation. In this study, the primary objective was to determine the inter-period reproducibility of QST on different body regions of healthy volunteers. In addition, the secondary objective was to collect reference data for these body regions.

Methods: Thirteen (13) QST parameters were assessed twice, one to three weeks apart, on the dominant hand, right forearm, right flank and lower back of healthy volunteers (aged 18-25 years), according to the protocol established by the German Research Network on Neuropathic Pain (DFNS) (Rolke, 2006). The inter-period reproducibility was quantified via the Intraclass Correlation Coefficient (ICC).

Results: Twenty (20) healthy volunteers (50% female, 21.67 ± 2.11 years [mean ± SD], 25% left-handed) completed both study visits (Table 1). Neither paradoxical heat sensations nor dynamic mechanical allodynia were observed. All QST parameters showed a fair (ICC ≥ 0.4) to excellent (ICC ≥ 0.8) reproducibility across the four body regions, excluding the cold detection threshold (ICC_{hand} = 0.336), mechanical detection threshold ($ICC_{forearm}$ = 0.302, ICC_{flank} = 0.197, $ICC_{lower\ back}$ = 0.109) and mechanical pain threshold (ICC_{hand} = 0.388, $ICC_{forearm}$ = 0.330) (Table 2).

Table 1: Overview of QST-parameters measured during the first study visit (n = 20). Neither paradoxical heat sensations nor dynamic mechanical allodynia were observed. All data are presented as mean ± standard deviation (SD). QST-parameters include cold detection threshold (CDT), warm detection threshold (WDT), thermal sensory limen (TSL), cold pain threshold (CPT), heat pain threshold (HPT), mechanical detection threshold (MDT), mechanical pain threshold (MPT), mechanical pain sensitivity (MPS) quantified via a Numerical Rating Scale (NRS), wind-up ratio (WUR), vibration detection threshold (VDT) and pressure pain threshold (PPT).

	Mean ± SD			
	Dominant hand	Forearm	Flank	Lower back
CDT (°C)	30.54 ± 0.6729	30.73 ± 0.5083	30.35 ± 0.6054	30.53 ± 0.3772
WDT (°C)	34.16 ± 0.8781	34.20 ± 0.6036	34.26 ± 0.9471	34.09 ± 0.6908
TSL (°C)	3.577 ± 1.322	3.831 ± 1.243	3.924 ± 1.589	3.647 ± 1.417
CPT (°C)	8.734 ± 9.442	13.24 ± 9.592	8.974 ± 9.575	7.363 ± 10.65
HPT (°C)	44.59 ± 3.985	43.48 ± 3.505	44.32 ± 3.041	43.10 ± 3.006
MDT (mN)	1.785 ± 1.195	1.414 ± 1.496	1.534 ± 1.537	2.268 ± 2.497
MPT (mN)	45.85 ± 28.71	30.94 ± 17.84	41.42 ± 42.99	56.22 ± 56.77
MPS (NRS/100)	1.001 ± 0.9630	1.163 ± 0.9690	1.135 ± 1.468	0.7685 ± 0.7222
WUR (NRS series/NRS single)	2.140 ± 1.138	2.852 ± 1.318	3.283 ± 2.528	3.552 ± 3.043
VDT (threshold/8)	7.667 ± 0.5067	6.983 ± 0.7138	6.867 ± 0.6439	7.233 ± 0.5082
PPT (kPa)	465.9 ± 144.9	362.3 ± 115.8	622.5 ± 238.9	622.5 ± 238.9

Table 2: Intraclass Correlation Coefficient (ICC) with 95% confidence intervals (CI) of the inter-period reproducibility of QST parameters (n = 20). Neither paradoxical heat sensations nor dynamic mechanical allodynia were observed. An ICC of ≥ 0.8 is defined as excellent, 0.6 – 0.8 as good, 0.4 – 0.6 as fair and < 0.4 as poor reproducibility (Marynissen, 2022). QST parameters include cold detection threshold (CDT), warm detection threshold (WDT), thermal sensory limen (TSL), cold pain threshold (CPT), heat pain threshold (HPT), mechanical detection threshold (MDT), mechanical pain threshold (MPT), mechanical pain sensitivity (MPS), wind-up ratio (WUR), vibration detection threshold (VDT) and pressure pain threshold (PPT).

	ICC (95% CI)			
	Dominant hand	Forearm	Flank	Lower back
CDT	0.336 (0.030;0.584)	0.849 (0.664;0.936)	0.512 (0.109;0.771)	0.687 (0.378;0.858)
WDT	0.559 (0.187;0.791)	0.664 (0.334;0.849)	0.525 (0.130;0.777)	0.582 (0.222;0.802)
TSL	0.898 (0.767;0.957)	0.825 (0.621;0.925)	0.851 (0.671;0.936)	0.835 (0.640;0.929)
CPT	0.891 (0.754;0.954)	0.832 (0.614;0.933)	0.579 (0.214;0.802)	0.743 (0.471;0.886)
HPT	0.738 (0.459;0.885)	0.802 (0.472;0.935)	0.720 (0.431;0.875)	0.825 (0.616;0.925)
MDT	0.787 (0.547;0.907)	0.302 (-0.146;0.647)	0.197 (-0.253;0.577)	0.109 (-0.298;0.482)
MPT	0.388 (-0.044;0.698)	0.330 (-0.113;0.663)	0.789 (0.554;0.907)	0.838 (0.627;0.934)
MPS	0.468 (0.054;0.745)	0.869 (0.772;0.926)	0.751 (0.486;0.889)	0.565 (0.194;0.794)
WUR	0.856 (0.679;0.939)	0.936 (0.849;0.973)	0.941 (0.860;0.976)	0.777 (0.526;0.903)
VDT	0.886 (0.743;0.952)	0.752 (0.487;0.890)	0.777 (0.525;0.903)	0.591 (0.225;0.811)
PPT	0.944 (0.869;0.977)	0.876 (0.722;0.947)	0.881 (0.790;0.934)	0.881 (0.790;0.934)

Conclusions: Based on the fair to excellent reproducibility of the QST parameters in general, QST can be considered an accurate method to investigate the somatosensory phenotype of patients with sensory symptoms in these body regions.

III-C.18

SHAPE MATTERS: COMPARING HEMISPHERICAL AND CYLINDRICAL ALGOMETER TIPS FOR PRESSURE PAIN THRESHOLD ASSESSMENT

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Background and aims: Pressure pain thresholds (PPTs) are widely used to assess deep tissue pain sensitivity. Most studies employ pressure algometers with cylindrical, flat tips. However, the cylindrical shape can cause skin distension, and it has been suggested that a hemispherical shape more selectively activates deep afferents. This is supported by the observation of hemispherical tips causing higher muscle strain than cylindrical tips. The present study examined whether PPTs differ when measured using a cylindrical tip compared to one with a hemispherical tip.

Methods: Forty healthy participants (age: 27.2 years, SD=4.16, 20 females) were recruited. PPTs were assessed over the participants' thenar eminence and tibialis anterior muscle using a Wagner algometer (FDK 10) with the standard cylindrical tip, and a custom-made 3D-printed hemispherical tip, each 1 cm in diameter. The orders of body area and tip were randomized and counterbalanced. Differences in PPTs acquired with the two tips were tested with Wilcoxon signed-rank tests.

Results: PPTs measured using the cylindrical tip were higher than PPTs measured using the hemispherical tip at both the thenar eminence (cylindrical: median: 3.0 kg/cm^2, interquartile range: 2.42-3.97; hemispherical: 2.7 kg/cm^2, 2.29-3.41; V=596.5, p=0.01) and the tibialis anterior muscle (cylindrical: median: 3.6 kg/cm^2, interquartile range: 2.88-4.72; hemispherical: 3.1 kg/cm^2, 2.31-4.43; V=582, p=0.02).

Conclusions: The present findings demonstrate that the shape of the pressure algometer tip influences PPT assessments and provide a basis for comparing results between studies using hemispherical tips and those using cylindrical tips.

III-C.20

ASSESSMENT OF SENSITIZATION, PAIN CONTRIBUTING FACTORS AND HEALTH STATUS IN WORK-RELATED THUMB PAIN AMONG PHYSIOTHERAPISTS. A CROSS-SECTIONAL CASE-CONTROL STUDY

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Background and aims: Physiotherapists' work-related thumb pain (WRTP) is highly impairing the physiotherapists' working ability and hasn't yet been described in a biopsychosocial framework. This study aimed to investigate the relationship between WRTP and sensitization phenomena in the peripheral and central nervous systems. Moreover, this research assessed the impact of pain-influencing cognitive factors described in the literature, such as anxiety, depression, self-efficacy, kinesiophobia, and catastrophization. This research also aimed to define the participants' health status based on the biopsychosocial framework and the role of the autonomic nervous system alterations.

Methods: In this cross-sectional study, 44 physiotherapists and 44 physiotherapy controls were assessed. Participants completed questionnaires on hand function, central sensitization, and pain-influencing factors. Examiners administered the ICF Generic Core Set (ICF-GCS), bedside quantitative sensory testing (bedside-QST), strength tests, and the vagus nerve neurodynamic test (VNNDT). All statistical tests were adjusted by age and other identified confounding factors.

Results: Physiotherapists presented sensitization involving mechanisms explained by spinal cord plasticity, without features of supra-axial involvement. Physiotherapists reported significantly more self-efficacy than controls despite the pain-related impairments. The ICF-GCS identified a significant limitation in physiotherapists' ability to work, showing a reliable detection of WRTP. ICF-GCS defined the WRTP phenomenon discriminating it from pain-free controls. The VNNDT detected long-term adaptations of the autonomic nervous system to WRTP compared to normative values and was not predictive of WRTP.

Conclusions: WRTP among physiotherapists is a multifactorial condition, involving sensitization processes like temporal summation that leads them to adopt coping strategies inadequate to overcome the pain mechanisms involved, and the derived disability.

III-C.21

CENTRAL AND PERIPHERAL SENSITIZATION, AND PAIN CONTRIBUTING FACTORS IN SHOULDER PAIN PATIENTS AND HEALTHY PEOPLE

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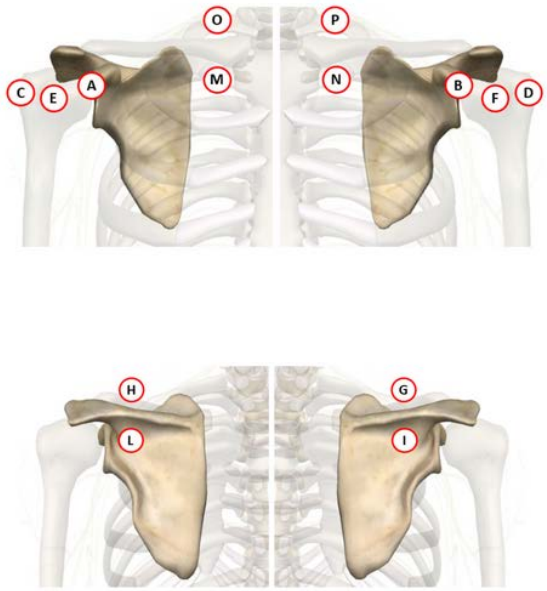
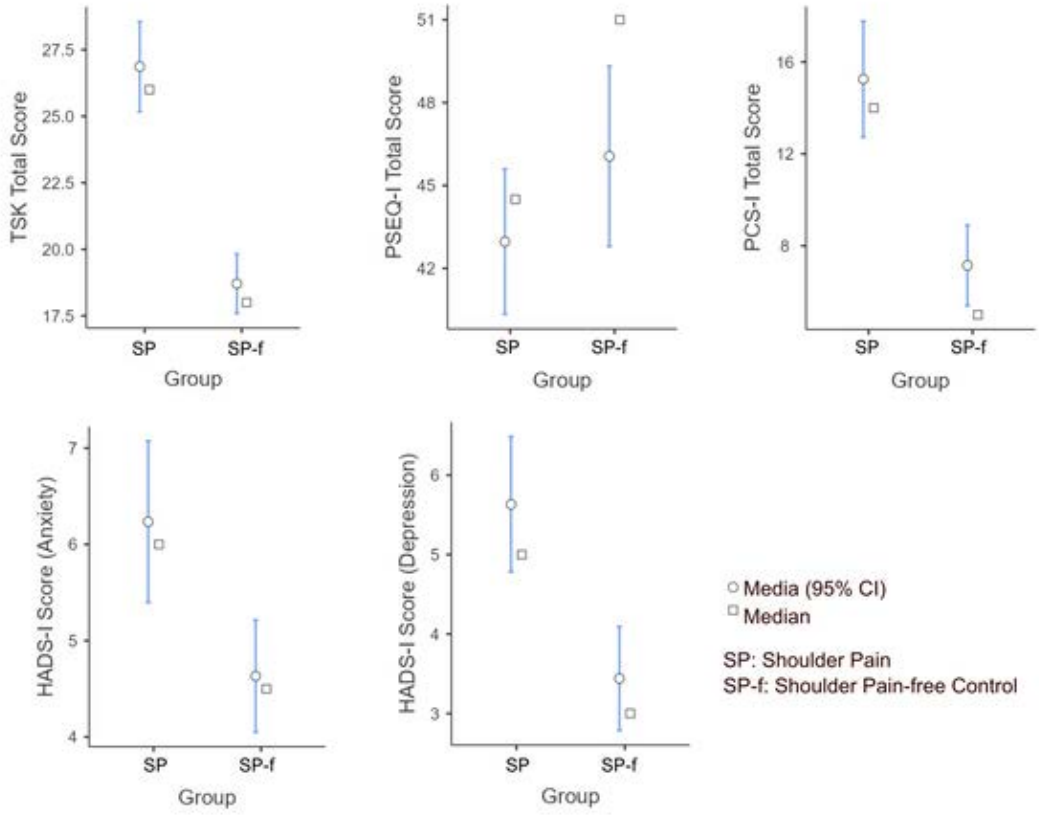
Background and aims: This case-control study, investigated sensitization phenomena in non-specific shoulder pain (NSSP) patients and shoulder pain-free controls matched by age and sex. Additionally, it explored the health status, autonomic nervous system function, and psychosocial factors such as kinesiophobia, catastrophization, self-efficacy, anxiety, and depression.

Methods: 68 NSSP patients and 68 controls completed rating scales on pain intensity, disability, psychological factors, and sensitization phenomena involving neuroplastic changes. The ICF Generic Core-Set was adopted to assess health status (HS) and bedside quantitative sensory testing was used to explore temporal pain summation (PTS), static mechanical allodynia, hyperalgesia, and sensory discrimination. The neurodynamic tests for the upper limb and the vagus nerve were adopted to assess the mechanosensitivity of the somatic and autonomic nerves.



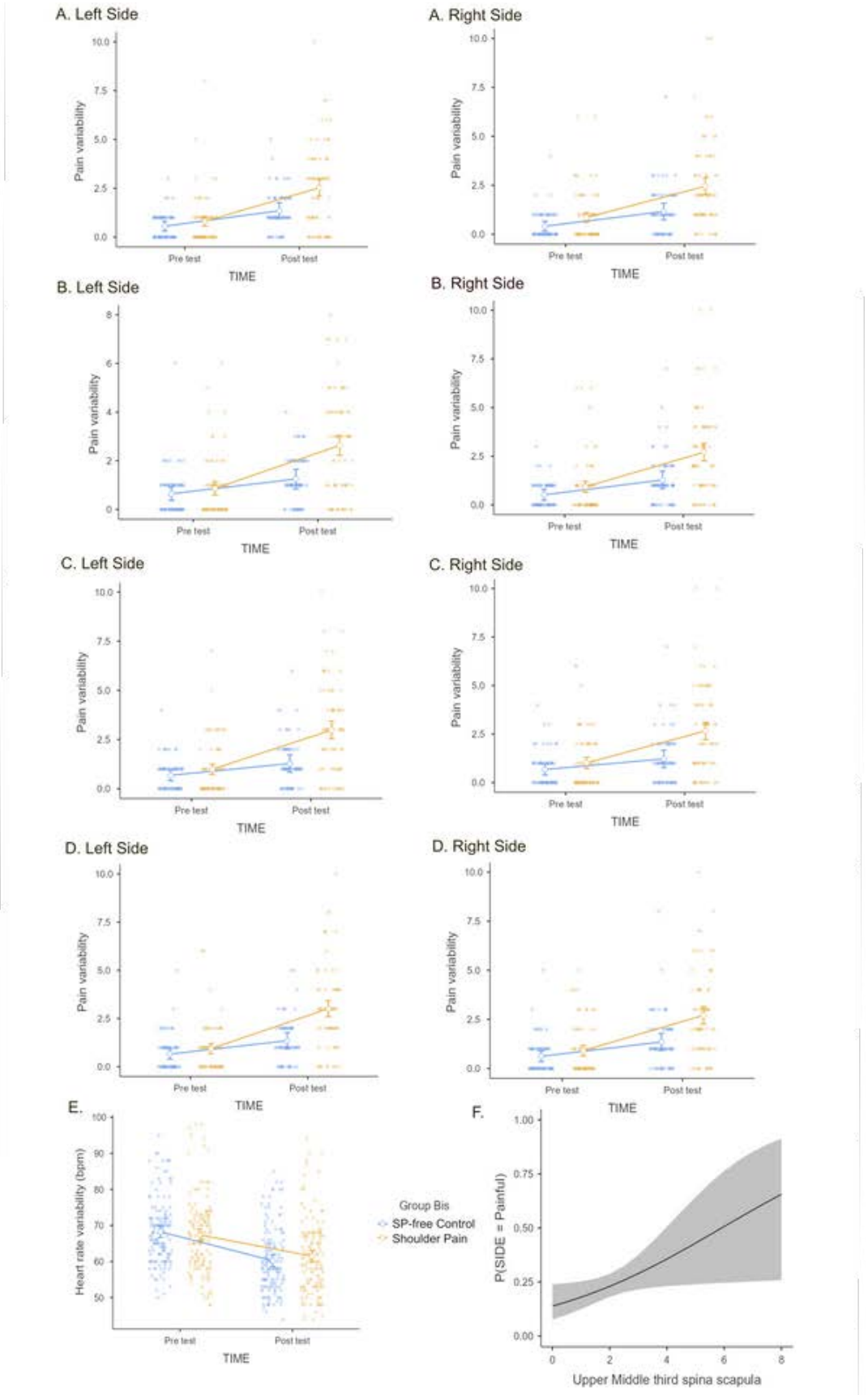
Results: Patients exhibited significantly higher mechanical allodynia and PTS but reduced sensory discrimination of stimuli compared to controls. NSSP patients showed higher but not clinically relevant scores for psychological factors and reduced perceived HS. Adjusted logistic regression revealed higher Central Sensitization Inventory scores and vagus nerve test positivity as strong predictors for NSSP. In contrast, good sensory discrimination and higher health perceived are protective from NSSP.

A


TSK Total Score
27.5
25.0
22.5
20.0
17.5
SP
SP-f
Group
PSEQ-I Total Score
51
48
45
42
PCS-I Total Score
16
12
8
HADS-I Score (Anxiety)
7
6
5
4
HADS-I Score (Depression)
6
5
4
3
Media (95% CI)
Median
SP: Shoulder Pain
SP-f: Shoulder Pain-free Control

B


Heatmap of Shoulder Pain VS Shoulder Pain-free Control
Value
2.0
1.5
1.0
0.5
0.0
Group
Shoulder Pain
Shoulder Pain-free control
b130
b152
b280
d230
d450
d455
d850
ICF Qualificators



Conclusions: Results suggest sensitization phenomena involving spinal cord and peripheral nerve plasticity, but no brain sensitization or major psychological impairment in NSSP patients. Although limitations exist, this study highlights contributing factors to pain chronicity in NSSP, that can be quantified by simple, cost-effective tools like bedside-QST, the ICF Generic Core-Set, and the neurodynamic vagus nerve test, offering a comprehensive biopsychosocial assessment to guide personalized interventions.

III-C.22

EXPLORING THE RELATIONSHIP BETWEEN PAIN MODULATION AND PSYCHOLOGICAL STATE IN PATIENTS WITH CANCER

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Background and aims: Quantitative sensory testing (QST) can measure the efficacy of endogenous pain modulation. This method involves dynamic paradigms such as Conditioned Pain Modulation (CPM) and Temporal Summation of Second Pain (TSSP). However, psychological inter-individual differences can affect the results obtained in QST paradigms, as evidenced in clinical and healthy populations.

Methods: Given the prevalence of pain in cancer patients and its interaction with mood states, we have tested the relationship between QST measures (CPM, TSSP) and psychological variables like anxiety levels (GAD-7), depressive symptomatology (PHQ-9) and pain catastrophizing (PCS), using a sample of 81 patients with a cancer diagnosis (69 women, mean age 54 y. o.).

Results: The results indicated the existence of a slight but significant negative correlation between the magnitude of TSSP and the severity of the patients' depressive symptomatology. However, results from Bayesian statistics indicated that there is insufficient evidence to support this finding. In addition, we found a significant correlation – supported by extreme bayesian evidence - between the severity of depressive symptomatology and anxiety levels, as expected. We did not find any correlation with mood states for the magnitude of CPM or pain catastrophizing.

Conclusions: The status of endogenous pain modulation pathways in cancer patients does not appear to be related to their levels of anxiety, depression or pain catastrophising.

III-C.23

CAN HUMAN SPINAL NOCICEPTION ASSESSED USING THE NOCICEPTIVE FLEXION REFLEX BE MODULATED BY NON-CONSERVATIVE TREATMENT MODALITIES? EVIDENCE FROM A SYSTEMATIC REVIEW AND META-ANALYSIS

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Background and aims: The nociceptive flexion reflex (NFR) is a spinal reflex to withdraw the limb from painful stimuli and used in experimental settings as a measure of spinal nociception and hyperexcitability. Chronic pain patients show altered NFR-outcomes, suggestive of spinal cord sensitization. Although modulation of the NFR by non-conservative treatments has been extensively evaluated, its effects have not yet been systematically summarized. Therefore, a systematic review and meta-analysis was conducted to determine non-conservative treatment effects on NFR-related outcomes in individuals with a disorder and healthy persons.

Methods: Five electronic databases were searched to identify studies comparing the effects of non-conservative treatments to control interventions or conditions on NFR-outcomes. Risk of bias was assessed using the Cochrane RoB 2.0 tool and the ROBINS-I tool. Quality of evidence was determined following the GRADE approach. Meta-analysis was performed in Review Manager.

Results: Fifty-one studies were included, of which 38 in the meta-analysis. Low quality evidence shows an increase in NFR threshold and decrease in NFR area, very low-quality evidence shows an increase of NFR latency by non-conservative treatment. Individuals with a disorder (i.e., fibromyalgia and chronic spasticity) exhibited a larger NFR area reduction than healthy persons. Very low-to-low quality evidence shows no effect of non-conservative treatment on NFR magnitude and temporal summation of the NFR. Subanalyses are presented per treatment modality including subdivisions based on the WHO ATC/DDD-index and on the mechanism of action.

Conclusions: The NFR is a valuable tool for evaluating intervention effects. Certain pharmacological, surgical, and neurostimulation interventions might aid in normalization of spinal nociception.

III-C.25

CHRONIC CANCER-RELATED PAIN IN PATIENTS SEEKING REHABILITATION FOR VARIOUS NEEDS

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Background and aims: Chronic cancer-related pain is an increasing problem concurrently with the use of more aggressive and prolonged treatment. Cancer patients' pain problems in daily life need more attention, so the patients can receive appropriate treatment. The aims of the study were 1) to describe the prevalence and characteristics of pain before and after in-patient rehabilitation in patients living with or after cancer, and 2) compare pain characteristics such as the intensity and spatial distribution of pain to that of a reference population with chronic non-cancer pain (CNCP).

Methods: From 2018 to 2021, questionnaire data was collected from 1097 cancer patients (can-cohort) prior to participation in a 7-9 weeks rehabilitation course and at the end of the course. The course wasn't specifically targeting pain problems, and required participants to be self sufficient. Their responses were compared with similar PRO-data from a reference population with CNCP (CNCP-cohort) consisting of 2208 patients treated in an interdisciplinary Pain Centre.

Results: Preliminary results show that in the can-cohort, 64% reported pain every day or on most days. Pain intensity scores (scaled 0-10) for the can-cohort (median= 5, IQR= 3-6) were similar to, but slightly lower than those of the CNCP-cohort (median=6, IQR= 5-8). Patterns of spatial distribution of pain was similar in both groups, but slightly more widespread in the CNCP-cohort. Overall, the can-cohort had better self-reported health than the CNCP-cohort. The study is work-in-progress.

Conclusions: Chronic cancer-related pain affects many patients living with or after cancer, to an extent comparable with CNCP-patients seen in pain clinics.

III-C.26

PREVALENCE OF CHRONIC PAIN IN 7TH AND 8TH GRADE STUDENTS: A STUDY IN A SMALL PORTUGUESE TOWN

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Background and aims: It is estimated that 1 in 4 adolescents experience chronic pain, significantly affecting their well-being. Understanding the prevalence of chronic pain in adolescents and exploring approaches to its prevention and treatment is essential. The aim of this study was to assess pain experiences of 7th and 8th school grades adolescents through a structured questionnaire.

Methods: A total of 355 adolescents from the 7th and 8th grade at a school in Marinha Grande, Portugal, completed a self-administered questionnaire. The questionnaire gathered demographic data and information on pain characteristics, including location, duration, frequency and intensity, and management strategies.

Results: A total of 355 adolescents answered the questionnaire. Of these, 54% were male and 46% were female. 75% of respondents reported experiencing pain in the past three months. The most common pain locations were the head (62%), limbs (62%) and back (54%). Pain intensity was generally moderate, with 47% rating their pain as 3 to 5 on a 11-point numeric rating scale. Notably, 71% of adolescents who reported pain did not consult a physician, and 42% did not pursue any treatment. Among those who sought treatment for their pain, 44% used medication, 23% received physiotherapy and 35% opted for massage.

Conclusions: The high prevalence of pain among adolescents highlights the need for effective pain prevention strategies and management tailored to this age group, requiring early recognition and thorough assessment. This study provides valuable insights into the pain experiences of adolescents, emphasizing the need for comprehensive pain assessment and management in this population.

III-C.27

DISEASE BURDEN IN CHRONIC PAIN. A LARGE SCALE REGISTRY STUDY ACROSS THE ICD-11 CHRONIC PAIN CLASSIFICATION

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Background and aims: The ICD-11 classification of chronic pain came into effect for mortality reporting January 1st 2022 and is currently implemented. The Department of Pain Management at Oslo University Hospital started using and collecting data on the updated classification already in April 2020. These data provides novel insights into the eligibility of the new classification.

Through ICD-11 based diagnostic data and baseline data from the Oslo University Hospital Pain Registry we examined demographic, social and clinical characteristics across the patient groups neuropathic, secondary non-neuropathic and primary pain.

Methods: This observational cross-sectional study utilized patient-reported data and clinician reported ICD-11 diagnoses collected through the Oslo Pain Registry database between April 14 2020 and November 07 2023. The database is a clinical pain registry covering a broad range of pain related measures and diagnoses sampled from chronic pain patients referred to the specialist health care service in Norway.

Results: The ICD-11 criteria provide a valuable framework for classifying chronic pain. Our findings align with previous research utilizing ICD-10-to-11 conversions. ICD-11 data show that neuropathic pain patients face greater burdens compared to those with primary and secondary non-neuropathic pain, with lower QOL and higher levels of anxiety and depression. Psychological approaches may be key to successful treatment in this group.

Conclusions: We still work with the data analysis. Conclusions are drawn when the data analysis is completed.

III-C.28

VALUE4PAIN: DATA-DRIVEN IMPROVEMENT OF CHRONIC PAIN CARE IN THE SOUTH OF NETHERLAND, TO SUPPORT THE RIGHT CARE FOR THE RIGHT PATIENT AT THE RIGHT PLACE

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Background and aims: Treating chronic pain is challenged by over- and under-treatment, fragmented care, and suboptimal outcomes. The aim of the Value4Pain consortium addresses current lack of value-based data-driven tools to enhance patientcare.

Methods: This work package of Value4Pain visualizes complex care processes of chronic pain patients receiving pain care at the University Pain Clinic Maastricht+ between 2015-2024. Patient reported outcome/experience measurements, treatment and process data was integrated into a data-platform and visualized with Power BI.

Results: This first version of the data-platform visualizes 2785 chronic pain patients. The first two columns indicate influencing baseline factors; diagnosis, pain characteristics, socio-demographics, and psychological factors. The third column informs on the received interventions per year in a stacked bar chart and type of diagnosis belonging to the intervention by a donut chart. The last column shows treatment outcomes measured at six months follow-up. The interactivity of the data-platform is shown in Dutch in figure 1 for patients with a practicing level of education(54%) and figure 2 for those with an academic level of education(18%) receiving Spinal Cord Stimulation. The amount of interventions received and range of diagnosis differs, with a lower score on the Numeric Rating Scale of 5.9 (delta of -2.06) for the former group and a 6.5(delta of -0.83) for the latter group.

Figure 1

Figure 2

Conclusions: The interactive data-platform provides advanced functionalities for clinicians and researchers to perform complex transformations and create insightful visualizations. The next step will apply process mining and value stream mapping of the provided patientcare.

III-C.29

EDOL MHEALTH APP AND WEB PLATFORM FOR MEDICAL FOLLOW-UP OF CHRONIC PAIN PATIENTS: SNAPSHOT OF THE FRENCH EDOL NATIONAL COHORT AFTER 3 YEARS

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Background and aims: Chronic pain impacts around 30% of the population, significantly diminishing both quality of life and work performance, while also increasing healthcare costs. Additionally, the management of chronic pain patients is complicated, often yielding only partial data on their daily pain experiences. This complexity hinders effective treatment and may contribute to the limited success of existing therapies. Implementing real-time monitoring of both subjective and objective indicators of chronic pain through mobile health (mHealth) programs has the potential to enhance patient characterization, understand chronic pain and its medications, and assess its daily impacts, ultimately improving medical management.

Methods: A large-scale cohort study was set up across France, involving patients living with chronic pain who were followed at 18 specialized pain clinics. The study utilized an mHealth tool to track and follow up on these patients. Patients participated by completing multiple surveys, providing bodymaps, and filling out weekly assessments. Additionally, they had access to educational resources focused on chronic pain management. Physicians were able to monitor patient progress in real time through an online platform.

Results: The study included 2173 individuals experiencing chronic pain, with an average age of 48 years. The majority of participants were women (81%).

64% of participants have had pain for 5 years or more, and 28% experience are diagnosed with multiple pain conditions.

71% demonstrate kinesiophobia, and 33% show signs of alexithymia.

We compared PROMIS et NeuroQol scores depending on patients' age, diagnosis and pain duration (attached)

Treatment	**%**
Antidepressants	43%
Paracetamol	40%
Opioids	36%
Antiepileptics	23%
NSAID	15%

Pain classification (ICD-11)	**%**
Chronic widespread pain	35%
Chronic neuropathic pain	20%
Chronic postsurgical or post traumatic pain	16%
Chronic primary musculoskeletal pain	14%
Chronic primary headache or orofacial pain	12%
Chronic secondary musculoskeletal pain	12%

Conclusions: The use of eDOL enabled to provide a snapshot of the national cohort.

III-C.30

THE USE OF RECTAL DICLOFENAC FOR POSTOP LOWER SEGMENT CAESAREAN SECTION PAIN: AN AUDIT EXAMINING COMPLIANCE, COMPLICATIONS AND EFFICACY

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Background and aims: Mayo University Hospital's enhanced recovery analgesia protocol (MUH FAST-TRACK) aims to minimise patient's pain in the post-op period: shortening hospital stay; enhancing recovery; minimising surgical morbidity and improving patient satisfaction. Pain after caesarean section can be related to at least two components, postoperative pain from the wound and from uterine contractions.

Fast track regimes comprises of 100mg PR Diclofenac interop with a further 50mg PO within the 24 hour period, 1G Paracetamol 6 hourly max 4g in 24 hour period, and a breakthrough of Oxynorm if required (all patient specific).

Methods: We conducted a cross-sectional convenience sample questionnaire of patient's day 1 post-op lower segment caesarean section (LSCS) and thus were eligible for FAST-TRACK analgesia. MUH Clinical Research Ethics Committee granted ethical approval and data was analysed using excel. The data was collected in the month of January 2024 on the Maternity ward.

Results: 43 participants, with a mean age of 34.5, were recruited: with 32 participants prescribed as per FAST-TRACK. Non-adherence to prescribed post-op analgesia was reported in 11 participants. A median pain score of 1 (0-10) and median pain satisfaction of 'very satisfied' (satisfied – very satisfied) was reported.

Conclusions: Mayo University Hospital has achieved significant standardisation in post-operative pain management. Anaesthetists have initiated evidenced based management strategies improving outcomes. Our data suggests the practice of a multimodal approach to post-operative analgesia and that the use of Diclofenac 100mg PR/ PO 50mg in conjunction with paracetamol (Oxynorm if required) provides effective postoperative analgesia.

III-C.31

COMPREHENSIVE CARE FOR METASTATIC BONE DISEASE: THE OXMINT INITIATIVE

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Background and aims: Metastatic bone disease is frequently associated with symptomatic skeletal-related events including severe pain. Symptoms from bone metastases frequently significantly reduce quality of life at a time when life expectancy is very limited and quality of life paramount. To date there has not been a comprehensive recognised pathway for the review of patients with difficult to manage symptomatic metastatic bone disease in the UK to ensure timely, equitable and appropriate management.

Methods: The Oxford Metastatic Intervention Team (OxMINT) is a multi-specialty forum for patients with metastatic bone disease causing uncontrolled symptoms to be considered for timely optimal intervention. Members include Interventional Musculoskeletal (MSK) Radiology, Spinal Surgery, Orthopaedic Surgery, Clinical Oncology, Interventional Pain Anaesthetics, Neurosurgery, Palliative Medicine, and Psychological Medicine. All interventions aim for symptomatic control with a focus on personalised holistic oncological care. Symptoms include pain or those due to impending fracture or joint instability. MDT recommendations to date include interventional radiological procedures, radiotherapy, surgery, anaesthetic blocks and specialist medication.

Results: 117 patients have been discussed in 134 MDT discussions with a spread of haemato-oncological diagnoses. Average age 66 years. Average oral morphine equivalent dose of 84mg. Over 70% of referrals were outpatients and the majority of those who were hospital or hospice inpatients had been admitted due to pain. The average time

from referral to discussion was 2.2 days. In 87 cases intervention was suggested (22 surgical, 29 interventional radiology, 6 anaesthetic and 32 external beam radiotherapy).

Conclusions: Multidisciplinary working are essential for the successful management of symptomatic metastatic bone disease.

III-C.32

RESTING EEG NETWORK ABNORMALITIES ASSOCIATED WITH PHANTOM LIMB PAIN: A PRELIMINARY STUDY OF FOUR CASES

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Background and aims: Phantom Limb Pain (PLP) is a common phenomenon among amputees, characterized by pain in the „phantom“ sensation of the missing limb. This pain is thought to result from brain plasticity, affecting both local sensory-motor areas and global network levels. This study aims to investigate resting-state EEG network abnormalities associated with PLP.

Methods: Four patients with PLP participated in this study, approved by the Ethics Committees of Kio University. During EEG recording, subjects sat comfortably with eyes closed, staying in a resting state. EEG signals were continuously recorded at 1024 Hz using a 64-channel EEG amplifier (BioSemi) for at least three minutes. After measurement and preprocessing (resampling, noise reduction, etc.) in MATLAB (MATLAB2023b), brain network analysis based on graph theory was conducted.

Results: For each epoch, the debiased weighted phase-lag index (dwPLI) was calculated for all pairwise channel combinations, constructing a 64×64 connectivity matrix that covered all electrodes. Based on this matrix, the connectivity strength at each node was computed. The results indicated that in the alpha band, patients with stronger PLP exhibited lower connectivity strength in the midline regions, while those with less PLP showed higher connectivity strength in the sensory-motor areas, visual areas, and midline regions.

Conclusions: Upper limb amputees with PLP showed alterations in the sensory-motor areas and the default mode network. Therefore, it is considered important for PLP rehabilitation to focus on interventions that facilitate the reconstruction of the sensory-motor network and the default mode network.

III-C.33

ASSESSING THE PREDICTIVE VALUE OF PEAK ALPHA FREQUENCY FOR THE SENSITIVITY TO PAIN

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Background and aims: Pain perception varies considerably between and within individuals. The peak alpha frequency (PAF) over somatosensory areas has recently been shown to predict an individual’s sensitivity to longer-lasting experimental and clinical pain. PAF is, thus, discussed as a potential biomarker and novel target for neuromodulatory pain treatments. Here, we scrutinized the generalizability of the relation between PAF and pain.

Methods: In two identical sessions separated by one month, we applied brief painful laser stimuli to 159 healthy participants and related inter- and intra-individual variations of pain perception to PAF measured with electroencephalography (EEG). In a preregistered two-step approach, we first related PAF to pain perception using a predefined analytical pipeline. We then complemented these analyses with multiverse analyses, testing the robustness of our findings across different analytical choices. For internal replication, analyses were repeated for both sessions.

Results: Comprehensive predefined and multiverse analyses across two sessions did not provide consistent evidence for a predictive role of PAF for brief experimental pain. This applied to both inter- and intra-individual pain variations and when measuring PAF over somatosensory areas or on a global level. Notably, a positive control analysis confirmed the sensitivity of our analytical approach by detecting the well-known slowing of global PAF with age.

Conclusions: Our findings demonstrate that the relationship between PAF and pain does not generalize to all types of pain. They call for a systematic exploration of the relation between PAF, pain perception, and other neuropsychiatric symptoms to better understand the perspectives and limits of PAF as a biomarker.

III-C.34

PAIN SENSITIVITY AND EMOTIONAL PROCESSING IN CHRONIC WIDESPREAD PAIN: EXPLORING RESTING EEG BIOMARKERS

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Background and aims: We analyzed resting EEGs from 22 CWP patients and 22 matched HC from the Technical University of Munich dataset using low-resolution brain electromagnetic tomography (LORETA). Differences in CSD and FC were assessed with unpaired t-tests, and their relationships with subjective pain intensity and mood were evaluated through correlation analyses. The significance threshold was set at $p<0.05$.

Methods: Twenty-two CWP patients and 22 healthy controls (HC) from the Technical University of Munich dataset were included. Resting EEGs were analyzed using low-resolution brain electromagnetic tomography analysis (LORETA). CWP and HC were compared for CSD and FC using unpaired t-tests. Correlation analysis was performed between secondary endpoints and CSD/FC in the CWP group. The significance level was set at 0.05.

Results: While overall CSD and FC did not differ significantly between groups, specific patterns were observed in the CWP group. Notably, CSD within the gamma band (30.5–60 Hz) in the posterior cingulate cortex and adjacent precuneus showed a strong negative correlation with current pain levels ($p<0.01$). Similarly, FC within the delta band between the right anterior insula and anterior cingulate cortex was positively correlated with emotional distress scores from the McGill Pain Questionnaire ($p<0.05$).

Conclusions: Our findings emphasize the importance of the default mode and salience networks in modulating pain and emotion in CWP. The posterior cingulate, precuneus, anterior insula, and anterior cingulate cortex play key roles, enhancing our understanding of the neurophysiological underpinnings of CWP. This could further assist in the development of targeted non-invasive treatments.

III-C.36

EXPLORING CHANGES AND ASSOCIATIONS IN PRIMARY MOTOR CORTEX AND MOTOR-SENSORY TESTS IN RELATION TO LOW BACK PAIN RECOVERY

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Background and aims: The evidence for primary motor cortex reorganization in people with low back pain (LBP) varies and is conflicting. Little is known about its association with motor and sensory tests, and recovery. We investigated the organization of the primary motor cortex, and associations with motor and sensory tests over time in people with LBP (both those who recovered and did not recover) in comparison with people without LBP.

Methods: A prospective study with a five-week follow-up was conducted in people with (N=25) and without (N=25) LBP. Participants with LBP received usual care physiotherapy during the time-interval. The primary motor cortex organization, including the Center of Gravity (CoG) and Area of the cortical representation of trunk muscles, was evaluated using neuronavigated transcranial magnetic stimulation, based on individual MRIs. Additionally, a motor control test (spiral tracking test) and sensory tests (quantitative sensory testing, graphaesthesia, two-point discrimination threshold) were administered.

Results: In non-recovered participants, the CoG of longissimus L5 moved significantly anterior, and their temporal pain summation decreased significantly more than in people without LBP. The spiral tracking path length decreased significantly in participants without LBP, which differed significantly from the increase in recovered participants. Significant associations were found between CoG and area of predominantly longissimus L5 with quantitative sensory tests, and the spiral tracking test.

Conclusions: We found a limited number of significant results, mainly related to longissimus L5. The direction of these changes and associations varied. Hence, it is unclear if true changes in cortical organization occur in people with LBP on a short timescale.

III-C.37

RESTING STATE EEG AND MEG IN MIGRAINE – A SYSTEMATIC REVIEW AND META-ANALYSIS

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Background and aims: Migraine affects over 1 billion people globally, and there is a significant need for clinically valuable biomarkers to guide diagnosis and treatment. Neuroimaging studies have uncovered widespread changes in brain function in people with migraine. Electroencephalography (EEG) and magnetoencephalography (MEG) studies have shown alterations in neuronal oscillation and connectivity patterns across various frequency bands, but results were often conflicting. Crucially, there has not yet been a systematic synthesis of available evidence on the use of M/EEG in migraine and potential biomarker applications.

Methods: We conducted a preregistered systematic review and meta-analysis (PROSPERO *CRD42024550157*). We searched MEDLINE, Web of Science, and EMBASE for peer-reviewed studies that utilized resting-state M/EEG to analyze brain activity through oscillatory power, peak frequency, or connectivity features. Meta-analysis (random-effects-models) was conducted for comparisons with *k>4* suitable studies, and semi-quantitative data synthesis was used for the remaining comparisons. Risk of Bias was assessed with the Newcastle-Ottawa-Scale.

Results: After screening *3596* studies, *27* studies were included. Meta-analyses revealed higher power of brain activity at theta frequencies (3–8 Hz) than in healthy participants. Furthermore, we found evidence for lower alpha and beta connectivity in people with migraine in the interictal phase. Moreover, some evidence for higher delta and beta power in the premonitory compared to the interictal phase was found.

Conclusions: Our findings can guide future M/EEG studies on migraine pathophysiology and brain-based biomarkers, which should consider comorbidities and aim for standardized, collaborative approaches.

III-C.38

TRANSDIAGNOSTIC RESTING-STATE EEG BIOMARKERS OF CHRONIC PAIN, DEPRESSION, AND FATIGUE

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Background and aims: Chronic pain, depression, and fatigue are highly comorbid and prevalent symptoms. Importantly, this symptom cluster has been associated with increased suffering and poor treatment outcomes. The underlying brain mechanisms are only partially understood, but a common etiology has been proposed. However, transdiagnostic biomarkers are lacking. Insights into brain function in chronic pain, depression, and fatigue will aid the understanding of this comorbidity. Moreover, developing transdiagnostic biomarkers could further the diagnosis and treatment of this symptom cluster in line with the NIMH Research domain criteria approach.

Methods: To summarize the current knowledge on electrophysiological brain correlates of chronic pain, depression, and fatigue, we performed a series of preregistered systematic literature reviews (PROSPERO: CRD42021272622, CRD42022330113, CRD42024492853) following PRISMA-Guidelines. MEDLINE, Web of Science Core Collection, and EMBASE were searched for quantitative resting-state electroencephalography (EEG) studies in adult patients suffering from these symptoms separately.

Results: The systematic reviews for chronic pain, fatigue, and depression included 76, 26, and 53 studies, respectively. For all three, semiquantitative analysis of cross-sectional studies using albatross plots revealed an increase in theta band power compared to healthy participants. The risk of bias was assessed with a modified Newcastle-Ottawa Scale and was considerably high in all the systematic reviews.

Conclusions: These findings point towards increased theta oscillations as a transdiagnostic biomarker for the symptom cluster of pain, depression, and fatigue. Thus, using theta oscillations to diagnose, monitor, and eventually treat this burdensome comorbidity, e.g., using neuromodulation techniques, should be further evaluated.

III-C.39

NEURAL AND PSYCHOLOGICAL PREDICTORS OF POST-STROKE PAIN: INSIGHTS FROM LESION NETWORK MAPPING

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Background and aims: Post-stroke pain (PSP) affects nearly half of stroke survivors, significantly impairing quality of life. The interplay between PSP and psychological factors, such as anxiety and depression, is underexplored. This study investigates predictors of PSP and its relationship with mental health comorbidities, using advanced lesion network mapping techniques.

Methods: We analysed data from the INSPiRE-TMS cohort, which included 1,022 stroke patients with clinical date, 391 of whom had additional neuroimaging examinations. Pain severity was evaluated using the EQ-5D-3L questionnaire at Baseline, 1, 2, and 3 years post-stroke. Severe pain (EQ-5D score = 3) and psychological factors were assessed longitudinally. Lesion symptom and network mapping were conducted to identify neural correlates of PSP. Neurosynth was used to compare our lesion network results with a large database of neuroimaging studies.

Results: Up to 50% of patients reported pain post-stroke. Regression analyses identified anxiety as the only significant predictor of PSP (OR 2.58, p = 0.047). Lesion network mapping revealed that PSP is associated with disruptions in networks involving insular cortex, thalamus, and anterior cingulate cortex (Fig.1A). Adjusting for anxiety (Fig.1C-D) highlighted distinct network contributions, suggesting interactive effects of psychological states on pain perception. Neurosynth comparison indicated that the terms most strongly associated with our network were pain and nociception (Fig.2), suggesting common neural pathways underlying PSP, irrespective of PSP etiology.

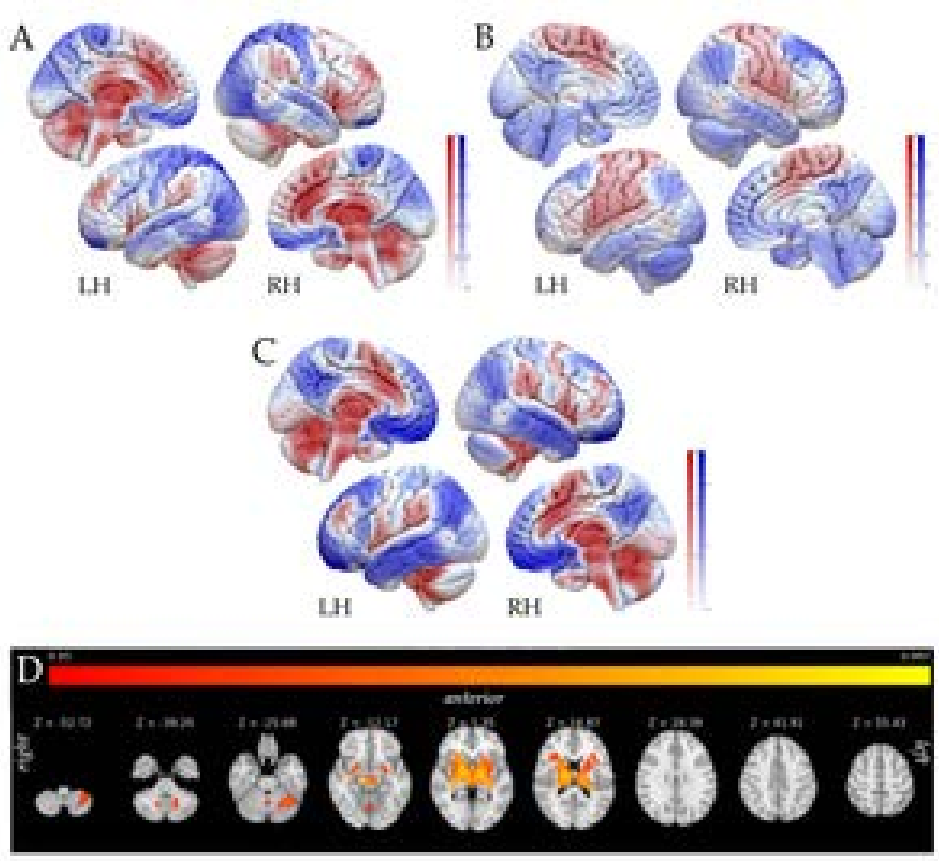

Fig.1

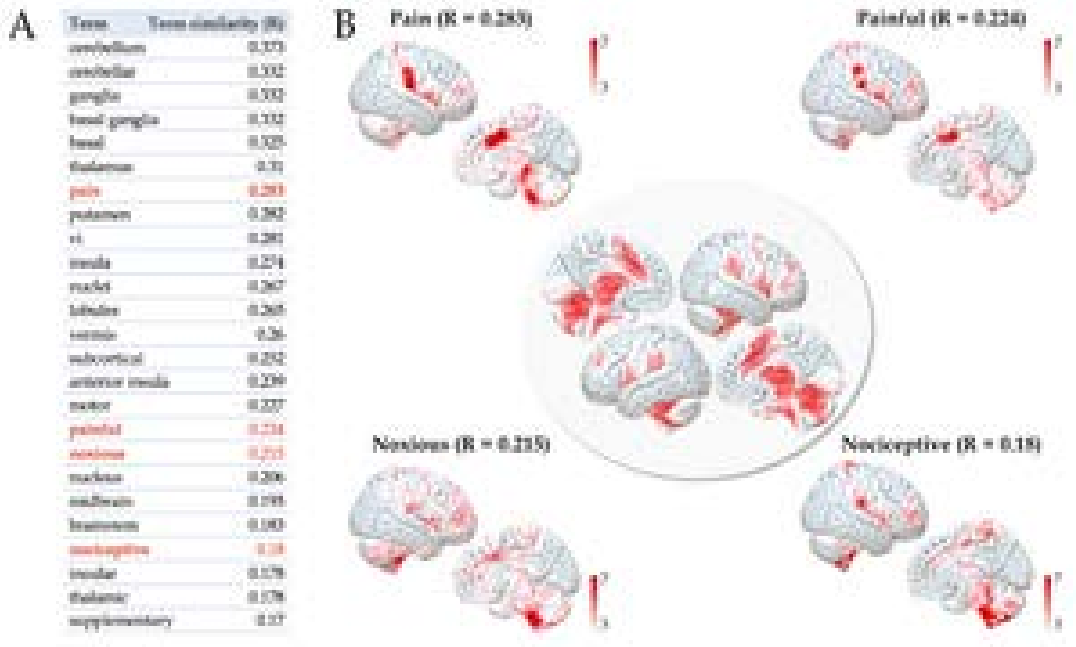

Fig.2

Conclusions: PSP and psychological comorbidities exhibit a reciprocal relationship, highlighting the need for integrated, multidisciplinary approaches. Personalized interventions targeting both neural and psychological components of PSP could improve long-term outcomes for stroke survivors.

III-C.40

ASSESSING THE TEST-RETEST RELIABILITY OF EVENT RELATED CORTICAL ACTIVITY FOLLOWING HIGH FREQUENCY STIMULATION INDUCED SENSITISATION OF CENTRAL NOCICEPTIVE PATHWAYS

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Background and aims: The high-frequency stimulation (HFS) model is linked to the gradual development of pain sensitivity in nociceptive pathways [1]. These temporal changes in sensitivity, along with their associated cortical responses, can be evaluated through psychophysical pain ratings alongside electroencephalography (EEG) [2]. However, the test-retest reliability of HFS-induced temporal changes in EEG and psychophysical pain rating data are unclear.

Methods: Twenty-nine participants (19 female) attended two sessions a week apart. Anxiety (state and trait) was assessed at the start of each session. HFS was applied to the volar forearm with mechanical pain sensitivity (MPS) and electrically-evoked responses assessed in a heterotopic and homotopic area, respectively at baseline and 5, 20, 35, and 50 minutes post-HFS. EEG data were time-locked to nociceptive stimuli. Pain and EEG outputs were analysed using linear mixed-effects models (LMM), with fixed effects for time, session, and mediators such as anxiety. ICCs (absolute-agreement, ICC3,1) were calculated for test-retest reliability.

Results: Test-arm MPS showed significant hyperalgesia over time ($F=6.76$, $p<0.001$) and differences between sessions ($F=32.21$, $p<0.001$), mediated by HFS pain intensity ($F=8.28$, $p=0.005$) and trait anxiety ($F=6.18$, $p=0.014$). Control-arm MPS demonstrated hypoalgesia over time ($F=3.17$, $p=0.015$) and differences between sessions ($F=82.6$, $p<0.001$). Homotopic responses showed session effects but no time effects. ICCs were highest at baseline (0.79–0.92) but varied post-HFS (0.53–0.87). Prospective EEG analyses will evaluate ERP and ERSP measures and their relationship to pain ratings.

Conclusions: HFS induces reliable mechanical hyperalgesia, although with test-retest variability introduced over time. EEG analysis may elucidate cortical mechanisms underlying these changes.

III-C.41

HOW IS ALTERED PAIN MODULATION RELATED TO BRAIN VOLUMES IN DIFFERENT PAIN POPULATIONS?

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Background and aims: Dysfunctional endogenous pain modulation is implicated in chronic pain conditions such as fibromyalgia (FM) and chronic low back pain (CLBP). This study aimed to examine the association between brain volumes (i.e. structural alterations in gray matter) and pain modulatory mechanisms in FM, CLBP, recurrent low back pain (RLBP), and pain-free controls.

Methods: In this cross-sectional study, 83 female participants (21 FM, 21 CLBP, 22 RLBP, 19 controls) underwent structural MRI to assess gray matter volumes (GMVs) in pain-related brain regions and a conditioned pain modulation (CPM) paradigm to evaluate endogenous pain modulation. Group differences in GMVs, CPM outcomes, and their associations were analyzed.

Results: FM patients exhibited significantly lower pain thresholds and inefficient pain modulation (lower CPM responses) compared to the other groups ($p<.05$). Right superior frontal GMVs were significantly lower in FM and CLBP compared to RLBP and controls ($p<.01$). Also, the bilateral cerebellum was significantly lower in FM compared to the other groups ($p<.01$). In the chronic pain groups (FM and CLBP) smaller cerebellar GMVs were correlated with small pain modulatory capacity ($p<.05$). Interestingly, the RLBP group showed an opposite association (negative correlation, $p<.05$). In controls larger right superior frontal GMVs were correlated with better CPM responses ($p<.05$), which was absent in the pain-groups.

Conclusions: Dysfunctional pain modulation in chronic pain patients, especially in FM, correlates with decreased GMVs in specific brain regions such as the cerebellum. These structural alterations may underlie impaired pain inhibition, offering insights into the neural mechanisms of chronic pain conditions.

III-C.42

DYNAMICS OF ELECTROENCEPHALOGRAPHIC PEAK ALPHA FREQUENCY IN CAPSAICIN-INDUCED PAIN AND RESOLUTION

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Background and aims: Electroencephalographic (EEG) peak alpha frequency (PAF) is associated with chronic and experimentally induced pain. Additionally, prolonged experimental pain decreases PAF, but this change was not reversible upon pain resolution. Therefore, PAF may reflect pain-associated states rather than ongoing pain presence. This study aimed to understand mechanisms relating PAF to pain, by investigating capsaicin-induced pain effects on PAF in pain-free adults during 1- and 24-hour pain, resolution via cooling, and failitation through reheating.

Methods: Pre-registered Bayesian secondary analysis (https://osf.io/5ekxs/) used data from two placebo-controlled, cross-over studies (N=52). Participants underwent capsaicin-patch induced pain and placebo-patch sessions with EEG recordings at baseline and 1-hour. The second study included 24-hour sessions (n=24), with EEG measured before and during patch cooling and reheating. Global PAF (center of gravity) was extracted using the DISCOVER-EEG pipeline.

Results: Capsaicin induced pain after 1-hour (6.8±2.2, numerical rating scale) and 24 hours (3.8±2.3), while placebo did not (1-hour: 0.4±1.0; 24-hour: 0.06±0.2). PAF decreased during 1-hour capsaicin pain compared to placebo (b=-0.04, 96% CrI: [-0.1, 0.02], evidence ratio=8.8). PAF then increased between 1-hour and 24-hours for capsaicin compared to placebo (b =0.14, 96% CrI: [0.05, 0.24], evidence ratio=443.4). From 24-hours application to pain resolution via cooling, PAF decreased for capsaicin compared to placebo (b=-0.10, 96% CrI: [-0.19, -0.01], evidence ratio=50.3).

Conclusions: Capsaicin-induced pain affects PAF, with acute decreases then increases after 24 hours, possibly reflecting compensatory attention mechanisms, since a decrease was also found with subsequent pain resolution. These findings underscore the complexity of pain adaptation and temporal PAF dynamics.

III-C.43

THE INFLUENCE OF PAIN ON MULTISENSORY INTEGRATION AND THE UNDERLYING NEURONAL NETWORKS

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Background and aims: Pain disorders such as migraine and fibromyalgia can alter multisensory integration. Multisensory illusions are a powerful tool to research these alterations and are also suitable researching their underlying neuronal mechanisms in humans using functional magnetic neuroimaging (fMRI). Nevertheless, the number of pain-related multisensory illusion paradigms are limited. We developed a novel pain-related multisensory illusion suitable for fMRI.

Methods: In the well-researched sound-induced flash-illusion (SIFI) a beep-tone accompanied by two flashes can lead to the illusory perception of just one flash. We replaced the beep tone by painful electrical stimulation creating the pain-induced flash illusion (PIFI) and tested its robustness in comparison to the SIFI. Furthermore, we investigated the underlying neuronal networks using fMRI. Here we used the Illusion as an informative for multisensory processing and compared the brain activation patterns during audio-visual and pain-visual illusions.

Results: Pain is able to influence visual perception. We reproduced the results in three consecutive experiments. Non-painful electrical stimuli also create an illusion, but with a weaker power than painful stimuli. In functional imaging, we found a common pattern of brain activation during audio-visual and pain-visual illusion, while some areas seem to be exclusive to a pain-visual and audio-visual multisensory network.

Conclusions: The development of PIFI and the comparison to its counterpart SIFI sets a path for further investigation in the interaction of multisensory processing and pain.

III-C.44

RESTING-STATE NEURAL CORRELATES OF DISRUPTIONS IN SPATIAL PERCEPTION DURING TONIC EXPERIMENTAL PAIN: A PILOT FMRI PROTOCOL

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Background and aims: Accurate collision prediction is essential for avoiding injury in everyday life. After injury, these predictions are even more critical for responding to potential threats. While changes in spatial perception and responses to approaching objects have been observed during anxiety, threat, and in chronic pain conditions, little is known about spatial attention changes during tonic (post-injury-like) pain. This protocol describes a pilot study to investigate neural changes in spatiotemporal representations during tonic experimental pain.

Methods: Fourteen healthy participants will complete a time-to-collision task prior to MRI scanning, responding when a ball approaching towards the left or right would hypothetically collide with them. The task will be performed during no pain and with tonic pain on the left forearm. fMRI resting-state activations will be compared between pain and no-pain conditions, using time-to-collision estimates as covariates.

Results: The project is ongoing (expected completion: March 2025). We hypothesize differences in behavioural responses during tonic pain, particularly in individuals reporting higher pain unpleasantness and state anxiety. Additionally, we hypothesize that default mode network activation will predict intertrial variability of collision estimations and behavioural responses during tonic pain.

Conclusions: This novel paradigm explores the neural basis of changes in spatial perception during tonic pain. Altered patterns of resting-state neural activation and collision estimations may reflect shifts in threat sensitivity during tonic pain, offering valuable insights into recovery and rehabilitation processes in injury states. Findings could also help identify individuals who are at greater risk of transitioning from acute to chronic pain, guiding early interventions to improve outcomes.

III-C.46

RECOMMENDATIONS FOR DEVELOPMENT, IMPLEMENTATION AND REPORTING OF TRANSLATIONAL CHRONIC PAIN TRIALS –A MULTIDISCIPLINARY, INTERNATIONAL DELPHI-CONSENSUS PROCESS FROM THE IT-PAIN CONSORTIUM

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Background and aims: Despite extensive research, progress in management of chronic pain remains limited. Reasons are huge heterogeneity of protocol design and data collection in preclinical and clinical chronic pain trials, hampering comparability and translatability of results from bench to bedside. The EU-funded ITPain consortium addressed these challenges by developing consensus-based recommendations to harmonise protocols and data collection within and between preclinical and clinical pain trials with the focus on outcome assessment, sensory phenotyping, preclinical pain models and multi-omics approaches.

Methods: Scoping reviews and focus meetings were conducted to identify goals and gaps in clinical and preclinical pain research. Based on these results, preliminary recommendations were formulated and discussed with a

multidisciplinary team of clinicians, clinical scientists, pain researchers of different disciplines as well as patient representatives at a face-to-face meeting. A Delphi process with three iterative rounds and consensus meetings generated a definitive list of consensus-based recommendations.

Results: Seventy-five initial recommendations were condensed and refined into a definitive list, which aims to improve the quality and translatability of chronic pain research across clinical and preclinical contexts. Clinical recommendations address patient selection, outcome domains, and sensory phenotyping, while preclinical guidelines focus on meaningful pain models including assessment of pain and sensory testing. Recommendations on aspects related to -omics techniques in preclinical and clinical trials round off the list.

Conclusions: These recommendations will improve future trial design, reduce research waste, and facilitate the translation of preclinical findings into clinical practice with the aims of enhancing the discovery of novel therapeutic targets and the development of effective treatments.

D | PAIN THERAPIES

I-D.01

INTEGRATIVE KOREAN MEDICINE TREATMENT FOR PATIENTS WITH FIBROMYALGIA: A PROSPECTIVE OBSERVATIONAL STUDY

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Background and aims: Fibromyalgia (FM) is characterized by chronic widespread pain, often accompanied by fatigue, sleep disturbance, other functional symptoms. Integrative Korean Medicine (KM) treatment is a multidisciplinary intervention that is effective in alleviating pain and functional symptoms. To preliminarily explore its effectiveness on pain and psychosocial comorbidity of FM patients, we pragmatically implemented an integrative KM treatment based on individual symptoms.

Methods: From June 2022 to December 2022, we recruited twenty FM patients according to the modified 2016 American College of Rheumatology criteria. Integrative KM treatments were tailored to the FM patients twice a week for 4 weeks in real-world practice. The primary outcome was numeric rating scale (NRS). The secondary outcomes measure consisted of scales for pain, mood, other symptoms and facial expression analysis. Outcome measures were collected at baseline, week 2 and week 4.

Results: Of the 20 enrolled patients, 15 completed treatments for 4 weeks. Between baseline and week 4, the NRS scores on pain of the day decreased from 6.40 to 5.15 (p-value = .0158) for the average pain score vs from 7.85 to 6.40 (p-value = .0104) for the most severe pain score. In the correlation analysis, the mean pain intensity was correlated with pain catastrophizing scale, beck depression inventory, and beck anxiety inventory as well as with facial expression of joy.

Conclusions: In this study, integrative KM effectively reduced not only the severity of pain but also depression and anxiety symptoms in FM patients. Additionally, we found significant correlations between pain and some psychiatric symptoms before and after treatment.

I-D.02

COMPARATIVE EFFECT OF ACUPUNCTURE RELATED TO USUAL CARE IN PATIENTS WITH CHRONIC LOW BACK PAIN: A SYSTEMATIC REVIEW OF THE LITERATURE

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Background and aims: Chronic low back pain (cLBP) is a prevalent condition that significantly impacts individuals' quality of life and poses a substantial burden on healthcare systems. Complementary and alternative medicine

approaches, such as acupuncture, have gained attention for their potential in managing cLBP. The aim of this systematic review is to compare the effectiveness of acupuncture in treating cLBP compared to usual care.

Methods: A literature search was conducted from inception to February 2024 in MEDLINE (PubMed), Scopus, PEDro, and Cochrane Library databases. Only studies satisfying the inclusion and exclusion criteria (Table1) were selected.Two reviewers independently screened the studies, used the PEDro scale to assess their quality and extracted the data.

Inclusion Criteria	**Exclusion Criteria**
English Language	Pregnancy
Randomised Control Trials	systematic reviews or meta-analyses, case studies, pilot studies, study protocols, observational studies, preliminary studies, etc.
Body - , Electro-, Cranial-, Ear-acupuncture	Sham acupuncture, bee venom acupuncture, thread acupuncture
Acupuncture technique as a single treatment	Acupuncture technique part of the treatment
Pain in lower back with a duration longer than 3 months	Pain in lower back with a duration less than 3 months
	Age less than 18
	Pain attributed to infections, fractures, tumors, systemic disease, radicular syndrome, cauda equina syndrome, vertebral or other fracture, previous spinal surgery

Table1: Inclusion/Exclusion Criteria

Results: Two reviewers independently included 9 studies from a total of 2926 initial records, with 1816 participants that met the inclusion/exclusion criteria in this systematic review.

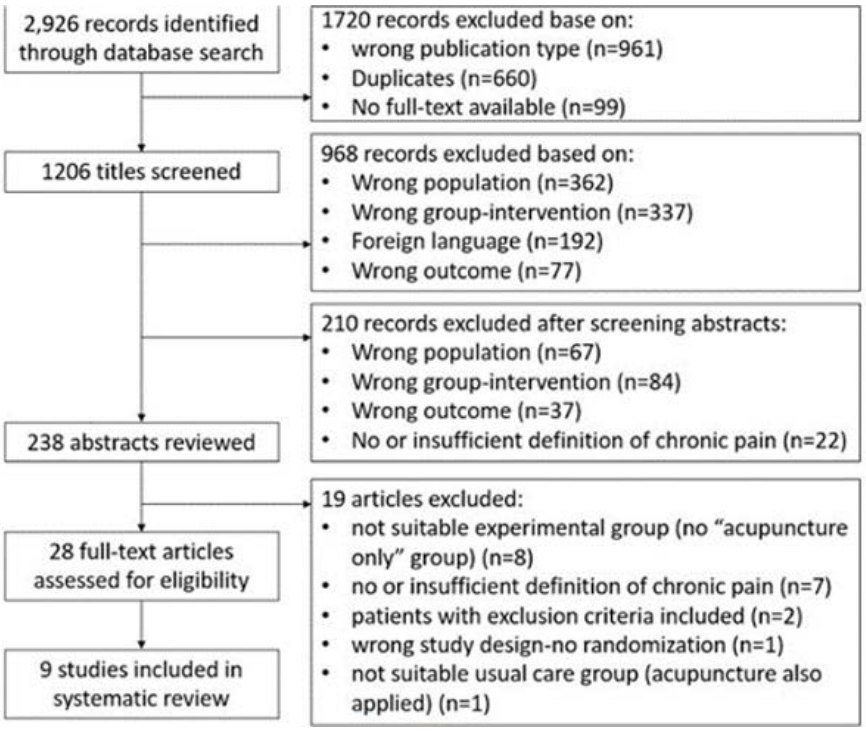

Fig. 1 Literature flow

The mean value of the Pedro Scale for the nine studies was 5.6 ranging from 2(1 study) to 8(3 studies) (Table 2)

Author / Year	Pedro Score
Lara Palomo et al. 2024	8
Lehmann et al 1986	2
Cheng et al 2023	5
Meng et al 2022	8
Namiranian et al 2022	5
Shankar et 2011	5
Haake et al 2007	8
Camiliotti et al 2015	4
Zaringhalam et al 2010	6

Despite the differences between the studies regarding treatment duration, number of sessions and other parameters the majority of RCTs concluded that acupuncture produced statistically better results regarding pain, functional disability, fear avoidance, quality of life compared to usual care both in the short and long term.

Conclusions: Acupuncture compared to usual care is considered effective in reducing pain, functional disability and improving quality of life in patients with cLBP. However since there was very low homogeneity in the included studies these results need to be interpreted with caution.

I-D.03

MECHANISMS OF ELECTROACUPUNCTURE AND PREGABALIN ATTENUATE NEUROPATHIC PAIN AND REPAIR ULTRASTRUCTURE DAMAGE IN A RAT MODEL OF BRACHIAL PLEXUS NEURALGIA

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Background and aims: The goal of this study was to investigate the effect of Electroacupuncture (EA) and pregabalin on brachial plexus neuralgia (BPN) and comparing the structural changes of the peripheral nervous system (PNS) and regions of the central nervous system (CNS) in rats with BPN.

Methods: Thirty-two adult male Sprague-Dawley rats were randomly divided into 4 groups: sham-operated (Con group), brachial plexus neuralgia (BPN group), EA with BPN (EA group), and BPN with pregabalin (PGB group). The mechanical withdrawal thresholds (MWT) were examined using the von Frey test. EA and pregabalin were given daily from postoperative day (POD) 14 to 35. Structural alterations were examined bilaterally in the primary sensory cortex, forelimb region, anterior cingulate cortex, hippocampus, thalamus, cervical, thoracic, and lumbar spinal cords via transmission electron microscopy on POD 40. Meanwhile, the ultrastructural changes of bilateral brachial plexus and dorsal root ganglions (DRG) at the cervical, thoracic and lumbar levels were also observed.

Results: The MWT showed a significant increase compared to BNP group after EA and pregabalin interventions. But the long-term analgesic effects of EA appeared superior to that of pregabalin. Furthermore, EA repaired the myelin sheath damage at the spinal cord levels. Damages include demyelination were limited to the ipsilateral DRG at corresponding segment and bilateral CNS.

Conclusions: Damages induced by neuropathic pain are limited to the ipsilateral DRG at corresponding segment and bilateral CNS that processes pain information. EA and pregabalin partially attenuate neuropathic pain and repair neuronal damage in BPN rat model. Moreover, EA have a long-term analgesic effect.

I-D.04

THE VALUE OF THE OSTEOPATHIC APPROACH IN SUPPORTING WOMEN SUFFERING FROM ENDOMETRIOSIS

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Background and aims: Endometriosis is a disease that represents a major public health issue, with an individual and societal economic burden. Drug treatments have limited effectiveness, with 11% to 19% of patients reporting no improvement. Consequently, complementary and alternative medicines (CAM) are increasingly sought by this population.

This study explores the interest of an osteopathic approach in the support of patients suffering from endometriosis.

Methods: A qualitative method was used, based on individual 'semi-directive' interviews with patients suffering from endometriosis and having recourse to an osteopath. Analysis was carried out using Atlas.ti software.

Results: Our results reveal that the main reason for osteopathic consultation in cases of endometriosis is the desire to find a more natural alternative to pain management, without side effects. They describe beneficial effects on digestive and urinary symptoms, as well as on dysmenorrhea and dyspareunia. However, relief may be temporary, with a variable duration of respite. The effects of treatment are also likely to depend on the practitioner, the quality of listening is an important factor for these patients. For some, osteopathic support helped to reduce their stress and to feel more relaxed. The importance of recognizing and integrating this discipline into the endometriosis care pathway to improve patients' quality of life was also emphasized.

Conclusions: This study contributes to a deeper understanding of the role of osteopathy in supporting women with endometriosis, and the value of integrating this health approach into the care pathway.

I-D.05

LOW BACK PAIN IN PARKINSON'S DISEASE PATIENTS: AN OSTEOPATHIC MANAGEMENT AND BALANCE'S IMPACT

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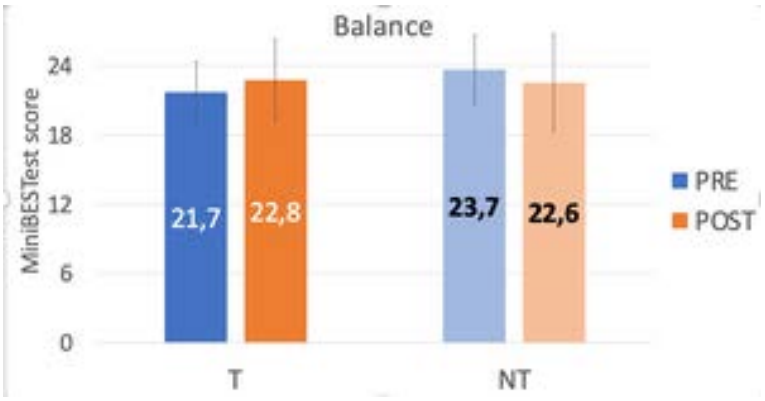
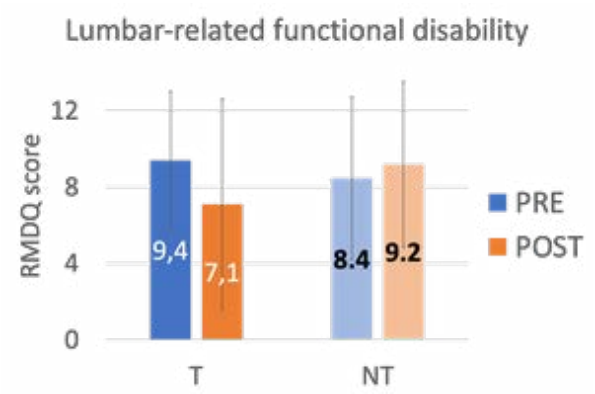
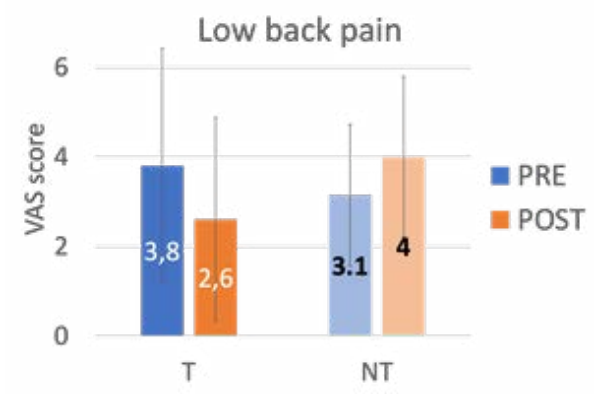
Background and aims: The aim of this study was to evaluate the benefits of osteopathic treatment (OT) on balance performance in cases of low back pain in a population suffering from Parkinson's disease (PD).

Methods: The sample consisted of 21 subjects with PD, with a mean age of 69.8±5.95 years. Subjects were randomly divided into two groups by gender to ensure homogeneity: a control group (NT) and a group that received osteopathic treatment (T). The independent variable was the group, and the dependent variables measured included balance (MiniBESTest), PD-related pain (KPDPS), low back pain (VAS), kinesiophobia (TSK), lumbar-related functional disability (RMDQ), and motor function (MSD-UPDRSIII).

Results: A statistically significant difference after intervention was observed between the groups for the variables MiniBESTest ($p = 0.023^*$ and $\eta 2 = 0.146$), RMDQ ($p = 0.039^*$ and $\eta 2 = 0.205$), and VAS ($p = 0.044^*$ and $\eta 2 = 0.197$). An improvement in balance parameters of MiniBESTest was measured for the T group, while the NT group experienced a deterioration.







Conclusions: A clinically significant difference was observed for the RMDQ and the VAS score between groups. Including osteopathic treatment for low back pain in a multidisciplinary approach for patients with Parkinson's Disease appears relevant for improving pain, functional disability, and balance. Addressing lumbar pain could have positive effects on the morbidity related to the risk of falls in PD and could help to prevent the risk of chronic pain.

I-D.07

EMPOWERING PATIENTS THROUGH THE INTRODUCTION OF PRE-PROCEDURE EDUCATIONAL VIDEO CONTENT IN THE PAIN CLINIC

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Background and aims: Patient's often experience pre-procedure anxiety, with many reporting that better pre-procedure education would have improved their experience[i].[ii]. Furthermore, pre-procedure education has frequently been shown to reduce patient anxiety[iii].

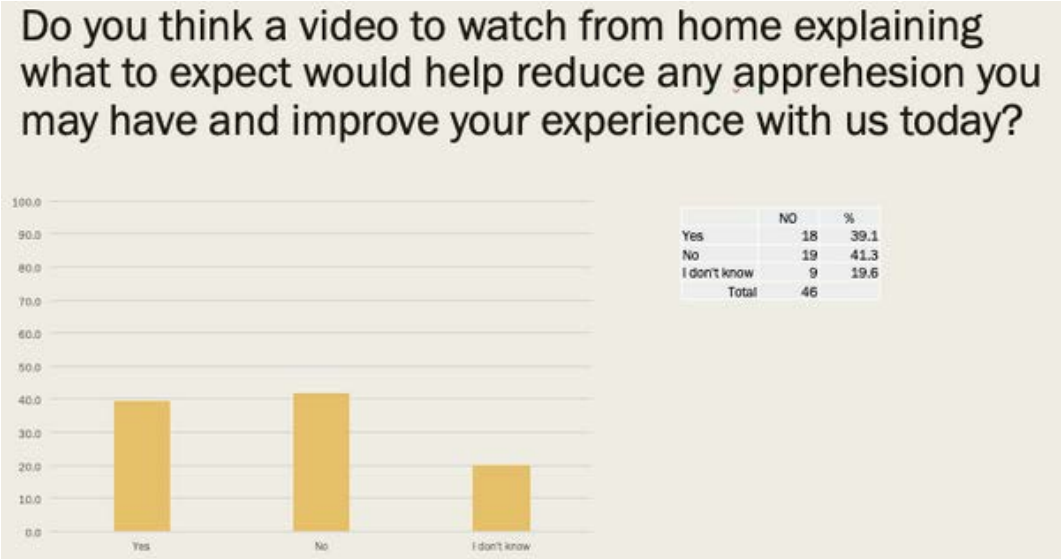
Studies have found that patients are open to the use of video education and have found this resource useful[iv].[v]. It was, therefore, theorized that video education could be used in the pain clinic to help reduce pre-procedure anxiety and improve education.

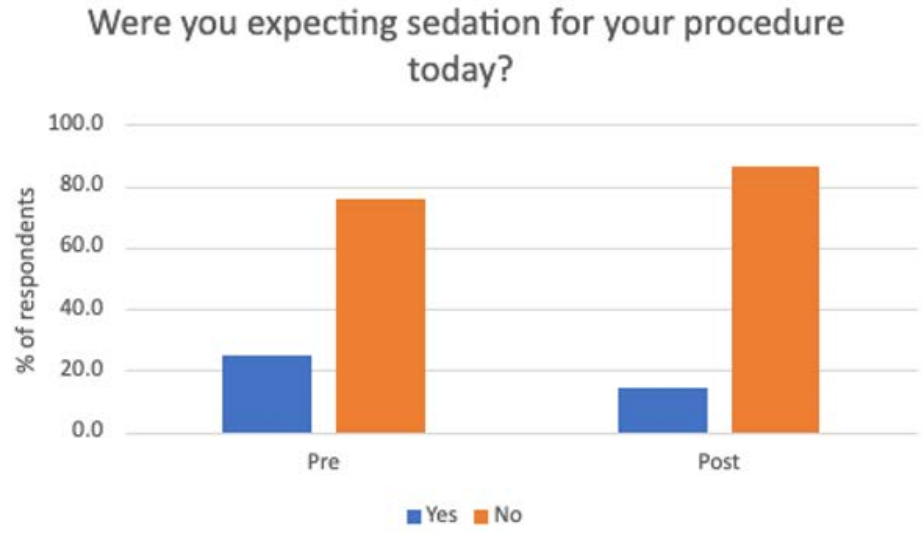
Methods: A pre-production questionnaire was given to 50 patients assessing anxiety and knowledge of what to expect with regards to sedation.

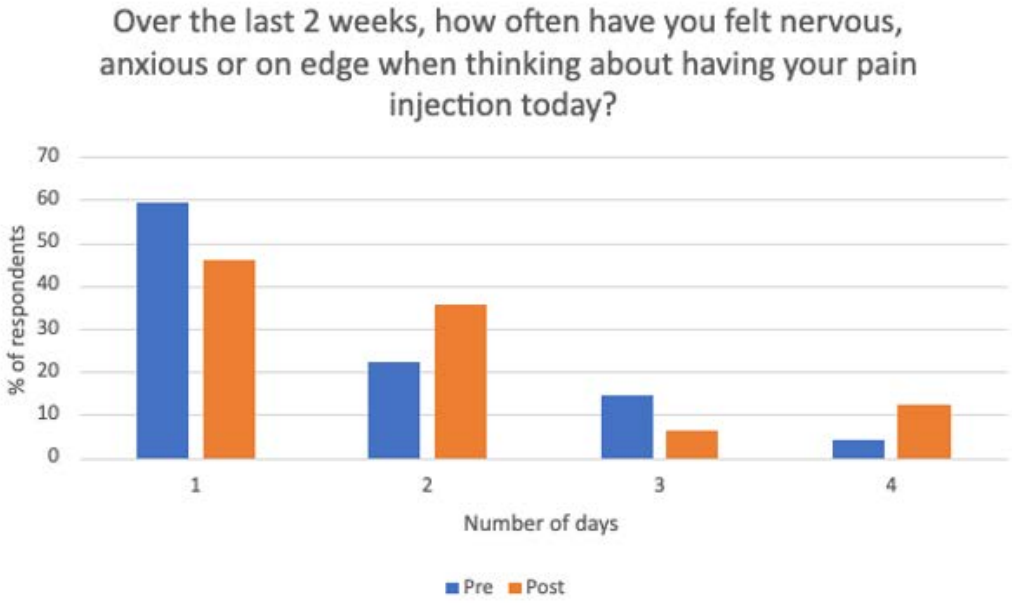
2 videos were produced, an education session and a virtual tour of the unit. These videos were distributed to a new cohort of patients through appointment letters before attending the unit.

Patients were then given a similar questionnaire at their appointment to assess anxiety levels, education and ease of access to the videos.

Results: Pre-implementation questionnaire found that 40% of patients reported an educational video would have reduced apprehension and improved experience. 40% reported significant levels of anxiety before their appointment. 25% of patients were expecting sedation during their procedure.77% of post-implementation cohort had watched the educational videos and significantly less expected sedation (14%). 45% reporting issues with access to the video. 62% found the video had reduced apprehension and improved their experience.







Conclusions: The implementation of the videos has helped increase patient knowledge and was useful in reducing patient apprehension. However, there remains significant issues with the distribution of access to the video that need to be addressed.

I-D.08

EXAMINING THE TYPE, QUALITY, AND CONTENT OF WEB-BASED INFORMATION FOR PEOPLE WITH CHRONIC PAIN INTERESTED IN SPINAL CORD STIMULATION: SOCIAL LISTENING STUDY

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Background and aims: The increased availability of web-based medical information has encouraged patients to seek health care information from multiple sources. To date, no studies have evaluated what information is available about neuromodulation on the web. This study aims to explore the type, quality, and content of web-based information regarding spinal cord stimulation (SCS) for chronic pain that is freely available and targeted at health care consumers.

Methods: The social listening tool Awario was used to search Facebook, Twitter, YouTube, Instagram, blogs, and the web. Quality appraisal of the extracted information was performed using the DISCERN instrument. A thematic analysis through inductive coding was conducted.

Results: The initial search identified 2174 entries, of which 630 (28.98%) entries were eventually withheld, which could be categorized as web pages, including news and blogs (18.1%); Reddit posts (5.1%); Vimeo hits (6%); or YouTube hits (70.8%). Most posts originated in the United States (519/630, 82.4%). Regarding the content, 66.2% of the entries discussed how SCS works. In total, 55.6% did not elaborate on the fact that there may be >1 potential treatment choice and 47.7% did not discuss the influence of SCS on the overall quality of life. The inductive coding revealed 4 main themes; pain and the burden of pain (14.34%), neuromodulation as a treatment approach (36.66%), device-related aspects (19.38%); and patient benefits and testimonials.

Conclusions: Health care consumers have access to web-based information about SCS. The reliability, trustworthiness, and correctness of web-based sources should be carefully considered before automatically relying on the content.

I-D.09

SENECA – NEW THERAPIES FOR THE MULTIMODAL TREATMENT OF CHRONIC LOW BACK PAIN (CLBP) USING AURICULAR VAGUS NERVE STIMULATION (AVNS) AND DIGITAL THERAPY MANAGEMENT

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Background and aims: For multimodal, interdisciplinary care of patients with CLBP, the integration of effective non-drug therapies such as aVNS and the improvement of care through the implementation of digital treatment management is recommended.

SENECA's goal is to implement technological solutions to optimize CLBP-treatment and improve long-term outcomes through the integration of aVNS and an online therapy-management-system including a patient smartphone app.

Methods: Patients and pain specialists are actively involved in the development of a platform that includes a physician dashboard and a patient smartphone-app for therapy management/documentation. Using surveys, the following parameters were collected from patients and HCPs: basic patient data, digital affinity, requirements for an app/ integrated HCP dashboard to support general pain treatment and multimodal pain therapy at Klinikum Klagenfurt.

Results: 83 patients participated in the survey for the needs and requirements of a general digital pain app. Surveys on a specific digital integration of the multimodal therapy as offered in Klagenfurt were collected from 8 patients and 10 HCPs. Most participants were positive about using a digital therapy management platform, as long as the time required is limited. They mostly agree on sharing personal app-health-data with treating physicians (73%) but ensuring data security is an important requirement.

Conclusions: A clear and linked documentation option of the disease can make a significant contribution to the success of therapy for chronic pain disorders. The patient-survey revealed an existing need and interest in a user-centered digital tool, as the documentation, coordination and evaluation of therapy and relevant outcome parameters are key to effective, individual care.

I-D.11

FROM ‚HEADEGGS' TO ‚LOS CABEZUDOS': SPANISH TRANSLATION, CULTURAL ADAPTATION, AND EFFECTIVENESS OF AN EDUCATIONAL HEADACHE WEBSITE

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Background and aims: One-third of Spanish children experience recurrent headaches. There are insufficient headache pain education resources in Spain. Thus, we aimed to translate and culturally adapt an English headache education website for Spanish children and to evaluate its potential effectiveness in terms of reducing pain intensity and pain interference, and increasing pain knowledge, and pain self-efficacy.

Methods: First, we translated the English website (www.headeggs.org) using DeepL, which was subsequently thoroughly revised by a bilingual team. Then, we recruited participants from a school in Málaga with caregivers' consent. The intervention consisted of three school visits.

At T0, demographics and baseline measurements were collected, followed by an introduction to the Spanish website (www.los-cabezudos.com). Participants were given full access to the website from T0 onwards. T1 consisted of two classroom visits to introduce and explore the website and a second baseline measurement. The two-month follow-up measurement was delivered remotely (T2).

Statistical analyses, such as linear mixed-effects multilevel models were employed.

Results: 210 schoolchildren (ages 10–14; M = 11.8, SD = 1.2) participated. 139 children experienced headaches (66%), 26 children reported recurrent headaches (13%). Pain intensity (maximum: $p = .002$; average: $p = .001$), pain self-efficacy ($p < .001$), pain interference ($p = .002$), and headache knowledge ($p < .001$) showed significant improvements in children with recurrent headaches over time. Children expressed satisfaction with the website.

Conclusions: This study successfully tested the Spanish adaptation of the headache website and demonstrated its potential effectiveness in reducing pain intensity and interference and increasing pain self-efficacy and headache knowledge.

I-D.12

VIRTUAL REALITY APPLICATION FOR ENHANCING COMMUNICATION SKILLS OF PHYSIOTHERAPY STUDENTS IN CHRONIC MUSCULOSKELETAL PAIN MANAGEMENT

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Background and aims: Training physiotherapists in communication skills is crucial for improving patient satisfaction and clinical outcomes of chronic musculoskeletal patients. Virtual reality (VR) offers an innovative educational tool for developing these skills through interactive clinical scenarios with virtual patients. This study aimed to investigate

(a) the usability of VR scenarios and

(b) the effectiveness of VR applications in improving communication skills among physiotherapy undergraduate students.

Methods: A VR scenario featuring a patient with chronic low back pain was utilized in the study. The scenario was developed as part of the „EmpathyInHealth" Erasmus+ project. Undergraduate physiotherapy students participated after providing informed consent. Repeated measurements were taken at three time points: A (pre-test), B (post-test), and C (two weeks after the intervention). Kirkpatrick's model was used for evaluation of knowledge, skills and attitude of physiotherapy students. Outcome measures included: (i) an evaluation form for the interaction with VR scenario, (ii) a multiple-choice questionnaire based on the Calgary-Cambridge guide, and (iii) the self-efficacy questionnaire (SE-12).

Results: Sixty-four undergraduate students participated, including 32 second-year and 32 fourth-year students. They reported high satisfaction with the VR scenario (mean: 9.05 ± 1.08) and the training method (mean: 8.81 ± 1.23). Statistical analysis revealed significant improvements in learning outcomes between A and B ($p < 0.05$) and retention of self-reported learning outcomes between B and C ($p < 0.05$).

Conclusions: The use of virtual reality (VR) could serve as an innovative, interactive, and valuable educational tool, enhancing physiotherapy students' confidence in their clinical communication skills and management of chronic musculoskeletal patients.

I-D.13

UNLOCKING THE GENETICS OF CHRONIC PAIN IN ONCOLOGY PATIENTS WITH MACHINE LEARNING APPROACHES: A MULTIDISCIPLINARY PROTOCOL DEVELOPMENT

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Background and aims: Opioids are commonly prescribed for chronic pain management in oncology patients. This research aims to develop a machine learning model for predicting individual responses to opioids, using a combination of genetic and clinical factors.

Methods: The proposed protocol involves the development of a high-dimensional machine learning model to predict responses to tramadol and codeine in oncology patients. Genetic data will be integrated from genes involved in opioid metabolism (e.g OPRM1, CYP2D6), drug transporters (e.g.ABCB1), and additional pharmacogenomic markers. Clinical variables such as age, gender, BMI, smoking status and comorbidities will also be embodied in the data. Gene expression profiles will be analyzed for phase I (CYP450) and phase II enzymes that contribute to opioid biotransformation, while clinical factors will be incorporated to refine predictions.

Results: Data collection and analysis are underway. As this study is in its initial stages, preliminary results are not yet available. The focus will be on presenting the study design, methodology and the anticipated approach for integrating data into the machine learning model. The finalized model is expected to provide robust predictions, leading to more tailored pain management strategies.

Conclusions: The protocol introduces an innovative approach to opioid therapy in chronic cancer pain management by integrating genetic and clinical data through machine learning. The study's design, aims to optimize pain relief, minimize opioid-related side effects and support a more personalized approach to patient care. Ongoing validation and refinement will prepare the model for future clinical application, ultimately enhancing the quality of life for oncology patients.

I-D.15

COOPERATIVE WORK BETWEEN CLINICAL NURSES AND DOCTORS FOR THE PAIN MANAGEMENT OF HOSPITAL CONSULTATION REFERRALS AT CENTRE HOSPITALIER DE L'UNIVERSITÉ DE MONTRÉAL (CHUM)

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Background and aims: In 2017 our Pain Management Center (PMC) was moved to the CHUM, one of the largest hospitals in Canada. The staff at the PMC not only manage daily outpatient consultations and therapies but also a significant number of in-house consultations for hospitalized patients with chronic pain issues. We present here the results our collaborative efforts for patients who are admitted to a tertiary care hospital and who require attention for chronic pain issues which, if not addressed, compromise their discharge.

Methods: A full-time nurse clinician role has been dedicated to these referrals. Patient care begins with a triage of priority concerns. Once established, a pain duo of nurse clinician and doctor complete evaluations and all required interventions. A significant amount of time is also spent on teaching both nursing and medical staff regarding the use of analgesics, on patient advocacy and assuring strong a presence amongst multidisciplinary team meetings.

Results: Since 2017, a total of 2,350 hospitalized patient consultations have been carried out. This represents around 350 -370 consultations per year. There is a constant pool of 10-15 admitted patients for which our pain clinic team is actively involved but only 1 out of 10 will require outpatient follow up at our clinic after discharge.

Conclusions: An established collaborative agreement between a nurse clinician and a group of pain physicians leads to enhanced patient care, improved collaboration with referring physicians and care teams as well as earlier patient discharge. Clinical outcome measures and patient satisfaction remain to be studied.

I-D.16

TRANSDISCIPLINARY THREE-MONTH COMPLEX CHRONIC PAIN MANAGEMENT PROGRAMME AND ONE-YEAR FOLLOW-UP STUDY, ALONG WITH A SUMMARY OF THE RESULTS

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Background and aims: This study aimed to assess the efficacy of the transdisciplinary treatment approach for patients with chronic musculoskeletal pain, which we introduced at our institution in 1997 and has been employed in treating these patients since then.

The present programme involved 46 clients.

Methods: Examinations: rheumatological examination, physiotherapy and medicinal massage assessment, psychological examination (questionnaires, interviews, Rorschach Projective Test), and psychiatric specialist examination. Our treatment program included individualized physiotherapy, therapeutic massage, psychotherapy (neuro-education, cognitive therapy, self-efficacy enhancement, relaxation), and psychiatric consultation.

Before the process began, the professionals comprising the treatment team received joint coaching. During the process, they engaged in Balint Group Work. At three and six months following the conclusion of treatment, participants completed a follow-up test battery. We repeated the complex assessments after one year.

Results: The methods and results of the programme are fully aligned with the recommendations outlined in the international guidelines and the literature. Clients have transitioned from a patient role to a learner, thereby regaining control over their life management. Their physical parameters (e.g. tissue stiffness, mobility, subjective well-being, pain level, subjective degree of disability, fear of movement, etc.) and psychological state (level of anxiety, quality of life, level of depression, etc.) have all demonstrated improvement. The transdisciplinary team was perceived as an extended family, providing a supportive social network.

Conclusions: This presentation will describe the program's structure and methodology, summarise the results, and include a video feed of patients discussing their experiences.

I-D.17

ARNOLD-CHIARI SYNDROME (A CASE REPORT)

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Background and aims: Arnold-Chiari malformation (ACM) is a developmental defect of the cerebellum characterized by a displacement of specific brain structures into the spinal canal. The condition causes abnormalities of cerebrospinal fluid flow and is often associated with syringomyelia. The most common symptoms include headache and impaired cerebellar function (balance problems, poor coordination, muscle weakness, increased muscle tone, and altered touch sensation).

Methods: The diagnosis was established according to the medical history (neck and shoulder pain, burning sensation in the neck, back of the head, left shoulder and arm, as well as the lower back pain and lower chest and shoulder-blade convulsions) followed by MRI diagnosis revealing massive syringomyelia in a thoracic spinal segment. Consequently, the patient underwent a two-stage surgery (ACM, Laminectomy).

Results: The postoperative course shows functional improvement. The patient still daily reports pain in the back of the head, pain below the lower chest and shoulder blades, pain and burning sensation in the left arm, sensation of skin pressure and tension in the right torso, back pressure, altered touch sensation, burning and pain to touch in

the right foot (allodynia). She does not sleep well and manifests walking difficulties. Medicamentous therapy was administered, including Pregabalin tablets 150 mg 2x2; Duloxetine tablets 10 mg 1X1, Milgamma tablets (Benfotiamine, Pyridoxine hydrochloride 100/100 mg) 1x1, Paracetamol tablets 500 mg 2 x 2, Palmitoylethanolamide 300 mg 1X1.

Conclusions: The therapeutic modalities applied improved the patient‘s condition by about 50%; however, the ailments persisted.

I-D.18

EXTERNAL VALIDATION OF FOUR MODELS PREDICTING TREATMENT SUCCESS AFTER INTERDISCIPLINARY MULTIMODAL PAIN TREATMENT

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Background and aims: Chronic musculoskeletal pain (CMP) is a significant health and socioeconomic issue, representing the most prevalent chronic pain condition. Early identification of patients at risk of unsuccessful treatment is crucial for enhancing treatment effectiveness by informing patients and tailoring treatment plans accordingly. Recently, we developed prediction models for successful interdisciplinary multimodal pain treatment (IMPT) using observational health data. External validation is essential before these models can be confidently implemented in clinical practice. Therefore, our aim was to externally validate and recalibrate four prediction models for IMPT success in patients with CMP.

Methods: We conducted a prospective cohort study in routine care enrolling patients with CMP undergoing a 10-week IMPT. Success was assessed using four outcomes: patients' recovery perspective, physical and mental quality of life, and disability. We evaluated 63 demographic and candidate predictors, primarily patient reported outcome measures.

Results: A total of 1977 patients participated, achieving IMPT success rates between 30% and 57%. After external validation and recalibration, four models included 44 predictors, with nine consistently appearing across all models. All recalibrated models demonstrated strong calibration and fair to good discrimination with AUC-values ranging from 0.68 to 0.77, specificity from 0.44 to 0.72, and sensitivity from 0.64 to 0.87.

Conclusions: Our findings show that treatment success can be predicted using standardized patient-reported measures, exhibiting strong discriminatory power. However, predictors vary depending on the outcome, highlighting the importance of careful selection of the most relevant outcome upfront. These results support the potential for patient-centered care and the development of a robust decision-making tool.

I-D.19

EFFICACY OF A PAIN NEUROSCIENCE EDUCATION LECTURE TO 7TH AND 8TH GRADE STUDENTS

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Background and aims: Pain neuroscience intervention (PNI) is an educational strategy designed to change one's understanding of pain and is recognized as a crucial tool in the treatment of chronic pain. Incorporating PNI into school curriculums could correct misconceptions and aid in developing effective chronic pain prevention strategies. This study aims to evaluate the efficacy of a brief pain neurophysiology lecture among high school students, using the Neurophysiology of Pain Questionnaire (NPQ).

Methods: A total of 355 adolescents from 7th and 8th grades of a Portuguese high school, attended a 30-minute lecture on PNI, based on current key learning targets. Immediately after the lecture, the NPQ was completed by the attendees.

Results: All 355 students completed the NPQ. Their ages ranged from 12 and 15 years old, with 54% female and 46% male. The average score was 5 correct answers out of 19 questions (26%). There were no significant differences

in the number of correct answers between the 7th and 8th grades. Only one question ("Pain only occurs when you are injured or at risk of being injured.") had a correct answer rate greater than 50%. The remaining questions on pain neurophysiology had correct answer rates below 50%.

Conclusions: This study highlights that a brief PNI lecture is not effective in improving the understanding of pain neurophysiology among 7th and 8th grade students. The findings underscore the need for improved education on the neurophysiology of pain among adolescents.

I-D.20

FUNCTION AND PAIN IMPROVEMENT IN HEMOPHILIC ARTHROPATHIA ON REHABILITATION PROGRAM (RP) IN ESTONIA IN KURESSAARE. THE FEEDBACK FROM PATIENTS

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Background and aims: Spontaneous bleeds into the target joints causing joint inflammation, function decline, pain and progressive difficulty in movements leading to development of severe arthropathy. Physiotherapy is an important part of treatment in Haemophilia aimed to improve pain, joint mobility and quality of life, but it need regular feedback from physiotherapist. As functionality is related with psychological and social problems a multidisciplinary guidance is necessary for patients. In discussions with Estonian MPO (member patients organisation) the need for regular rehabilitation for patients was established focused on individual one-to-one sessions.

Methods: Individual physiotherapy in gym and pool three times during three days and evaluation of patients by specialist. Questionnaire for feedback: Did the RP matched with your expectations of rehabilitation in general? Was 3 days enough or should the program be extended to 5 days? What kind of additional services would you like to get? Which was the service most useful/satisfactory for you?

Results: 21 patients (age 21-55) participated in RP. Most were satisfied with 3-day program, 50% wished it for – 5 days. There was a age related difference – younger patients were satisfied with shorted period due to more active pace of life. The water treatments were appreciated. Dietary counselling was missed. Unexpectedly the consultation with social worker was highly ranked and 95% needed the consultation with psychologist.

Conclusions: As 50% of program participants wished for extended program beyond 3 days and as the background was the related to patient's age, the importance to create individual programs, based on patient generation was highlighted.

I-D.21

REACHING CONSENSUS ON THE CONTENT OF A BIOPSYCHOSOCIAL REHABILITATION PROGRAMME IN CHRONIC LOW BACK PAIN – CHECKLIST: A DELPHI STUDY

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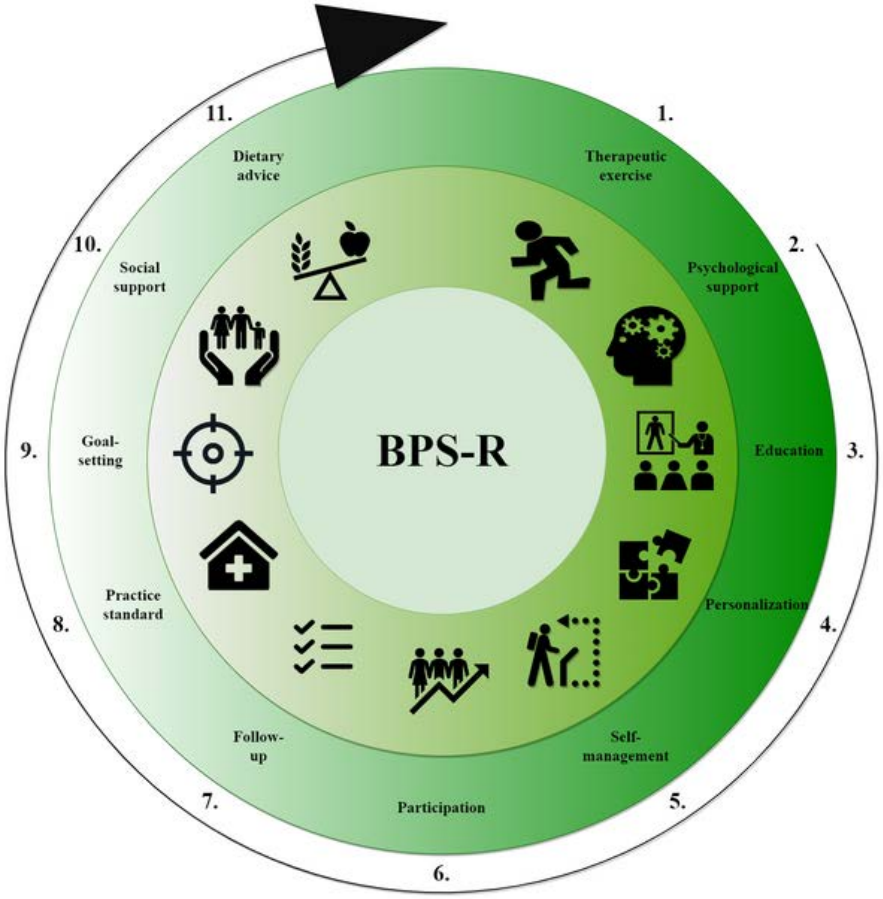
Background and aims: Chronic low back pain numbers continue to increase worldwide, causing a high socio-economic burden. Biopsychosocial rehabilitation has already proven to be effective. Nonetheless, in research and practice there is no consensus on the exact content of rehabilitation. A checklist was developed to guide and support the evaluation, comparison, and development of rehabilitation for chronic low back pain.

Methods: A Delphi survey, based on the attributes of a concept analysis containing all possible items of the checklist, was distributed across the international networks of EFIC and IFPOHE. Participants were asked to score each item on three content-validity indicators: (1) clarity and comprehensibility, (2) relevance and importance and (3) alignment with the overall goal. A consensus-threshold of 75% was used. General questions were asked about the checklist as a whole, together with feedback on the items and any missing items.



Results: Round one and two of the Delphi study respectfully featured 66 and 50 participants with an average 16.8 and 17.3 years of experience in research or clinical practice. Multiple disciplines from all over the world participated in the study, mostly featuring European countries. After two rounds, consensus was reached on all but two items. Finally, adaptations were made to the remaining two items in agreement with the participants who disagreed on the remaining items, leading to consensus.

Biopsychosocial Rehabilitation in Chronic Low Back Pain - Checklist

Items	Questions	YES/NO
1. Therapeutic exercise	Does the rehabilitation programme include therapeutic exercises?	YES NO
1.1 Exercise	Does the rehabilitation programme include exercise therapy?	YES NO
1.2 Active approach	Does the rehabilitation programme require the patient to participate actively in the treatment and stimulate an active lifestyle for the patient?	YES NO
1.3 Reconditioning	Does the rehabilitation programme include cardiovascular reconditioning?	YES NO
2. Psychological support	Does the rehabilitation programme support the patient on a psychological level?	YES NO
2.1 Thoughts and behaviors	Are maladaptive thoughts and behaviors of the patient addressed and adjusted accordingly?	YES NO
2.2 Psychological counseling	Does the programme include psychological counseling?	YES NO
2.3 Reassuring	Does the programme include reassuring the patient about the feasibility of completing the rehabilitation programme?	YES NO
2.4 Reinforcement	Is all rehabilitation progress, no matter how little, reinforced?	YES NO
3. Education	Does the rehabilitation programme include education of the patient?	YES NO
3.1 Educational approach	Does the rehabilitation programme educate the patient?	YES NO
3.2 Detailed information available	Is there a detailed description of the education available to the patient?	YES NO
4. Personalization	Does the rehabilitation programme allow for personalization to the individual?	YES NO
4.1 Individualization/ tailoring	Is the rehabilitation programme individualized to the needs of the patient?	YES NO
4.2 Guidance	Does the therapist guide the patient during the programme and provide adjustments when necessary?	YES NO
4.3 Interdisciplinary communication	Do multiple disciplines take part in the programme and do they collaborate and communicate with each other?	YES NO
4.4 Patient-centered	Is the patient central to the rehabilitation programme?	YES NO
4.5 Therapist consistency	Is continuity of guidance by the same therapist for each discipline optimized during rehabilitation?	YES NO
4.6 Graded activity	Does the rehabilitation programme include graded activity, increasing the activity levels of the patient?	YES NO
4.7 Feedback	Is feedback gradually used to adapt rehabilitation to the needs of the patient when appropriate for their condition?	YES NO
4.8 Other therapies	Does the programme include taking into account other simultaneous therapies addressing the pain symptoms of the patient?	YES NO
4.9 Shared decision making	Are decisions regarding the rehabilitation and its outcomes made by the patient in consultation with the therapist?	YES NO

5. Self-management	Does the rehabilitation programme include actions to increase self-management?	YES NO
5.1 Self-governing	Does the rehabilitation programme include actions to increase the patient's self-governance?	YES NO
5.2 Pain management	Does the rehabilitation programme include actions to cope with (increasing) pain?	YES NO
5.3 Medication management	Does the rehabilitation programme include actions to manage a patient's medication?	YES NO
5.4 Self-efficacy	Does the rehabilitation programme include actions to improve self-efficacy?	YES NO
5.5 Prevention	Does the rehabilitation programme include preventive actions?	YES NO
5.6 Safety netting	Does the rehabilitation programme include recognizing and addressing acute deteriorations in general health status?	YES NO
5.7 Lifestyle	Are lifestyle factors (sleep, smoking, sedentary behavior and alcohol intake...) influencing the pain problem discussed and addressed?	
6. Participation	Does the rehabilitation programme include actions to improve a patient's participation?	YES NO
6.1 Implementation of meaningful ADL	Does the rehabilitation programme include implementation of meaningful activities of daily living?	YES NO
6.2 Return-to-work	Does the rehabilitation programme include actions aimed at improving the chances of return-to-work?	YES NO
7. Follow up	Does the rehabilitation programme include regular follow-up from and actions to increase adherence by the patient?	YES NO
7.1 Re-evaluation	Is the patient regularly evaluated during the rehabilitation programme?	YES NO
7.2 Adherence measures	Does the rehabilitation programme include actions to improve adherence to the programme?	YES NO
8. Practice standard	Does the rehabilitation programme include the highest and most recent standards for good clinical practice?	YES NO
8.1 Expertise	Is therapy guided by experts in their respective fields?	YES NO
8.2 Evidence-based	Is rehabilitation substantiated by the latest evidence?	YES NO
8.3 Standardization	Is the rehabilitation programme based on a standardized decision protocol including personalization?	YES NO
9. Goal-setting	Does the rehabilitation programme include setting goals?	YES NO
10. Social support	Does the rehabilitation programme include actions to support the patient on the social level?	YES NO
11. Dietary advice	Does the rehabilitation programme include advice on a healthy and varied diet?	YES NO

Conclusions: We reached consensus on a content valid checklist and comprehensive tool, applicable in research and clinical practice for practitioners and researchers to develop and study the effectiveness of biopsychosocial rehabilitation in chronic low back pain.

I–D.22

EVALUATION OF ‚PAIN RETRAINED'- AN INTERDISCIPLINARY ONLINE PAIN EDUCATION PROGRAMME

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Background and aims: Modern models of chronic pain care emphasise education. Inconsistencies exist within the literature where one conclusion from the extant evidence is that educational approaches work well, while some suggest only limited effectiveness. Existing pain education tends to be brief and unidisciplinary and there are challenges relating to access. We report on an intervention aimed at addressing these issues and its evaluation.

Methods: An interdisciplinary pain education programme, Pain Retrained, was developed. It delivered 12 hours of content over six weekly online sessions to groups of participants. This study evaluated outcomes at its conclusion and three-month follow-up. Participants completed measures of pain self-efficacy, depression and health-related quality of life at pre- and post- programme and 3 month follow-up. Analysis was with repeated measures multivariate analysis of variance.

Results: Of the 261 participants, 60%(n=167) identified as female. Mean age was 49 years(SD = 12), mean pain duration was 14 years(SD = 5.8). There were significant omnibus effects when comparing post-programme and 3 month follow-up scores with pre-programme scores. Follow up univariate analysis showed statistically significant change for pain self-efficacy and depression at post-programme and follow-up in comparison to baseline.

Conclusions: The Pain Retrained programme represents an innovative approach which has successfully addressed several challenges, including timely access and optimisation of care for those living with chronic pain. There was evidence of sustained benefit for pain self-efficacy and depression. This programme and its evaluation is the first of its type on the island of Ireland and has significant potential for replication and scaling across healthcare settings.

I-D.23

PERSPECTIVES AND PRIORITIES FOR ENDOMETRIOSIS MULTIDISCIPLINARY TEAM CARE IN AUSTRALIA: A QUALITATIVE MIXED-METHODS STUDY INVOLVING PATIENTS, CAREGIVERS AND HEALTH PROFESSIONALS

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Background and aims: Endometriosis is a chronic condition affecting 1 in 7 women, girls, and gender-diverse individuals in Australia. Multidisciplinary team (MDT) care is fundamental for managing chronic pain in endometriosis. Nevertheless, limited studies have explored endometriosis MDT care in the Australian context, and there remains a lack of consensus on what a MDT care model should include. This study aimed to evaluate patient and health professional perspectives on MDT care models for endometriosis and pelvic pain.

Methods: A co-designed mixed-methods study was developed by an advisory group of 14 healthcare professionals and people with endometriosis. Online surveys capturing quantitative and qualitative data were disseminated to patients/carers and healthcare professionals. Thematic analysis was performed on qualitative data, and consensus statements were developed and refined through 2 focus group meetings with each consumer group.

Results: Participants included 29 healthcare professionals and 24 patients/carers. Recommendations were voiced under 5 key themes: preferences for clinic environments, staff interactions, services and care coordination, goal setting and resource needs. Patients valued empathetic, experienced clinicians and preferred options for face-to-face and telehealth interactions. Financial strain was a significant concern, highlighting the need for affordable care. Both groups stressed the importance of up-to-date, evidence-based information and personalised care plans.

Conclusions: This study underscores the need for person-centred, holistic, and accessible MDT clinics for endometriosis and pelvic pain in Australia. The consensus statements provide a blueprint for developing such clinics. Implementing these recommendations may enhance endometriosis care quality, improving patient experiences and outcomes. Future research should focus on evaluating the impact of these recommendations.

I-D.24

TREATMENT RESPONES: ADVERSE CHILDHOOD EXPERIENCES AND MULTIDISCIPLINARY PAIN REHABILITATION

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Background and aims: Pain is the main reason people seek medical assistance. Pain treatment and rehabilitation outcomes are often unsatisfactory. Adverse childhood experiences (ACEs) are common, and chronic pain is one of the most common consequence of ACEs. Moreover, pain treatment shows worse outcome for those with ACEs than others. The purpose of this study is to examine the experiences of women with ACEs of interdisciplinary pain rehabilitation.

Methods: Interpretive phenomenology with ten case studies of participants with three or more ACEs that have undergone interdisciplinary pain rehabilitation, 17 interviews total.

Results: All participants lived in a stressful home as children, characterized by parental drinking, violence and psychiatric illness. They all have a variety of health problems as adults. The group that did *not* respond to the treatment had an overactive stress system, had not been asked about ACEs and didn't know their effect on future health, and had neither the support of family, social environment, nor healthcare professionals in past or present. The group that responded to treatment has helpful hobbies and successful ways to manage stress, had been asked about ACEs and understand the context of trauma and health problems, have an understanding family and social environment and have protective personality traits such as resilience and serenity.

Conclusions: Addressing chronic harmful stress, asking people about ACEs, educating them on the consequences of trauma on their overall health and wellbeing, and preventing re-traumatization within the healthcare system could play a role in increasing interdisciplinary pain rehabilitation response of this group.

I-D.25

HEALTHCARE UTILIZATION AND RESOURCE DISTRIBUTION BEFORE AND AFTER INTERDISCIPLINARY PAIN REHABILITATION IN PRIMARY CARE

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Background and aims: Chronic pain is a frequent reason for care seeking in primary care (PC) and in most cases also managed there. The interdisciplinary pain rehabilitation program (IPRP) is the gold standard treatment for patients with chronic pain, yet it is scarcely used in PC. Chronic pain is associated with increased healthcare utilization (HCU). This study aimed to evaluate the HCU by patients with chronic pain in PC in two Swedish regions one year before and one year after an IPRP. The distribution of costs and resources were also examined.

Methods: Data from a national pain registry and HCU data from administrative registries were combined using personal identification numbers of the participants (n=147) who completed a IPRP between 2012 and 2015. The number of outpatient healthcare contacts was the outcome measure. Costs and distribution of resources one year before and one year after IPRP were compared across using paired t-tests. A healthcare-provider perspective was applied in the HCU cost description.

Results: HCU in the cohort dropped by 16% the year after IPRP.

n=146	**Before IPRP**			**After IPRP**			
	Total	**Mean (SD)**	**Median (IQR)**	**Total**	**Mean (SD)**	**Median (IQR)**	***p-value*[a]**
All contacts	4710	32 (26.5)	25 (31)	3961	27 (23.9)	21 (30)	0.013
Visits	2774	19 (14.8)	14 (16)	2350	16 (15.1)	12 (19)	0.055
Administrative items and telephone contacts	1936	13 (15.0)	9 (21)	1611	11 (12.8)	6 (16)	0.018
[a]p-value, paired sample t-test, applies for comparison of totals.							

Costs for outpatient visits declined by 12%. Physiotherapist and GP visits diminished the most, 31% (p=0.048) vs. 23% (p<0.001). Visits to nurses, occupational therapists and psychologists/social workers augmented slightly (6%, 5% vs. 10%).

		Before IPRP	**After IPRP**	
Caregiver category	**Unit cost[a] (€)**	**Total cost (€)**	**Total cost (€)**	**Differences (€)**
GP	223	133,652	102,414	-31,238 (23%)
Specialist physician	544	193,786	178,545	-15,241 (8%)
PC nurse	95	20,096	21,239	+1,143 (6%)
Specialist nurse	290	33,379	38,894	+5,515 (17%)
Physiotherapist	95	89,585	61,940	-27,645 (31%)
Occupational therapist	95	20,235	21,185	+923 (5%)
Psychologist/Social worker	95	28,880	32,110	+3,230 (11%)
All caregivers in total	NA	519,613	456,327	-63,286 (12%)
(EUR 1 = SEK 11.9171). [a]per visit				

Conclusions: IPRP may reduce HCU, free resources and streamline chronic pain management in PC. The study is unique in examining HCU by patients with chronic pain specified by care givers. The study provides insight into how changes in HCU after completed IPRP may affect daily PC activities.

I-D.26

HELPING ADOLESCENTS RIDE THE WAVES OF SEVERE DYSMENORRHOEA WITH CONFIDENCE AND KNOWLEDGE: PRESENTATION OF A NOVEL THERAPEUTIC EDUCATION PROGRAMME FOR ADOLESCENTS

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Background and aims: Dysmenorrhoea is a common reason for consultation in adolescents and its impact on quality of life and school absenteeism is significant. Endometriosis is on everyone's mind, but MRI studies show a cut-off in detection at 18 years of age, resulting in a „grey zone" where symptom management is the main challenge. Our team conducted a study (DEMETER) in 2022 with focus groups of patients, parents and professionals, which highlighted the isolation and lack of care of these young patients, as well as their difficulty in managing pain. The helplessness of both parents and healthcare professionals was also acute. These findings led us to develop a novel therapeutic education programme (TEP)

Methods: This TEP was designed with parallel workshop sessions for adolescents and their caregivers. For adolescents, a paediatric gynaecologist-psychologist duo facilitates discussions about anatomy, treatments, pain and daily symptom management using an adaptation of a therapeutic game developed by a patient association. An introduction to various non-drug therapies (TENS, sophrology...) allows them to experiment with other pain management techniques. Finally, a dietary workshop introduces a balanced diet, while a physical activity workshop helps the young women to maintain their physical activity. At the same time, parents benefit from workshops (medical, dietetic, relations with the school...) and discussion groups to help them better manage their child's pain.

Results: The first TEP session took place in September 2024, bringing together 7 young girls and 9 parents, two of whom were couples. The discussions in the groups were very rich. Satisfaction surveys reflected the value of the workshops, although this depended on the facilitator. The experimentation with yoga postures for pain relief was particularly appreciated by the teenage girls. Another session will take place in February 2025 with programme adaptations based on the global evaluations.

Conclusions: Due to its impact and frequency, holistic management of severe adolescent dysmenorrhoea is essential. Designing a specific TEP programme with a multidisciplinary, interactive approach seems to be an interesting response, as evidenced by the final group chart filled with „understood, similarities, sharing, listening, less alone, benevolence, support".

I-D.27

ASKING SPANISH ADOLESCENTS ABOUT THEIR PAIN-RELATED NEEDS: A STUDY WITH FOCUS GROUPS

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Background and aims: According to recent WHO guidelines and the biopsychosocial model of pain, treatments must address the needs of adolescents with chronic pain. In Spain, however, these needs remain largely unknown. Therefore, we aimed to identify the pain-related needs of Spanish adolescents.

Methods: Sociodemographic surveys were distributed and informed consents were signed. Inclusion criteria were to be aged 10-17 and have pain for more than 3 months. Focus groups were conducted. Data was analyzed following a qualitative framework approach using the Consolidated Framework for Implementation Research (CFIR). Finally, the Public and Patient Engagement Evaluation Tool (PPEET) was administered to assess satisfaction with the focus group.

Results: Due to last-minute dropouts, we carried out 2 focus groups and 2 individual interviews. A total of 9 adolescents participated, aged 11-16, 4 male and 5 female. The average number of months with pain was 30,

self-reported pain intensity was 7/10 and abdominal pain was the most common type (4/9). All participants showed satisfaction in the PPEET.

The reported needs were integrated into the CFIR domains and subdomains. As a summary participants highlighted the need for: family support and friendships, peer with pain support, distraction strategies/hobbies to manage pain, access to better pain medications, psychological care, receiving a diagnosis, non-invasive treatments, help to travel long distances to access specialized professionals.

Conclusions: Several unmet needs were detected among Spanish adolescents. Those needs cover diverse aspects of biopsychosocial model of pain. Every stakeholder involved in a teenager's pain experience should consider these unmet needs.

I-D.30

IS THERE A NEED FOR PEER-EDUCATION IN INTERDISCIPLINARY MULTIMODAL PAIN THERAPY (IMPT)? RESULTS OF FOCUS GROUP INTERVIEWS WITH CHRONIC PAIN PATIENTS

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Background and aims: In healthcare it is assumed that peer-education (PE) has more chance of permeating the peer-group and changing behaviour than information-giving just by professionals *(Topping-2022;Matthias-2016)*. Also in chronic pain-management it is suggested that peer-support may be a useful therapeutic supplement to improve patients self-management and self-efficacy *(Wilson-2024)*. In IMPT, education is an important intervention, but to date there are no recommendations to implement PE in these programs. Aim of this study is to examine the need for/ benefits of PE in IMPT from a patient-perspective.

Methods: Patients who had completed the IMPT took part in semi-structured focus-group interviews, which were moderated by two professionals of the IMPT-team. In addition to identifying needs and benefits of PE, the interviews also discussed possible topics that could be teached by peers and peer characteristics. The interviews were recorded by "knowledge-mapping" and analysed using content-analysis.

Results: 14 interviews have been conducted with 76 patients. The vast majority (92%) rated PE as beneficial in IMPT. Main topics for PE from a patient-perspective are the self-experience in IMPT, the successful integration of the skills learned into everyday life after IMPT and acceptance of pain. The additional benefit of PE is seen in the role-model function and the promotion of motivation to change behaviour. As potentially negative aspect demotivation was cited if one's own therapy success is perceived as lower than that of the peer.

Conclusions: From the patient's point of view, the inclusion of PE in IMPT is considered beneficial and helpful in learning to cope with chronic pain.

I-D.31

CONNECTING PAIN TRAJECTORIES AND YOUTH PAIN CARE JOURNEY NARRATIVES WITH AN EXPLANATORY SEQUENTIAL MIXED METHODS DESIGN

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Background and aims: Persistent musculoskeletal (MSK) pain affects up to 39% of youth. Current treatments for pediatric MSK pain demonstrate limited efficacy, with approximately 50% of youth refractory. The aim of the current study was to contextualize quantitative functional disability trajectories across 1 year of multidisciplinary pain treatment using youths' own telling of their pain care journey narratives.

Methods: This study utilized an explanatory sequential mixed methods design. Youth (N=42) who participated in a larger study aiming to identify a prognostic signature of recovery vs. persistence of pain and functional disability in adolescents with chronic MSK pain, were invited to participate. Qualitative semi-structured interviews were conducted to examine the lived experiences of youth seeking care for chronic MSK pain. Youth were categorized into 'improved' (i.e., at least 30% improvement and demonstrated positive trajectory) and 'persistent' (less than 30% improvement and negative trajectory or no change) categories based on their responses on the Functional

Disability Index (FDI) across baseline, 3, 6, 9 and 12-month time points. Youth narratives were analyzed using reflexive thematic analysis.

Results: Thematic analysis generated 4 themes differentiating these two groups: Youths' orientation to chronic pain diagnosis and explanation, perceived support of healthcare providers, mindset and approach to pain management, and how youth tell their story.

Conclusions: Integrating qualitative data with quantitative trajectories provided deeper insights into the complex factors influencing youths' pain treatment outcomes and functional trajectories, including the ways youth feel supported in pain care, which has direct implications for pain treatment.

I-D.33

TO IMPROVE ACCESS TO INTRATHECAL THERAPY FOR CANCER PAIN SFETD'S ONLINE TOOLBOX EXPLAINING OFFICIAL GUIDELINES HAS BEEN TRANSLATED INTO ENGLISH

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Background and aims: Pain is one of the most common and distressing symptoms for patients with cancer and is a significant factor underlying impairment of quality of life. Thus, intractable pain can limit the tolerance to curative treatments which impacts survival. Recent systematic reviews and meta-analyses report that 52% to 69% of patients with cancer still experience pain, regardless of the stage of their disease and despite medical management. Intrathecal drug delivery (IDD) is a therapeutic option that allows targeted delivery of analgesics to the intrathecal space, thus optimising pain management and reducing doses of medication and side effects. Unfortunatelly IDD is still underused due to lack of awareness of the technique, fear of complications, absence of coordination with implanters or supposed invasiveness.

Methods: From 2019 to 2022 some members of SFETD created a toolbox. This is an online knowledge resource dedicated to the management of IDD with the aim of improving the diffusion and understanding of this technique. Various aspects of IDD are detailed. This toolbox is updated regularly.

Results: Website data from 2023 shows that 1,586 practitioners consulted the information, attesting to its success. This has led us to translate the toolbox into English, facilitating international diffusion of this information to the medical community to improve pain management world-wide.

Conclusions: Wider diffusion of IDD is vital to improve the care of cancer patients. To benefit from IDD patients should be referred early by oncologists to surgeons and pain specialists. This toolbox aims to achieve the awarness necessary for this early referral to be realised.

I-D.34

PSOAS COMPARTMENT BLOCK FOR EMERGENCY HIP REPLACEMENT SURGERY – CASE REPORT

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Background and aims: Peripheral nerve blocks for hip replacement surgery improves postoperative analgesia and typically is used in combination with general anesthesia or spinal anesthesia. Its use as a sole anesthesia technique is not recommended for hip surgery, because it is not beneficial for patient's intraoperative comfort and treatment outcome. Despite of this concept, there are some clinical situations when peripheral nerve block – psoas compartment block is preferable than traditional anesthesia methods.

Methods: 92-year-old woman admitted to our hospital due to right femur neck fracture. Decision to perform emergency hip replacement surgery was made. Patient had several comorbidities: arterial hypertension III, heart insufficiency NYHA III, two times myocardial infarction, (last one - three years ago), ischemic heart disease, two times ischemic stroke, blindness, persistent atrial fibrillation, diabetes mellitus type II. We decided to provide surgery under psoas compartment block.

Results: After patient sedation (midazolam 2 mg. i. v.) psoas compartment block performed using nerve stimulation technique. Perineural catheter inserted and local anesthetics 1% 20.0 ml lidocaine and 0.5% 20.0 ml ropivacaine injected through the catheter. Adequate analgesia received after 15 min. Surgery and anesthesia - without complications. There was no discomfort of patient and vital parameters were stable during surgery. , No additional analgesia and sedation was needed during and after surgery. Peripheral nerve catheter removed after 16 h. without the need of additional analgesia. Patient discharged home without any complications.

Conclusions: For hip replacement surgery, psoas compartment block is possible to use as an alternative of general or spinal anesthesia in selective cases.

I-D.35

SPONTANEOUS INTRACRANIAL HYPOTENSION - THE ROLE OF A "LOW VOLUME" EPIDURAL BLOOD PATCH - A CASE REPORT

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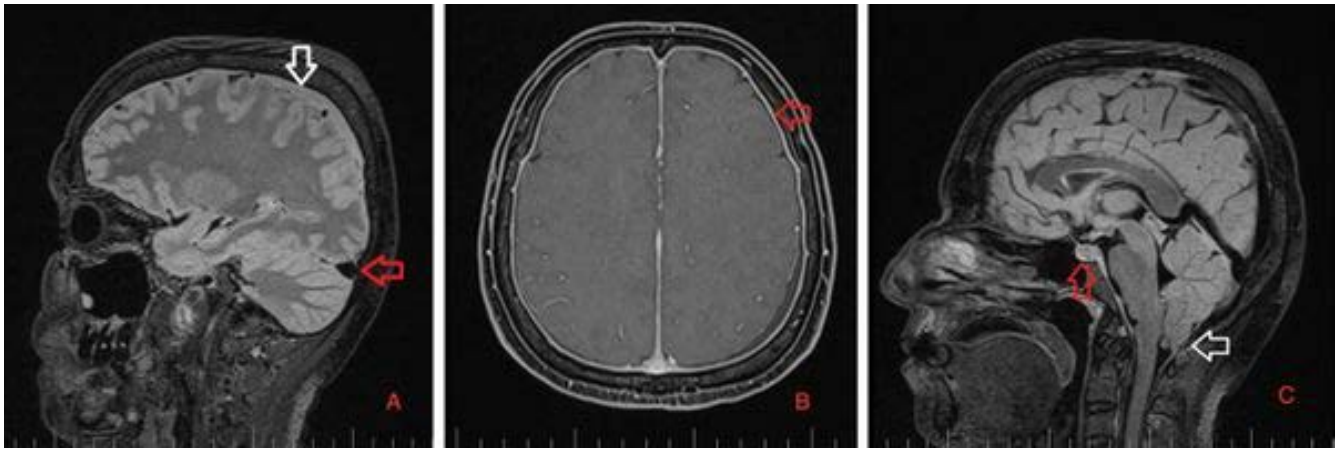
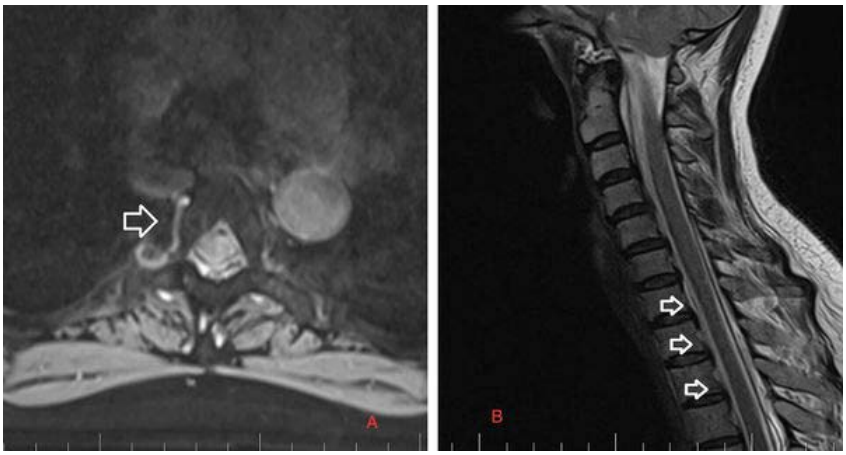
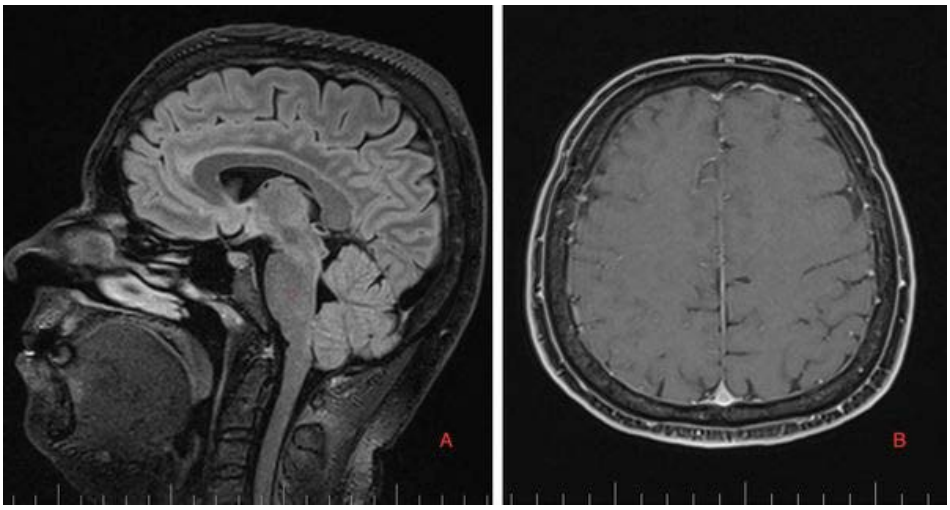
Background and aims: Spontaneous intracranial hypotension is a rare neurological syndrome that is often overlooked despite its prevalence of 5/100,000 people a year. There is a lack of understanding of its exact pathophysiology as well as significant variability in clinical management. The diagnosis of SIH is based mainly on the postural headache according to the ICHD-3. MRI of the brain in patients with SIH is usually performed as a part of headache evaluation. In suspected cases of SIH, an MRI of the spine should be evaluated to detect the site of the leak It is useful for planning the therapy.

Methods: The authors report a case of a 47-old-year woman after chemotherapy and radiotherapy for breast cancer with acute, severe postural headache. The brain and spine MRI showed signs of intracranial hypotension (fig.1,2). The authors describe the results of a non-targeted epidural blood patch with 10 mL of the patient's blood administered after unsuccessful conservative treatment.





Results: At six months follow-up, the patient was almost asymptomatic, taking only 100 mg of caffeine medications twice a day. Brain (fig.3) and C-spine MRI showed a total regression of SIH signs.



Conclusions: SIH is a distinct entity and requires a high index of suspicion for diagnosis. Our patient fulfilled the objective criteria of the diagnosis: an abnormal brain and C-spine MRI with CSF leak at spinal imaging. This case report points out that even a “low volume” EBP can be effective and safe in the treatment of SIH.

I-D.36

BOTULINUM TOXIN A FOR PAIN MANAGEMENT IN STIFF PERSON SYNDROME

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Background and aims: Stiff Person Syndrome (SPS) is a rare neurological disorder characterized by severe muscle stiffness and spasms, often resulting in significant pain and impaired mobility. Traditional treatments include immunotherapy, muscle relaxants, and pain management strategies, but these approaches often yield limited relief. Botulinum toxin A (BoNT-A) has emerged as a potential therapeutic option for managing pain and muscle rigidity in SPS. By inhibiting the release of acetylcholine at neuromuscular junctions, BoNT-A can reduce muscle spasms and alleviate associated pain.

Methods: This study enrolled two patients diagnosed with Stiff Person Syndrome (SPS), characterized by a marked increase in muscle tone of the masticatory muscles and the scalene muscle group, significantly impairing their quality of life. Both patients received Botulinum Toxin Type A (BoNT-A) injections guided by ultrasound, targeting specific muscle groups:

- Temporalis (15 U per muscle)
- Masseter (40 U per muscle)
- Scalenus anterior (15 U per muscle)
- Scalenus medius (30 U per muscle)

Pain severity was evaluated using the Numeric Rating Scale (NRS) before and one month after BoNT-A therapy.

Results: Prior to BoNT-A therapy, the severity of pain, as assessed by the NRS, averaged 8. At the one-month mark following BoNT-A treatment, the average pain severity decreased to 4. This significant improvement in the subjective perception of pain (assessed using the NRS) remained constant for up to four months after the BoNT-A injection.

Conclusions: Treatment with BoNT-A in our specific cases resulted in a significant improvement in terms of pain perception, with effects lasting up to four months post-injection.

I-D.37

ULTRASOUND-GUIDED INTERCOSTAL BLOCK FOR THE MANAGEMENT OF INTERCOSTAL NEURALGIA IN PREGNANT WOMEN

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Background and aims: Intercostal neuralgia (ICN) during pregnancy is a challenging condition that can significantly impact the quality of life of expectant mothers. It appears as a consequence of mechanical irritation of the intercostal nerves due to the growth of the uterus, increased intra-abdominal pressure on the diaphragm or because of the influence of progesterone.

Intercostal nerve blocks have already been validated as a valuable tool in managing thoracic and abdominal pain syndromes. However, the safety and efficacy of this procedure specifically in pregnant women need to be further investigated to ensure the security of mother and unborn child.

Methods: Data from medical records from patients being treated with ICB between May 2017 and June 2024 at the University Hospital Bonn, Germany were extracted. ICB was applied by ultrasound-guided infiltration of the affected intercostal nerve with a 4 to 6 ml ropivacaine 0.75% solution after informed consent.

Results: This study collects data from 19 women who presented in our centre with severe unilateral chest or flank pain and were diagnosed with ICN. All women were subsequently treated with ICB and reported immediate pain relief after the application of the block. No relevant complications were recorded and only two patients required a second infiltration two days after the intervention due to recurrence.

Conclusions: To our knowledge, this is the first case series report demonstrating that ICB with ropivacaine is easy and safe to perform in pregnant women suffering ICN. All patients in this study reported pain relief and showed no complications.

I-D.38

THE COMPARISON OF TACTILE DISCRIMINATION TRAINING AND OCULOMOTOR EXERCISES IN PEOPLE WITH CHRONIC NECK PAIN

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Background and aims: There is little evidence for the effectiveness of tactile discrimination training (TDT) and oculomotor exercises (OEs) in people with chronic neck pain. To determine determine the superiority of one intervention over another on pain outcomes in people with chronic neck pain.

Methods: 57 participants were randomly divided into three groups: TDT, OEs, and a control group who received no intervention. Pain intensity, neck pain-related disability, pressure pain thresholds (PPTs), mechanical pain of temporal summation (mTSP), and conditioned pain modulation were assessed as pain outcomes. Depending on the normality, a repeated measures ANOVA or F1-LD-F1 design was used to analyse the data.

Results: A significant group*time interaction and main effects for time were found for pain intensity (p:0.019, p:0.009, respectively) and pain-related disability ($p<0.001$, $p<0.001$; respectively). There was a significant group*time interaction for PPTs at the remote site (p:0.010) and a main effect for time for mTSP at the painful side of the neck (p:0.022). TDT and OEs resulted in a significantly higher improvement in pain intensity (p:0.05, $p<0.001$; respectively) and neck pain-related disability (p:0.005, p:0.07; respectively). A significantly higher improvement in PPT at the remote site after TDT was found (p:0.004). The control group demonstrated a significantly higher improvement in mTSP in the painful area of the neck (p:0.048).

Conclusions: OEs provide more improvement in pain intensity and neck pain-related disability than TDT. However, TDT is more effective in reducing pain sensitivity at the remote site. Therefore, both treatments can be used together to increase pain outcomes in people with chronic neck pain.

I-D.39

THE EFFECTIVENESS OF THORACIC SPINE MANIPULATION ON THORACIC SPINE PAIN

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Background and aims: The prevalence of thoracic spine (TS) pain is ~20%. The aim of the study is to evaluate the effectiveness of TS manipulation on TS pain in adults.

Methods: The volunteered adult participants with TS pain were recruited through primary health care. Potential participants filled in TS pain questionnaires (average pain, the worst pain and night pain in VAS) and had medical screening. The mean of the three VAS values had to be at least 35mm.

Participants were randomly allocated to manipulation and placebo groups. Both groups received maximum of six treatments in three weeks. Physical assessment and questionnaires were implemented at baseline, after three weeks of treatment, and in six- and eleven-weeks follow-ups.

The minimally clinically important change was set to 20mm in VAS. Independent t-tests and Mann-Whitney U test were used to test the differences between treatment groups.

Results: The participants (N=74, mean age 39 years) were randomized into the treatment groups. The mean pain scores were 44mm and 45mm for average pain, 56mm and 59mm for the worst pain, and 40mm and 44mm for night pain in manipulation and placebo groups, respectively, at baseline. There was significant and clinically important improvement in maximum pain variable in manipulation group compared to the placebo group at the end of the treatment period (decrement difference between groups 23mm). However, no significant differences were found in the follow-ups.

Conclusions: TS manipulation can decrease the TS pain significantly more than placebo in a short-term.

I-D.40

THIRD WAVE PSYCHOLOGICAL THERAPIES AND THE MANAGEMENT OF CHRONIC LOW BACK PAIN: A SCOPING REVIEW

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Background and aims: Chronic low back pain (CLBP) is a leading global cause of disability, disproportionately affecting individuals from deprived and culturally and linguistically diverse (CALD) backgrounds. Psychological therapies are increasingly tailored to patients, recognising the limitations of ‚one-size-fits-all' approaches. Third-wave psychological therapies may better support CALD communities by aligning with diverse belief systems, but evidence on their application remains unclear.

To map the evidence on third-wave psychological therapies in physiotherapy for adults with CLBP, examining therapy components, processes of change, delivery, inclusion, and cultural-sensitivity.

Methods: Methods followed JBI and PRISMA-ScR guidance. Databases searched: MEDLINE, AMED, CINAHL, PsycINFO, and Web of Science. Two independent reviewers screened articles and extracted data using piloted forms to ensure consistency.

Results: Of 582 records identified, 22 studies met inclusion criteria. Therapies included Cognitive Functional Therapy, Acceptance and Commitment Therapy, Mindfulness-Based Therapies, and Compassion-Focused Therapies. These were delivered individually or in groups, in-person or virtually, often combined with exercise. Core components included cognitive restructuring, mindfulness, self-compassion, body-based experiential learning, and values-based action. Processes of change included self-efficacy, mindfulness, acceptance, and psychological flexibility. Only one study addressed cultural considerations, with no inclusion of non-native speakers or multilingual resources. Standardised outcome measures were lacking.

Conclusions: Third-wave psychological therapies represent a shift the biopsychosocial management of CLBP. Flexible delivery enhances clinical utility across diverse settings. Limited cultural-sensitivity and inclusion were observed, alongside significant overlap in therapy components and processes of change. This review will guide future, focus group questions and inform the coproduction of a culturally-informed CLBP intervention.

I-D.41

THE INTERRELATIONS OF PAIN AND CULTURAL FACTORS ON COGNITIVE TASK PERFORMANCE IN VASCULAR DEMENTIA

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Background and aims: This study explores the interrelations between pain, culture, and cognitive performance in individuals with vascular dementia, aiming to improve understanding of pain's impact on cognitive function in dementia and the influence of cultural factors on pain perception and communication.

The study investigates how pain affects cognitive task performance and examines the role of cultural orientation and PTSD in shaping pain experiences and intercultural communication apprehension in dementia care.

Methods: Using a mixed-methods approach, pain was assessed with self-reported McGill Pain Questionnaire scores and observed PAINAD scores, while cognitive performance was measured through the Trail Making Test (TMT) and the N-back task. Cultural factors, including individualism, were analyzed for their impact on communication apprehension.

Results: Higher self-reported pain generally aligned with observed pain scores, though some discrepancies occurred. Sensory pain significantly affected complex cognitive tasks, with reaction times slowing with higher pain levels. Pain impact on the TMT increased with task difficulty, while N-back task performance remained stable. Individualism influenced communication apprehension but did not predict all outcomes. TMT and 4-back performance were predictors of chronic pain, with PTSD increasing chronic pain likelihood.

Conclusions: The findings underscore pain's effect on cognitive tasks in dementia, emphasizing cultural and individual factors, like PTSD, in shaping pain and communication in care settings.

I-D.42

INTRADISCAL PULSED RADIOFREQUENCY PLUS PLATELET-RICH PLASMA FOR CHRONIC DISCOGENIC PAIN

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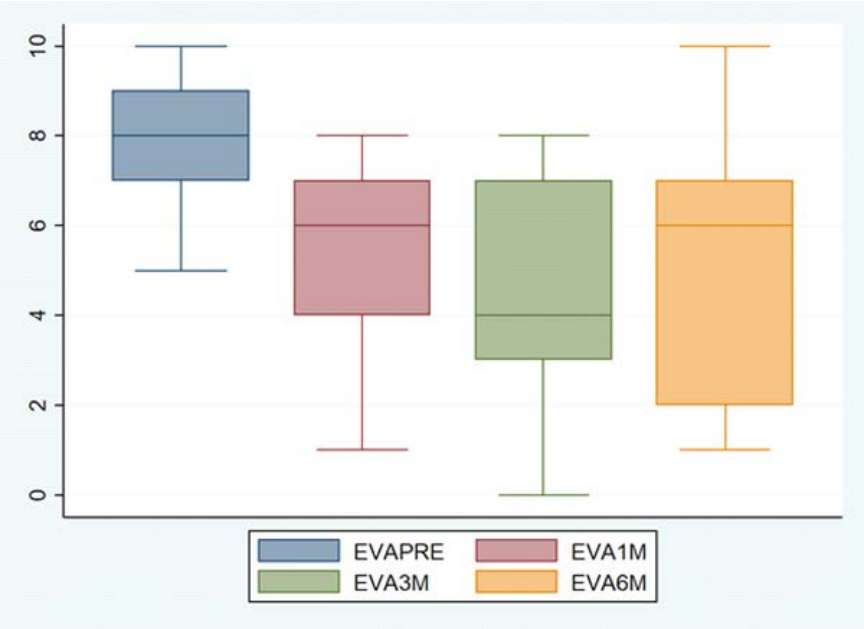
Background and aims: Discogenic pain is the most common cause of low back pain (LBP). Intradiscal Pulsed Radiofrequency (ID-PRF) is used for the treatment of discogenic LBP. The effect of Platelet-Rich Plasma (PRP) on IVD degeneration has been investigated in vitro and in animal models, with significant reparative effects. We investigated the efficacy of ID-PRF plus PRP in patients with discogenic LBP.

Methods: We collect patients treated with ID-PRF and PRP in our hospital from January 2023 to January 2024. Thirty-four patients were included. The patients were treated with ID-PRF plus PRP into pulpous nucleus. Treatment efficacy was evaluated using the Numeric Rating Scale (NRS-11) at 1, 3 and 6-months. Success was defined as a reduction in NRS11 of 50% or more.

Results: The mean age was 50.1 (SD 9.9) years, with 53% of female patients and 23% of patients received opioids, mainly tramadol. The treated levels were thirteen patients L4-L5, fourteen L5-S1 and five L4-L5 and L5-S1. The preprocedural NRS was 7.76 (SD 1.18) in a 0 to 10 scale. There was a median decrease of NRS of 2 points at 1 month, 4 points at 3 months and 2 points at 6 months, being statistically significant (Kruskall-Wallis $p<0.001$) (Figure 1). The relief of 50% or more of baseline pain is observed in 46% of patients at the first month and in 60% of patients at 3 and 6 months.



Conclusions: In patients with discogenic LBP, ID-PRF plus PRP significantly decreased pain at one month and this improvement was improved, at 3 and 6 months.

I-D.43

EFFICACY OF INVASIVE TECHNIQUES FOR CHRONIC SHOULDER PAIN IN OUR PAIN UNIT

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Background and aims: Suprascapular nerve block or radiofrequency RF, is an analgesic technique part of the therapeutic arsenal for chronic diseases affecting the shoulder. Shoulder pain is one of the most frequent reasons for consultation in patients of all ages in routine clinical practice. Due to its high prevalence, time, and resources involved, it constitutes a major health problem.

Methods: A cross-sectional descriptive research compared with other studies. 134 procedures (72 SSNBs and 62 RFs) were analysed over a time period from January 2021 to September 2022. Efficacy was measured using the Patient Global Impression of Improvement Scale (PGI-I).

Results: Patients from the 134 procedures we observed that: 24,6% felt very much better, 38,8% much better, 16,4% a little better, 18,7% noticed no change, 1,5% felt a little worse and no patient felt either much worse or very much worse. Of the 72 SSNBs performed, 79,2% were effective. Of the 62 RFs carried out 80,6% showed an improvement. 65,7% of the procedures were conducted in women. In the SSNBs there was an improvement of 77,8% in men compared to 79,6% in women. Meanwhile in the RFs we found and improvement of 86,2% in men and 75,8% in women.

Conclusions: A total of 107 (79,8%) procedures, both SSNB and RF, were effective. We consider invasive techniques to be effective and safe for the treatment of chronic shoulder pain.Both techniques were mostly undertaken by women. SSNBs were slightly more effective in women whereas RFs were in men. There was also faintly more improvement in RFs tan in SSNBs.

I-D.44

THE MEASUREMENT THE EPIDURAL SPACE DISTANCE BASED ON MRI DATA FOR BETTER SAFETY OF INTERLAMINAR STEROID INJECTIONS

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Background and aims: Epidural steroid injection is the gold standard for radicular pain treatment. MRI of the spine data is an important part of preparing before procedure. To improve interlaminar epidural steroid injection accuracy, choice of the optimal needle length and decrease X-ray dose.

Methods: We include in this study 19 patients, mean age 58,7±17,9 (man 8, woman 11) with degenerative lumbar spine disorder and bilateral radiculopathy. We use MRI of the lumbar spine data and Radiant software for measurement the epidural space distance (90° angle to skin line and the line parallel to the spinous process). We perform standard fluoroscopic guided interlaminar epidural steroid injections and measure real epidural space distance data.

Results: We measure patient`s MRI of the spine data 90° from the skin to epidural space 7.03±1.54 cm, line parallel to the spinous process from the skin to the epidural space 7.57±1.29 cm, and distance between the skin and epidural space during fluoroscopic guided epidural steroid injection 7.69±1.64 cm. Spearman Correlations demonstrate high correlation between MRI of the spine data 90° from the skin to epidural space and real procedure data (0.87; $p<0.05$), and very high correlation between line parallel to the spinous process from the skin to the epidural space and real procedure data (0.99; $p<0.05$).

Conclusions: It is possible to use MRI data of the spine based on the measurement epidural space distance for choice optimal needle length, keeping in mind these distance during procedure for decrease X-ray amount and improve physician's and patient`s safety.

I-D.46

ULTRASOUND GUIDED MAXILLARY NERVE BLOCKS AS A RESCUE THERAPY FOR POST GASSERIAN GANGLION RADIOFREQUENCY ABLATION PAIN

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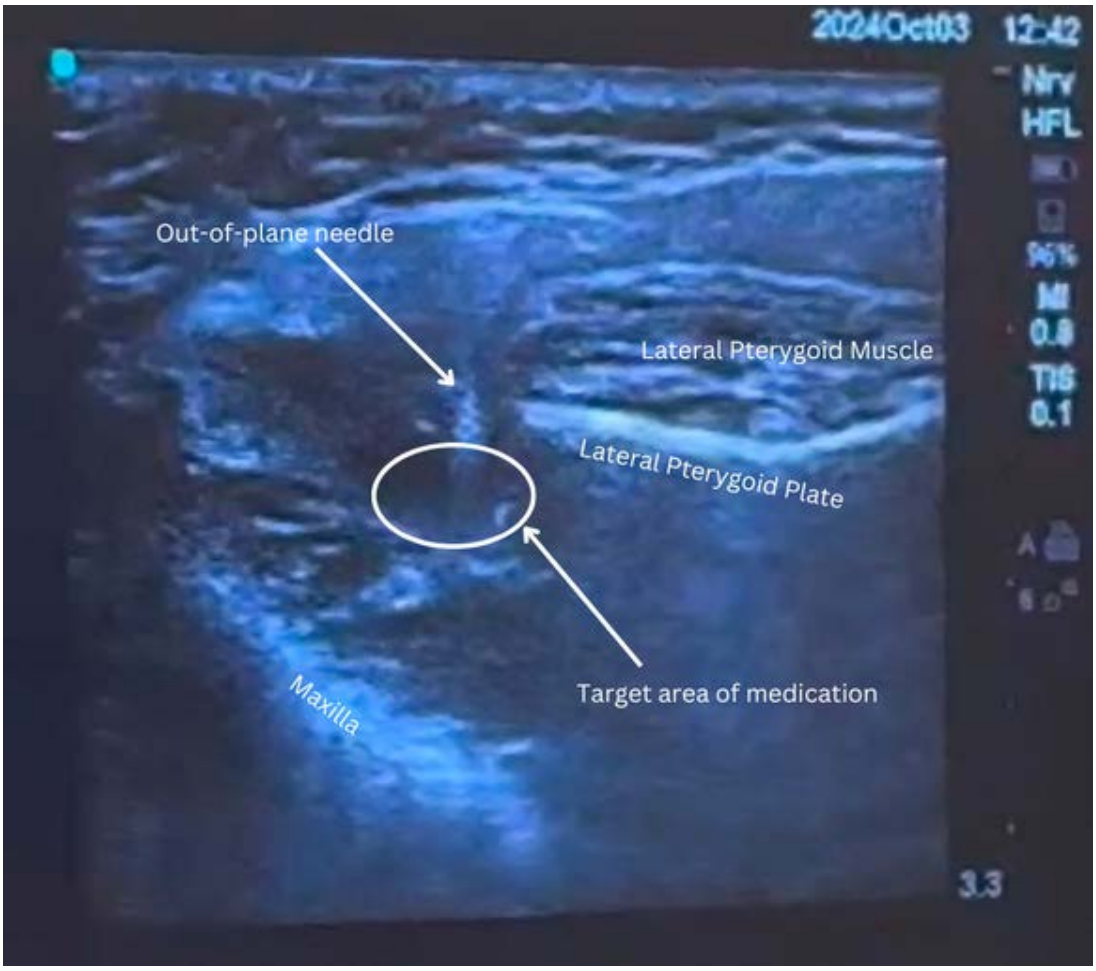
Background and aims: Trigeminal neuralgia can be refractory to medical and interventional treatments, including gasserian ganglion radiofrequency ablation (RFA). We present 2 cases where ultrasound-guided maxillary nerve blocks were employed as rescue therapy for residual pain post-RFA.

Methods:

Case 1: A 75 year old female with a carbamazepine allergy presents with a 7-year history of trigeminal neuralgia (Left V2/3). Treatment with paracetamol, pregabalin, amitriptyline, tramadol, topical and intravenous lignocaine were unsuccessful. A left gasserian ganglion RFA resolved her V3 pain but she had persistent V2 pain complicated by anesthesia dolorosa.

Case 2: A 67 year old female with a 7 year history of trigeminal neuralgia (Right V2/3). She tested positive for HLA-B1502 and trials of gabapentin, pregabalin, lamotrigine and acupuncture were unsuccessful. A right gasserian ganglion RFA resolved her V3 pain but she had persistent right V2 pain despite a repeat gasserian RFA.

In both cases, an ultrasound guided maxillary nerve block was performed as a rescue therapy. An infrazygomatic approach targeting the maxillary nerve in the pterygopalatine fossa was performed in an out-of-plane approach with 20mg of triamcinolone and 1ml of 0.5% bupivacaine (Figure 1).



Results: Both patients had significant pain reduction after 1 month (Numerical rating scale score 8 to 3, and 7 to 2 respectively). No block related complications occurred. Patient satisfaction was high, and both expressed willingness for repeat blocks.

Conclusions: Ultrasound guided maxillary nerve blocks are effective as a rescue therapy for residual V2 pain post-gasserian RFA, offering a promising option for refractory trigeminal neuralgia management.

I-D.47

CONTINUOUS PERICAPSULAR NERVE GROUP (PENG) BLOCK INFUSION FOR PAIN CONTROL IN A PATIENT WITH SUPERIOR AND INFERIOR PELVIC RAMI FRACTURES: A CASE REPORT

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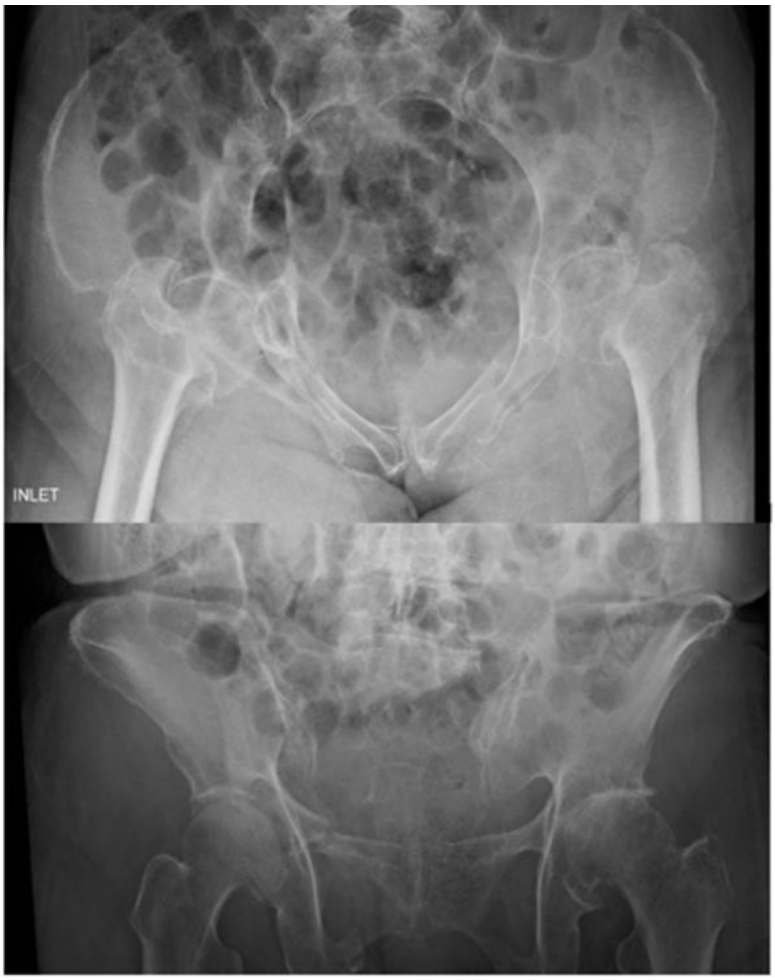
Background and aims: This case report discusses a novel approach of PENG catheter for the management of pelvic fractures. Opioids provided inadequate relief and were accompanied by adverse effects, including nausea and drowsiness, which limited their tolerability. Due to the potential complications, the patient declined surgical intervention, necessitating an alternative pain management strategy. The PENG block provided targeted analgesia, significantly reducing the patient's pain, improving mobility, and enhancing overall recovery with minimal adverse effects.

Methods: A 67-year-old woman presented with superior and inferior pelvic rami fractures after a fall. She reported severe pain, 9/10, unresponsive to opioids which were associated with nausea, drowsiness, and only partial relief. She was not keen for surgical intervention due to its risks.



Results: A PENG block was initiated with a continuous infusion using an Pajunk e-cath 80mm set. There was difficulty threading the catheter under the psoas tendon despite hydrodilation as the space kept collapsing. Hence the cateter was sited adjacent to the psoas tendon with good local anaesthetic spread seen when injected through the catheter. An infusion of 0.2% Ropivacaine was ran at 5ml/hour and subsequently increased to 7ml/hour. Her pain score dropped to 2/10 allowing improved mobility and facilitating her participation in physical therapy. The catheter was removed after a week.

Conclusions: This case highlights the efficacy of the PENG catheter as a non-opioid, regional approach to managing complex pelvic fractures, suggesting its potential application in patients contraindicated for surgery or intolerant to systemic pain management. For persistent pain, PENG neurolysis could offer an innovative long-term solution.

I-D.48

WHAT IF IT HURTS? PHYSICAL ACTIVITY BEFORE AND AFTER BACK SURGERY: A QUALITATIVE STUDY

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Background and aims: Lumbar spinal fusion (LSF) is a widely used surgical procedure to treat degenerative lumbar spine disorders in patients with chronic low back pain. Unfortunately, several patients going through LSF stay physically inactive after surgery. To understand the barriers to physical activity, and to support patients doing physical activity despite the pain, it seems crucial to have a thorough understanding of patients‘ experiences and beliefs regarding physical activity.

The aim is to explore and comprehend the varied experiences related to physical activity in patients undergoing LSF.

Methods: A qualitative study performed from the position of subtle realism. In all, 20 participants ≥18 years old with chronic low back pain who had undergone a lumbar spinal fusion were interviewed. Empirical data were analysed using the Template analysis approach.

Results: Analysis of the interviews produced five overall themes: Consequences of physical activity despite pain – placing hopes in surgery; First steps after surgery – experiences of physical activity after surgery; Re-establishment of physical activity after surgery; Contrasts in the re-establishment of physical activity; and Balancing physical activity and social life after surgery.

Conclusions: Our research highlights the critical early phase right after lumbar spinal fusion, where participants express vulnerability, insecurity, and worries about physical activity. The study underscores an unmet need for early guidance and support regarding physical activity after lumbar spinal fusion. Further, the participants express a strong desire to be included as equal partners in the planning of their active rehabilitation process, which suggests a need for a more collaborative and patient-centred approach to care.

I-D.49

THE EFFICACY OF INTRA ARTICULAR SHOULDER INJECTION VERSES COMBINED SUPRASCAPULAR AND AXILLARY NERVE BLOCK FOR ADHESIVE CAPSULITIS: A DOUBLE-BLIND RANDOMIZED CONTROL TRIAL

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Background and aims: Frozen shoulder is an incapacitating disease that causes pain and limitation in the shoulder joint functional capacity. This work aimed to assess the efficacy of ultrasound-guided combined intra-articular corticosteroids (CS) injection and combined suprascapular & axillary nerve block (CSSANB) in pain control in patients with frozen shoulders.

Methods: This double-blind randomized controlled trial took place at Ghurki Trust Teaching Hospital in Lahore. The study included 80 patients aged 18 to 65 with unilateral stage 2-3 adhesive capsulitis who were randomly assigned to one of two groups: intra-articular shoulder injections or combination suprascapular and axillary nerve blocks. Secondary outcome measures included the Visual Analogue Scale (VAS) for pain and the Short Form 36 (SF-36) questionnaire to assess quality of life. Data were analyzed using SPSS version 26.0 and R studio.

Results: In this study, the visual analog scale (VAS) pain scores and various active and passive range of motion measurements were compared between two groups over 12 weeks. At baseline (0 week), Group A reported a VAS score of 7.5 ± 1.2, while Group B had a score of 7.4 ± 1.3 (p-value = 0.825), showing no significant difference. By the end of the study, at 12 weeks, Group A's VAS score decreased to 4.3 ± 1.1 ($p < 0.01$), and Group B's score decreased to 5.0 ± 1.0 ($p = 0.015$), with a between-group comparison p-value of 0.65.

Conclusions: SSNB, when used as an adjunct to ANB, positively affected immediate pain relief and functional improvement in shoulder patients.

I-D.51

ULTRASOUND-GUIDED ERECTOR SPINAE PLANE BLOCK FOR PAIN RELIEF IN PATIENTS WITH CHRONIC THORACIC HERPES ZOSTER

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Background and aims: Postherpetic neuralgia (PHN) is defined as dermatomal pain lasting at least 90 days after the appearance of the acute Herpes Zoster rash. Several studies have recently shown that the erector spinae plane block (ESPB) is effective in the treatment of thoracic neuropathic or postoperative pain. In this study, we aimed to evaluate the efficacy of ESPB in patients with chronic pain due to PHN.

Methods: Medical records of 18 patients with a diagnosis of chronic PHN unresponsive to conservative treatment and who underwent ultrasound-guided ESPB were reviewed retrospectively. Visual analog scale (VAS) scores were recorded at pre-procedure and post-precedure 1 month follow-up. All data were then analyzed statistically.

Results: The average age of the patients was 69,61 (49-87) years, 55,6% (10) were female, 44.4% (8) were male. While the mean VAS score before the ESPB was 8.06, the mean VAS score after the ESPB was 3.45 at 1-month follow-up. At the 1st month after the procedure, the proportion of patients who completely stopped using medications was 38,9%. No serious complication was found in any patient.

Conclusions: The ESPB is an effective and safe treatment option for pain management of toracic PHN in the short term. Randomized controlled trials with longer follow-up involving more patients are needed.

I-D.52

USE OF ULTRASOUND-GUIDED SUPRASCAPULAR NERVE (SSN) BLOCK IN THE SELECTION OF PATIENTS FOR RADIOFREQUENCY ABLATION - PRELIMINARY RESULTS

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Background and aims: Chronic shoulder pain (CSP), with its multiple etiologies, is a common symptom with significant impacts on daily functioning. In the past few years, many publications have shown the effectiveness of ultrasound-guided blockade of the suprascapular nerve (SSN) to alleviate this type of pain. More recently, publications have emerged, discussing the use of radiofrequency ablation of the SSN to prolong pain relief.

Our aim is to use this nerve block as a predictive test to select patients who will be most likely to respond effectively to treatment with radiofrequency ablation of the SSN.

Methods: Ten patients with chronic shoulder pain received an ultrasound-guided SSN block using the suprascapular notch as the intended target.

After obtaining informed consent, the relevant risks, benefits, and alternative treatments were discussed. Standard vital sign monitoring was used, and the patient was positioned appropriately.

The test was performed with 4 ml of local anesthetic, injected under ultrasound guidance.

If the patient reported a 50% pain reduction or a 50% functional improvement lasting 12 hours, the patient was eligible for RF ablation.

Results: For now, 6 out of 8 patients suffering from CSP obtained a 50% pain reduction or a 50% functional improvement

Conclusions: Performing this simple and rapid test with local anesthetics allows identification and selection of the most appropriate candidates for RF ablation and thus the best use of medical resources.

I-D.54

ANGIOGRAPHIC EVALUATION OF VESSEL STAINING AND INTERVENTION EFFICACY IN PATIENTS WITH COMPLEX REGIONAL PAIN SYNDROME

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[1]Jeonbuk National University Hospital, Jeonju, Korea, Republic of, [2]Jeonbuk National University Medical School, Jeonju, Korea, Republic of

Background and aims: One of the hypotheses for the pathophysiology of complex regional pain syndrome (CRPS) is that the ascending autonomic nervous system can impact blood vessels through a phenomenon known as sympathetic coupling. Sympathetic coupling is an abnormal interaction between sympathetic nerves and blood vessels, resulting in vascular tone and blood flow dysregulation. This dysregulation can lead to vascular structural changes and alterations in temperature within the affected area.

Methods: In this study, angiography was performed in CRPS patients to evaluate vascular abnormalities and perfusion, and embolization or reperfusion was performed according to the angiography results. The purpose of this study is to report the results of angiography, compare them with Digital Infrared Thermographic Imaging (DITI) and three-phase bone scan (TPBS), and evaluate the changes in symptoms after intervention in CRPS patients.

Results: Retrospectively, we enrolled 5 patients diagnosed with Complex Regional Pain Syndrome (CRPS) according to the Budapest criteria, who had undergone angiography, DITI, and conducted TPBS. Based on the angiography

results, three out of the five patients showed decreased vascular perfusion, while two showed increased staining. Reperfusion using eglandin was performed in patients with poor vascular perfusion, and embolization with imipenem/cilastatin was performed in patients with increased abnormal staining. No significant changes in pain were observed in all patients before and after the procedure. Additionally, comparing the angiography, DITI, and TPBS results did not show similar patterns.

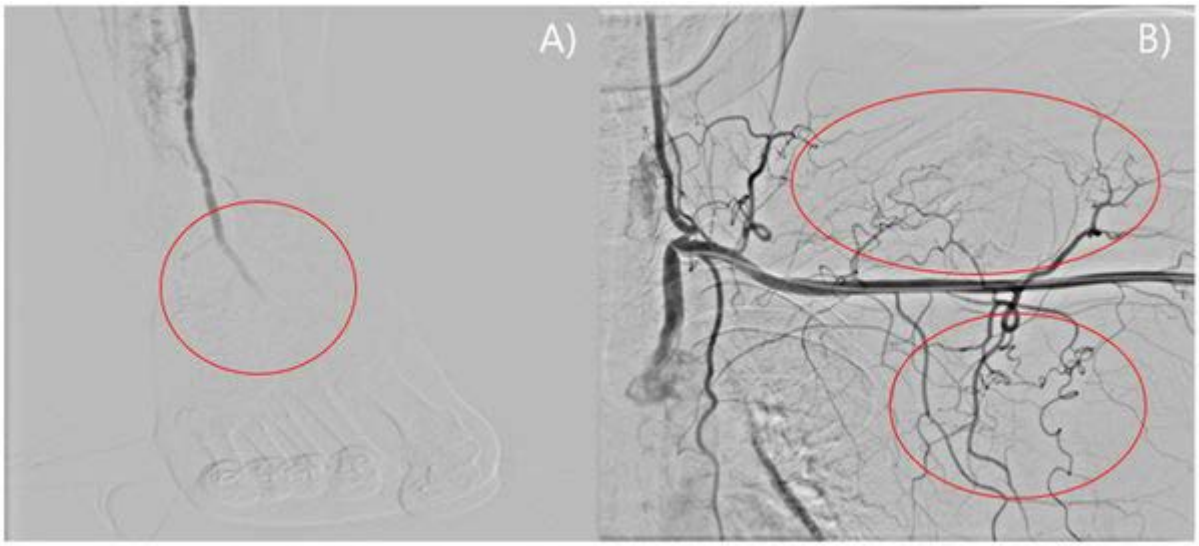

Fig. 1. A) Poor vascular perfusion in arteries around ankle. B) Increased staining around left shoulder joint.

Table 1. Patients data

	Age	Sex	Lesion	DITI	TPBS P-B-D	Angiography	VAS Before/after
Patient 1	43	F	Rt. Ankle	↓	S-D-S	Poor perfusion	7/7
Patient 2	39	F	Lt. Knee	n/s	I-I-S	Poor perfusion	5/5
Patient 3	39	M	Rt. Ankle	↓	D-D-I	Poor perfusion	7/7
Patient 4	34	M	Lt. Shoulder	n/s	S-S-S	Increased staining	8/8
Patien 5	64	F	Lt. Shoudler	n/s	S-S-I	Increased staining	7/7

DITI; Digital Infrared Thermographic Imaging TPBS;3-Phase Bone Scan VAS;Visual Analog Scale Rt;Right Lt;Left n/s;not significant

P-B-D; Perfusion phase-Blood pooling phase-Delayed phase S;Symmetric D;Decreased I;Increased

Conclusions: Abnormal staining and reduced perfusion were found in the angiography of CPRS patients, and there was no pain improvement by the intervention of angiography.

I-D.55

PATIENT SATISFACTION WITH SINGLE-SHOT SPINAL ANALGESIA FOR LABOR

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Background and aims: In low /middle income countries due to a shortage of anesthesia providers, especially during the COVID-19 pandemic, epidural anesthesia is mostly not available to pregnant women; an alternative is single-shot spinal analgesia.

The aim of the study was to determine the patient satisfaction with single-shot spinal analgesia provided for Labor.

Methods: 50 parturients were asked to participate in this descriptive cross-sectional study performed in the General Hospital Sarajevo during a 2 year period. A tool used for the data collection was a questionnaire. A subjective feeling of pain was assessed by visual analogue scale before analgesia, 10 minutes into procedure, 1 hour after procedure and during the delivery. Timing for single-shot analgesia was the active phase of labor at cervical dilatation ≥ 5 cm. All parturients received 0,5% Levobupivacaine 0,5 ml, Fentanyl 25 mcg, 0,9% Sodium chloride 1 ml.

Results: The approximate duration of pain before the procedure was 4 hours. The pain was estimated as: VAS 9 (before the procedure), VAS 3 (10 minutes into the procedure), VAS 1 (1 hour after the procedure), VAS 4 (during delivery). 66% (33) parturients delivered babies during analgesia and in 34% (17) parturients the analgesia ended before delivery. The approximate duration of spinal analgesia was 110 min.

Conclusions: All parturients were satisfied with the analgesia, and even though some of them did not deliver during analgesia, they had enough time to rest and actively participate in the final stage of delivery.

I-D.56

NEW INDICATIONS ? UNPAIRED GANGLION BLOCK PROVIDES ANALGESIA FOR CANCER AND TRAUMATIC PAIN OF THE PUBIC, SCIATIC, AND ACETABULAR BONES, A CASE SERIES

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Background and aims: Unpaired ganglion block provides analgesia for sympathetic-dependent pain in the anorectal and perineal regions. However, we happened to experience a case in which an unpaired ganglion block performed for cancer pain in the anal region had a good analgesic effect on pubic metastatic pain. We have subsequently experienced good analgesic effects of unpaired ganglion block for cancer metastatic pain in the pubic bone, sciatic bone and acetabular bone, as well as for fractures due to trauma. A retrospective study was conducted with the aim of clarifying the efficacy of unpaired ganglion block.

Methods: We retrospectively investigated the efficacy of ganglion impar block performed at our institution for pain due to pubic, sciatic, and acetabular metastases of cancer or traumatic fractures.

Results: Unpaired ganglion blocks were performed in 16 patients with complaints of pain related to the pubic bone, sciatic bone and acetabulum. Thirteen patients had cancer metastases and three had traumatic fractures. An unpaired ganglion block was performed with local anaesthetic, followed by nerve destruction. Pain was almost completely resolved in all cases at the time of injection of the local anaesthetic.

Conclusions: In the present study, unpaired ganglion block with local anaesthetic was found to be analgesic in almost all cases of pain due to cancer metastases and traumatic fractures of the pubic bone, sciatic bone and hip bone. Unpaired ganglion block performed at the distal most end of the sympathetic trunk provided analgesia in the pubic bone, sciatic bone and acetabulum.

I-D.57

VIRTUAL REALITY FOR ANALGESIA FOR SPINE SURGERYI IN ADOLESCENTS: A PROSPECTIVE RANDOMIZED OPEN-LABEL STUDY

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Background and aims: The primary objective is to evaluate the effect of the association of virtual reality (VR) sessions with usual management on the cumulative consumption of morphine or morphine equivalent post-operatively in adolescents aged from 13 to 18 years who have undergone scoliosis surgery.

Methods: ViRAgeSS is a prospective, superiority, controlled, randomised, unblinded, single-centre study. Population was divided into 2 groups:

- virtual reality combined with standard analgesic treatment (VR group).

- standard analgesic treatment (control group).

Each patient in the experimental group benefits from an adapted VR program „Child Pain“ including two daily sessions lasting 20 minutes from the first to

the third post-operative day during their stay in the continuing care unit.

A medical and economic evaluation will also be carried ou

Results: 101 teenagers were included(77 females, 24 males). The average age was 14,8 years. The average weight was 52,7 kg, average height 163,6 cm. Regarding the ASA score, 78,22% of the population had a score of 1(no systemic disease)19,8% a score of 2, and 0,099% a score of 3. Morphine consumption was similar in both groups (1mg/kg IV equivalent on average over days 1-3) with no statiscally significant difference between the 2 groups.

Conclusions: There was nos significant differences in morphine consumption, anxiety, or post-operative pain between the No VR and the VR group. These results suggest that both pain management strategies are equivalent on these measures. Further in depth analysis are on going to identify subgroups of the population who could benefit from VR.

I-D.58

RETROSPECTIVE STUDY OF SERRATUS POSTERIOR SUPERIOR INTERCOSTAL PLAN BLOCK IN PATIENTS WITH MYOFASCIAL PAIN SYNDROME IN THE LOWER NECK AND BACK REGION

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Background and aims: Myofascial pain syndrome is a significant disability-related public health issue, commonly encountered in the general population. The objective of this study was to evaluate the impact of serratus posterior superior intercostal plane (SPSIP) block on pain relief and biopsychosocial factors in patients with myofascial pain syndrome affecting the lower neck and back.

Methods: Patients who underwent SPSIP block for myofascial pain in the back and lower neck at the Hacettepe University Pain Clinic between February 2023 and December 2023 were assessed. Pain intensity and biopsychosocial characteristics were measured using the Numerical Rating Scale (NRS), the DN4 questionnaire, and the Bournemouth Questionnaire for Neck Pain (BBA). Data were collected before the procedure and one to three months post-procedure for comparison.

Results: A total of 42 patients participated in the study. The mean age was 49.55 ± 10.38 years, body mass index (BMI) was 27.23 ± 5.02, and duration of pain was 46.93 ± 38.14 months (range: 2 to 144 months). Significant reductions in pain intensity and improvements in biopsychosocial outcomes were observed across all measures (NRS, BBA, and DN4) at both one month and three months after the procedure, compared to baseline ($p < 0.001$). However, no significant differences were found between the one-month and three-month follow-up assessments ($p = 0.506$ for NRS, $p = 0.724$ for BBA, $p = 0.221$ for DN4).

Conclusions: The SPSIP block provided significant pain relief and improved quality of life for patients with lower neck and back myofascial pain syndrome, with sustained benefits observed up to three months following the procedure.

I-D.59

INTERPEDICULAR APPROACH IN PERCUTANEOUS SACROPLASTY FOR TREATING PAIN DUE TO DIRECT INVASION OF RECTAL CANCER INTO THE S3 BODY: A CASE REPORT

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Background and aims: Percutaneous sacroplasty is mainly used as an intervention for pain associated with sacral insufficiency fractures or sacral metastatic

tumors. However, sacroplasty for managing the pain associated with direct sacral invasion of rectal cancer has been rarely reported.

Methods: We present a case of a 74-year-old patient who underwent sacroplasty via the interpedicular approach under fluoroscopic guidance to relieve pain resulting from direct tumor invasion into the S3 body.

Results: After the procedure, the patient experienced immediate pain relief and did not feel worse pain with ambulation. Aside from peritumoral vascular leakage, no other significant complications occurred immediately post-procedure.

Conclusions: After the procedure, the patient experienced immediate pain relief and did not feel worse pain with ambulation. Aside from peritumoral vascular leakage, no other significant complications occurred immediately post-procedure.

I-D.60

EFFECTS OF LUMBAR FACET NERVE BLOCK ON BACK PAIN, POSTURAL SWAY AND HEALTH RELATED QUALITY OF LIFE, IN PATIENTS WITH CHRONIC BACK PAIN

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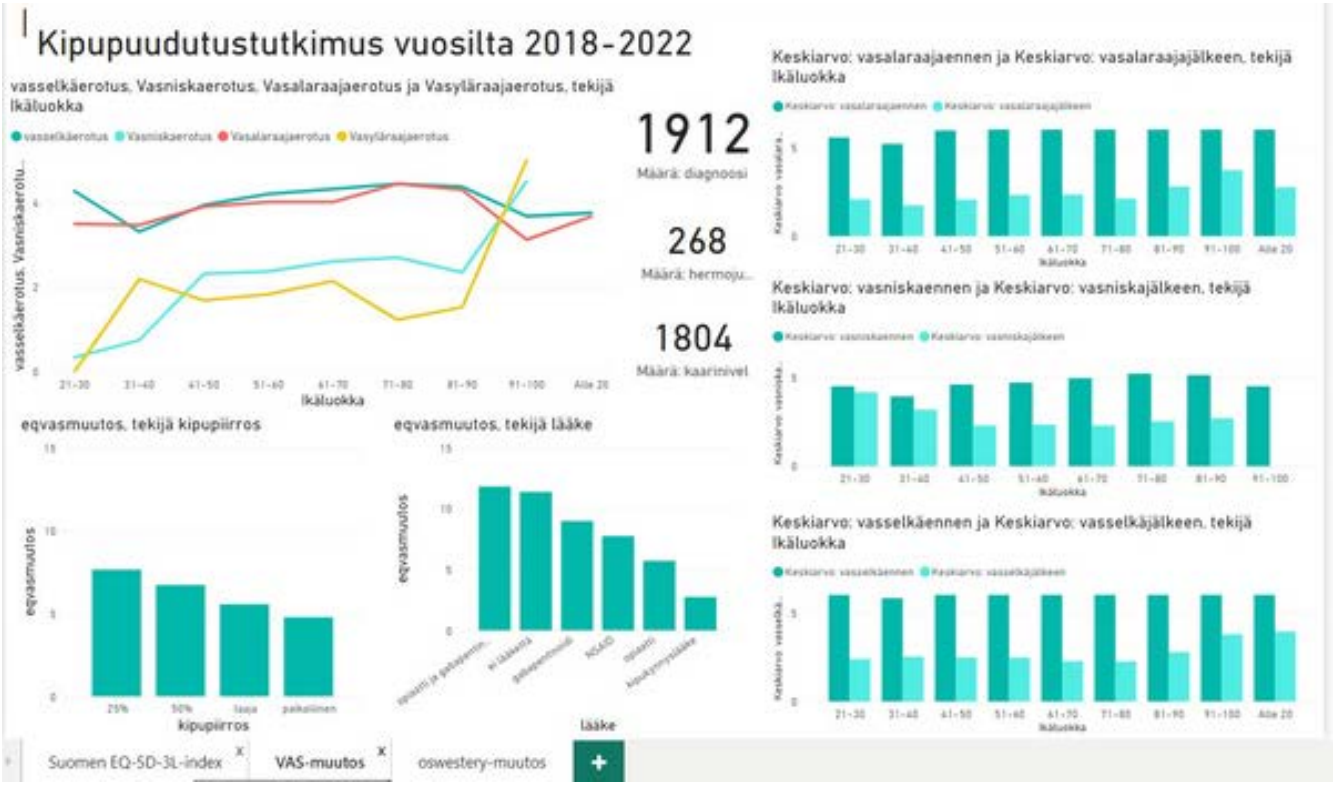
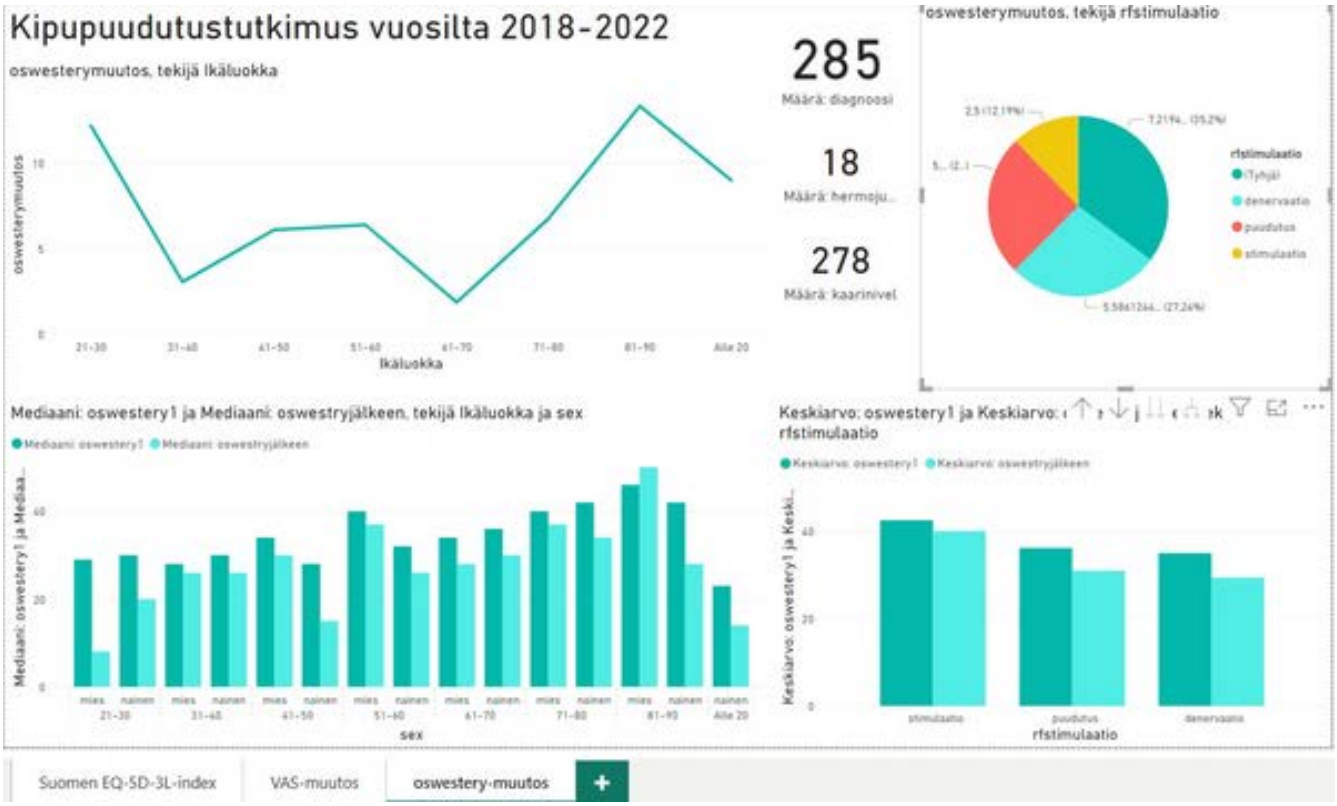
Background and aims: Needle-based interventions, particularly interventions targeting the facet (zygapophysial) joints, are commonly utilized for the treatment of low back pain. Lumbar facet joints have been implicated in chronic low back pain in a significant portion of patients, with estimates ranging up to 45%. To investigate effects of facet-nerve blocks on back pain and postural sway in patients with chronic back pain. We also study life-quality changes and costs between different treatment strategies.

Methods: Quality register study on 1910 patients 2018-2022. Change of oswestry index, EQ5DL3 and pain was studied before and 1 month after intervention.

Results:





Conclusions: Our study was a clinical quality registry study on patients who received interventional pain treatment at the unit for physical medicine and rehabilitation. This multimodal treatment protocol include pain reprocessing toward increased physical activity and return to activities after facet-nerve blocks. This working model includes explanation (diagnostic facet block), positive expectations with physical activity (“motion is lotion,use it or lose it”) and follow-up. Patients undergoing interventional pain management reported significant improvements for all variables at one- moth follow-up. Thus, these positive long-term effects after single blocks at 1-month follow up may also be related to changes in brain state (Limbicemotional-relearning)

I-D.61

A PROSPECTIVE STUDY OF PREDICTIVE FACTORS INFLUENCING THE EFFECTIVENESS OF INTERLAMINAR EPIDURAL INFILTRATION IN THE MANAGEMENT OF SCIATICA DUE TO LUMBAR DISC HERNIATION

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Background and aims: Disc herniation affects 75-80% of individuals and is a leading cause of lumbar pain and spinal surgery, particularly in men over 35. Management includes conservative treatments like bed rest, physiotherapy, medications, and epidural corticosteroid injections (ESI). Since ESI efficacy varies, identifying predictive factors is crucial to optimize treatment and reduce risks.

Methods: Thirty-four patients (15 men; aged 26-69, mean=46.24±1.9) scheduled for interlaminar ESI, were pre-evaluated and received up to three injections, spaced 2-4 weeks apart. Outcomes were assessed using Arabic versions of McGill Pain Questionnaire Short Form, Oswestry Low Back Disability (ODI), Global Impression of Change score, Numerical Pain Rating Scale (NPRS) and surgical decision. Follow-ups occurred biweekly for 2 months, then monthly for 4 months, with a final evaluation at 1 year. Variations in scores were correlated with baseline factors, including sex, age, BMI, hernia volume, pain duration, straight leg test degree, motor deficit.

Results: Patients with inflammatory pain had significant reductions in NRPS (p=0.0197) and ODI (p=0.008) compared to those with mechanical pain. Pain duration positively correlated with reductions in NPRS (p=0.02) and ODI (p=0.019). Multivariate analysis showed that only the type of pain (inflammatory but not mechanical) predicted ODI changes (p=0.038), while larger herniation volumes (grade 3; p=0.045) predicted surgical decision.

Conclusions: Patients with inflammatory lumbar pain due to lumbar disc sciatica with longer pain histories seem to respond best to ESI, while those with larger disk herniations are more likely to require surgery. These findings emphasize the importance of tailored treatment based on pain type and herniation volume.

I-D.62

EVALUATING THE EFFICACY OF EMERGENCY DEPARTMENT FEMORAL NERVE BLOCKS FOR PAIN MANAGEMENT IN PAEDIATRIC FEMORAL FRACTURES AT ALDER HEY CHILDREN‘S HOSPITAL

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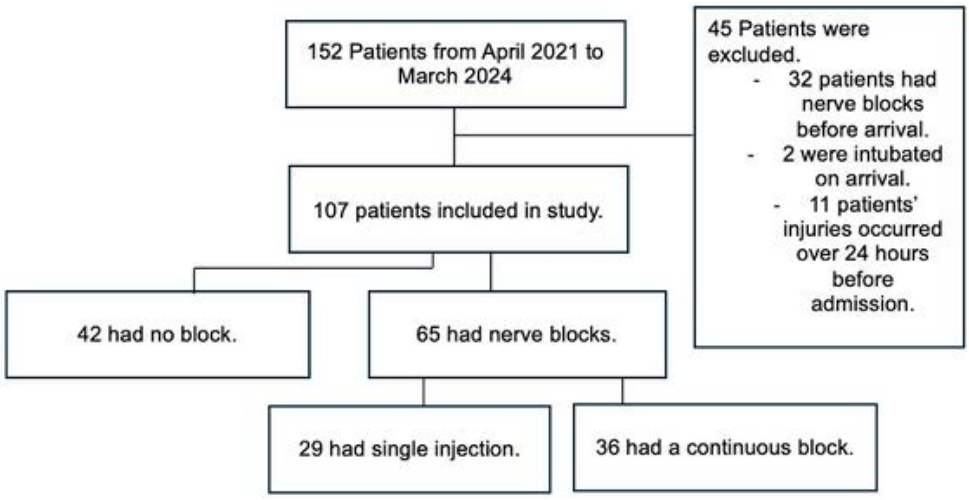
Background and aims: Paediatric femoral fractures are a painful and potentially life-threatening injury. Regional anaesthesia may be considered an alternative or supplement to systemic methods for managing the pain of this injury. While well-researched in adults, the evidence base for nerve blocks in children with femoral fractures is limited. This study aims to evaluate the safety and efficacy of nerve blocks for paediatric femoral fractures.

Methods: This retrospective, single-centre observational study investigated all children (0-16yrs) who presented to a paediatric ED with an acute femur fracture between April 2021 and March 2024. The primary outcome was the amount of morphine required in the first 48 hours of admission. Secondary outcomes include the change in pain scores at 24 and 48 hours and adverse events.



Results: Of 152 patients screened, 107 were included. The mean age was 6 years 5 months, and 78.5% were boys. Average morphine use in 48 hours was not significantly different between the groups (p= p=0.4854). All groups experienced adequate pain relief. No significant difference between groups was observed in pain scores after 24 or 48 hours (p= 0.3679). There were no cases of local anaesthetic toxicity or life or limb-threatening side effects.

	Average number of doses	Total mg	Total mg/kg	Mean mg/kg
Single Injection	3.55	535.4	20.45	0.71
Continuous Infusion	2.3	357.6	15.6	0.43
No Nerve Block	2.4	461.45	18.44	0.44

	Average Pre Pain score	Average Post Pain score 24h	Difference in 24h	P-Value	Average Post Pain score 48h	Difference in 48h
Single Injection	4.18	3.62	-0.56	0.332	3.86	-0.32
Continuous Infusion	5.2	3.24	-1.96	0.0422	3.74	-1.46
Without Block	2.8	3	+0.2	0.459	3.23	+0.43

Conclusions: This report suggests that nerve blocks are a safe method of pain management. Both nerve blocks and systemic analgesia provide adequate pain relief to paediatric patients with acute femoral fractures in the ED. However, this report cannot confidently conclude that femoral nerve blocks perform better than systemic analgesia for children with this injury.

I-D.63

ACUTE PAIN SERVICE NEEDS AND INTERVENTION IN A MAJOR TRAUMA CENTRE: A 1 YEAR RETROSPECTIVE OBSERVATIONAL STUDY

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[1]Cork University Hospital, Cork, Ireland, [2]Trinity College Dublin, Dublin, Ireland

Background and aims: Cork University Hospital is a recently designated major trauma centre(MTC) in Ireland. The Inpatient Trauma Service (IPTS), which was established in June 2023, is a consultant-led multidisciplinary team, which coordinates the care of the trauma patients and aims to expedite their journey to recovery. This includes referral to specialist services including the acute pain service (APS), surgical specialties, and etc.

To quantify and characterise patients who require acute pain service (APS) referral. To describe the interventions by the APS team and outcomes for patients.

Methods: A retrospective observational study as part of an audit.

Participants: All patients in the MTC that were reviewed by the IPTS between June 2023 and June 2024.

Main Outcome Measures: Demographics of patients requiring APS referral. Type of pain intervention, time to assessment, length of stay (LOS), and adherence to chest wall injury pathway.

Results: 713 patients were reviewed by the IPTS. 20% (n=146) of patients required APS referral. The average age of patient's referred to the APS was 60 years old.

Mechanism of Injury: 44 Fall <2m, 41 Road Trauma, 39 Fall from height >2m, 7 Assaults/Blows, 1 Shooting/stabbing,14 Other.

LOS of patients admitted under cardiothoracics was decreased by 36 hours in the second 7 months by comparison to the first 7 months through streamlined facilitation of regional analgesia by the APS.

Conclusions: As a new major trauma centre, quantifying frequency of referral, types of intervention, and measuring time to assessment ensures appropriate resourcing of acute pain services in the development of a Major Trauma Centre.

I-D.66

ATELOCOLLAGEN VS. PROLOTHERAPY IN PARTIAL-THICKNESS SUPRASPINATUS TEARS: A PROSPECTIVE RANDOMIZED CONTROLLED TRIAL WITH MRI-CONFIRMED OUTCOMES

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Background and aims: Partial-thickness supraspinatus tear (PTST) is a common cause of shoulder pain with varying treatment options. This study aimed to compare the efficacy of prolotherapy using hypertonic dextrose solution and atelocollagen injections for the treatment of PTST.

Methods: Thirty-four patients with PTST were enrolled and randomly assigned to two groups: Group P received prolotherapy and Group C received atelocollagen injections. The treatments (ultra-sound guided injections) were administered in three sessions at oneweek intervals. The primary outcome was pain reduction, measured immediately after treatment and at 2 weeks, 1 month, and 3 months. Secondary outcomes were functional improvements via the Korean Shoulder Pain and Disability Index (K-SPADI) and the Shoulder Constant-Murley Scoring System (SCSS) at 1 and 3 months, alongside magnetic resonance imaging (MRI) evaluations of the supraspinatus tear at 3 months against the baseline.

Results: Of the 34 patients, 28 completed the study. Group C (n = 15) showed significant pain relief from baseline at both 1 and 3 months ($p = 0.04$ and $p < 0.01$) post-injection, whereas Group P (n = 13) showed significant pain reduction only at 2 weeks postinjection. MRI findings indicated better healing outcomes in Group C, with improvements observed in four patients compared with none in Group P. Functional scores improved in both groups ($p < 0.01$); however, no significant differences were observed.

Conclusions: Compared to prolotherapy, atelocollagen injection significantly reduced pain in the management of PTST and may lead to some structural improvement.

I-D.67

ULTRASOUND-GUIDED RADIOFREQUENCY ABLATION OF THE GENICULAR NERVES: AN INNOVATIVE NON-OPERATIVE TREATMENT FOR KNEE OSTEOARTHRITIS

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Background and aims: Radiofrequency (RF) treatment of the genicular nerves shows promise for managing chronic osteoarthritic and persistent postsurgical knee pain (PPSP) that doesn't respond to conventional medical management.

Methods: The retrospective single center cohort study of patients treated with ultrasound guided RF of the genicular nerves for chronic knee pain was conducted in the Center for Regeneration and Rehabilitation Novi Pazar, Serbia,

from October 2022 to November 2024. Subgroup analysis based on the etiology of pain was performed in addition to the total study population analysis. Outcome parameters were global perceived effect (GPE), Numeric Rating Scale for pain, consumption of potent opioids, and treatment safety at six weeks and cross sectionally at a variable time point. Treatment success was defined as GPE ≥ 50%.

Results: Results showed that out of 96 cases screened, 90 were included in the study, with 26 diagnosed with PPSP and 64 with degenerative knee pain. The study found that treatment success was achieved in 80 out of 90 interventions (88.9%) at six weeks, with similar results in both groups. Follow-up assessments showed that in 95% of patients with significantly reduced pain, this effect was maintained over six months and in 72% of patients over eleven months, with the mean duration of the impact of the RF treatment being 9.5 months.

Conclusions: RF of the genicular nerves has shown a success rate of over 88% for patients who are refractory to conventional medical management. The treatment was well-tolerated and had a mean duration of effect of 9.5 months.

I-D.68

ULTRASOUND GUIDED BLOCKADE OF THE ADDUCTOR CANAL WITH A LOCAL ANESTHETIC REDUCES PAIN AND IMPROVES KNEE INJURY AND OSTEOARTHRITIS OUTCOME SCORE IN THE KNEE OSTEOARTHRITIS

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Background and aims: Knee osteoarthritis (OA) is characterized by chronic pain and significant reduction in patient's functioning and quality of life. The objective of our study was to investigate the effects of adductor canal blockade on knee pain and Knee Injury and Osteoarthritis Outcome Score (KOOS) in patients with knee OA.

Methods: 77 patients with idiopathic knee OA were included in our research. Maximal and minimal pain intensity were assessed using an 11-point verbal numerical rating scale NRS scale. Knee Injury and Osteoarthritis Outcome Score (KOOS) is scored separately from 0 (extreme knee problems) to 100 (no knee problems). All were measured at baseline and 1 month and after the blockade of the adductor canal by using 14 ml of 0.25% levobupivacaine and 100 mcg clonidine.

Results: 75 participants finished the study. Maximal and minimal pain intensity decreased significantly after the intervention comparing baseline NRS_{max} 8.1 and 1 month after blockade NRS_{max} 4.2. Changes in quadriceps muscle strength, Time up to go test (TUG), 30-second chair (30CST), ROM test, KOOS were significant improved. Pain during quadriceps muscle strength measurement decreased significantly in both knee joints. Pain intensity during the TUG and the 30CST decreased substantially 1 hour after the intervention and then remained at similar levels in the later measurements, KOOS baseline and 1 month respectively (pain 36/58, symptoms 53/64, activities of daily living subscale 36/61 and quality of life subscale 18/31).

Conclusions: Our study shows that ultrasound-guided adductor canal blockade is associated with significantly improved KOOS and reduced pain in patients with knee OA.

I-D.70

TRANSCRANIAL MAGNETIC STIMULATION WITH EEG-BASED CONNECTIVITY TO IDENTIFY RESPONDERS TO RTMS TREATMENTS - A FEASIBILITY PILOT STUDY

E. De Martino[1], B. Andry Nascimento Couto[1], A. Jakobsen[1], A. Girardi Casali[2], P. Dane Bonde-Heriksen[1], T. Graven-Nielsen[1], D. Ciampi de Andrade[1]

[1]Aalborg University, Gistrup, Denmark, [2]Federal University of São Paulo, São Paulo, Brazil

Background and aims: Approximately half of chronic pain patients respond with reduced pain intensity to high-frequency (10 Hz) repetitive transcranial magnetic stimulation (rTMS) delivered to the primary motor cortex (M1). However, it is crucial to identify which patients will benefit from this treatment. Combining TMS with electroencephalogram (TMS-EEG) allows for exploring cortical connectivity. Evaluating this connectivity before administering rTMS may provide insights into which patients are likely to respond favourably to the treatment.

Methods: Seven chronic pain patients were assessed with TMS-EEG to M1 before ten daily sessions of 10 Hz rTMS to M1. Pain intensity was assessed at baseline and post-treatment. Responders were defined as a 30% decrease in pain intensity on an 11-point numerical rating scale. TMS-evoked potentials were analysed using a debiased weighted phase lag index for pre- and post-TMS stimulus periods. Connectivity changes were quantified using phase and space factors: Phase measured how EEG channels connected above the average signal's 95% confidence interval (CI). Space was the Euclidean distance between EEG channel pairs with significant changes (>95% CI) after the TMS probing pulse. TMS-EEG at M1 was also collected from thirty healthy volunteers.

Results: Four patients responded to M1 rTMS, and three did not. The average reduction in pain intensity was 1.4±1.5. TMS-EEG showed low connectivity indices in all responders, while two non-responders had higher indices above the 75th percentile of healthy volunteers.

Conclusions: These pilot results demonstrate the framework feasibility of studying phase-based connectivity measures induced by pretreatment TMS-EEG to predict the effectiveness of rTMS in chronic pain patients.

I-D.72

CHALLENGES WITH REPLACING THE INTRATHECAL DRUG DELIVERY SYSTEM: A CASE SERIES

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Background and aims: Intrathecal drug delivery system acts as a rescue therapy for patients who suffer from chronic spasticity and those with severe chronic pain conditions with failed other interventions (1). Four of our patients with Prometra I pump implanted nine years ago need a replacement of the whole system. This issue arises as Prometra I pumps become unavailable in Europe and the United Kingdom, which necessitates the insertion of a completely new system (3).

Methods: The old pump was explanted under general anaesthesia, in a lateral position, and under fluoroscopy guidance. The old intrathecal catheter was clamped using surgical clips and ligated using a non-absorbable suture. Starting one level below the old catheter insertion site was essential to introduce the epidural needle and place the new catheter. After the procedure, the new pump was started with only 50% of the previous old dose.

Results: All four patients were implanted successfully with the new Medtronic Synchromed II pumps. One of the four patients developed mild side effects of Baclofen overdose when the new pump was started at the same dose as the old pump. The other three patients didn't develop any side effects or complications when the pump started at only 50% of the old dose and gradually increased daily during their in-hospital stay.

Conclusions: It was mandatory to insert the new intrathecal catheter at a lower level than the old one. Starting the patient on a low dosage compared to the previous one and titrating it gradually decreases the risk of complications, mainly overdosage.

I-D.74

THETA BURST STIMULATION OVER THE RIGHT TEMPORO-PARIETAL JUNCTION MODULATES PAIN PERCEPTION IN BORDERLINE PERSONALITY DISORDER

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Background and aims: Borderline personality disorder (BPD) is characterized by pain hyposensitivity which has been related to dissociation and altered activity in fronto-limbic brain areas. However, dissociation is a multidimensional phenomenon including altered body awareness, suggesting that temporo-parietal networks, contributing to the

integration of body-related sensory information might also be involved in altered pain perception in BPD. We therefore aimed to investigate the effect of modulation of the right temporo-parietal junction (rTPJ) neural activity by theta-burst stimulation (TBS) on pain perception in BPD.

Methods: We investigated 15 individuals with BPD by using neuronavigated TBS. In 4 separate sessions, participants received a continuous TBS protocol (cTBS) and an intermittent TBS protocol (iTBS), known to decrease and increase cortical excitability, respectively over the rTPJ and the left visual cortex (lV1) as a control region. Before and after TBS stimulation we assessed electrical perception and pain thresholds.

Results: For pain thresholds, there was a significant interaction between time point and stimulated brain area, $F_{1,14} = 6.61$, $p = .022$. Post hoc tests revealed a significant decrease in pain thresholds after rTPJ stimulation, $t_{14} = 2.49$, $p = .026$, while there was no significant difference in pain threshold before and after lV1 stimulation, $p = .55$. There were no other significant main or interaction effects for pain or perception thresholds.

Conclusions: Our results support that disturbed sensory processing at the rTPJ contributes to altered pain perception in BPD. Modulation of its activity seems to normalize pain perception, with facilitating stimulation being descriptively more effective than inhibiting stimulation.

I-D.75

ANALGESIC EFFICACY OF NON-INVASIVE NEUROMODULATION TECHNIQUES IN CHRONIC CANCER PAIN: A SYSTEMATIC REVIEW

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Background and aims: Cancer has become a significant source of pain, attributable to both the tumor‘s and the treatments. Non-invasive brain stimulation (NIBS) is recommended in refractory neuropathic pain; however, its efficacy in chronic cancer-related pain (CRP) remains unknown. A few pilot studies and randomized controlled trials (RCTs) have assessed the effectiveness of NIBS on pain in CRP.

Methods: A systematic review of neuromodulation studies on patients with chronic CRP involving transcranial direct currents stimulation (tDCS) or transcranial magnetic stimulation (TMS) was carried out through PubMed, Cochrane, Web of science and Google Scholar to June 2024. The quality of the evidence was assessed using the PEDro scale.

Results: Keyword-based search and reference tracking identified 9 records that fulfilled the selection criteria (184 patients). In the tDCS protocols, one RCT had an effect size of -1.03 [-1.26; -0.81], and two case reports showed a significant pain intensity (VAS) decreased of -4.3/10 on average. The rTMS protocols provided similar pain relief, with two RCTs showing an effect size of -1.09 [-1.27; -0.90], two observational studies reporting a significant pooled effect on pain intensity (-0.85 [-1.62; -0.08] and -2.30 [-2.73; -1.87]), and two case reports where pain was reduced by -4.8/10 on average.

Conclusions: NIBS could represent an interesting therapeutic strategy to provide pain relief in in individuals with refractory CRP. However, due to the low level of evidence and the high heterogeneity of trials included (i.e., various pain conditions), a randomized controlled trial of high methodological quality is now required to validate these promising results.

I-D.77

LONG-TERM EFFECTS OF A MILLIMETER-WAVE NEUROMODULATION DEVICE ON QUALITY OF LIFE AND IMPRESSION OF CHANGE IN USERS WITH FIBROMYALGIA

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Background and aims: Fibromyalgia (FM) is a nociplastic pain disorder for which non-pharmacological treatments are recommended as first-line management. Exposure of the peripheral nervous system to millimeter waves (MMW) leads to a central release of endogenous opioids [1], resulting in hypoalgesia and parasympathetic effects [2].

Methods: In a retrospective study using real-life data from an offer combining a MMW wristband and a tracking application, we studied the long-term evolution of the quality of life of people with FM. The cohort study consisted of 185 FM users who subscribed to the offer for at least 18 months and responded to the French version of the FM impact questionnaire (FIQ, [3]) and the Patient Global Impression of Change (PGIC, [4]) at baseline and quarterly.

Results: Responses to the FIQ showed an average reduction in scores of 27.3% from the first trimester (Month 3 (M3)), which was maintained over time until the 18th month (M6=25.6%, M9=29.4%, M12=28.3%, M15=27.3%, M18=27.5%). The PGIC revealed that 89.4%, 89%, 83.7%, 86.1%, 82%, and 80.7% of users considered their quality of life as improved from little to very much at M3, M6, M9, M12, M15, and M18 respectively.

Conclusions: These data, confirming the results obtained in a clinical trial [5], are the first to report the use of an MMW device in real life and its impact on the quality of life of people with FM over a duration rarely reported in the FM literature. However, they are subject to selection and confirmation biases, which are discussed.

I-D.79

EFFECT OF TRANSAURICULAR VAGAL NERVE STIMULATION ON PAIN AND CARDIOCEPTION IN HEALTHY INDIVIDUALS

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Background and aims: Vagal nerve stimulation (VNS) is proposed to modulate brainstem and cortical centers processing pain, interoception and autonomic activity. VNS can be delivered non-invasively via transauricular stimulation (taVNS). However, reports on its effects are scarce. This randomized, crossover study explored the effect of taVNS on pressure pain, cardioception, and autonomic activity.

Methods: Thirty healthy participants (15 females) received taVNS and sham in a cross-over design. Whilst stimulation parameters were identical (25 Hz, 200 µs pulse, for 20min continuously at supra perception-threshold intensity), taVNS was delivered to the left concha cymba and sham to the left earlobe. Pressure pain sensitivity was the primary outcome, and secondary were cardioception accuracy, indices of autonomic activity and conditioned pain modulation. Measures were acquired at baseline, immediately after (post), and 30 minutes after (post30) each stimulation. Percentage changes from baseline were calculated (%ΔPost, %ΔPost30). At both percentage changes, differences following taVNS and sham were explored.

Results: No significant changes were found. An exploratory analysis on individual taVNS-responders (those presenting a decrease in pressure pain sensitivity only following taVNS but not sham, N = 8) demonstrated that taVNS significantly increased an index of parasympathetic autonomic activity compared to sham (16.69±14.46; 1.31±12.73; respectively, p=0.024) at %ΔPost30.

Conclusions: TaVNS did not significantly affect pressure pain sensitivity, cardioception, and autonomic activity. The exploratory analysis suggests that alterations of autonomic activity may be associated with anti-nociceptive effects of taVNS in a percentage of individuals. This alteration could be a marker of successful vagal stimulation, reaching the brainstem.

I-D.81

MODULATING PAIN USING SENSORY ENTRAINMENT OF SOMATOSENSORY ALPHA ACTIVITY

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Background and aims: New treatment approaches for chronic pain are needed. Since brain activity at alpha frequencies (8-13 Hz) inhibits sensory processing, its modulation might influence pain perception. This ongoing study investigates the effects of somatosensory alpha entrainment on pain. To this end, we combine electrical somatosensory stimulation (ESS) with tonic experimental thermal pain as a first step toward chronic pain applications.

Methods: Forty healthy right-handed participants receive ESS via two left-wrist electrodes in parallel to 8 minutes of painful thermal stimulation at left hand. Brain activity is recorded using EEG. Each participant completes four sessions on 4 different days with 4 types of ESS in parallel to pain stimulation: stimulation at 1) the individual peak alpha frequency (PAF), 2) beta frequency (25 Hz), 3) arrhythmic alpha frequency (varied within a +/- 2 Hz surrounding PAF), 4) no stimulation. ESS intensity is individually adjusted to induce non-painful tingling sensations, thermal stimulation to induce moderately painful tonic pain. The amplitude of somatosensory alpha activity derived from the EEG and pain ratings are statistically compared between conditions to investigate ESS-induced effects on brain activity and pain.

Results: Pilot data and analyses confirmed the feasibility of alpha entrainment with ESS, showing strong evidence for higher alpha activity (PAF) compared to beta stimulation (n = 31, Bayes $Factor_{10}$ = 19.6). The analysis of ongoing data recordings will complement these findings with comparisons of pain ratings between stimulations.

Conclusions: ESS can be used as entraining method; further data collection will show whether it can be used as a pain modulation technique.

I-D.82

PROTOCOL FOR THE USE OF MULTI-MODAL IMAGING TO GUIDE DEEP BRAIN STIMULATION FOR CHRONIC POST-STROKE PAIN

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Background and aims: Central neuropathic pain refers to pain caused by lesion or disease of the central somatosensory system. Stroke is one of the leading causes of disability worldwide with central post-stroke pain (CPSP) occurring in up to 35% of patients. Despite this, effective interventions for CPSP remain elusive. Deep brain stimulation (DBS) has the potential to be highly effective for improving pain. However, there is a need to better understand the patient candidates, patient-specific anatomical targets, and stimulation settings that will maximise the benefits of DBS for chronic pain.

Methods: Thirty patients with CPSP will be enrolled in a randomised double-blind controlled trial of DBS in the sensory thalamus and periaqueductal grey. Preoperative diffusion tractography will be used to identify the somatosensory-thalamic tracts to guide the optimal trajectory for placement of the lead within the sensory thalamus. Patients will then receive one month ON stimulation and one month pseudo-ON stimulation. The order of the settings will be randomised. Changes in the McGill Pain Questionnaire Short Form Present Pain Intensity subscale (MPQ-SF-PPI) will be evaluated before and after each stimulation program. Changes in pain relief will be evaluated against the tracts activated by the ON stimulation settings. Preoperative resting-state functional MRI and arterial spin labelling will be used to evaluate the mechanisms by which stimulation parameters, lead placement, and stroke pathology may influence DBS outcomes.

Results: Concludes Jan 2025

Conclusions: The outcome of this trial will determine the potential benefit of DBS as a treatment for CPSP. Multi-modal imaging will be used to identify the patient candidates, targets, and stimulation parameters that should be considered for optimal treatment outcomes.

I-D.83

INTRATHECAL PUMP THERAPY IN CANCER PATIENTS: PRELIMINARY RESULTS FROM A MULTICENTER STUDY

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Background and aims: Intrathecal pump therapy has become a critical approach for managing refractory cancer pain. This study evaluates its clinical impact in oncology patients treated at two tertiary care centers: Hospital de Ourense and Hospital de la Princesa.

Methods: Data were collected on patient demographics, pain characteristics, type of intrathecal medication administered (bupivacaine, ziconotide, or morphine), and outcomes from validated scales, including the Visual Analog Scale (VAS), the DN4 questionnaire and quality-of-life assessments. Evaluations were conducted pre-implantation, post-implantation, and at the final visit. Treatment response was defined as a ≥50% reduction in VAS scores post-implantation. Survival analysis was performed to assess the association between pain response and overall survival.

Results: Intrathecal therapy significantly reduced VAS scores from pre-implantation ($p < 0.001$) to post-implantation and maintained at the final visit ($p < 0.01$). DN4 and quality-of-life scores also improved significantly ($p < 0.05$). Responders (VAS reduction ≥50%) were more frequently treated with ziconotide-containing regimens compared to non-responders ($p < 0.001$), while morphine monotherapy was more common in non-responders (66.7% vs. 0%, $p < 0.001$).

Survival analysis revealed a significant association between pain response and survival, with responders showing longer median survival (~400 vs. ~100 days, $p = 0.0031$).

Conclusions: Intrathecal pump therapy is safe and effective for managing refractory cancer pain, providing significant improvements in pain relief, neuropathic pain, and quality of life. Pain response is associated with prolonged survival.

I-D.84

IMPACT OF TDCS ON NEURAL PROCESSING OF FACIAL EXPRESSIONS IN INDIVIDUALS WITH FIBROMYALGIA: AN EVENT-RELATED POTENTIAL ANALYSIS

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Background and aims: Individuals with fibromyalgia (FM) exhibit abnormal brain activity during emotional tasks, such as reduced functional connectivity and altered event-related potentials (ERPs), reflecting impaired attention and emotional modulation. Transcranial direct current stimulation (tDCS) is a promising tool for modulating pain and emotional processing, but its effects on FM remain unclear. Objective: To evaluate the effect of tDCS on emotional processing in individuals with FM.

Methods: Twenty-eight women with FM (mean age: 54.9; SD: 8.8) underwent a resting EEG assessment (7 minutes, eyes closed) and completed a facial expression recognition task (neutral, happy, angry, pain expressions) in 40 randomized blocks before and after real (n = 14; 1.5 mA, 20 minutes, anode over C3, cathode over Fp2) or sham (n = 13) tDCS. Three ERP components (P100, N100, N170) were analyzed.

Results: The real tDCS group showed no pre-post changes in ERP amplitude for any emotion. In contrast, the sham group exhibited reduced N100 amplitude when viewing pain and happy expressions after stimulation. No significant group differences were observed in other ERPs.

Conclusions: tDCS seems to preserve pre-stimulation neural responses, potentially preventing habituation or reduced engagement in FM patients. The sham group's reduced N100 amplitude suggests diminished attention or habituation, especially to pain and happy expressions, indicating altered emotional processing in FM. Future research with larger samples and varied tDCS parameters is needed to better understand its therapeutic potential in FM.

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I-D.85

HEMODYNAMIC CHANGES INDUCED BY TDCS: IMPACTS ON CEREBRAL PERFUSION AND TECHNIQUE SAFETY

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Background and aims: Transcranial direct current stimulation (tDCS) has been widely used for therapeutic purposes, but its neurophysiological mechanisms remain poorly understood. Objective: To identify the potential effects of tDCS on cerebral hemodynamics.

Methods: Nine studies were included in this review. Databases searched: PubMed, Medline, Embase, and Web of Science. Studies evaluating the impact of tDCS on hemodynamic parameters in healthy individuals were selected. Exclusion criteria included animal studies, the use of other neuromodulation techniques, and studies involving additional simultaneous interventions. No restrictions on language or publication year were applied.

Results: tDCS can increase cerebral perfusion depending on the polarity and intensity applied. Studies show that both single and repeated sessions can lead to increased cerebral blood flow (CBF) and oxygenation. Increases in CBF were observed during and after stimulation; moreover, longer stimulation durations resulted in more prolonged effects. tDCS modulates activity in the brain region beneath the stimulating electrode and also affects functionally connected regions, with effects varying based on the polarity used. For example, anodal tDCS has been shown to increase perfusion, while cathodal tDCS reduces it.

Conclusions: tDCS induces significant changes in cerebral perfusion and oxygenation, varying according to the polarity and intensity applied, supporting its therapeutic effects. Reported adverse effects are mild and resolve at the end of stimulation, posing no additional risks to individuals. Despite its therapeutic potential, further studies are required to assess long-term effects and its impact on specific populations.

Acknowledgment: CAPES (88881.981204/2024-01), Brazil.

I-D.86

THE IMPACT OF LOW-LEVEL LASER ON THE SENESCENCE AND OXIDATIVE STRESS OF HUMAN ADIPOSE TISSUE-DERIVED MESENCHYMAL STEM CELLS

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Background and aims: Human adipose tissue-derived MSCs (hAT-MSCs) are used in many clinical studies today. Aging and oxidative stress are essential in the pathogenesis of most diseases and pain syndromes. Since the primary mechanism of action of a low-level laser (LLL) is based on a photobiological reaction with living tissue, i.e., photobiomodulation, this study aimed to examine the effect of LLL on the senescence and oxidative stress of hAT-MSCs.

Methods: Treatment of hAT-MSCs by LLL was performed with a gallium-aluminum-arsenide (GaAlAs) diode, wavelength 808 nm, laser beam cross-sectional area 1 cm^2, continuous radiation emission, the optical power of the laser beam 200 m, and a laser beam density of 0.2 W/cm^2. The emission time depended on the desired energy density, and in a series of experiments in different groups, they monitored the effect after 1 J/cm^2, 3 J/cm^2, 5 J/cm^2, and 10 J/cm^2 of transmitted energy. Cells were treated once daily for 7 days. Senescence-associated β-galactosidase (SA-β-Gal) activity, as a marker of cell aging, and the concentration of ROS (H_2O_2), reactive nitrogen species (NO_2^-), and redox status, as markers of oxidative stress, were determined.

Results: After 7 days of treatment, it was shown that LLL in any selected dose does not change the percentage of cells expressing SA-β-galactosidase and does not affect the concentration of H_2O_2, NO_2^-, GSH, and GSSG.

Conclusions: Our results showed that LLL treatment did not significantly affect the aging and oxidative stress of hAT-MSCs. These results further explain the effect of LLL on stem cells.

II-D-01

PSYCHOLOGICALLY RELEVANT PATIENT REPORTED OUTCOME MEASURES (PROMS) FOR ASSESSMENT AND INTERVENTION IN PAIN NEUROMODULATION SERVICES

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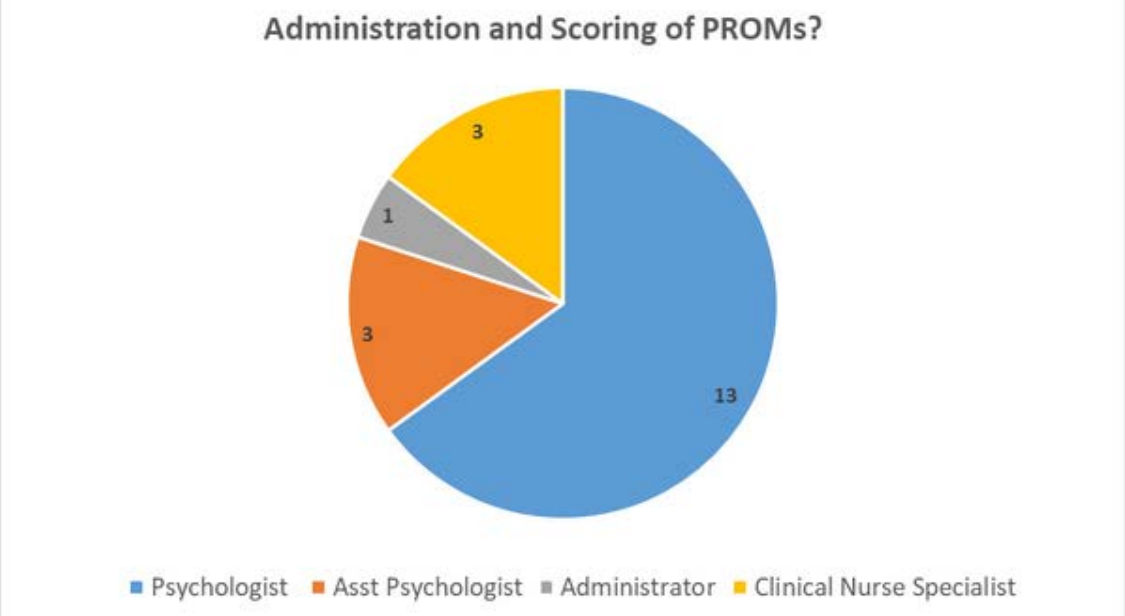
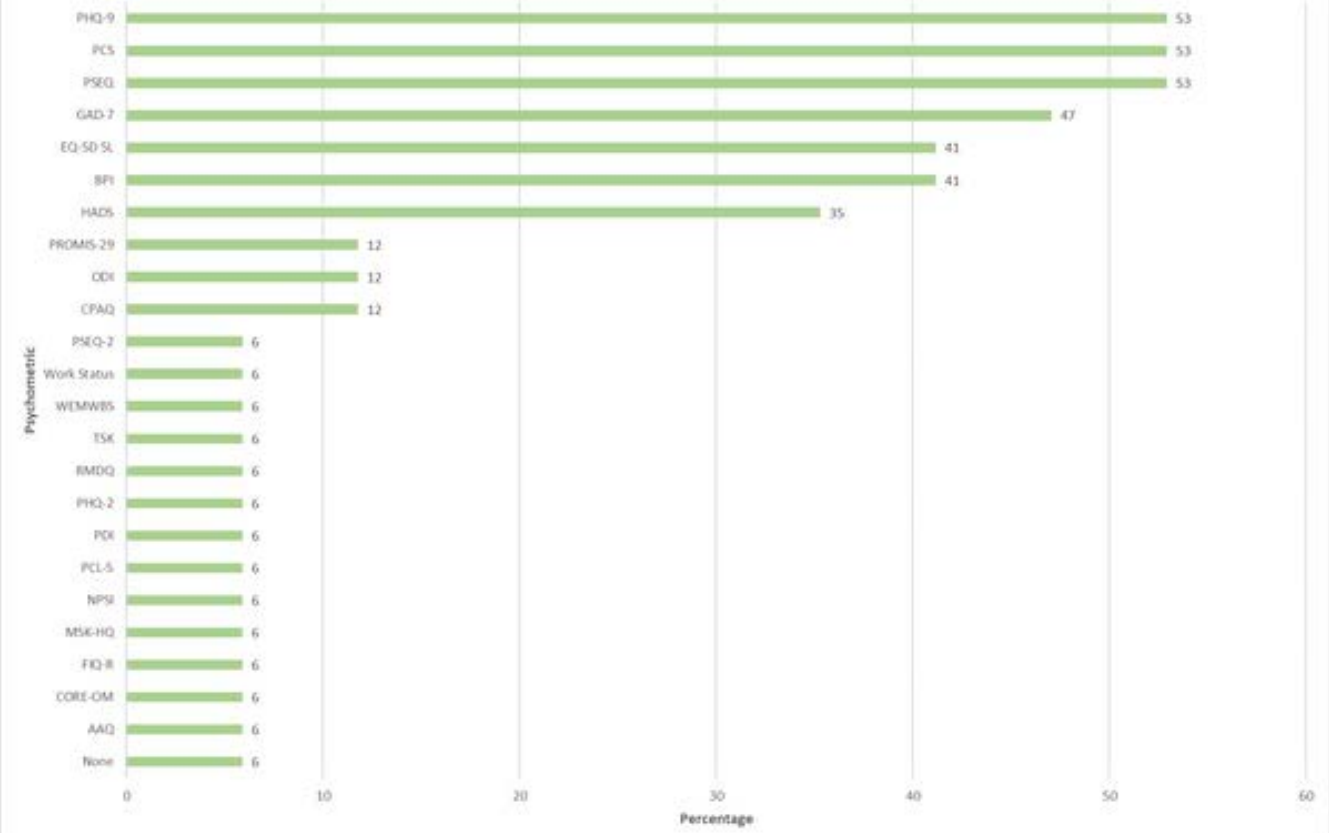
Background and aims: Psychologists in Pain Neuromodulation (PiPiN) is a network of UK-based psychologists collaborating to advance psychological aspects of neuromodulation care. Pain management services are advised to collect patient-reported outcome measures (PROMs) across various domains, there is no specific guidance on psychologically relevant PROMs, leading to variation. This study aimed to survey current use and inform best practices for PROMs in UK neuromodulation services.

Methods: A 17-item survey, developed by PiPiN, was distributed to 30 neuromodulation services in January 2024, with 18 responses received by March 2024. Data was analysed by members of the working group and a selection of the results presented herein.

Results: Data was categorized into three themes: A) PROMs use for eligibility and progress assessment, B) practicalities of PROMs collection, and C) qualitative insights. Results revealed that most services use PROMs to assess eligibility, with common tools including mood measures (e.g., PHQ, HADS), pain self-efficacy (PSEQ), and pain catastrophization (PCS). One-third of services do not collect PROMs post-implantation.PROMs collection methods varied widely, involving online, postal, and in-person forms. Psychologists typically managed PROMs administration, though some services shared responsibilities with other staff. Confidence in sourcing PROMs licenses was low, and few centers routinely included PROMs data in correspondence. Qualitative data highlighted motivational challenges affecting patient responses and concerns over measure completion rates.





Conclusions: The survey underscores the need for harmonized guidance on PROMs selection, collection, and interpretation, aiming to reduce variability and burden while enhancing clinical utility. Clear patient information on PROMs' roles in treatment pathways is also recommended.

II-D-02

NON-INVASIVE VAGUS NERVE STIMULATION TO MODULATE NOCICEPTION; HEART RATE VARIABILITY AND BALANCE: PRELIMINARY RESULTS FROM A RANDOMIZED SINGLE-BLINDED STUDY

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Background and aims: The vagus nerve (VN) regulates vital functions (heart rate [HR], blood pressure, digestion, and immune response) and participates in proprioception and voluntary motion capability. Recent evidence has shown bidirectional communication between the internal organs and the brain through the VN and that the stimulation of this nerve has beneficial effects on high social impacting conditions like acute and chronic pain, postural control deficit, and intestinal dysfunction.

Methods: 128 healthy subjects (64 females) aged between 18 and 60 years were enrolled and randomly assigned into 3 VN Stimulation (VNs) protocols consisting of 4, 12, and 16 minutes of mechanical VNs or to a Sham VNs. The following outcomes were assessed before and immediately after the VNs: nociceptive pain intensity at rest, mechanical allodynia, and temporal summation in the forehead, neck, and abdomen skin; HR and Heart Rate Variability (HRV) were assessed by heart beat-to-beat recording, balance on standing with the eyes closed on the dominant leg.

Results: Preliminary findings have shown that pain intensity to nociceptive stimuli, and pain temporal summation on the abdomen and neck skin can be modulated by VNs. VNs also affect HR at rest and HRV parameters returning to basal levels immediately after the end of the stimulation. VNs tend to increase the balance on the dominant leg immediately after the stimulation.

Conclusions: The preliminary results obtained suggest that mechanical non-invasive VNs can affect pain sensitivity, pain modulation, HRV, and balance in healthy people (NCT06541808).

II-D-03

A RANDOMIZED SHAM-CONTROLLED CROSSOVER STUDY USING EXOPULSE MOLLII SUIT IN FIBROMYAGIA

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Background and aims: Transcutaneous electrical nerve stimulation (TENS) is effective for pain management, but traditional TENS units with two or four electrodes may not be adequate for patients with widespread pain. To overcome these limitations, the EXOPULSE Mollii Suit is introduced as a novel solution, featuring 58 electrodes integrated into a suit linked to a single control unit. This study examines the impact of this device on fibromyalgia symptoms.

Methods: Phase 1 consisted of a randomized, crossover, sham-controlled trial through which patients received active and sham stimulation for two consecutive weeks. Phase 2 consisted of an open-label period of daily stimulation (1 hour per day) for 28 days. Effects were assessed using several tools, including the Visual Analog Scale for Pain and Fatigue (VAS), the Brief Pain Inventory (BPI), the Pain Catastrophizing Scale, the Fibromyalgia Impact Questionnaire (FIQ), the Short Form 36 Health Survey (SF36), and the Hospital Anxiety and Depression Scale.

Results: After two weeks of stimulation, a significant improvement in VAS scores (pain and fatigue), BPI, SF36, and FIQ was observed in the active intervention. These benefits were also observed after four weeks of stimulation, along with positive changes in psycho-emotional symptoms and fibromyalgia impact on quality of life.

Conclusions: This stimulation system appears to reduce pain and fatigue while improving quality of life in people with fibromyalgia. The underlying mechanism likely involves the „gate control" theory. In other words, stimulation of large non-nociceptive nerve fibers may inhibit the transmission of pain signals carried by smaller nociceptive fibers.

II-D-04

THE THERAPEUTIC EFFECT OF PLATELET-RICH PLASMA ON CHRONIC PAIN

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Background and aims: Neuropathic and post-surgical pain are common chronic pain types that are difficult to treat effectively. Recently, platelet-rich plasma (PRP) injections have emerged as a potential therapy. PRP, an autologous blood concentrate rich in growth factors, cytokines, chemokines, adhesion molecules, and serotonin, may promote nerve regeneration and reduce the neuro-immune response, offering potential pain relief. Our study aims to evaluate the preventive and curative potential of PRP in mouse models of neuropathic and post-surgical pain.

Methods: We used a model of chronic sciatic nerve constriction in mice by inserting a polyethylene sleeve („cuff") around the sciatic nerve. Male and female mice underwent either „cuff" placement or a „sham" procedure as controls. Additionally, we employed a postsurgical pain model involving a longitudinal paw incision. Platelet-rich plasma (PRP) and platelet-poor plasma (PPP) controls were prepared from citrated whole blood obtained via abdominal aorta draw from anesthetized mice. Mechanical (von Frey filament test), thermal hypersensitivity (Hargreaves test for heat and dry ice test for cold) were assessed to evaluate PRP's impact on pain symptoms in these models.

Results: Our results demonstrate that perioperative administration of PRP prevents the development of mechanical and thermal hypersensitivity in our murine models of neuropathic and post-surgical pain. Moreover, when pain is already established, intrathecal administration of PRP also provides temporary relief.

Conclusions: These results highlight the real preventive potential of PRP against neuropathic and post-surgical chronic pain when administered during surgeries.

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II-D-06

EFFECT OF NADA EAR ACUPUNCTURE AND MEDICAL ACUPUNCTURE FOR CENTRAL SENSITIZATION, PRESSURE AND TEMPERATURE PAIN THRESHOLDS IN OLDER PATIENTS WITH CHRONIC NONSPECIFIC LOW BACK PAIN

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Background and aims: The purpose of this study was to investigate the effect of NADA (National Acupuncture Detoxification Association) standardized ear acupuncture protocol in comparison to medical acupuncture (MA) on pain intensity, central sensitization (CS), pressure and temperature pain thresholds in older patients with chronic nonspecific low back pain (LBP).

Methods: This was a prospective, clinical, single center, open label, comparative study. 60 older patients with chronic nonspecific LBP were divided into two acupuncture groups: MA and NADA and received treatment once a day for 20 minutes, for a total of 10 sessions. The primary outcome measures were the reduction in pain intensity evaluated by the Numeric Rating Scale (NRS) and reduction in CS measured by Central Sensitization Inventory. The secondary outcomes were changes in pressure pain threshold (PPT) values and tolerance in response to thermal stimuli.

Results: A significant reduction compared to baseline was observed in both study groups in the NRS scores. MA and NADA reduced the intensity of CS in patients (not statistically significant versus baseline). MA significantly increased the values of PPT. NADA significantly increased the values of PPT measured in the following locations: forehead and thumb. No difference was observed between the effectiveness of MA and NADA in terms of increasing PPT. MA and NADA did not change the temperature pain detection thresholds and tolerance in response to thermal stimuli.

Conclusions: MA and NADA treatments appeared to be effective in reducing pain intensity and increasing pain pressure thresholds, and promising in reducing CS in older adults with chronic nonspecific LBP.

II-D-07

SHORT-TERM PSYCHOEDUCATIONAL INTERVENTIONS FOR CHRONIC NON-CANCER PAIN- A SYSTEMATIC REVIEW OF EFFECTS ON PAIN CATASTROPHIZING

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Background and aims: Pain catastrophizing is a maladaptive cognitive-affective response to pain, expressed by the tendency to magnify the pain threat. Various interventions to reduce pain threats have been reported, but there is a variety of content and duration which may result in different effects. This systematic review examined the effects of short-term psychoeducational interventions on pain catastrophizing in adults with chronic non-cancer pain.

Methods: A literature search was conducted across six databases from inception to June 2023. Inclusion criteria: randomized controlled trials, adults with chronic non-cancer pain, psychoeducational interventions lasting up to

four weeks, and pain catastrophizing outcomes. Methods adhered to PRISMA guidelines, the Synthesis Without Meta-analysis guidelines, and the Cochrane Risk of Bias tool 2.

Results: The search yielded 6,689 records; five studies were included, showing considerable heterogeneity. Interventions were delivered through physical/online appointments or self-administered using virtual reality in single or multiple sessions. Two low-risk-of-bias studies tested the same intervention comprising cognitive-behavioural therapy, mindfulness, and pain education in a 2-hour single session, demonstrating significant reductions in pain catastrophizing compared to health education or waiting list controls. One low-risk-of-bias study and two high-risk-of-bias studies showed significant intragroup improvements but no significant differences between groups when comparing composite psychoeducational interventions to simpler approaches.

Conclusions: Few studies were found and the evidence in favor of short-term psychoeducational interventions for pain catastrophizing is limited. However, they may indicate that the combination of different elements in short-term psychoeducational interventions can reduce pain catastrophizing in chronic non-cancer pain patients.

II-D-08

PATIENTS´ EXPERIENCES OF TRANSCUTANEOUS ELECTRICAL NERVE STIMULATION AS A POSTOPERATIVE PAIN RELIEF METHOD IN THE POST-ANAESTHESIA CARE UNIT AFTER LAPAROSCOPIC CHOLECYSTECTOMY

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Background and aims: High-frequency, high-intensity transcutaneous electrical nerve stimulation (HFHI TENS, i.e. 80 Hz and 40-60 mA) is an effective pain relief modality after elective surgery, offering fast pain relief within 5 minutes. Few studies have explored patients´ perspectives on using TENS for pain relief after surgery. This study investigates patients‘ experiences and perceptions of TENS as a complementary approach to traditional pharmacological pain management in postoperative care.

Methods: Patients undergoing elective laparoscopic cholecystectomy were offered TENS as an alternative to conventional pain treatment with IV opioids. Twenty participants attended a telephone interview. Data were analysed using a thematic analysis according to Braun and Clark.

Results: During their time in the PACU, 7 participants required additional opioid administration, and 13 participants obtained pain relief (NRS<3) with TENS as the only pain modality. Participants expressed that TENS provided reassurance and relaxation, calmed them, and gave them a sense of control over their pain. Participants perceived a greater degree of autonomy as TENS could be administered independently. They conveyed a preference for TENS, which they experienced as a safe and fast-acting alternative to opioids, despite its limitations in managing severe pain and rapid offset upon discontinuation.

Conclusions: Healthcare providers should consider patients’ needs to remain in control in a vulnerable situation after surgery and their reluctance to use pharmacological treatment for pain relief. For most patients, TENS is a valuable and safe alternative to conventional pain relief. However, considering the limitations of TENS, patients should be assured that traditional pain relief (i.e. opioids) is also available.

II-D-09

ENGAGING ADOLESCENTS, PARENTS AND HEALTHCARE PROVIDERS IN CO-CREATING PERSON-CENTERED INTERVENTIONS FOR ADOLESCENTS WITH PERSISTENT PAIN

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Background and aims: Persistent pain in adolescents is common, complex, and linked to school absenteeism and long-term health issues. Despite an urgent need for evidence-based guidelines and preventive measures, research often lacks early involvement of end-users, which is essential for developing targeted interventions. This study aims to identify challenges in current practices and to explore the visions of adolescents with persistent pain, parents, healthcare providers, and teachers, to develop an integral intervention.

Methods: Three "Future Workshops" were conducted in January and February 2023 in Oslo, Norway, involving adolescents with persistent pain (n=13), healthcare providers and teachers (n=16), and parents (n=4). The workshops employed generative methods encompassing critique, visionary, and implementation phases. Case vignettes and inspiration cards facilitated discussions, fostering a participatory environment to translate insights into actionable intervention visions. Workshop discussions were recorded and transcribed. The transcribed text was analyzed using reflexive thematic analysis (Braun and Clarke).

Results: Preliminary findings from the workshops showed that participants emphasized the need for enhanced interdisciplinary collaboration within school health services as an ideal and secure setting to initiate healthcare. Visions included early comprehensive assessments and screening, specialized adolescent-focused expertise, dedicated coordination roles, and the development of a digital platform aimed at offering targeted information and resources on pain management.

Conclusions: This study revealed crucial insights for improving care for adolescents with persistent pain. The findings emphasize the importance of early involvement of end-users in developing targeted interventions for adolescents with persistent pain, guiding their integration into the early stages of intervention development.

II-D-10

IMPEDIMENTS AND SUPPORT FOR THE IMPLEMENTATION OF PAIN REPROCESSING THERAPY (PRT) IN A TERTIARY CARE CHRONIC PAIN CLINIC

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Background and aims: Pain reprocessing therapy (PRT) is a relatively recent therapy that has shown benefits for several chronic pain syndromes such as low back pain, fibromyalgia, Crohn's disease and chronic headache, among others. We present the process whereby we were able to generate both institutional and patient „buy-in" in order to initiate and implement the program within our clinic.

Methods: The creation of the program required overcoming several hurdles and the completion of several steps: 1) obtaining administrative buy-in and support, 2) obtaining PRT certification for a core number of pivotal members of the department (pain physicians, psychologist, nurses), 3) integrating the knowledge accrued over the past 14 years of running programs such as the Therapeutic patient pain education, the Mindfulness based chronic pain management program, and the Creativity expression for pain reduction, 4) creating a screening tool for patients who would likely meet eligibility criteria and be willing to participate in a PRT program 5) developing a web-based structure that would permit organizing and hosting group PRT.

Results: To date there has excellent administrative support, 4 clinicians have obtained PRT certification, the directors of the 3 long running groups have agreed to share their expertise and knowledge for the creation of the PRT group. The patient selection questionnaire is being revised and administrative personnel have agreed to scheduling the course for the instructors.

Conclusions: The inclusion of PRT in our tertiary pain clinic may possibly be a transformative addition to our pain self-management and non-pharmacological strategies arsenal.

II-D-11

THE EFFECT OF MILD EXERCISE DURING CHEMOTHERAPY ON CANCER PATIENTS STRESS LEVEL

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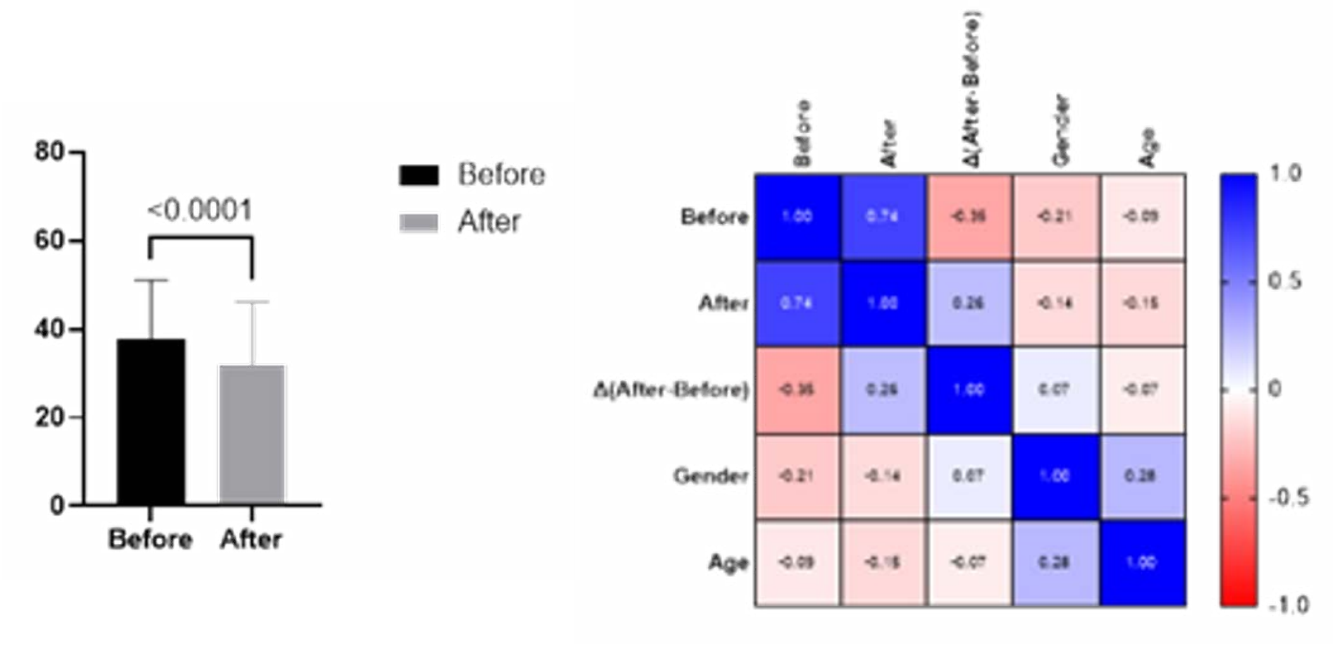
Background and aims: Cancer exerts profound physical and psychological impacts on patients. This prospective cohort study seeks to examine the effect of incorporating mild exercise and stretching into the care of patients undergoing chemotherapy in the short-term care unit, focusing on mitigating shortterm stress.

Methods: The enrolled patients completed the first half of the Greek-standardized State-Trait Anxiety Inventory (STAI) Form-X questionnaire to assess their psychological state. Anxiety levels were categorized as „no or low," „moderate," or „high" based on the STAI scores. After a 15-minute full-body stretching and mobility exercise regimen concurrent with their standard chemotherapy treatment, the patients completed the same STAI questionnaire. The pre- and post-exercise scores were then analyzed using the Wilcoxon signed-rank test for matched pairs.

Results: 45 patients with various cancer types, aged 69.02±10.75 years old, were recruited in the study. Before exercise, patients showed borderline "moderate" anxiety levels (37.73±13.33), which decreased to "low" (32.00±14.22) post-exercise, resulting in an absolute difference of -5.73±8.87. Comparing "before" and "after" scores yielded a statistically significant two-tailed p-value of <0.0001 (figure 1). Notably, using Spearman correlation analysis, gender and age were not correlated with patients' anxiety levels (figure 2).



Conclusions: Our study revealed a statistically significant short-term reduction in anxiety levels, suggesting that incorporating mild exercise during chemotherapy could potentially alleviate patients' anxiety. Nevertheless, the clinical relevance of this discovery remains uncertain, given the modest average decline in anxiety levels. This emphasizes the necessity for more comprehensive research to fully elucidate the potential advantages of integrating mild exercise into chemotherapy regimens.

II-D-13

COMPARISONS BETWEEN POST-ISOMETRIC RELAXATION TECHNIQUE AND MYOFASCIAL RELEASE TECHNIQUE ON MUSCLE STIFFNESS AND PAIN IN INDIVIDUALS WITH BRUXISM

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Background and aims: Bruxism is a repetitive jaw muscle activity that occurs during sleep or while awake, characterized by teeth clenching or grinding. Repetitive teeth clenching and grinding movements can cause spasms, stiffness, and pain in the chewing muscles. This study aimed to compare the effects of the post-isometric relaxation technique and myofascial release technique on masseter muscle stiffness and pain in individuals with bruxism.

Methods: Sixty individuals with bruxism (32 female; mean age, 33.37 ± 8.92 years) were randomly assigned to one of three groups a post-isometric relaxation (PIR) group, a myofascial release (MR) group, and a control group. Participants received one session PIR technique (PIR group), and a myofascial release technique. Muscle stiffness was evaluated with MyotonPRO and a pain visual analog scale.

Results: The PIT and the MR groups showed a significant change in masseter muscle stiffness and pain after intervention ($p<0.01$). There was a significant difference in masseter muscle stiffness and pain after treatment between groups ($p<0.001$), but there was no significant difference between the PIR group and the MR group ($p>0.05$).

Conclusions: PIR and MR techniques might provide improvement in muscle stiffness and pain in individuals with bruxism.

II-D-17

COMPARISON OF THE EFFECTS OF TAPING AND MANUAL THERAPY APPROACHES ON PAIN, FUNCTIONAL LEVEL AND DAILY LIVING ACTIVITIES IN HEMIPLEGIC SHOULDER PAIN

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Background and aims: Upper extremities are more frequently affected than lower extremities after a stroke. Upper extremity recovery is more difficult and slower. Secondary complications are often after stroke. A significant portion of functional impairments related to the upper extremities are due to shoulder problems. In patients who develop hemiplegia after a stroke, hemiplegic shoulder pain is observed in a high rate of approximately 84%. Therefore, this study aims to compare the effects of taping and mobilization on pain, functional capacity and activities of daily living in patients with post-stroke shoulder pain.

Methods: 36 patients with hemiplegic shoulder pain were divided into three groups equally. Patients in the control group (CG) were given exercises and home training. Taping was applied to the second group, taping group (TG), in addition to home exercise program. Manual therapy and home exercises were applied to the third group, manual therapy group (MTG). Pain, upper extremity motor function and motor activities, and independence in activities in daily living were assessed before and after the 4-week treatment program.

Results: Pre-treatment assessments were similar between the groups. Quality of life, perceived pain level, and functional capacity improved significantly in all groups after the treatment programs ($p < 0.05$). There was no difference between the groups after the treatment ($p > 0.05$).

Conclusions: More studies are needed to determine whether taping and manual therapy/mobilization applications have an additional benefit in hemiplegic shoulder pain.

II-D-18

PERSISTENCE OVER AVOIDANCE: A LONGITUDINAL OBSERVATIONAL COHORT STUDY ON ACUTE LOW BACK PAIN

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Background and aims: In low back pain (LBP), recovery from nociceptive pain occurs within a few weeks. Sometimes the pain persists beyond the expected time of recovery. This transition from acute to persistent LBP is poorly understood and may be related to how a person engages in daily activities. Activity patterns, such as avoidance and overactivity, describe how individuals organize their activities. These patterns play an important role in the development and maintenance of chronic pain. Furthermore, avoidance and overactivity mediate pain persistence by linking psychosocial factors and biomechanics.

Methods: In this observational cohort study, 165 participants were assessed at five time points: ≤ 1 month (baseline), 2, 3, 6, and 12 months after the onset of acute LBP. Simultaneously collected clinical data and the Avoidance-Endurance Questionnaire were collected.

Results: Avoidance decreased over time in parallel with pain intensity. In contrast, people who showed persistence behaviors remained at the same level of persistence. For people whose pain disappeared, preliminary data suggest that avoidance is related to pain, while persistence is more of a behavioral trait independent of pain.

Conclusions: To increase the effectiveness of primary treatment and secondary prevention of recurrent and persistent LBP, patient education should go beyond avoidance and include persistence behaviors.

II-D-19

NEW COMPLEMENTARY APPROACH TO IMPROVE CONDITION OF PATIENTS SUFFERING FROM CHRONIC PAIN: A PILOT STUDY

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Background and aims: It has been recognized that complementary approaches improve the quality of life (QoL) of patients suffering from chronic pain (CP). Hypnosis and meditation have shown significant benefits to decrease pain, anxiety, depression and sleep difficulties of these patients. Auto-induced cognitive trance (AICT), another technique based on modified state of consciousness (MSC), is currently studied for its interest in clinical context. AICT is a voluntarily MSC induced via vocalizations and body movements. A first case report has shown the interest of AICT in terms of pain perception and empowerment in CP (Collignon et al., submitted).

Methods: Six patients were included (females, 53±12y). AICT training consisted of two 2-days workshops, spaced by 2 weeks. The impact of AICT on pain and fatigue (visual analog scales), anxiety and depression (Hospital Anxiety and Depression Scale, Zigmond et al.,1983), beliefs and attitudes regarding pain (Survey of Pain Attitudes-35, Jensen et al.,2000) and QoL (Short From Health Survey, Ware et al.,1992) were assessed before and after the training. Descriptive analyses were done.

Results: Decrease was observed for pain (n=2), fatigue (n=3), anxiety (n=5), and depression (n=4). Regarding attitudes and beliefs, increase was observed in control over pain (n=1), while decrease was reported for perceived disability (n=4), pain and emotion link (n=3), medication needs (n=3), solicitude (n=2), medical cure (n=3). Improvement of physical (n=3) and mental QoL (n=3) was also observed.

Conclusions: AICT seems to positively impact the condition of patients with CP. Further randomized controlled studies with larger sample are needed to confirm these first observations.

II-D-20

VIRTUAL REALITY HYPNOSIS AS A PAIN AND ANXIETY RELIEF STRATEGY IN ONCOLOGY PATIENTS DURING A PORT-A-CATH PLACEMENT PROCEDURE: A PILOT STUDY

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Background and aims: Virtual reality and hypnosis have the potential to reduce pain and anxiety across various clinical conditions. While their combination (virtual reality hypnosis–VRH), is increasingly used by clinicians, few studies have assessed its interest during invasive procedures. In this prospective pilot study, we explore the effects of VRH on pain and anxiety in patients undergoing a port-a-cath placement surgical procedure (PAC).

Methods: Twenty patients (15 women, 68±8y.) were included. VRH was proposed as a complementary approach to reduce pain and anxiety during PAC. Surgical intervention lasted ±20 minutes. Pain and anxiety were assessed with numeric rating scale (NRS) before and after the procedure. Absorption and dissociation were assessed with NRS after the procedure. Paired samples t-tests were performed on pre-/post-anxiety and pain experienced by patients during PAC. Correlations between dissociation/absorption and pain and anxiety were calculated using non-parametric Wilcoxon correlation test.

Results: One patient was excluded because of missing data. Pre-anxiety was significantly higher than post-anxiety ($W=134$, $p<0.001$), post-pain showed a tendency towards decreasing compared to pre-pain ($W=27$, $p=0.317$). Significant negative correlation was found between anxiety post-PAC and absorption ($p = -0.592$, $p=0.003$); non-significant negative correlation was found between anxiety post-PAC and dissociation ($p=-.292$, $p>.05$).

Conclusions: VRH is feasible in the context of invasive procedure. These pilot results highlight the VRH's potential to reduce anxiety while increasing absorption and dissociation. . Further randomized controlled studies with larger sample are needed to confirm these first observations.

II-D-21

NO EVIDENCE THAT NECK-BASED LEFT/RIGHT JUDGMENT TASKS ELICIT MOTOR IMAGERY OF NECK MOVEMENTS

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Background and aims: The adoption and development of left/right judgment tasks (LRJTs) for the management of chronic pain is based on the premise that these elicit implicit motor imagery of the target body part. There is considerable evidence that this is the case for hand-based LRJTs; for example, the time it takes to recognise the laterality of a hand-based image (judgment time) is remarkably similar to how long it takes to move one's corresponding limb into the posture shown (movement time). This study aimed to examine whether judgment and movement times for neck-based LRJTs are similar.

Methods: Thirty-three participants completed the within-subject experiment. Participants were presented with a series of 128 images based on those commercially available as part of neck-based LRJTs (and also used in previous studies). In one block, participants were required to make left/right judgments (judgment task). In the following block, laterality was revealed and participants were instead required to move their head/neck to the position shown (movement task). Judgment times and movement times were measured.

Results: Movement times were slower when a larger movement amplitude was presented than when a smaller amplitude was presented leading to a significant amplitude effect. This was not the case for corresponding judgment times.

Conclusions: Our data strongly suggest neck-based LRJTs typically used in clinical practice do not elicit motor imagery of neck movements. Like many other LRJTs, neck-based LRJTs have been introduced to practice based on an assumption for which there is no scientific support. The available evidence suggests neck-based LRJTs have no therapeutic value.

II-D-22

PRIMARY HEALTHCARE EXPERIENCES OF PATIENTS WITH NON-SPECIFIC LOW BACK PAIN REFERRED TO PHYSIOTHERAPY IN ESTONIA: A QUALITATIVE STUDY OF CONSULTATION CONTENT AND COMMUNICATION

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Background and aims: About 85% of low back pain cases are classified as non-specific (NSLBP) due to the absence of a specific pathoanatomical cause (Maher et al., 2017). Effective education and communication are crucial for managing NSLBP, as they can improve treatment adherence and outcomes (Butow & Sharpe, 2013). However, in Estonia, the 15-minute duration of primary care appointments often limits the ability to thoroughly address pain education. This study aimed to explore the experiences of NSLBP patients with primary care, focusing on the content of consultations and various aspects of physician-patient communication.

Methods: Semi-structured interviews were conducted with 10 patients (70% female; age 37.4 ± 7.6 years) referred to physiotherapy with subacute or chronic NSLBP by different primary care physicians. The interview covered topics including causes and prognosis of NSLBP, recommended interventions, provided advice, and communication aspects such as the physician's attitude and approach. Thematic analysis was used for data analysis.

Results: Half of the participants reported receiving explanations about the potential causes of NSLBP, which were primarily biomechanical. No information about the prognosis of their condition or educational guidance was given. Conflicting advice regarding physical activity was common: four physicians recommended exercise, while four advised rest. Although 80% rated overall communication positively, 60% felt their pain was not taken seriously.

Conclusions: The interviews revealed that primary care physicians provided limited information about NSLBP. Communication had both positive and negative elements, and experiences varied notably among patients. There is a need for more comprehensive education and consistent communication strategies in primary care to better address NSLBP.

II-D-23

VIRTUAL REALITY FOR FIBROMYALGIA

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Background and aims: Fibromyalgia is a chronic pain syndrome associating diffuse chronic musculoskeletal pain,weakness and sleep disorders.

Current treatments for fibromyalgia (FM) include pharmaceutical medications as well as psychological,cognitive therapy, and activity management.There is a growing body of evidence supporting the use of VR as an adjunct therapy to reduce acute pain and improve quality of life.There may also be a promising alternative option for VR in patients with chronic pain.Investigator will analyze the pain reduction and impact on behavioral mechanisms with repétitive VR sessions on Fibromyalgia patients.

Methods: In a Prospective single-center observational study,participants will be set up in the VR equipment. They will engage 20 minutes sessions, twice a week for one month. The research team member will supervise the session.Time Frame: Pre-intervention, week 4 and 8.Primary Outcome:Pain Numerical Rating Scale [NRS] Secondary Outcome: 1-Pain Catastrophizing Scale [PCS] 2-Pain self-efficacy questionnaire (PSEQ) 3- Hospital anxiety and depression (HAD).

Results: Fifty participants completed all sessions.Significant (P <0.001) reduction were observed in Mean Pain Numerical Rating Scale (NRS) (baseline 6.8 (1.5) to 5.8 (1.9); -14.8%);Our findings showed an effect of VR on diminution of Pain Catastrophizing Scale (PCS) 33.6 to 27.6 (-5.9 ; -17.8% P <0.001) ; improvement of Self-Efficacy (PSEQ) 23.3 to 27 (+3.7 ;+16.3% p :0.0095) ; anxiety (HAD-A) 12.3 to 11.2 (-1.1;-8.5% p:0.0012) and also depression (HAD-D) 10.1 to 9 (-1; -10.8% p :0.0038).Significant correlation was found between evolution of NRS and PCS (rho:0.46;p:0.0008).

Conclusions: There is evidence which shows that VR can be an effective treatment for pain reduction.

II-D-25

EFFECTS OF PHOTOBIOMODULATION IN DIABETIC NEUROPATHIC PAIN AND WOUND: SYSTEMATIC REVIEW AND META-ANALYSIS

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Background and aims: Diabetic neuropathy and diabetic foot are common and debilitating complications of diabetes, leading to pain, nerve damage, poor wound healing, and a higher risk of amputation. Conventional treatments often provide limited relief, prompting the exploration of alternative therapies. Photobiomodulation (PBM), or low-level laser therapy (LLLT), is a non-invasive treatment that stimulates cellular repair, reduces inflammation, and promotes tissue regeneration.

Methods: This systematic review and meta-analysis aimed to evaluate PBM‘s physical and mental effects on patients with diabetic neuropathy and diabetic foot. The primary objective of this review is to assess PBM‘s efficacy in reducing pain and enhancing wound healing in diabetic foot ulcers. A systematic search will be conducted in databases, including PubMed, Embase, and Cochrane Library, to identify randomized controlled trials (RCTs), quasi-experimental, and observational studies. Eligible studies will compare PBM to placebo, sham therapy, or standard care in adult patients with diabetic neuropathy or diabetic foot. Data on pain reduction, nerve function improvement, wound healing, and psychological effects will be extracted and analyzed.

Results: Results suggest that PBM may reduce pain and accelerate wound healing. The meta-analysis will quantify the overall treatment effects and identify gaps in the current evidence base. Photobiomodulation shows promise as a complementary therapy for managing diabetic neuropathic pain and diabetic foot, offering both physical and mental benefits.

Conclusions: This systematic review and meta-analysis will contribute to the growing body of literature by comprehensively assessing PBM's effectiveness in these populations. The findings may guide future clinical practice and inform decision-making regarding integrating PBM into diabetes care.

II-D-27

DEVELOPMENT AND FEASIBILITY TESTING OF AN OPIOID-DEPRESCRIBING-SUPPORT-EDUCATIONAL-PROGRAM FOR HEALTHCARE PROFESSIONALS IN PRIMARY CARE: A PROCESS EVALUATION STUDY

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Background and aims: Patients with chronic pain are often in long-term opioid therapy (L-TOT), despite recommendations against it. L-TOT is associated with a range of side effects and tolerance development causing ineffectiveness. Patients in L-TOT impose financial burdens on healthcare systems and social services. Most patients are managed in primary care where successful opioids deprescribing are rare. The study aims to develop and test an educational-program to empower primary care professionals in opioid deprescribing in patients with chronic pain.

Methods: Drawing on experience from a specialized multidisciplinary pain centre, insight from semi-structured interviews with healthcare professionals, and ethnographic observations of interactions between patients and healthcare professionals in L-TOT consultations, we developed an opioid-deprescribing-support-educational-program tailored for primary care professionals. This program was designed to enhance the competencies needed to manage opioid deprescribing effectively. The program's feasibility was evaluated through questionnaires and observation during teaching sessions.

Results: Our result indicates that primary care professionals lack adequate competencies in deprescribing opioids and supporting patients with L-TOT. The educational-program focuses on understanding chronic pain, management strategies, and empathic support, as this knowledge is believed to enhance and encourage the deprescribing in patients with L-TOT. The educational-program is feasible for primary care. Its content is relevant and high-quality, and testing is ongoing.

Conclusions: The program was developed with insight from primary care, a multidisciplinary pain centre and with profound knowledge of this context. It is feasible for the context.

If further results support the program, it can be integrated into primary care in-service training to support behavior change in opioid deprescribing.

II-D-28

THE USE OF AUGMENTED REALITY FOR QUTENZA RELATED PROCEDURAL PAIN

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Background and aims: Digital reality is transforming hospital experiences by offering patients immersive environments that can reduce stress, alleviate pain, and enhance overall well-being during treatment. The aim was to investigate pain experiences of patients receiving Qutenza therapy and the impact of the use of Augmented Reality (AR) intra treatment.

Methods: Audit was performed on pain intensity, pain interference (PI) and quality of life (QoL) scores for 100 consecutive Qutenza application appointments and from follow up appointment two weeks afterwards. Analysis

was performed using Microsoft Excel to identify the impact of the use of Augmented Reality on patient reported outcomes (n=48) when compared to appointments where it was not utilised (n=52).

Results: AR resulted in a reduction on the numerical rating scale by 48.22% between pre and post-treatment scores.

	30 Min (n=48)	**45 Min (n=48)**	**End of Intervention (n=48)**	***p*-value[b]**
Augmented Reality Used[a]	6 (3.75, 7)	3 (2, 3.25)	2 (2, 3)	<0.0001

[a] *Median (quartile 1, quartile 3)*

[b] *Friedman Test*

There was a 34.4% increase on the NRS from pre-treatment to therapy completion without AR.

	30 Min (n=52)	**45 Min (n=52)**	**End of Intervention (n=52)**	***p*-value[b]**
Augmented Reality Not Used[a]	6 (4, 7)	6 (5, 7)	6 (5, 7)	0.0001

There was a mean reduction by 41.97% in PI scores from pre-treatment to two weeks post therapy for those who used AR in comparison to 47.19% for those who did not. QoL scores improved by 66.36% from pre-treatment to follow up for those who did not utilise AR in comparison to 71.43% improvement for those who did.

Conclusions: AR is a means of analgesic enhancement for Qutenza related procedural pain. On follow up, there was minimal difference between subgroups measurement findings with a significant improvement in PI and QoL measures in both subgroups with the use of Qutenza for localised peripheral neuropathic pain.

II-D-29

EVALUATING THE EFFECTIVENESS OF A VIRTUAL REALITY-BASED LUMBAR AND CERVICAL SPINE SCHOOL PROGRAM

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Background and aims: The primary objective of this study is to evaluate the therapeutic effectiveness of a spine school program augmented with virtual reality applications in individuals with chronic neck-low back pain. The study examines the effects of a personalized, virtual reality-based spine school program on parameters such as pain, disability, functionality, fear of movement, and proprioception.

Methods: A total of 39 individuals with chronic neck-low back pain participated in the study. After excluding those with conditions like prior spinal surgery, recent physical therapy, or comorbidities, participants were randomly divided into two groups. The experimental group completed a four-week virtual reality-based spine school program followed by home exercises, while the control group only performed home exercises supervised by a physiotherapist. Assessments included joint position sense (goniometry), fear of movement (Tampa Scale), pain levels (VAS), and functionality (Oswestry Disability Index).

Results: Table 1. Demographic Characteristics of Individuals with Chronic Pain in the Control and Experimental Groups

	Experimental Group (n=20) X ± SD (min.-max.)	Control Group (n=19) X ± SD (min.-max.)
Age (years, mean ± SD)	36,55±0,30 (18,00-55,00)	24,78±8,74 (18,00-43,00)
Height (cm)	165,35±12,02 (155,00-180,00)	162,47±6,76 (155,00-181,00)
Weight (kg)	70,35±10,96 (52,00-88,00)	61,52±15,09 (41,00-95,00)
Body Muscle Index (BMI) (kg/m^2)	25,57±3,49 (19,10-33,20)	23,38±5,92 (14,50-36,20)

Table 2. Intra-Group and Inter-Group Differences in Individuals Pain Before and After Treatment

Evaluation Parameter	**Control Group (n=19)[w]**		**Experimental Group (n=20) [w]**		**Difference between groups[m]**	
	z	**p**	**z**	**p**	**Z**	**p**
Visual Analog Scale (Rest)	-3,732[b]	**0,000**	-2,938[b]	**0,003**	-,652	,515
Visual Analog Scale (Night)	-2,727[b]	**0,006**	-2,783[b]	**0,005**	-,437	0,662
Visual Analog Scale (Activity)	-2,268[b]	**0,023**	-3,104[b]	**0,002**	-,733	0,646
Perceived Cognitive Impairment Questionnaire	-1,148[b]	0,251	-,828[b]	0,408	-,084	0,933
Joint Position Sense (Lumbar flexion-Standing)	-3,043[b]	**0,002**	-,442[b]	0,659	-2,112	**0,035**
Joint Position Sense (Lumbar flexion-Sitting)	-1,587[b]	0,112	-,746[b]	0,455	-,789	0,430
Joint Position Sense (Lumbar extension-Standing)	-,686[b]	0,493	-2,000[b]	**0,046**	-,881	0,378
Tampa Kinesiophobia Scale	-,363[b]	0,717	-,851[b]	0,395	-,394	0,693
Oswestry Low Back Pain Questionnaire	-3,360[b]	**0,001**	-3,158[b]	**0,002**	-1,467	0,142

Both groups showed significant improvements in pain levels, joint position sense, and disability associated with pain. However, inter-group analysis revealed a significant difference only in joint position sense during lumbar flexion in the standing position.

Conclusions: VR could make significant contributions to programs focused on improving postural balance, precise movement control, or proprioceptive skills in rehabilitation. While other treatment methods may effectively improve general health, flexibility, or muscle strength, virtual reality-based therapy seems to offer a unique advantage in enhancing joint position sense.

II-D-33

PNEUMOTHORAX AFTER ACUPUNCTURE: A CASE REPORT

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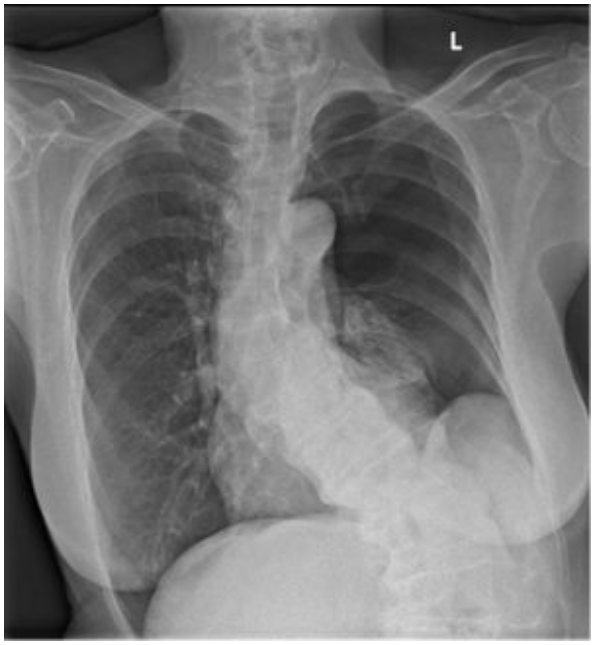
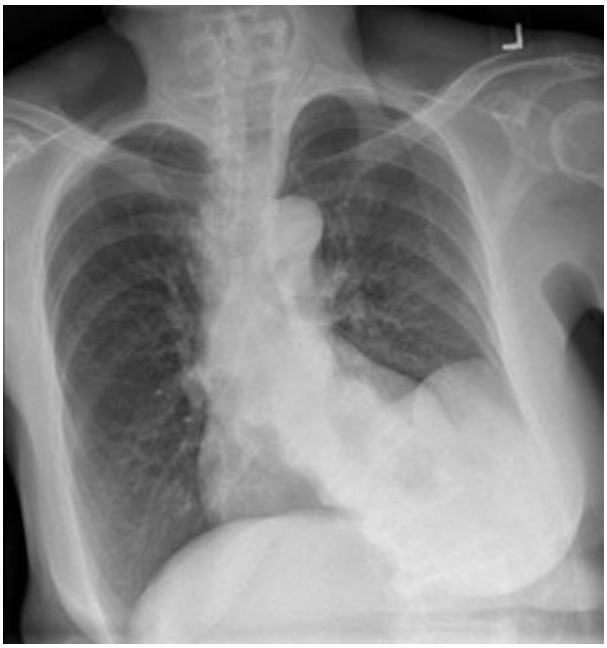
Background and aims: Widely regarded as a safe therapy, Acupuncture is a form of traditional Chinese medicine increasing in popularity worldwide. However, many are not aware of the risks associated with this popular therapy for musculoskeletal issues.

Methods: A 78 year-old lady was admitted to the Emergency Department for palpitations after acupuncture therapy. She had received acupuncture therapy regularly as part of the management of chronic back pain.

Results: She was haemodynamically stable and saturating well on room air. Examination findings were significant for decreased air entry over the left lung fields. A chest radiograph (CXR) was carried out which showed a large left pneumothorax with mediastinal shift. A Wayne catheter was inserted in the ED and she was admitted to the inpatient ward for further observation. The chest tube was removed two days after insertion after satisfactory improvement of pneumothorax and she was discharged home stable. Subsequent outpatient follow-up showed complete resolution of pneumothorax.





Conclusions: Many patients and acupuncture providers locally are unaware of the potential severity of these acupuncture-related risks. We think there is a need for increased education and awareness for potential adverse outcomes from acupuncture. To this end, full informed consent before any potentially invasive procedure – including acupuncture – should be obtained from the patient before the commencement of therapy. Patients with premorbids that increase their risk of complications should be identified and monitored closely. Red flag advice should also be given routinely after therapy so that symptomatic patients may seek prompt medical attention should the need arise.

II-D-35

INVESTIGATING NOCICEPTIVE NEURAL RESPONSES UNDER FOCUSED HYPNOANALGESIA: LOCAL AND REMOTE EFFECTS

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Background and aims: Hypnoanalgesia refers to pain reduction using hypnotic suggestions. Among the different hypnotic techniques, focused hypnoanalgesia (FHA) has attracted recent interest. Corresponding to the selective modulation of pain by inducing analgesia on a restricted body part, it is among other things used for wound care and surgical procedures. However, the underlying mechanisms are still unclear. The aim of this study is to investigate whether FHA can selectively modulate cortical responses to nociceptive stimuli originating from one body limb without affecting those from another limb.

Methods: FHA was induced on one arm using the protective glove technique, while nociceptive stimulations were applied alternatively between the left and right forearms using contact heat stimuli. Intensity ratings and event-related brain potentials were measured in response to both stimuli before, during, and after FHA.

Results: Behavioural measures show that FHA induces lower intensity perception for stimuli applied on the hypnotized arm compared to the other arm, while there are no differences before and after FHA. The selective effects are however short-lived. Electrophysiological results do not match behavioural responses, and show a decrease of amplitude of the N2-P2 complex across time points that is similar between the arms.

Conclusions: FHA is able to selectively modulate pain perception. Nevertheless, its effect tends to generalize with stimulus repetition. This could be explained by the deepening of the global hypnotic state over time, generating overall analgesia, or by a behavioural adaption to protect the whole body against nociceptive stimuli. Electrophysiological results can be interpreted as reflecting a global influence of hypnosis on the cortical processing of noxious inputs that is not restricted to a specific limb but generalized to the whole body.

II-D-37

DANCE THERAPY AS A NON-PHARMACOLOGICAL INTERVENTION FOR CHRONIC PAIN IN ADOLESCENTS

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Background and aims: Chronic pain significantly impacts adolescents' quality of life, often linked to movement fear and degraded body image. A multidisciplinary approach addressing anxiety and catastrophizing is crucial, with active patient involvement. This study evaluates the benefits of dance therapy for adolescents with chronic pain, comparing its effectiveness to traditional art therapy and yoga to underscore the value of body-centered interventions.

Methods: Recruited patients (aged 12-20) are assigned to one of the groups for a treatment course of 15 one-hour sessions on a weekly basis. They will be asked to complete regular questionnaires (Kinesiophobia, anxiety, pain catastrophizing, fear of pain, quality of life, body image) and visual numerical scales VAS (Pain, mood, fatigue).

Results: Ten patients (15.7±2.6 years, 8 girls) have been included so far. VAS assessments show a 39±6% pain reduction in 73% of sessions and a 49±3% mood improvement in 84% of sessions. Fatigue showed more variability, with a 48±11% improvement in 55% of sessions. Patients rated the sessions highly enjoyable (9.6/10), despite often starting them with significant pain (>6/10). Baseline questionnaires revealed predominantly pathological scores for kinesiophobia, anxiety, pain catastrophizing, and fear of pain. Overall, the scores of these questionnaires improve when repeated during the art/dance-therapy and/or yoga period session. Results were more variable for quality of life and body percept, depending on the patient.

Conclusions: These preliminary results suggest both an immediate and a longer-term beneficial effect of the sessions, and are very encouraging for the continuation of the study.

II-D-38

INSULA DEEP BRAIN STIMULATION FOR CHRONIC NEUROPATHIC PAIN – A CLINICAL TRIAL

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Background and aims: The insula is a key area for pain processing. We have preliminary evidence that direct stimulation of the anterior insula increases the heat pain threshold in humans. We aim to investigate the safety of insula deep brain stimulation (DBS) for chronic neuropathic pain management.

Methods: A two-staged DBS clinical trial was designed to study twelve patients with medication-refractory chronic neuropathic pain. Phase 1 of the clinical trial involves stereotactic implantation of multi-contact intracerebral depth electrodes for bilateral insula mapping and continuous electroencephalogram (EEG) monitoring. Subjects who respond to the direct insular stimulation in phase 1 will advance to phase 2 for permanent DBS implantation and enter a randomized, sham-stimulation-controlled trial. Subjects' pain experience will be collected in their natural environments via ecological momentary assessment (EMA) methodology.

Results: Five subjects completed the phase 1 study. Stimulating the posterior insula commonly evoked numbness or tingling sensations (n = 5). Afterdischarges (n = 5) and clinical seizure (n = 1) were seen after high current stimulations. All subjects met the responder's criteria (increase in heat pain threshold, decrease in clinical or experimental pain). Exploratory EEG spectral analysis showed that chronic pain is associated with excessive alpha oscillations in the posterior insula that were reversed following direct anterior insula stimulation ($p < 0.05$, n = 4).

Conclusions: Insula stimulation is well tolerated in the hospital setting. Acute anti-nociceptive responses to electrical stimulation of the anterior insula have been consistently observed. The long-term chronic pain relief effects of DBS neuromodulation are still under investigation.

II-D-39

HIGH-INTENSITY LASER THERAPY IN CHRONIC LOW BACK PAIN: COMPREHENSIVE ANALYSIS OF TREATMENT EFFECTIVENESS AND CHANGES IN QUALITY OF LIFE

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Background and aims: Chronic Low Back Pain (CLBP) is a complex and multifactorial condition characterized by persistent discomfort in the lumbosacral region of the spine, typically lasting for 3 months or more.

High-Intensity Laser Therapy (HILT) is an advanced form of Laser Therapy that uses high-powered laser beams to treat musculoskeletal pain, including CLBP. The aim of this study was the comprehensive analysis of HILT treatment effectiveness and changes in quality of life in patients with CLBP.

Methods: The study included 264 patients with CLBP, of whom 148 were men (56%), 116 were women (44%). The average intensity of the pain according to the VAS was 8 points. Each patient received an average of 4 HILT treatments, each lasting for 20 minutes. If necessary, the treatment course was repeated once more after a 1-month break.

The Quality of Life (QoL) of the patients was assessed via SF-36 Questionnaire before and after the HILT.

Results: 212 patients were satisfied with only one cycle of treatment. 52 patients needed a second cycle of treatment after 1 month. In the first group, the pain intensity on the VAS scale decreased up to 2. In the second group, the pain intensity was assessed as 4 after the first treatment, and 1 after the second treatment. All the Scores of QoL were improved after the HILT in all patients without exception.

Conclusions: HILT is a non-invasive, effective method for treating CLBP, with long-lasting results lasting up to 1 year. HILT can significantly improve pain-related quality of life.

II-D-40

LOW FREQUENCY PULSED ELECTROMAGNETIC FIELD THERAPY IN LOW BACK PAIN: ALTERNATIVE OR MANDATORY COMPONENT OF TREATMENT?

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Background and aims: Chronic low back pain (CLBP) is defined as lower back pain lasting for longer than 12 weeks or 3 months, even after an initial injury or underlying cause of acute low back pain has been treated. Low Frequency Pulsed Electromagnetic Field (LF-PEMF) therapy has been investigated as a treatment for various types of pain, including CLBP. The aim of this study was the clinical investigation of clinical effects of the LF-PEMF in the CLBP patients.

Methods: 202 patients with definite clinical diagnosis of CLBP have been included. Of the 202 patients, 178 (88%) received medication for an average of 2 months, or an average of 2 sessions of up to 7 days, before the LF-PEMF. The average duration of the disease was 8 months. The clinical diagnosis was made on average 2 months after the first complaints of the disease due to non-consultation with a doctor. The average intensity of the pain according to the VAS was 7 points. points. Each patient received LF-PEMF procedures, each lasting average for 60 minutes.

Results: All patients were satisfied with only one cycle of treatment. The pain intensity was assessed average as 2 points by VAS after the treatment. After 6 months, the patients were re-evaluated and only 40 patients (20%) reported that the pain had worsened again, averaging 4-5 points.

Conclusions: LF-PEMF may be an effective treatment for chronic low back pain even when used as an isolated therapy. In the case of combination therapies, the effectiveness of this method is underestimated. Further studies including comparing the effects of LF-PEMF against a control condition should be conducted.

II-D-41

‚HALF OF THEM DON'T WANT TO KNOW AND HALF OF THEM DON'T UNDERSTAND' - THE LIVED EXPERIENCE OF SEEKING PAIN CARE IN IRISH HEALTHCARE SERVICES

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Background and aims: A supportive healthcare experience implementing a biopsychosocial approach can empower a person with chronic pain to make informed decisions and engage in autonomous health related behaviours. Despite the positive influence of supportive healthcare on psychological and physical health, little is known about the presence of healthcare support in healthcare settings with underdeveloped chronic pain services. Focusing specifically on autonomy support and self-management skills, this idiographic study explores the lived experience of persons with chronic pain accessing Irish healthcare services.

Methods: Semi-structured interviews were conducted on seven adults self-reporting both a diagnosis of chronic pain (pain >3 months) and treatment for their pain from a minimum of three different healthcare professionals. Participants were recruited from a medical exercise facility. Interview transcripts were analysed using interpretative phenomenological analysis.

Results: Analyses generated four themes: 'my healthcare professional decided'; 'lost in a system'; 'support me as a whole person' and 'regaining control'. Participants described regular experiences of invalidation and biomedical approaches to pain management. Participants reported being highly motivated to enhance their knowledge and regain control of their life but desired varying levels of healthcare support to achieve this.

Conclusions: Participants' experiences were largely in contrast to the desired biopsychosocial model of care. Persons with chronic pain desire access to early knowledge, autonomy support and pathways to enhance self-management skills. Future research is needed to explore practical solutions to deliver enhanced pain care in healthcare services where infrastructure and resources impact the delivery of care.

II-D-44

EFFECTIVENESS OF ONLINE-TRAINED APPLIED RELAXATION ON DEPRESSION AND UNSPECIFIC SYMPTOMS - A PILOT STUDY

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Background and aims: Applied relaxation (AR) is a self-management method for treatment of various psychological and somatic conditions. Digitalization would offer an efficient and flexible way for training of AR. The aim of this pilot study was to evaluate the effectiveness of AR (trained using an online service) on depression and unspecific physical symptoms.

Methods: 26 volunteers (6 men/ 20 women, mean age 36.8, SD 14.1 yrs) from the staff and students at the Universities of Oulu and Eastern Finland, Finland, trained AR using the online service. Depression and unspecific physical symptoms were assessed before treatment and after training program using questionnaires including PHQ (Patient Health Questionnaire)-9 and PHQ-15 on depression and unspecific physical symptoms, respectively. Differences in total sum scores of PHQ-9 (range 0-27) and PHQ-15 (range 0-30) between baseline and follow-up points were evaluated using two-sided paired-samples t-test.

Results: The mean of the total sum score of PHQ-9 decreased from baseline (mean 14.4, SD 4.9) to follow-up (mean 13.3, SD 4.6) (p=0.059). The mean of the total sum score of PHQ-15 decreased significantly from baseline (mean 21.6, SD 3.2) to follow-up (mean 20.5, SD 3.5) (p=0.017).

Conclusions: This preliminary study showed that the online service for training of AR may be efficient in relieving unspecific physical symptoms, and a tendency for relieving of depression symptoms was also shown. The AR method trained using online service may be beneficial to a patient with psychosocial burden. However, further studies are needed to evaluate its applicability for clinical use.

II-D-45

PAIN-RELATED VARIABLES AS CONTRIBUTING FACTORS TO PHYSICAL ACTIVITY AFTER BREAST CANCER SURGERY: A ONE-YEAR FOLLOW-UP STUDY

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Background and aims: Physical activity (PA) levels among breast cancer survivors following surgery are often low, with unclear roles played by pain-related factors. This study investigates the trajectory and determinants of PA in 184 breast cancer survivors at 1 week (T1), 4 months (T4), and 12 months (T12) post-surgery, focusing on pain-related factors.

Methods: A linear mixed model was utilized to evaluate objectively measured PA changes in the first year post-surgery. Multivariate analyses explored associations between moderate-to-vigorous physical activity (MVPA) and patient characteristics, pain-related factors, emotional and physical functioning, and quality of life (QoL) at each timepoint. Predictors for MVPA at T12 were also identified.

Results: Weekly minutes of overall PA, MVPA, and steps increased, while sedentary time significantly decreased between T1 and T12, with most changes observed between T4 and T12. All regression models, adjusted for age and BMI, were significant ($p<0.001$) and showed that at T1 ($AdjR^2$: 15.3%), anxiety and pain-related disability negatively impacted MVPA. At T4 ($AdjR^2$: 25%), central sensitization signs and physical symptom burden negatively affected MVPA, whereas higher QoL positively influenced it. By T12 ($AdjR^2$: 25.7%), poorer upper limb functioning negatively contributed. Higher existential wellbeing, physical symptom burden, and pain catastrophizing at T1 and central sensitization signs at T4 explained lower MVPA at T12, albeit only a small variance.

Conclusions: Breast cancer survivors demonstrate increased PA over the first year post-surgery, influenced by time-dependent factors. Pain-related factors hinder PA early on, emphasizing the need for tailored interventions in early rehabilitation addressing immediate and long-term survivorship needs to enhance PA.

II-D-46

THE IMPACT OF AN APPLIED RELAXATION ONLINE SERVICE ON BODY PAIN - A PILOT STUDY

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Background and aims: Applied relaxation (AR) is a self-management method used and tested treating musculoskeletal pain and psychosomatic conditions. AR has been used as a 6-week program for chronic pain patients under the guidance of health care professionals. Developing a technology-aided online AR training program gives a treatment option for wider target groups, regardless of time and place of use. The aim of this pilot study was to test the developed AR online service on musculoskeletal pain and on pain-related disability.

Methods: Non-patient volunteers (mean age 39.1 years, women 76.2%) in a pilot study responded to a webropol survey prior to (n=60) and after (n=26) the AR online service training with questions of pain in nine body sites and pain site-related disability. The difference of means of pain sites and pain site-related disability between baseline and follow up were evaluated with the two-sided paired samples T-test.

Results: The mean of number of body pain sites (range from 0 to 9) was significantly higher at baseline (mean 4.0, SD 2.2) than follow-up (mean 2.9, SD 2.7) ($p=0.006$), whereas the mean of pain related disability (range from 0 to 9) decreased from 0.42 (SD 0.76) to 0.08 (SD 0.27) ($p=0.036$).

Conclusions: The AR online service may offer a useful tool as a cost-efficient self-management method for musculoskeletal pain. Further studies on pain patients are needed to evaluate the AR online service‘s effect on musculoskeletal pain and the background factors of pain.

II-D-47

MINDFULNESS & ACCEPTANCE AND COMMITMENT THERAPY (ACT) APPROACH IN MUSCULOSKELETAL PERSISTENT PAIN STATES: A CASE SERIES

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Background and aims: Musculoskeletal (MSK) pain persistence constitutes a major global challenge, a source of significant suffering, disability and healthcare costs[1]. This complexity, with psychological, social, and biophysical contributors was addressed in the following case-series in which are shown the results of a combined physiotherapy treatment merging Mindfulness-based Therapy[2] with Acceptance and Commitment Therapy (ACT)[3-4].

ACT has been shown to have positive effects in chronic pain[5], and meta-analyses showed improvements in pain intensity, physical functioning, depression and anxiety, and quality of life (QoL)[6].

Methods:

DEMOGRAPHIC CHARACTERISTIC OF PARTICIPANTS n 12		
Sex n (%)	Female	7 (58.33)
Baseline Age (years)	Mean (SD)	54.92 (15.28)
Years Living with Persistent NsLBP	Mean (SD)	1.52 (1.18)
Level of Education n (%)	Primary School	5 (41.66)
	Secondary School	3 (25)
	Third Level (Undergraduate Degree)	1 (8.33)
	Higher Level (Postgraduate Degree)	3 (25)
Relationship Status n (%)	Married / Cohabiting	9 (75)
	In a Relationship, Not Cohabiting	2 (16.66)
	Single	1 (8.33)
Work Status n (%)	Student	0 (0)
	Not Working	4 (33.33)
	Working Part-Time	1 (8.33)
	Working Full-Time	7 (58.33)

n 12 patients with persistent MSK pain conditions [chronic non-specific LBP, complex regional pain syndrome, fibromyalgia, failed back surgery, recurrent knee pain in elderly patients] was enrolled in one-year period and evaluated with initial, post-intervention (six months) evaluation and one-year follow-up, with administration of Patient-Related Outcome Measures such as Örebro Musculoskeletal Pain Screening Questionnaire and consequent further psychosocial assessment with FABQ, TSK, PCS, CSQ and PSEQ, as measures to evaluate patients' mindset change and treatment engagement. Physiotherapy treatment was based on Mindfulness sessions with body scan audio record and meditation walks merged with ACT principles to teach simple psychological skills, to promote psychological flexibility, and to address facilitators and barriers to self-management.

Results:

Outcomes Measures	Baseline n [Mean - (SD) - 95% CI]	Post-Intervention (Six Months) n [Mean - (SD) - 95% CI]	One Year Follow-Up n [Mean - (SD) - 95% CI]
OMPSQ	12 [58.25 - (12.96) - (50.94 - 65.56)]	12 [25.66 - (5.75) - (22.43 - 28.89)]	12 [19.41 - (3.91) - (17.21 - 21.61)]
FABQ	12 [46.58 - (15.50) - (37.85 - 55.31)]	12 [22.33 - (15.68) - (13.50 - 31.16)]	12 [10.83 - (7.62) - (6.54 - 15.12)]
FABQpa	12 [24.25 - (1.35) - (23.49 - 25.01)]	12 [11.25 - (1.21) - (10.57 - 11.93)]	12 [4.58 - (1.37) - (3.80 - 5.36)]
FABQw	12 [22.00 - (7.32) - (17.89 - 26.11)]	12 [7.16 - (1.74) - (6.19 - 8.13)]	12 [2.42 - (1.73) - (1.45 - 3.39)]
TSK	12 [44.58 - (5.38) - (41.56 - 47.60)]	12 [17.75 - (4.07) - (15.45 - 20.05)]	12 [4.33 - (2.23) - (3.08 - 5.58)]
TSKpa	12 [21.58 - (2.71) - (20.06 - 22.10)]	12 [9.92 - (2.54) - (8.50 - 11.34)]	12 [2.33 - (1.43) - (1.53 - 3.13)]
TSKsf	12 [23.00 - (3.57) - (21.00 - 25.00)]	12 [7.83 - (2.17) - (6.60 - 9.06)]	12 [2.00 - (1.35) - (1.24 - 2.76)]
PCS	12 [44.08 - (2.78) - (42.52 - 45.64)]	12 [14.16 - (2.95) - (12.50 - 15.82)]	12 [3.09 - (1.30) - (1.37 - 4.81)]
PCSh	12 [20.83 - (2.52) - (19.41 - 22.25)]	12 [7.42 - (2.06) - (6.25 - 8.59)]	12 [2.16 - (1.47) - (1.34 - 2.98)]
PCSr	12 [17.08 - (2.15) - (15.87 - 18.29)]	12 [6.42 - (1.44) - (5.61 - 7.23)]	12 [1.42 - (0.51) - (1.13 - 1.71)]
PCSm	12 [6.16 - (1.85) - (5.13 - 7.19)]	12 [0.58 - (0.90) - (0.08 - 1.08)]	12 [0.00 - (0.00) - (0.00 - 0.00)]
CSQ	12 [83.75 - (9.13) - (58.60 - 68.90)]	12 [105.08 - (5.91) - (101.75 - 108.41)]	12 [111.92 - (3.94) - (109.70 - 114.14)]
CSQd	12 [7.16 - (3.09) - (5.41 - 8.91)]	12 [26.58 - (2.64) - (25.10 - 28.06)]	12 [28.33 - (1.33) - (27.59 - 29.07)]
CSQc	12 [32.25 - (3.36) - (30.36 - 34.14)]	12 [8.83 - (3.95) - (6.61 - 11.05)]	12 [3.16 - (3.35) - (1.26 - 5.06)]
CSQips	12 [6.16 - (2.88) - (4.55 - 7.77)]	12 [26.66 - (3.28) - (24.81 - 28.51)]	12 [29.16 - (1.03) - (27.07 - 31.05)]
CSQdfp	12 [4.75 - (2.14) - (3.55 - 5.95)]	12 [19.66 - (3.80) - (18.56 - 20.78)]	12 [23.16 - (1.03) - (22.58 - 23.74)]
CSQcss	12 [6.58 - (2.27) - (5.31 - 7.85)]	12 [18.66 - (3.55) - (16.66 - 20.66)]	12 [22.83 - (1.03) - (22.25 - 23.41)]
CSQp	12 [6.92 - (3.39) - (5.01 - 8.83)]	12 [5.66 - (2.57) - (4.22 - 7.10)]	12 [4.75 - (1.71) - (3.80 - 5.70)]
PSEQ	12 [16.33 - (5.17) - (13.43 - 19.23)]	12 [51.83 - (3.15) - (50.06 - 53.60)]	12 [56.16 - (1.58) - (57.26 - 59.06)]

***ABBREVIATIONS*: OMPSQ (Short Form):** Örebro Musculoskeletal Pain Screening Questionnaire; **FABQ:** Fear-Avoidance Beliefs Questionnaire (**FABQpa:** Physical Activities Subscale; **FABQw:** Work Subscale); **TSK:** Tampa Scale of Kinesiophobia (**TSKaa:** Activities Avoidance Subscale; **TSKsf:** Somatic Focus Subscale); **PCS:** Pain Catastrophyzing Scale (**PCSh:** Helplessness Subscale; **PCSr:** Rumination Subscale; **PCSm:** Magnification Subscale); **CSQ:** Coping Strategies Questionnaire (**CSQd:** Distraction Subscale; **CSQc:** Catastrophizing Subscale; **CSQips:** Ignoring Pain Sensation Subscale; **CSQdfp:** Distancing from Pain Subscale; **CSQcss:** Coping Self Statements; **CSQp:** Praying Subscale); **PSEQ:** Pain Self-Efficacy Questionnaire.

Setting Agenda: initial assessment, feedback and rationale for discussions about results (Empathising, Normalising & Reassuring)
Shifting Focus from Pain to Function: presenting ACT's principles and building-up open engagement
Values-based Goals Setting: identifying core values and setting related goals (*SMART Goals*)
Addressing Barriers to Goals Reaching: searching strategies to promote openness, awareness and engagement to overcome perceived barriers to change
Goals Adjustment / Development: checking the salience of goals and adjust it if required
Integration of Learned Information into Self-Management Strategies: review key skills and identify a support network

Under a dispositionalist patient-centred[7-9] psychologically-informed practice[10-12], the therapeutic process guided by Mindfulness and ACT principles enabled to improve psychological flexibility and enhance self-management activation, as shown at post-intervention (six month) and at one-year follow-up, at outcomes re-evaluation comparing to baseline.

Conclusions: In persistent pain states mindfulness and ACT may representing a good viaticum that prompt patients' recovery and thrive.

II-D-48

PAIN MANAGEMENT STRATEGIES: USES, SATISFACTION AND RELATED-COST

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Background and aims: Chronic pain is a prevalent issue worldwide, affecting up to 20% of the general population. Few studies have investigated the alternatives these individuals use to manage their pain and the costs they incur. The aim of this study was to address this issue.

Methods: A cross-sectional online survey was designed to gather information about: socioeconomic variables, pain-related information, and alternatives used for pain management (use, cost, satisfaction, and intention to use). A total of 511 adults with chronic pain (>3 months, with at least two pain episodes per week) completed the survey.

Results: Most participants were women (89%), with primary pain (52%). They reported having used a mean of 18 alternatives (SD: 4.79), being this significantly correlated with some pain-related and socioeconomic variables. The following alternatives were utilized by more than 90% of the sample: Resting, Taking prescribed medications, Distracting, Exercising, and Applying heat. Satisfaction with the alternatives used were assigned in most of the cases less than 3 points (in a 1 to 5 scale). Mean of total reported expenses in the last year for participants was 1563 € (SD= 3053). This was significantly correlated with some pain and socioeconomic variables.

Conclusions: Individuals with chronic pain appear to employ a considerable number of management strategies, and invest a significant amount of financial resources. However, satisfaction with these management strategies is relatively low, indicating a need for more effective interventions.

II-D-50

ENHANCING INTERDISCIPLINARY COLLABORATION AND PATIENT-CENTERED CARE IN MANAGING CHRONIC MUSCULOSKELETAL PAIN: AN ACTION RESEARCH STUDY IN A MUNICIPALITY SETTING

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Background and aims: There is a need for integration of physical and mental health services to improve rehabilitation for patients with complex chronic pain. This includes person-centered care alongside enhanced multidisciplinary collaboration. Collaboration with social workers seems to be the next research frontier to enable a system-wide approach for patients interacting with multiple professionals. This study aimed to identify the main challenges and potential solutions experienced by patients, social workers, physiotherapists, occupational therapists, and psychologists when treating patients experiencing chronic and complex musculoskeletal (MSK) pain within the municipality.

Methods: This action research study involved three workshops with 25 participants, including healthcare professionals (N=18) and patients (N=7). The first two workshops focused on generating future solutions with social workers and patients, respectively. The final workshop included all professionals (excluding patients), using an open, collaborative method to uncover barriers and facilitators regarding interdisciplinary collaboration and healthcare system navigation. Data were transcribed, thematically analyzed, and synthesized across workshops.

Results: Key challenges included lack of trust, poor communication, and feelings of disrespect, leaving patients feeling invalidated. Patients reported frustration with long wait times, rushed consultations, and inadequate care coordination, leading to isolation and anxiety. Suggested solutions included improving initial consultations, establishing clearer communication, and using IT tools to support teamwork.

Conclusions: This study highlights the need for active patient involvement, interdisciplinary collaboration, and early, personalized interventions. Future research should focus on enhancing collaboration and communication, empowering patients through improved health literacy, and utilizing technology to improve care coordination, addressing systemic challenges in managing chronic, complex pain.

II-D-51

INTRODUCTION OF A THERAPEUTIC EXERCISE PROGRAM THROUGH A TELEREHABILITATION (IA) APPLICATION FOR PATIENTS IMPLANTED WITH A SPINAL CORD STIMULATION

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Background and aims: There is evidence that shows that the incorporation of therapeutic exercise in the post-spinal stimulator implant rehabilitation program improves the results of this type of intervention in patients undergoing lumbar spine surgery.

This study aims to evaluate the effectiveness of applying a digital tool for prescribing and monitoring therapeutic exercise in patients who have had a spinal stimulator implanted.

Methods: This is a prospective, single-center study.

The digital telerehabilitation system used in this study is Trak©, a software as a medical device (SaMD) that allows the monitoring and functional assessment of patients with musculoskeletal injuries during their rehabilitation process remotely.

Inclusion criteria: Adult post-lumbar spine surgery patients with chronic lumbar pain diagnosed withfailed spine surgery syndrome in whom a spinal stimulator has been implanted. It is necessary that they have an internet connection on the device they are going to use for telerehabilitation and that they have signed the informed consent.

Results: Five patients have been included. Adherence to the TRAK application is 82% of the prescribed sessions are carried out.

Of the total number of sessions prescribed so far, 34 sessions, 27 of them were completed with the assistance of the Artificial Intelligence System; that is, 79.41% of the sessions used AI.

No patient has had problems accessing the tool. There have been no electrode displacements.

Conclusions: The use of the tool has been easy for most patients, mostly using assistance with Artificial Intelligence, and the exercises prescribed in an ascending manner have not involved displacement of SCS electrodes.

II-D-52

COGNITIVE BEHAVIORAL THERAPY-BASED EXERCISE FACILITATION METHOD USING THE "IKIIKI REHABILITATION NOTEBOOK" IN PATIENTS WITH INTRACTABLE CHRONIC PAIN

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Background and aims: Recent clinical practice guidelines for chronic pain indicate, with a high evidence level, that the combination of exercise and cognitive behavioral therapy (CBT) is effective. The purpose of this study was to analyze the effectiveness of CBT-based exercise facilitation method using the "Ikiiki Rehabilitation Notebook" in patients with intractable chronic pain. "Ikiiki" means active in Japanese.

Methods: The subjects were 12 males and 23 females (mean age 54) with chronic low back (n=17), lower extremity (n=14), high back (n=2), LBP with lower extremity (n=1) or neck (n=1) pain without specific lesions. Indications for using the notebook were as follows: (1) Numerical Rating Scale (NRS) for pain > 3/10, (2) all patients had pain somewhere in the body, other than headaches, for more than 3 months, resulting in disability in activities of daily living (ADL), and (3) the patients are eager to do rehabilitation therapy. Once every 2 weeks, the patients returned to the clinic to go over the notebook. Each case was evaluated in terms of the NRS, the pain disability assessment scale (PDAS), pain catastrophizing scale (PCS), and EuroQol 5 Dimension (EQ-5D) which evaluate quality of life (QOL) at pretreatment and post-treatment.

Results: The NRS, PDAS, PCS, and EQ-5D were improved significantly 11 months after starting to use the notebook.

Conclusions: The Ikiiki Rehabilitation Notebook is a valuable tool to educate patients about the cause and treatment of pain and to actively facilitate CBT-based exercise, resulting in the improvement of ADL and QOL.

II-D-53

NARRATIVES IN MUSCULOSKELETAL PERSISTENT PAIN STATES AS A PRECIOUS TOOL FOR MODELLING THERAPEUTICAL JOURNEY: A CASE REPORT

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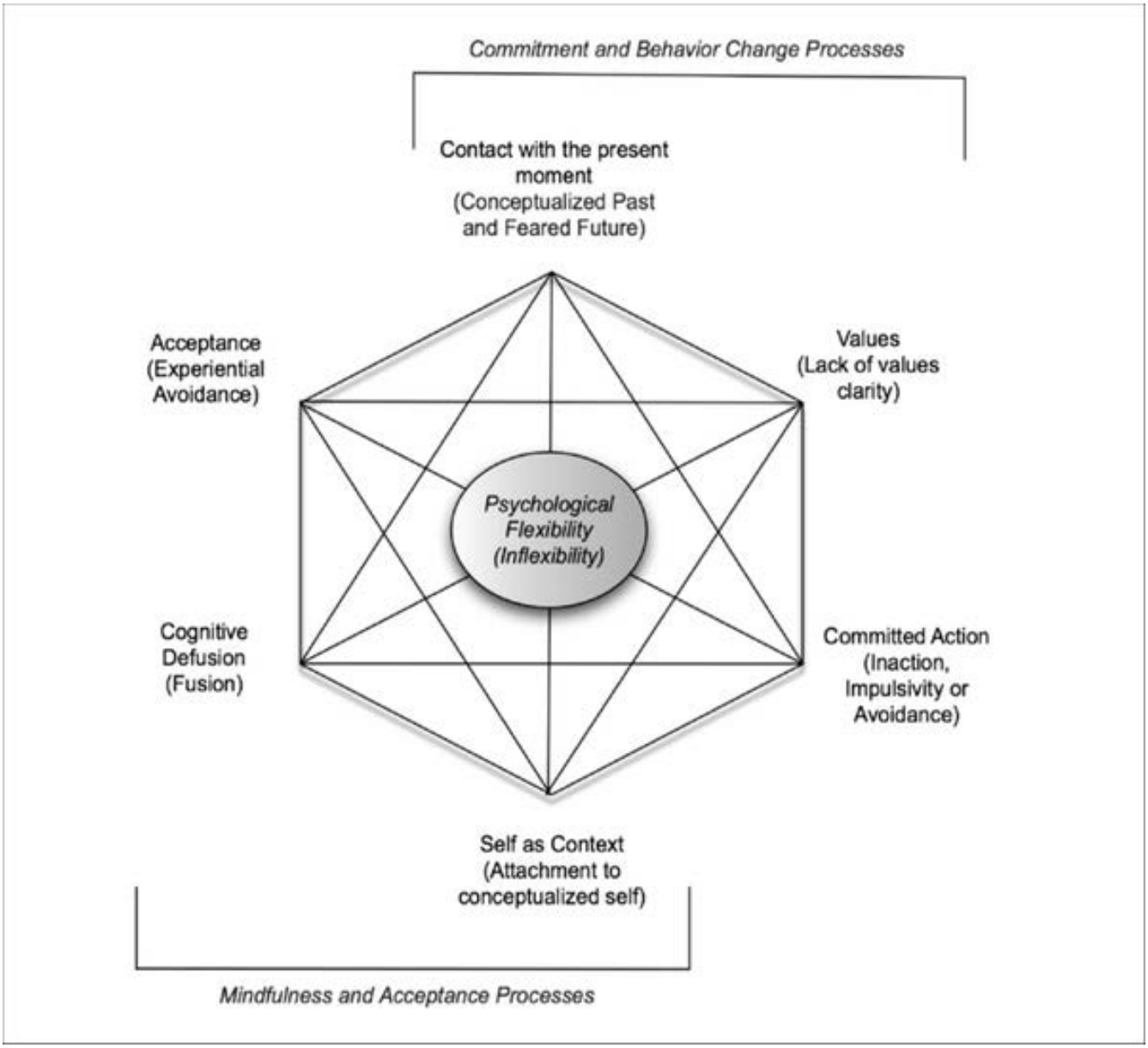
Background and aims: Musculoskeletal (MSK) persistent pain states represent challenging conditions for both patients and clinicians[1], with significant suffering, disability, and healthcare costs[2].

This complexity was addressed in the following case-report about a patient with Complex Regional Pain Syndrome-I (CRPS-I) after distal radial fracture, in which are shown both quantitative and qualitative results.

Methods: n 1 with confirmed Budapest's Criteria[3-4] for CRPS-I diagnosis. Initial evaluation and subsequent follow-up have been characterized by the administration of Patient-Related Outcome Measures (PROMs) like OMPSQ and further functional and psychosocial assessment with PRWHE, FABQ, TSK, PCS, CPAQ plus PSEQ, as measures to evaluate patient's mindset change and treatment engagement. Further, a semi-structured interview was conducted to identify narratively personal qualitative aspects of patient's pain experience, at every temporal phase.

The therapeutic process combined CRPS-related Pain Neuroscience Education (PNE)[5], Graded Motor Imagery (GMI)[6] and Graded Activities Exposure (GEXP)[7-8] with PHotograph series Of Daily Activities (PHODA)[9] as therapeutic exercise modalities, and the introduction of Mindfulness[10-11] sessions merged with Acceptance and Commitment Therapy (ACT)[12-13].



Results: Following a dispositionalist patient-centred[14-16] and psychologically-informed approach[17-19], the multimodal therapeutical journey permitted to achieve overtime the functional recover of the hand, the making sense of the pain experience and the restoration of the quality of life (QoL).

Patient-Related Outcome Measures (PROMs) Initial Consultation (Encounter #1)						
OMPSQ (Short Form) [88/100]	PRWHE [94/100] PRWHEp [46/50] PRWHEf [48/50]	FABQ [67/72] FABQpa [30/30] FABQw [37/42]	TSK [45/52] TSKaa [18/24] TSKaf [27/28]	PCS [45/52] PCSh [22/24] PCSr [20/20] PCSa [3/8]	CPAQ [21/120] CPAQaa [12/66] CPAQpw [9/54]	PSEQ [10/60]

Patient-Related Outcome Measures (PROMs) Six Months (Encounter #24)						
OMPSQ (Short Form) [20/100]	PRWHE [35/100] PRWHEp [15/50] PRWHEf [20/50]	FABQ [22/72] FABQpa [10/30] FABQw [12/42]	TSK [15/52] TSKaa [7/24] TSKaf [8/28]	PCS [10/52] PCSh [5/24] PCSr [5/20] PCSa [0/8]	CPAQ [111/120] CPAQaa [57/66] CPAQpw [54/54]	PSEQ [53/60]

Patient-Related Outcome Measures (PROMs) One Year (Encounter #36)						
OMPSQ (Short Form) [12/100]	PRWHE [22/100] PRWHEp [8/50] PRWHEf [14/50]	FABQ [8/72] FABQpa [3/30] FABQw [5/42]	TSK [13/52] TSKaa [6/24] TSKaf [7/28]	PCS [1/52] PCSh [1/24] PCSr [0/20] PCSa [0/8]	CPAQ [120/120] CPAQaa [66/66] CPAQpw [54/54]	PSEQ [60/60]

Patient-Related Outcome Measures (PROMs) Eighteen Months Follow-Up (Encounter #37)						
OMPSQ (Short Form) [10/100]	PRWHE [8/100] PRWHEp [2/50] PRWHEf [6/50]	FABQ [0/72] FABQpa [0/30] FABQw [0/42]	TSK [13/52] TSKaa [6/24] TSKaf [7/28]	PCS [0/52] PCSh [0/24] PCSr [0/20] PCSa [0/8]	CPAQ [120/120] CPAQaa [66/66] CPAQpw [54/54]	PSEQ [60/60]

Patient-Related Outcome Measures (PROMs) Two Year Follow-Up (Encounter #38)						
OMPSQ (Short Form) [10/100]	PRWHE [2/100] PRWHEp [0/50] PRWHEf [2/50]	FABQ [0/72] FABQpa [0/30] FABQw [0/42]	TSK [13/52] TSKaa [6/24] TSKaf [7/28]	PCS [0/52] PCSh [0/24] PCSr [0/20] PCSa [0/8]	CPAQ [120/120] CPAQaa [66/66] CPAQpw [54/54]	PSEQ [60/60]

Conclusions: In persistent pain states the therapeutic pathways[20-21] should be shaped towards a multidimensional framework whose the main objective is to reach a meaning(s) of pain experience, where the uniqueness of single clinical presentation can be effectively met and managed condescendingly and prompt patients' recovery and thrive.

II-D-54

EMOTIONAL AWARENESS AND EXPRESSION THERAPY VS COGNITIVE BEHAVIOURAL THERAPY IN PATIENTS WITH CHRONIC PAIN: A SYSTEMATIC REVIEW AND META-ANALYSIS OF RANDOMIZED CONTROLLED TRIALS

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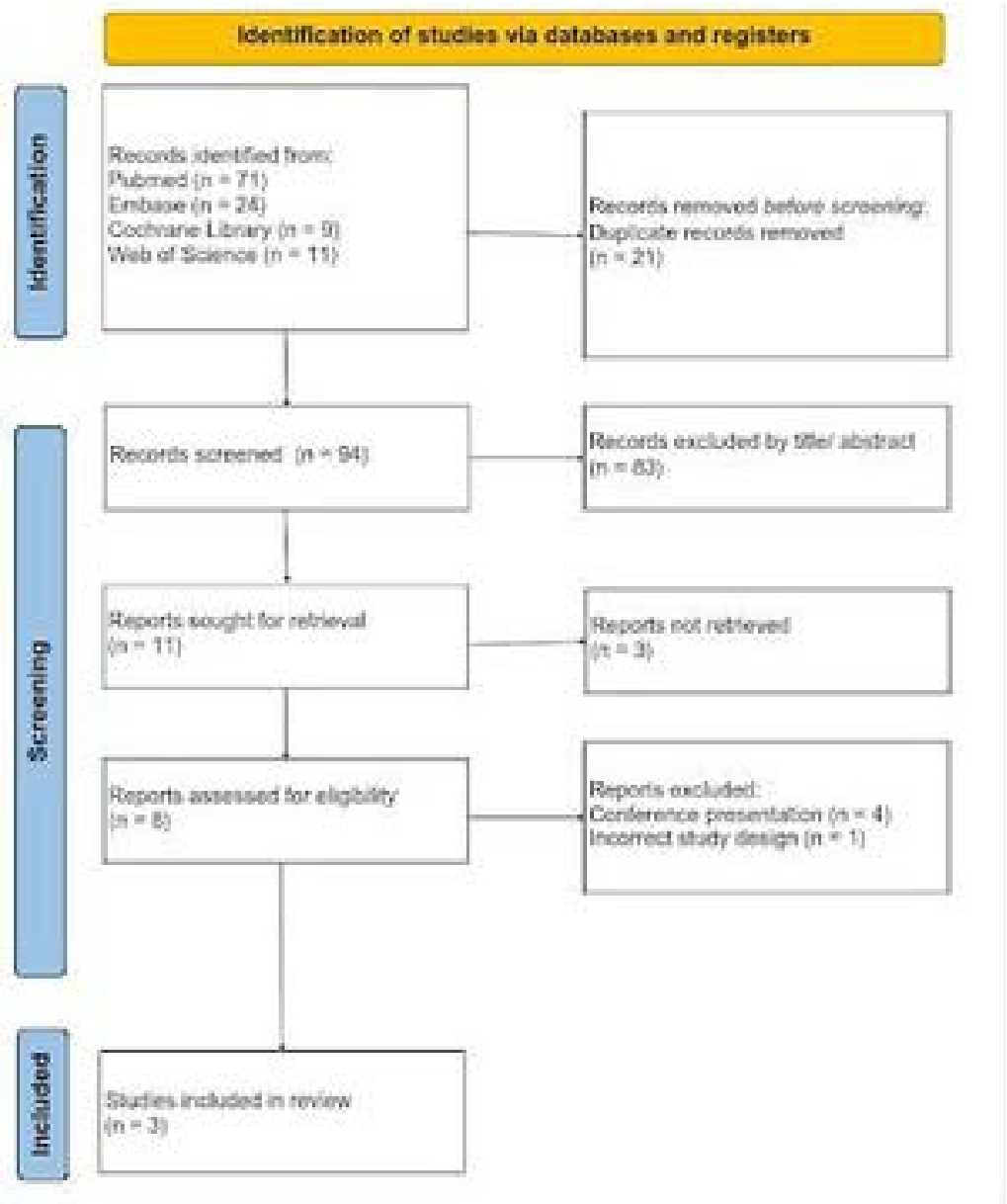
Background and aims: Emotional awareness and expression therapy (EAET) is a newer approach that focuses on identifying and expressing repressed emotions. While cognitive behavioural therapy (CBT) has ample evidence supporting its efficacy, the benefits provided by EAET are still unknown.

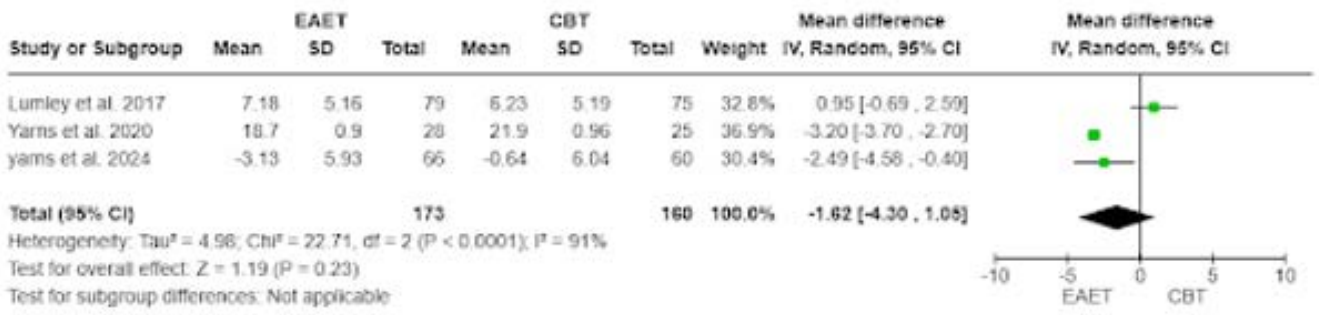
We aimed to compare the efficacy of EAET versus CBT in treating chronic pain and stress-related conditions.

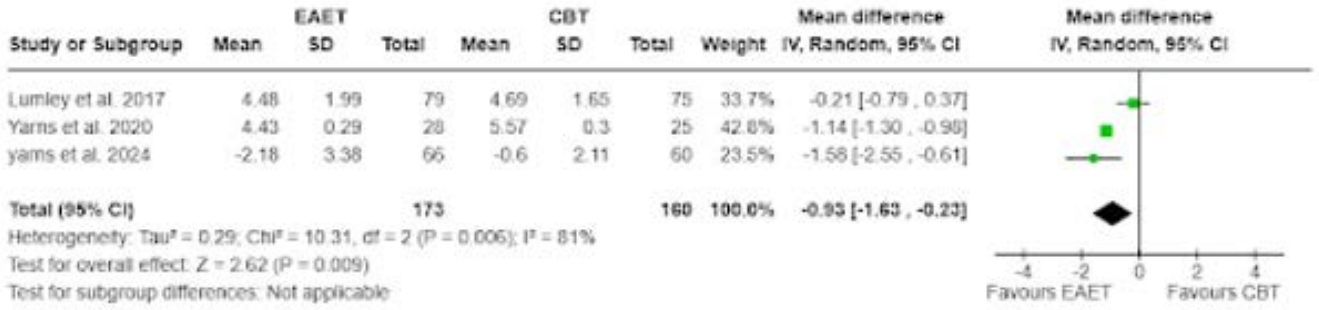
Methods: We systematically searched PubMed, Embase, Cochrane and Web of Science databases for randomized controlled trials (RCTs) comparing EAET with CBT in patients with chronic pain. Statistical analysis was performed using Review Manager 8.1.1 (Cochrane Collaboration). Heterogeneity was assessed by I2. We pooled mean differences (MD) with 95% confidence intervals (CI). Reduction in pain severity was assessed using brief pain

inventory (BPI), anxiety by PROMIS anxiety short form 7a, sleep disturbances by PROMIS sleep disturbances short form 8a and satisfaction with life by NIH toolbox general life satisfaction fixed form B.



Results: Three RCTs reporting data on 333 patients were included. Among them, 73 (52%) received EAT and 160 (48%) received CBT. Follow-up ranged from 3 to 6 months. The mean age of patients between studies ranged from 48 to 75 years. EAT significantly reduced pain severity (see Figure 2A) compared with CBT. There were no differences in anxiety (Figure 2B), Sleep disturbance (MD -0.21 points; 95% CI -0.55 to 0.12: p=0.22; R = 55%) and satisfaction with life (MD 0.71 points: 95% CI -0.24 to 1.65 : p=0.14; R=94%).





Conclusions:
In patients with chronic pain, EAT was associated with a greater reduction in pain severity compared with CBT.

II-D-55

EVALUATING THE BENEFITS OF REDUCED DOSE BURDEN: DEXIBUPROFEN COMPARED TO IBUPROFEN IN PAIN MANAGEMENT FOR SELF-CARE -A LITERATURE REVIEW

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Background and aims: Optimizing pain management while reducing medication load is crucial, particularly in self- care situations where individuals rely on over the counter (OTC) medications.

The aim is to review whether the lower dosing requirements of DXI provide effective pain management, improve overall quality of life and reduce undesirable side effects compared to conventional IBU.

Methods: Systemic search of the databases PubMed, Embase, and Google Scholar databases up to November 12, 2024.

Randomized controlled trials (RCTs) which highlights the efficacy and safety of DXI compared to IBU was considered for further analysis.

Results: From the results yielded, a total of four RCTs are included for analysis. In a RCT of 102 women with dysmenorrhea, DXI (200/300mg) single dose, when compared to IBU (400mg), had demonstrated superiority in pain relief and DXI (200 mg) showed a significantly faster onset of action (p = 0.035) compared to conventional IBU (400 mg). DXI 400 mg twice daily demonstrated statistically better safety profile (P=0.028) than IBU 2400 mg in an RCT with 489 osteoarthritis of hip or knee patients. In an another RCT with 178 osteoarthritis of hip or knee patients, DXI 600/1200 mg daily for 15 days had shown better tolerability and significant superiority in pain, stiffness and physical function (p = 0.055) than 2400 mg of IBU.

Conclusions: These review findings suggest that DXI may offer effective pain relief with favorable safety profile compared to half the dose of IBU, making it a promising option for reducing medication load and enhancing patient outcomes in self-care management.

II-D-56

EMPLOYING THE COM-B MODEL TO IDENTIFY BARRIERS AND FACILITATORS TO ENGAGING IN SELF-MANAGEMENT STRATEGIES (SMS) VIA PAIN-MANAGEMENT APPLICATIONS (PMA) AMONG CHRONIC PAIN PATIENTS (CPPS)

R. Harding[1], M. Passaportis[1], E. Miles[1], F. Matcham[1]

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Background and aims: Chronic Pain (CP) is the leading cause of disability worldwide and is a global health concern. NICE recommends the use of SMS to manage pain and accompanying symptoms, but adherence remains low. mHealth offers opportunity to support behaviour implementation and maintenance among CPPs. However, consistent use of mHealth is low, potentially a consequence of lack of theoretical underpinnings, end-user involvement and personalisation of commercially available PMA. Therefore, there is a necessity for more adaptive and theoretically driven PMA to be developed, to support CPPs. Employing the COM-B model, this study aimed to identify key barriers and facilitators to engaging with SMS via a PMA among CPPs.

Methods: Semi-structured interviews with 24 CPPs were conducted. Transcripts were transcribed verbatim and analysed using reflexive thematic analysis. Themes were mapped onto the COM-B model to identify key barriers and facilitators to engagement.

Results: Results identified barriers and facilitators aligned with *Psychological Capability*, *Physical Capability*, *Physical Opportunity*, *Social Opportunity,* and *Reflective Motivation*. Barriers reflected: Impact of pain and ability to engage; Cognitive load; Information access; Financial; Self-efficacy and Individual differences. Facilitators represented: Connection with like-minded others; Improved pain awareness and autonomy and Accessibility.

Conclusions: This study provides insight into perceived barriers and facilitators to engaging with SMS via PMA among CPPs. Employing COM-B model mapping facilitated the identification of key behavioural components that influence uptake and utilisation of SMS via digital interventions, providing a foundation for theoretically underpinned intervention development and implementation.

II-D-58

DEVELOPING AN EDUCATIONAL PODCAST ON FIBROMYALGIA

M. Pereira Ribeiro[1], H. Adel Ashmawi[1], J. Melo DeSantana[2], R. Krasic Alaiti[3], L. Fukusawa[4], R. Barbosa Ribeiro[5], M. Chacur[1]

[1]*University of São Paulo, São Paulo, Brazil,* [2]*Federal University of Sergipe, Sergipe, Brazil,* [3]*University of São Paulo, Ribeirão Preto, Brazil,* [4]*Santa Casa de São Paulo, São Paulo, Brazil,* [5]*Federal University of Pelotas, Pelotas, Brazil*

Background and aims: Fibromyalgia is a chronic syndrome marked by widespread musculoskeletal pain, fatigue, sleep disturbances, cognitive difficulties, and a significant impact on quality of life. Its etiology is multifactorial, and as there is no definitive cure, it requires a multidisciplinary treatment approach. Pain education can improve treatment adherence, enhance understanding of the condition, reduce fear, and encourage behavioral changes, ultimately improving the quality of life. This study aims to develop and validate educational pain narratives for fibromyalgia patients, created through collaboration between healthcare professionals and patients, and delivered in the form of a podcast.

Methods: This document outlines the protocol for a methodological and collaborative research study. Participants will include individuals with fibromyalgia and pain management specialists. Validation will be conducted using an online Delphi technique, employing a Likert scale to calculate the Content Validity Index (CVI). The study will progress through six phases: Phase 1: Theoretical groundwork and planning; Phase 2: Development of educational narratives; Phase 3: Internal validation; Phase 4: Recruitment and external validation with patients and professionals; Phase 5: Refinement of narratives via Delphi; Phase 6: Production of the final podcast.

Results: As data collection and analysis are ongoing, this protocol focuses on the narrative validation process. The study will calculate the CVI based on Likert scale responses. Items rated as 3 (agree) or 4 (strongly agree) will be deemed valid, while items rated as 1 (strongly disagree) or 2 (disagree) will be revised or removed.

Conclusions: This study outlines a comprehensive protocol for creating an educational strategy that, once validated, could become a valuable tool for clinical practices, supporting research initiatives, and informing health policy. Additionally, it seeks to enhance health literacy and improve the well-being of individuals with fibromyalgia by delivering engaging and accessible content through a podcast format.

II-D-59

A WEB-BASED INTERVENTION TO SUPPORT POST-SURGICAL PAIN AND SYMPTOM SELF-MANAGEMENT FOLLOWING BREAST CANCER SURGERY: REDUCING THE INCIDENCE AND IMPACT OF ACUTE AND PERSISTENT POST-SURGICAL PAIN

S. Hartup[1,2], M.I Johnson[3], L.J Ashley[3], M. Briggs[4,5]

[1]Leeds Teaching Hospitals NHS Trust, Leeds, United Kingdom, [2]University of Leeds, Leeds, United Kingdom, [3]Leeds Beckett University, Leeds, United Kingdom, [4]University of Liverpool, Liverpool, United Kingdom, [5]Liverpool University Hospitals NHS Foundation Trust, Liverpool, United Kingdom

Background and aims: There were 2.3 million breast cancer cases in 2022 worldwide. Poor acute pain management can result in persistent post-surgical pain, the most common negative consequence of surgery. A mixed-methods approach was used to co-develop a web-based intervention, ePainQ, to capture patient self-reported pain and provide individualised self-management advice.

Methods: ePainQ is a self-management website including a symptom questionnaire providing advice tailored to the individual based on responses about pain, swelling, functionality and QoL. ePainQ was tested in a feasibility study for acceptability, usability and perceived usefulness, including assessing uptake, retention, follow-up and completion rates.

Study arms: usual care (cohort) vs. intervention (ePainQ).

Intervention: daily symptom reporting and reports to staff via linkage to electronic patient records.

Data collection: baseline, 2-weeks, 3-and 9 months post-operatively.

Outcome measures: EORTC C30, and BR23, EQ-5D, HADS and BPI. Patient Activation measured at baseline and 9 months.

Results: 69 recruited; 60 intervention, 9 cohort. Mean age: 57.7yrs (SD 9.8; range 38-82), recruitment rate 63%, engagement rate 89.6%, 97.5% felt ePainQ was easy to use.

Outcome measures: 69/69 (100%) completion at baseline and 2 weeks. No active withdrawals, 13/69 passive withdrawals by 9 months. 14/69 interviews conducted with participants of varying ePainQ completion rates to capture positive and negative feedback. ePainQ was perceived to be supportive and easy to use. All 'progression to phase III RCT criteria' were met.

Conclusions: Study findings confirmed acceptability, usability, usefulness and benefits of the advice provided by ePainQ. ePainQ is now being tested within an NIHR RfPB funded multi-site RCT.

II-D-60

"WHEN PAIN PERSIST, WE HAVE TO RESIST" - THERAPEUTIC ALLIANCE AND PATIENT ENGAGEMENT AT A GLANCE IN PERSISTENT NON-SPECIFIC LOW BACK PAIN (NS-LBP): A CASE-REPORT

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[1]Azienda Sanitaria Friuli Occidentale - AsFO, Distretto delle Dolomiti Friulane, Maniago (PN), Italy

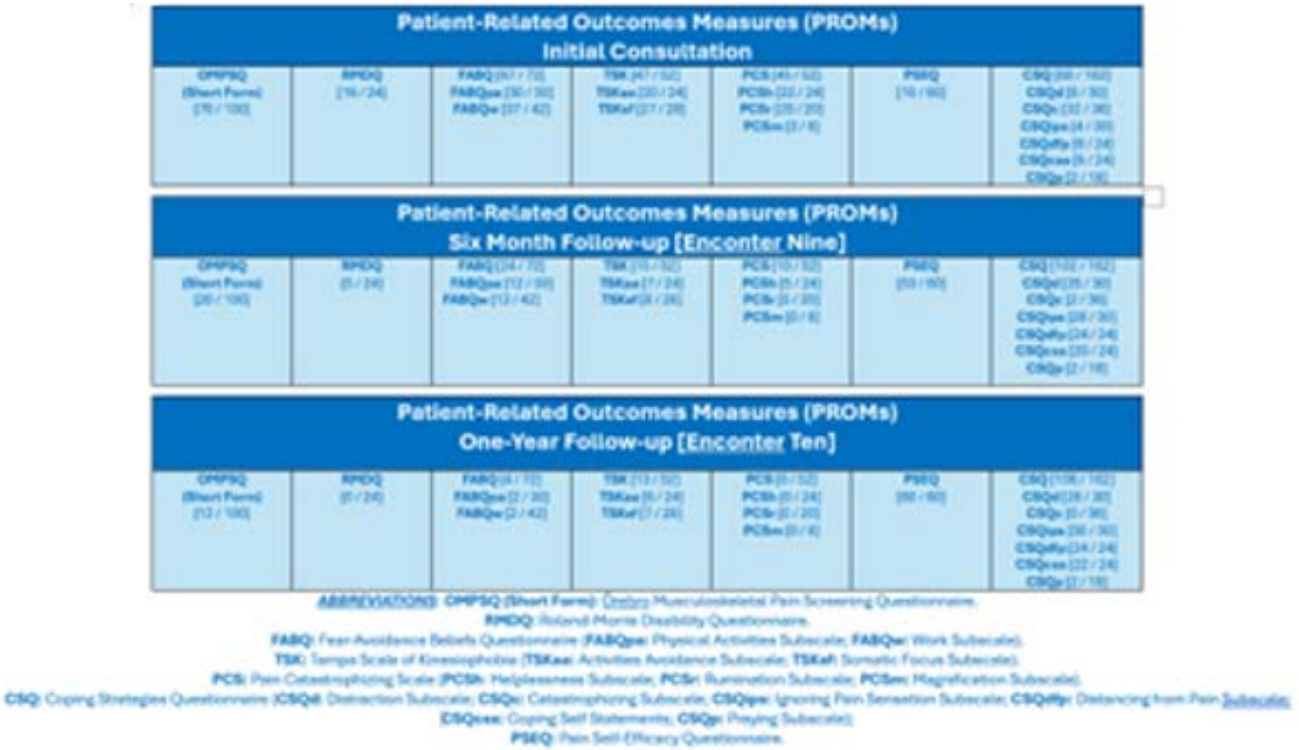
Background and aims: Persistent Non-specific Low Back Pain (Ns-LBP) is a common condition and source of significant suffering, disability and healthcare costs[1-3]. In this case-report are shown the results of a n=1 therapeutic path where therapeutic alliance and patient engagement have been enhanced, utilizing a causal dispositionalist approach[4], and analyzed by administration of outcome measures.

Methods:

Participant	Sex	Age	Diagnosis	Duration of Pain	Level of Education	Relationship Status	Work Status
B.G.	Female	62 yo	Non-Specific Low Back Pain [NS-LBP]	6 months	Secondary Level	Married	Full Time Industry Worker

n 1 with diagnosis of Ns-LBP for six months. Initial evaluation and subsequent follow-ups have been characterized by the administration of Patient-Related Outcome Measures (PROMs) such as Örebro Musculoskeletal Pain Screening Questionnaire (OMPSQ) and further functional and psychosocial assessment with RMDQ, FABQ, TSK, PCS, PSEQ plus CSQ as quantitative measures and further, at every temporal stage of treatment, a semi-structured interview was conducted to identify personal qualitative aspects of patient's pain experience[5-7], the established therapeutic alliance[8-9] patient's mindset change and treatment engagement[10-11].

Results:



Under a dispositionalist patient-centred[12-13] and psychologically-informed approach[14-16], the multimodal therapeutical journey permitted to achieve overtime the functional recover and the restoration of the quality of life. Furthermore, interviews responses elicited the personal sense-making of pain experience and individual functional recovery path.

Conclusions: In this episode of care, it has been possible, through a causal dispositionalist framework that sets apart a person-centred approach, to recover patient's functional levels and implement a self-management program[17-18] that consent her to cope successfully with his complaint, under a shared clinical decision-making and personal empowerment lens.

II-D-61

SUCCESSFUL USE OF ALFENTANIL AND LACOSAMIDE TO TREAT TOTAL PAIN IN END-STAGE MOTOR NEURONE DISEASE ALLOWING HEALING AND TRANSFORMATION

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Background and aims: A 69 years old gentleman was referred for his last five days to specialist palliative care with treatment resistant aspiration pneumonia. He had cardiac failure with 25% ejection fraction, and diagnosed with motor neuron disease 5 years ago. He was a divorcee and estranged from 3 of his 5 children. He struggled to discuss end of life planning with his two caring children.

The aims of specialist palliative care interventions were to relief the persistent cough triggering nerve pain into the legs. Allow his two caring children to open up to a meaningful end of life journey, and to facilitate engagement with his estranged children.

Methods: This case report describes how palliative care can be provided in a life limiting condition with total pain. It reveals how unexpected healing occurred in the patient and his family.

Results: He initially was apprehensive to medication due to fear of sedation. He agreed to use alfentanil as continuous subcutaneous infusion (CSCI) to address his cough. When his cough eased with alfentanil his underlying nerve pain decreased in frequency but not intensity. Introducing lacosamide in combination with alfentanil as CSCI relieved the intensity of his nerve pain.

Finding this therapeutic balance allowed him to engage more openly with his supportive children and gave him strength to engage with his estranged children.

Conclusions: Successful combination to these medications avoided sedation. It also gave him time to activate his resilience which allowed for reconciliation, transformation and healing in his final journey with all of his children and family.

II-D-62

DIGITAL METHADONE CONVERTER: SIMPLIFYING CANCER PAIN MANAGEMENT THROUGH PROTOCOL COMPARISON AND PRESCRIPTION SUPPORT

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[1]Lariboisiere University Hospital, Paris, France, [2]Colmar Civilian Hospital, Colmar, France

Background and aims: Methadone is effective for managing cancer pain, but its use is hindered by uncertainties in equianalgesic dosing and initiation protocols. A recent literature review identified seven high-quality protocols for methadone initiation. This study aimed to develop a digital tool to compare and facilitate the use of these protocols.

Methods: A two-phase approach was employed to create a digital methadone converter. Initially, an Excel spreadsheet was designed to calculate doses based on the seven identified protocols. Expert feedback led to refinements and adjustment. Subsequently, a web application was developed to enhance increase accessibility, offering dynamic calculations and user-friendly data access. The application was integrated into a comprehensive website www.metaconvert.eu providing extensive information on methadone for cancer pain.

Results: The resulting digital methadone converter tool offers a rapid overview and detailed comparison of seven high-quality protocols for methadone initiation in cancer pain management. It simplifies the prescription process by allowing users to compare calculated doses across protocols. The tool is part of a web platform that enhances both its utility and prescribers‘ knowledge. Feedback from French experts has been positive, emphasizing the tool‘s user-friendliness and clinical relevance.

Conclusions: This innovative digital resource bridges the gap between complex clinical guidelines and practical application, supporting healthcare professionals in managing cancer pain with methadone. By simplifying the prescription process, the converter may reduce end-of-life suffering and improve overall quality of life for patients. Further validation through larger-scale studies is warranted to establish its efficacy across diverse clinical settings.

II-D-64

CAN MEDICAL CANNABIS HELP TREAT NEUROPATHIC PAIN AND OPIOID USE DISORDERS IN ADOLESCENTS? A CASE REPORT

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[1]Department of Anesthesiology and Intensive Care, University Children’s Hospital Jagiellonian University Medical College, Cracow, Poland, [2]Department of Anesthesiology and Intensive Care, Jagiellonian University Medical College, Cracow, Poland, [3]Clinic of Anesthesiology and Intensive Care, Institute „Monument - Children‘s Health Center“, Warsaw, Poland, [4]Jagiellonian University Medical College, Faculty of Medicine, Cracow, Poland, [5]Department of Clinical Biochemistry, Pediatrics Institute, Jagiellonian University Medical College, Cracow, Poland, [6]Hospital Pharmacy, Upper-Silesian Medical Centre, Katowice, Poland, [7]Health Institute, Neurology and Restorative Medicine, Oswięcim, Poland, [8]Department of Pain Research and Treatment, Jagiellonian University Medical College, Cracow, Poland

Background and aims: Treating severe neuropathic pain associated with cancer in patients expected to survive for long periods is particularly challenging due to the nature of the pain and the risk of opioid addiction. Cannabinoids have been proven to be beneficial in the treatment of neuropathic pain in adults, but there is limited scientific evidence regarding their use in children.

In the presented case report, we evaluated the potential benefits of cannabinoid therapy in the treatment of cancer-related neuropathic pain and opioid use disorders in an adolescent abusing intranasal fentanyl.

Methods:

Table 1. Pain characteristics and analgesic treatment during hospitalization.

Time	Pain location	Pain intensity [NRS]	Treatment applied	Therapeutic effect [NRS]
Admission to hospital	Spatula and right and shoulder	7/8	Lidocaine IV infusion: 6mg/h; Morphine PCA IV: infusion 2mg/kg/min, boluses 2mg; Gabapentin 3x300mg PO; Acetaminofen IV, Metamizol IV, Ketoprofen IV.	2/3
After neurosurgical procedure	SP: left buttock, right shoulder, surgical wound BP: pain in rectum and anus during defecation; paroxysmal, stabbing, limb pain burning and stabbing with muscle spasm visible as extension of the toes	SP - 8/10 BP -10 (several times a day)	Lidocaine -IV infusion 6mg/h; Morphine PCA IV: infusion 5mg/kg/min, boluses 2mg; Pregabalin - 2x150mg PO; Acetaminofen IV, Metamizol IV, Ketoprofen IV; Sertraline 1x50mg PO.	SP – 4 BP - 8 (several times a day)
Preparation for outpatient treatment	SP: left buttock, right shoulder. BP: paroxysmal, stabbing, limb pain (mainly right) burning and stabbing with muscle spasm visible as extension of the toes.	SP – 4 BP- 8 (several times a day)	Oxycodone 100mg+ Naloxone 25mg/24h PO; Fentanyl intranasally 100ug/ dose- BP; Pregabalin 2x150mg PO; Lamotrygine 1x25mg PO; Acetaminofen PO, Metamizol PO, Ketoprofen PO; Duloxetine 1x60mg PO; Dexamethason 4mg-2mg-2mg PO; 5x Epidural blockade (20-30ml 0,25% Bupivacaine/ Ropivacaine +/- 8mg Dexamethason).	SP - 2/3 BP – 6 (less often)
NRS – numerical rating scale;	PO – per os; IV- intravenous;		PCA – patient controlled analgesia; SP – stationary pain;	BP – breakthrough pain

A 17-year-old male with recurrent osteosarcoma involving the upper mediastinum, right lung, Th3 vertebra, and spinal cord (Th2-Th4), with Horner‘s syndrome, hoarseness, and intractable pain (tab. 1). Treatments included pain medications, steroids, chemotherapy, and Th2 laminectomy with partial tumor removal. The neurosurgical procedure led to spinal cord injury, resulting in flaccid paralysis and severe pain below Th4. Following ineffective chemotherapy and intranasal fentanyl overuse, cannabinoid therapy was introduced at the Pain Management Clinic.

Results:

Table 2. Pain characteristics and analgesic treatment - the Pain Management Clinic

Pain location	Pain intensity [NRS]	Treatment applied	Therapeutic effect [NRS]
SP: left buttock, right shoulder. BP: paroxysmal, stabbing, limb pain burning and stabbing with muscle spasm visible as an extension of the toes. Stabbing, cramping pain in the chest. Spasticity of the lower limb muscles.	SP – 2/3 BP-7/8 (several times a day)	Oxycodone 120mg + Naloxone 30mg/24h PO, Fentanyl intranasally 200ug/dose- BP, Methadone 3x5mg PO, Pregabalin 2x300mg PO, Lamotrygine 2x25mg PO, Amitriptyline 1x50mg PO, Baclofen 2x10mg PO, *The vaporization of medical cannabis: THC 20% CBD<_0,5% - on request up to 8-10 sessions/day. Cannabis oils: CBD 10% sublingually 10 drops 2x/ day and 5 drops/day THC oil (THC 10%, CBD<1%).*	SP- 0 BP- 6 (about once every 3 days)
NRS – numerical rating scale;	PO – per os;	SP – stationary pain; BP – breakthrough pain; CBD- cannabidiol; THC- Tetrahydrocannabinol	

After initiating the vaporization of medical cannabis, improved pain control and reduced fentanyl consumption were observed. Significant improvement in analgesia and quality of life was reported after the use of cannabis oils by limiting the supply of oxycodone, minimizing the use of fentanyl, intensifying rehabilitation, improving appetite and sleep quality (tab. 2). The patient survived 20 months post-discharge.

Conclusions: Implementing cannabinoid therapy may be effective in managing neuropathic pain and reducing opioid use disorders in adolescents.

II-D-65

OPIOID TREATMENT AND OPIOPHOBIA AMONG HEALTH PROFESSIONALS IN KOSOVO

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Background and aims: Pain is a frequent and extremely troublesome symptom in patients which complicates clinical conditions, induces emotional distress, and significantly diminishes the quality of life. Opioids stand as the primary analgesic agents for addressing moderate-to-severe cancer pain.

The goal of this study was to assess the knowledge and barriers using opioid analgesics for pain management among healthcare professionals in hospitals in Kosovo.

Methods: A structured questionnaire was used to collect the data which was administered to healthcare professionals (specialist doctors, resident doctors, pharmacists, and nurses).

Results: A total of 156 healthcare professionals completed the questionnaire. The average age was 38.4 ± 7.1 years (range 22–63). An acceptable level of knowledge was observed in 48.7%. Knowledge items mostly answered incorrectly were related to opioid administration, pharmacology, dosing, adverse events, rotation, and toxicity. Knowledge scores were significantly higher for specialist doctors compared to residents, pharmacists and nurses. Healthcare professionals who handled opioids had significantly higher mean knowledge scores than those who did not. Among perceived barriers to using opioids, the most frequently reported barrier by respondents was fear of addiction by patients (81.6%), fear of adverse effects (72.4%) and lack of training programs on opioid dosing and monitoring (65.7%).

Conclusions: The findings of this study uncovered significant knowledge gaps among healthcare professionals in Kosovo concerning opioids (opiophobia) and pain management. There is an immediate requirement for the implementation of innovative interventions aimed at enhancing the understanding of opioid analgesics and pain management guidelines within the healthcare community in Kosovo.

II-D-66

POSTOPERATIVE PAIN MODULATION AND CORRELATION WITH OXIDATIVE STRESS AND INFLAMMATION BIOMARKERS IN SURGICALLY TREATED PATIENTS WITH LARYNGEAL CANCER

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Background and aims: Surgical treatment of laryngeal carcinoma includes different types of laryngectomies with neck dissection. Surgical tissue damage triggers an inflammatory response, leading to the release of pro-inflammatory molecules. This increases reactive oxygen species production and decreases antioxidant defense mechanisms, leading to postoperative oxidative stress. The aim of this study was to assess the correlation between oxidative stress (malondialdehyde, MDA; glutathione peroxidase, GPX; superoxide dismutase, SOD) and inflammation (interleukin 1, IL-1; interleukin-6, IL-6; C–reactive protein, CRP) parameters and postoperative pain management in patients surgically treated with laryngeal cancer.

Methods: This prospective study included 28 patients with surgically treated laryngeal cancer. Blood samples were taken for the analysis of oxidative stress and inflammation parameters before the operative treatment and after the operative treatment (1st postoperative day and 7th postoperative day). The concentrations of MDA, SOD, GPX, IL-1, IL-6, and CRP in the serum were determined by coated enzyme-linked immunosorbent assay (ELISA). The visual analog scale (VAS) was used for pain assessment.

Results: There was a statistically significant difference between pain intensity preoperative and on the 1st postoperative day, as well as from the 1st to the 7th postoperative day ($p < 0.001$). There was a correlation between oxidative stress and inflammation biomarkers and postoperative pain modulation in surgically treated patients with laryngeal cancer.

Conclusions: Age, more extensive surgery, CRP values, and use of tramadol were predictors for oxidative stress parameters.

II-D-69

INTRAVENOUS INFUSION OF LIDOCAINE, MAGNESIUM AND KETAMINE AS PART OF MULTIMODAL PAIN REGIMEN IN THORACIC SURGERY: A PROSPECTIVE OBSERVATIONAL COHORT

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Background and aims: Thoracic surgery is very painful. Multimodal analgesia where ketamine, magnesium, and lidocaine may be good alternatives, is crucial. The aim was to observe whether the intraoperative use of a combination of intravenous lidocaine infusion, ketamine, and magnesium decreases 24h morphine requirement and Visual Analogue Score (VAS) at 3 hours and 24 hours.

Methods: This is an observational prospective cohort study. Data from 119 patients older than 18 years old undergoing lung resection were collected during three years. The primary outcome was the 24h morphine requirement. Lidocaine 1.5mg/kg intravenous after induction followed an infusion of 1.5mg/kg/h until the end of surgery was used, magnesium 1.5gr and ketamine 0.3mg/kg before incision. A non-parametric test (Wilcoxon rank-sum and Fischer´s exact test) and Stata 13.1 was used for data analysis.

Results: From 119 patients, in 71 of them intravenous lidocaine, magnesium and ketamine were used and 47 of them did not. The first group obtained a significant reduction of intravenous 24h morphine requirement (median, [IQR] 3 [5-8] vs 0 [2-6], p =0.001) and a significant decrease in VAS at 3h (median, [IQR] 5 [3-5] vs 3 [2-5], p =0.006) and 24h (median, [IQR] 4 [1-4] vs 2 [0-3], p =0.0004).All patients received regular analgesia protocol. Caution, due to its small sample size. No adverse effects were observed.

Conclusions: The use of lidocaine, ketamine, and magnesium was associated with a significant decrease in intravenous 24h morphine requirement and a significant decrease in VAS at 3 and 24 hours postoperatively.

II-D-70

THE USE OF DULOXETINE IN A PEDIATRIC PATIENT WITH PHANTOM LIMB PAIN: CASE REPORT AND REVIEW OF THE LITERATURE

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Background and aims: Phantom limb pain (PLP) is a common challenge for children who have undergone amputation due to cancer treatment, significantly impacting their daily activities and quality of life.

Although drugs such as gabapentin, tricyclic antidepressants, opiates, and nerve blocks have yielded mixed results in adults, there are case reports suggesting potential effectiveness in pediatric patients. We emphasize that pregabalin and duloxetine are not approved for use in the pediatric population.We present the management of PLP in an 8-year-old patient.

Methods: The medical record data for the patient was obtained in collaboration with the orthopedics department.

Results: The child initially underwent three operations for suspected osteomyelitis in the proximal tibia. Following the operations, patient-controlled analgesia (PCA) with morphine, ketamine, and lidocaine was utilized for pain management. Subsequently, the diagnosis of Ewing sarcoma necessitated the amputation of the lower limb (above the knee). The child experienced phantom limb pain and received systemic gabapentin and paracetamol for relief. Additionally, when chemotherapy was initiated, the pain intensified, and a sphenoidal ganglion block was performed, which effectively alleviated the pain.

With the commencement of immunotherapy, the child experienced a resurgence of pain, severe anxiety, and mood disturbances, prompting the off-label initiation of pregabalin. Subsequently, due to a rapid decline in functionality, a child psychiatrist‘s consultation resulted in the diagnosis of major depressive disorder with suicidal thoughts. Monotherapy with duloxetine led to an improvement in psychological well-being and functionality, ultimately enabling successful reintegration into the social environment.

Conclusions: Pain management for pediatric patients with phantom limb pain is challenging.

II-D-72

N-PALMITOYL-D-GLUCOSAMINE REDUCES PAIN BEHAVIOUR AND INFLAMMATION IN EXPERIMENTAL DYSBIOSIS CONDITION

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Background and aims: Microbiota and its metabolites influence emotional behaviors and pain, suggesting that restoring gut microbiota could be a new therapeutic strategy for treating neurosensory and psychiatric disorders associated with inflammation. Research highlights the role of immune pathways in pain, by identifying toll-like receptor 4 (TLR4) as crucial in the inflammatory response.N-palmitoyl-D-glucosamine (PGA), a natural compound produced by bacteria such as *Rhizobium leguminosarum,* has demonstrated anti-inflammatory properties in animal models. Computational molecular docking also confirmed PGA‘s binding to the MD2domain ofTLR4.This study used a model of dysbiosis in mice exposed to a broad-spectrum antibiotics (Ab) cocktail, leading to imbalanced intestinal microbiota, to investigate PGA effects on gut inflammation and related neurosensory alterations.

Methods: Mice were treated with Ampicillin, Streptomycin, and Clindamycin (1 mg/kg) for 14 days. Mice were treated with PGA (10 mg/kg) (Epitech Group SpA) or vehicle (pluronic acid) by oral gavage from day 0 to day 14.Behavioral tests(colon-rectal distension,tail suspension,Y-maze)and electrophysiological analysis were conducted, along with biomolecular analysis.

Results: The perturbation of the gut microbiota was associated with an overall inflammatory condition, as suggested by the increase of fecal calprotectin and lipocalin levels in Ab-treated animals.Gut inflammation was associated with a marked colon-distension pain-related behavior along with sickness behaviors, reported as an increased immobility time and reduced burrowing behavior. Ab-induced overexcitation of nociceptive neurons was detected in terms of firing rate, frequency, and duration of excitation.PGA ameliorated gut inflammation,visceral pain and sickness-related behaviors.

Conclusions: Our findings emphasize the intestinal microbiota‘s role in neurosensory and affective disorders and highlight the beneficial effects of PGA.

II-D-74

PARACETAMOL SHIFT; EMBRACING ORAL PREMEDICATION IN PERI-OPERATIVE CARE

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Background and aims: Paracetamol is key in perioperative pain management, but the optimal administration route is debated due to efficacy, safety, cost, and logistics. National guidelines lack definitive evidence, leading to varied practices. This Quality Improvement Project (QIP) assessed current prescribing habits, barriers to optimal oral use, and anaesthetists' attitudes towards pre-operative analgesia packs to align practices with evidence, optimise resources, and enhance safety.

Methods: A departmental survey was conducted to understand prescribing habits and attitudes, alongside a financial analysis of paracetamol expenditure within the Trust. The multiple-choice questionnaire collected data on frequency of prescribing oral (PO) and intravenous (IV) paracetamol, interest in pre-operative analgesia packs, and perceived barriers to prescribing preoperative simple analgesia. Financial data from the Pharmacy Department compared annual expenditures on PO and IV paracetamol in Theatres in 2022.

Results: The questionnaire, with 32 responses from anaesthetists, revealed a dichotomy in prescribing practices: 58% rarely prescribe pre-operative paracetamol, however 74% are interested in its routine use for surgeries. Barriers include lack of computer access and staff shortages. In 2022, IV paracetamol cost £2939, significantly higher than £22 for oral paracetamol, with IV being 37 times more expensive per dose.

Conclusions: The QIP revealed key insights into perioperative paracetamol prescribing, highlighting opportunities to enhance safety and optimize resources. Improvements include reducing IV paracetamol costs and overcoming barriers to PO prescribing. As a result of this QUIP PO paracetamol packs have now been introduced in the anaesthetic room, allowing anaesthetists to administer directly, avoiding errors. A follow-up survey will assess the impact on prescribing patterns.

II-D-75

NEUROPATHIC PAIN FOLLOWING PERIPHERAL NERVE INJURY IN PATIENTS TREATED WITH CAPSAICIN (179 MG) PATCH: A RETROSPECTIVE COHORT STUDY OF IMPACT ON PAIN AND ITS CONSEQUENCES

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Background and aims: Chronic neuropathic pain may be triggered by diverse types of nerve injury altering peripheral nociceptive processing. Treatment is needed and topical treatment without systemic adverse reactions may be preferred.

Methods: Data from the German pain e-registry were extracted of patients with neuropathic pain following peripheral nerve injury (PNI) treated once and up to 4 times with high concentration capsaicin (179 mg) patch (HCCP) and tracked for 12 months irrespective of treatment. The impact of repeated HCCP treatment on pain intensity (VAS, 0-100 mm), mood, suicidality (DASS-21), ability to perform activities (von Korff pain severity) was evaluated.

Results: 499 PNI patients were included, mostly female (62%) on average 57 years old with mean pain duration of 4.7 years and 4 prior pain treatments [Table 1] receiving 1 (n=97), 2 (n=138), 3 (n=129), and 4 (n=135) HCCT treatments. With repeat treatment, average pain intensities decreased significantly (difference vs. baseline at Month 12 in patients with 4 HCCP, $p<0.001$) [Figure 1]; proportion of patients with severe depression/anxiety or suicidal ideation decreased [Table 2], and the number of days without usual activities decreased significantly (difference vs. baseline at Month 12 in patients with 4 HCCP, $p< 0.001$ [Figure 2]. The tolerability profile was characterized by local application site reactions.

Table 1: Demographic data of PNI patients (N=499) at baseline	
Age in years : mean (SD) [min;max])	57.1 (13.6) [18; 93]
Females (%)	62.5
Pain duration in years: mean (SD) [min;max]	4.7 (3.6)[0;12]
24-hour pain intensity on 0-100 mm VAS: average (SD)	53.8 (16.4)
Systemic pain treatments received prior to first HCCP treatment: mean number (SD) [min;max]	7.7 (2.3) [1; 15]
Concomitant pain treatments at baseline: mean number (SD) [min;max]	4.1 (1.7) [1; 10]
Proportion of patients severely depressed/anxious/ stressed at baseline (DASS-21): %	14.8/17.8/15.6
Proportion of patients with suicidal ideation at baseline (DASS-21) : %	20.6

Table 2 : Shift from baseline to month 12 in proportion of PNI patients who were severely depressed (≥14) /anxious(≥14) /stressed (≥17) as rated by the DASS-21 subscale and had suicidal ideation.

Number of HCCP treatments	DASS-21 Depression	DASS-21 Anxiety	DASS-21 Stress	Suicidal ideation
1 (n=97)	+12	+7	+14	0
2 (n=138)	+2.0	-1	-3.6	-0.7
3 (n=129)	-6.2	-10	-9.5	-7
4 (n=135)	-14.9	-20	-16.3	-15

Figure 1 : Average Pain Intensity (API) at baseline and Months 3, 6, 9 and 12 by number of HCCP treatments

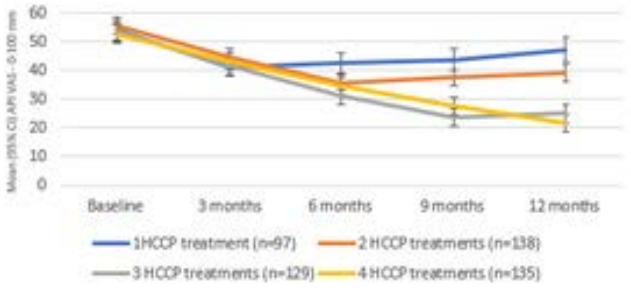
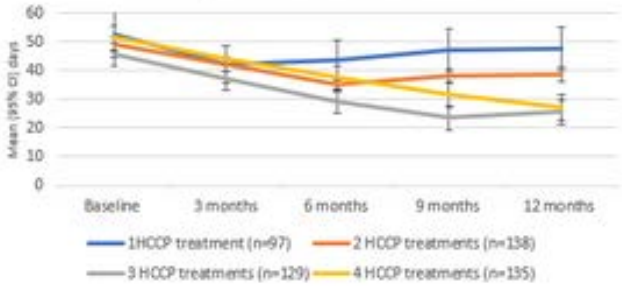


Figure 2 : Number of days without usual activites in the past 3 months at baseline, 3, 6, 9, 12 months by number of HCCP treatments



Conclusions: Patients waited on average for 5 years for their first HCCP treatment. HCCP treatment provided significant pain relief, improved mood, and reduced activity limitations. These improvements were more pronounced when HCCP treatment was repeated 3-4 times. Treatment with HCCP was well tolerated.

II-D-76

TREATMENT OF INTER-COSTO-BRACHIAL NEURALGIA AFTER BREAST CANCER SURGERY: OPEN LABEL FOLLOW-UP OF A MULTICENTER RANDOMIZED CONTROLLED CLINICAL TRIAL COMPARING CAPSAICIN 179 MG PATCH VS PREGABALIN

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Background and aims: Postsurgical neuropathic pain (PSNP) following breast surgery is common and debilitating, presenting as burning, stabbing, or pulling sensations. We aim to evaluate the effectiveness of high concentration 179 mg capsaicin patch (HCCP) compared to pregabalin in patients who had PSNP following breast cancer surgery within the preceding year.

Methods: A randomized controlled trial (RCT) compared the efficacy and tolerability of HCCP with oral pregabalin. Two months after randomization, patients were allowed to either continue or switch trial treatments for the remainder of the 6 months observation period. Assessments included the Numeric Pain Rating Scale (NPRS), size of the painful area, quality of life (EQ-5D).

Results: Of the 116 randomized and treated patients, 65 and 46 received one and two treatment(s) with HCCP respectively; 19 stopped treatment and none switched to pregabalin. Of the 51 pregabalin patients, 27 wanted to switch to HCCP (25 were treated), 19 continued on pregabalin and 5 stopped treatment. After 6 months 72.5% had stopped pregabalin treatment. In both treatment arms, the NPRS scores and size of the painful area decreased significantly at 2 and 6 months and EQ-5D-5L numerically improved (Table 1). Patients who received 2 HCCP treatments or switched from pregabalin to HCCP had significant additional decreases ($p<0.05$) in NPRS scores compared to month 2 (Table 2).

Table 1: Change from baseline to month 2 and month 6 in pain intensity, painful area size and EQ-5D by treatment of randomisation

Parameter	Timepoint	HCCP (n=65)	Pregabalin (n=51)
NPRS mean (SD)	Baseline	6 (1.5)	6.3 (1.7)
Change in NPRS from baseline mean (SD)	Month 2	-1.6 (2.4) *	-1.9 (2.6) *
	Month 6	-2.2 (2.5) *	-2.7 (2.9) *
Painful area size in cm^2 mean (SD)	Baseline	118.6 (3.6;309.9)	127.7 (7.1;337.1)
	Month 2	66.1 (49.9) *	91.9 (63.3) *
	Month 6	58.3 (60)*	69.4 (65.2) *
EQ-5D - 5L (median, range)	Baseline	0.732 (-0. 13 ; 0.888)	0.642 (0.38 ; 0.888)
	Month 2	0.798 (0.16 ; 1)	0.732 (-0.199 ; 1)
	Month 6	0.798 (-0.052 ; 1)	0.798 (0.046 ; 1) *

Table 2 : Change in pain intensity (NPRS) from month 2 to month 6 depending on HCCP treatment at month 2

	HCCP/ HCCP (n=46)	HCCP/no additional treatment (n=19)	pregabalin / HCCP (n=25)
Mean (SD)	-1.02 (2.18)	+0.39 (1.38)	-1.6 (3.03)
p value	0.0051	0.29	0.03

Conclusions: Repeated HCCP treatment results in further improvement. More patients switched from pregabalin to HCCP and none did the reverse. HCCP should be considered as early treatment option.

II-D-77

ANALGESIC AND ANTI-INFLAMMATORY EFFECTS OF CYCLODEXTRIN DERIVATIVES IN ACUTE PAIN ANIMAL MODELS

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Background and aims: Transient Receptor Potential Ankyrin 1 (TRPA1) and Vanilloid 1 (TRPV1) are non-selective cation channels involved in pain integration and inflammation. Cholesterol-rich membrane microdomains (lipid rafts) facilitate receptor activation on primary sensory neurons and peripheral nerrve endings. Cyclodextrin (CD) derivatives form inclusion complexes with cholesterol, depleting it from raft regions, leading to reduced receptor activation *in vitro*, potentially exerting analgesic effect *in vivo*.

Methods: CD derivatives were selected on basis of our previous results: randomly-methylated-β-cyclodextrin (RAMEB,3mM), (2-hydroxypropyl)-β-cyclodextrin (HPBCD,10mM), sulfobutylether-β-cyclodextrin (SBECD, 10mM) . Analgesic effect was evaluated in acute pain models after 30-min CD-pretreatment in 12-16-week-old male NMRI mice. Acute somatic chemonociception was induced by intraplantar (i.pl.) formalin (2.5%,10µL) injection, nocifensive behavior was observed. Resiniferatoxin (RTX,0.1µg/mL,10µL,i.pl.)-induced thermal allodynia and mechanical hyperalgesia were measured by increasing temperature hot plate and dynamic plantar aesthesiometer, respectively. In mouse ear mustard oil (MO,1%,10-10µL on both sides)-induced skin inflammation was investigated based on cutaneous blood perfusion alterations by laser speckle contrast analysis. Cholesterol depletion of CD treatment was measured from mouse plantar skin and ear tissue by colorimetric assay.

Results: CD-pretreatment significantly reduced formalin-induced nocifensive behavior duration, evoked by the release of inflammatory mediators. RTX-induced mechanical hyperalgesia was alleviated 30 and 90 minutes following treatment, without affecting thermal allodynia. MO-induced cutaneous blood perfusion elevation was significantly reduced in CD-pretreated animals compared to the control group. CD treatment reduced the total cholesterol content in the plantar skin and ear of mice compared to saline-treated control animals.

Conclusions: In conclusion CD derivatives are promising analgesic and anti-inflammatory agents via novel mechanism of action.

II-D-78

THE ANALGESIC EFFECT OF BOTULINUM TOXIN TYPE A (BTXA) IN RAT KNEE OSTEOARTHRITIS (OA) MODEL AND POTENTIAL MECHANISM

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Background and aims: Knee OA has an incidence rate of 25 % per year and responses to treatment are variable. The analgesic effect of intraarticular (IA) injection of BTXA has been observed in patients with knee OA. This study aims to investigate the potential analgesic effect of BTXA in rat knee OA and its potential mechanism.

Methods: Anterior cruciate ligament (ACL) transection was performed at week 0 in right knee of SD rats to establish rat knee OA model. IA injection with control (normal saline, NS, 0.6 ml) or BTXA (0.6 ml, 10u/ml) was administered in right knee joints in rats at 4 weeks postoperatively. Static weight bearing test was evaluated at 24 weeks postoperatively. ATDC5 chondrocyte cells treated without and with BTXA, cultured for 21 days, were analyzed for real-time polymerase chain reaction (RT-PCR) for Type X collagen, rho-associated, coiled-coil-containing protein kinase 1 (ROCK 1) & ROCK 2 level.

Results: Left-right weight difference (g) in static weight bearing test was significantly lower in BTXA (B10u) (7.59 ± 10. 66, n=8) group in comparison to control (39.06 ± 14.11, n=9) in week 24 ($p<0.05$). In ATDC5 chondrocyte cell culture, the expression of ROCK 1 and 2 and type X collagen decreased significantly after addition of BTXA, in comparison to control, based on RT-PCR.

Conclusions: Analgesic effect of IA BTXA was observed in rat knee OA model, which may be related to rho signaling pathway.

II-D-79

THE ANTINOCICEPTIVE EFFICACY OF TRAMADOL - MAGNESIUM COMBINATION IN AN INFLAMMATORY MODEL OF PAIN IN RATS

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Background and aims: Tramadol is one of the most frequently used opioid analgesics Magnesium was shown antinociceptive activity in some models of pain. This study aimed to assess the antinocicpetive effects of tramadol injected with / without the magnesium sulfate in a rat model of somatic inflammatory pain.

Methods: Carrageenan (0.5%, 0.1 ml/paw) was administered intraplantarlly to the rat hind paw for induction of inflammation. Paw withdrawal threshold to mechanical stimuli was assessed with von Frey analgesiometer. The tested drugs were administered systemically before carrageenan.

Results: Tramadol (1.25–10 mg/kg, intraperitoneally) at a dose-dependent manner reduced a carrageenan-induced mechanical hyperalgesia in male Wistar rats. Maximal antihyperalgesic effect is about 40–100%. Administration of a fixed dose of tramadol (1.25 mg/kg) with magnesium (5 or 30 mg/kg, subcutaneously) before induction of inflammation cause a dose-dependent enhancement and prolongation of the analgesic effect of tramadol.

Conclusions: Systemic administration of low doses of tramadol and magnesium sulfate given in combination is a potent and effective therapeutic option for prevention somatic inflammatory pain. Magnesium sulfate the best effect achives at a dose that is equivalent to the average human recommended daily dose.

II-D-80

SQUALENE-BASED NANOPARTICLES FOR THE TREATMENT OF CANCER-INDUCED BONE PAIN

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Background and aims: Osteosarcoma and Ewing‘s sarcoma, prevalent in children and young adults, cause severe, opioid-resistant cancer-induced bone pain (CIBP). Molecule X, which inhibits Nav channels crucial for pain perception, shows great potential but poses off-target toxicity risks. Encapsulation of Molecule X in squalene-based nanoparticles for intravenous administration aims to enhance tumor site accumulation via the Enhanced Permeation and Retention (EPR) effect. This strategy seeks to improve the therapeutic index by optimizing biodistribution and reducing cardiac toxicity, offering a potential advancement in managing CIBP in these patients.

Methods: Nanoparticles were synthesized using nanoprecipitation, involving ionic bonding between laboratory-synthesized squalenic acid and Molecule X. Pain sensitivity assessment was conducted using Von Frey filaments in C57BL6J mice induced with bone cancer using B16F10 cells. Cancer induction was confirmed using in vivo imaging system (IVIS). Hepatotoxicity was evaluated through plasma assays and qPCR analysis of liver samples.

Results: The results demonstrated that 30 minutes after nanoparticle injection, pain sensitivity returned to basal levels comparable to cancer-free mice, with effects lasting for at least 48 hours post-injection. Hepatotoxicity associated with the nanoparticles remained controlled.

Conclusions: By enhancing biodistribution, this approach allows Molecule X to effectively target tumor sites, maximizing its analgesic effects and reducing off-target toxicity. This makes Molecule X a promising candidate for inhibiting cancer-induced bone pain.

II-D-81

NEW PHARMACOLOGICAL INSIGHT INTO ETANERCEPT AND PREGABALIN IN ALLODYNIA AND NOCICEPTION: BEHAVIORAL STUDIES IN A MURINE NEUROPATHIC PAIN MODEL

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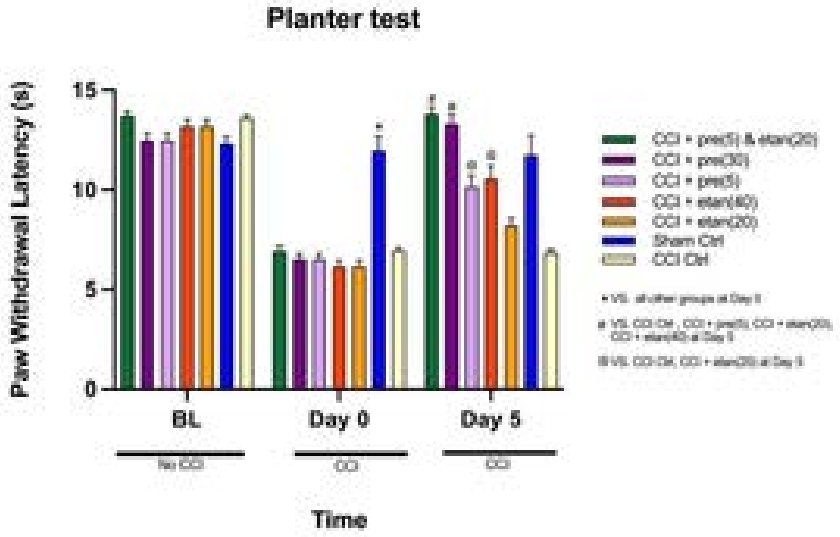
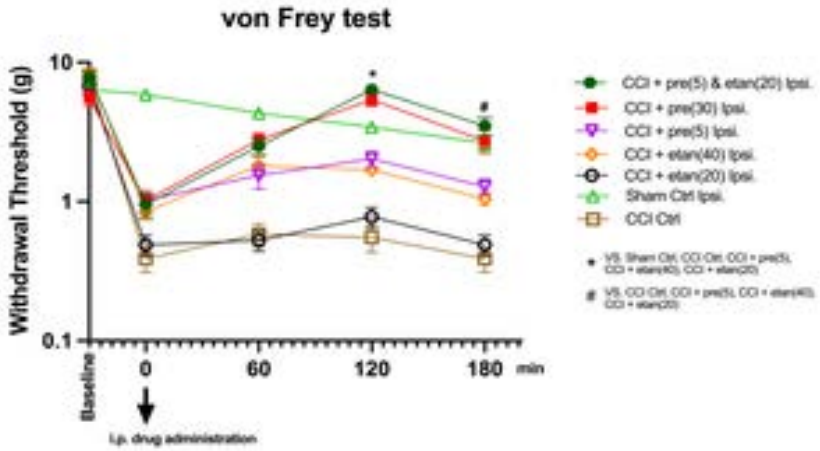
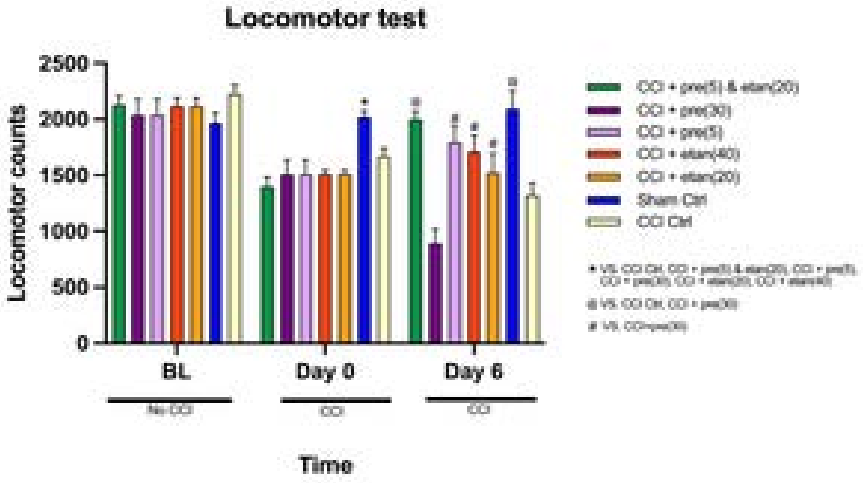
Background and aims: Neuropathic pain is challenging to treat, often resistant to existing therapies, and associated with significant side effects. Pregabalin, an anticonvulsant that modulates calcium channels, is effective but can cause dose-related side effects, including impaired motor and cognitive function, particularly in older patients. Combining reduced doses of pregabalin with agents targeting different pain mechanisms may improve outcomes. TNF-α blockers like etanercept show potential in treating neuropathic pain by modulating sodium channels, synaptic transmission, and reducing neuroinflammation. This study evaluates the efficacy and safety of combining low doses of etanercept and pregabalin in allodynia and nociceptive tests.

Methods: Male C57/BL6 mice were subjected to chronic constriction injury (CCI) of the sciatic nerve to induce neuropathic pain. Mice were divided into seven groups: sham control, CCI control, low and high doses of pregabalin, low and high doses of etanercept, and a combination of low doses of both drugs. Behavioral tests, including von Frey, hot-plate, plantar thermal stimulation, locomotor activity, and rotarod tests, assessed pain responses, motor activity, and coordination.

Results:







A high dose of pregabalin significantly reduced mechanical allodynia and thermal hyperalgesia ($p<0.001$) but impaired motor function, while a low dose of etanercept had no significant effect ($p>0.05$). However, the combination of low doses of etanercept (20 mg/kg) and pregabalin (5 mg/kg) significantly reduced both mechanical allodynia and thermal hyperalgesia ($p<0.001$) without impairing locomotor activity or motor coordination ($p>0.05$).

Conclusions: Co-administration of low doses of etanercept and pregabalin effectively reduces neuropathic pain with fewer side effects compared to high-dose pregabalin alone.

II-D-82

MODIFIED RELEASE OPIOID STEWARDSHIP

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Background and aims: With evidence to demonstrate that modified release (MR) opioids in acute pain are associated with harm and that divergence and poor disposal are associated with the opioid crisis, there is a need to improve the prescribing of opioids in a large private healthcare hospital.

Methods: It was identified that large numbers of MR opioids were routinely being prescribed during the perioperative period to Opioid naïve patients with no rationale. Over 50% of patients with no opioid history preop were prescribed MR in a 6 month period and the 2022 data showed over 9,500 tablets of MR morphine and oxycodone were dispensed as a take home prescription (TTO).

The following measures were introduced: a reverse step down analgesic ladder; a functional activity scale to drive opioid prescribing towards activity rather than just unidimensional high pain scores; an MDT educational programme, which included prescribing guidelines for the Resident Doctors and collaborative vigilance from the pharmacy team screening TTOs that include MR opioids.

Results: Data have shown a significant reduction in the use of MR opioids in the acute perioperative period, but the most significant data demonstrates a reduction of MR opioids dispensed as TTOs by more than 50% across 2023, this is expected to reduce again in 2024's data set based on this trajectory.

Patient Take Home Prescriptions for Modified Release (MR) Opioids		
	2022 patient issues	2023 patient issues
Morphine Sulphate MR 5mg	385 tablets	120 tablets
Morphine Sulphate MR 10mg	2176 tablets	1437 tablets
Morphine Sulphate MR 100mg	38 tablets	56 tablets
Oxycodone MR 5mg	1211 tablets	507 tablets
Oxycodone MR 10mg	4332 tablets	1902 tablets
Oxycodone MR 20mg	756 tablets	354 tablets
Oxycodone MR 40mg	608 tablets **	189 tablets
Oxycodone MR 60mg	zero	43 tablets
Oxycodone MR 80mg	zero	161 tablets **
		NB higher opioid dose use in 17 bed oncology unit *** 80mg added to inventory*

Conclusions: Opioid awareness, guidelines and screening vigilance has dramatically improved the prescribing of opioids for surgical pain within 18 months by over 50% improvement.

II-D-84

MELATONIN FOR CHRONIC BACK PAIN (THE MOCHA TRIAL): A STUDY PROTOCOL FOR A RANDOMIZED, DOUBLE BLIND, PLACEBO-CONTOLLED TRIAL

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Background and aims: Melatonin, mainly used for treating insomnia and jetlag, has demonstrated analgesic properties in chronic non-musculoskeletal pain conditions. Chronic back pain is a predominant cause of disability and socioeconomic burden worldwide, frequently accompanied by insomnia. Current pharmacological interventions often yield modest pain relief and carry significant side effects. This study aims to determine the effect of melatonin in reducing pain in patients with chronic back pain.

Methods: The MOCHA trial (EU-CT 2023-503530-41-00 and ClinicalTrials.gov ID NCT06476392) is a randomized, double-blind, placebo-controlled superiority trial. We will enroll 220 patients with chronic back pain and randomize them in a 1:1 ratio to receive either 10 mg of melatonin or a placebo daily for 6 weeks. The primary outcome is the difference in average pain intensity over the past 7 days, assessed from baseline to 6 weeks. Secondary outcomes include changes in insomnia severity, back-related disability, global perceived effect, and physical and mental health. Exploratory outcomes include physiological sleep metrics derived from ear-electroencephalography recordings and pressure pain thresholds assessed using a handheld algometer.

Results: The study protocol will be presented at the conference.

Conclusions: The MOCHA trial aims to evaluate the potential of melatonin, an affordable and widely accessible drug, in reducing pain and improving sleep in a population with limited effective treatment options. The results could significantly impact clinical practice by offering a dual-targeted treatment strategy for managing chronic back pain and associated sleep disturbances.

II-D-85

INCOBOTULINUMTOXINA (A BONT/A) REDUCED SIGNIFICANTLY INFLAMMATION RELATED PAIN BEHAVIOUR AND EXPRESSION OF INFLAMMATORY CYTOKINES IN CFA MODEL IN RATS

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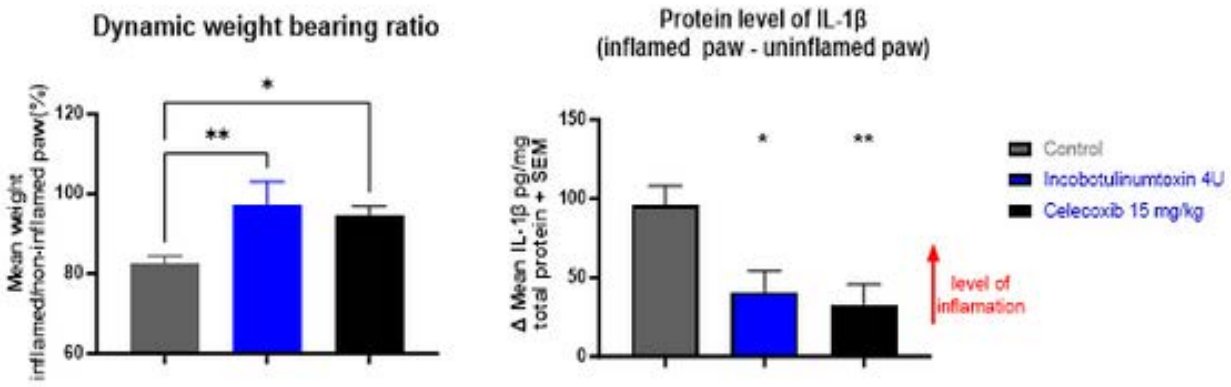
Background and aims: Literature increasingly supports the therapeutic potential of BoNT/A in chronic pain management. Unlike its canonical mechanism of action in movement disorders, BoNT/A appears to engage non-cholinergic pathways in alleviating pain. Recent publications investigating therapeutic BoNT/A effects in a mouse model for inflammatory pain and in a rat adjuvant-arthritis model indicate that anti-inflammatory processes may be significant in this context. We conducted a rat study to assess the effects of intraplantar Complete Freund´s Adjuvant (CFA) on evoked & non-evoked pain behavior and cytokine expression, comparing outcome of BoNT/A treatment to control treatments.

Methods: Male Wistar rats received 24 hours after unilateral intraplantar incobotulinumtoxinA (BoNT-A, NT-201) injection or vehicle an injection of CFA into the same hind paw (Day 0). Afterwards the rats were submitted to plethysmometer and Hargreave´s test (Day 1) and to Dynamic Weight Bearing (DWB) (Day 2).

Celecoxib (15 mg/kg p.o. from Day 0 to Day 2) served as positive control in a separate group. Hind-paw samples were collected for mRNA and protein analysis to assess cytokine expression.

Results:



IncobotulinumtoxinA and celecoxib treatments both significantly improved body posture, indicating reduced pain. QPCR analysis revealed a significant reduction of TNFa mRNA expression in the inflamed paw after incobotulinumtoxinA versus control. CFA-induced protein levels of IL-1b were significantly decreased by both treatments.

Conclusions: The outcome of our study supports that anti-inflammatory properties of incobotulinumtoxinA might contribute as one important mode of action driving analgesic effects observed in preclinical and clinical setting after treatment.

III-D.01

DIFFERENCES IN THE PREVALENCE OF LONG-TERM OPIOID USE BETWEEN OXYCODONE AND MORPHINE IN POSTOPERATIVE ORTHOPAEDIC PATIENTS: A QUASI-EXPERIMENTAL STUDY

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Background and aims: Postoperative opioids, intended for short-term pain management, can lead to unintended long-term use, negatively affecting health outcomes. Evidence suggests the risk of long-term opioid use differs by opioid, though long-term studies are limited. This study investigates whether oxycodone and morphine, as first-line opioids for postoperative pain, differ in the prevalence of long-term use among postoperative orthopaedic patients.

Methods: This quasi-experimental study included two cohorts of adult orthopaedic surgery patients: 1) oxycodone as the first-line opioid (April–August 2023) and 2) morphine as the first-line opioid (September 2023–January 2024). Six months post-surgery, patients completed an online survey on opioid use. Demographic and clinical data were extracted from patient files. Baseline characteristics were compared using chi-square tests and independent t-tests. The prevalence of long-term opioid use in both cohorts was analysed with intention-to-treat and per-protocol analyses, using chi-square tests.

Results: Of the 3,670 eligible patients, 1,904 (51.9%) were enrolled, with a mean age of 62.7 years (SD ± 13.0); 62.5% were female. Table 1 shows the baseline characteristics, which did not differ significantly between the oxycodone and morphine cohort. The prevalence of long-term opioid use at six months post-surgery was 8.8% in the oxycodone cohort and 7.1% in the morphine cohort, with no statistically significant difference between the two groups (see table 2).

Table 1 – baseline characteristics of study population

Characteristics	Total	Oxycodone	Morphine
N	1,904	883	1,021
Age – mean (SD)	62.7 ± 13.0	62.1 ± 13.6	63.2 ± 12.6
Female sex – n (%)	1,190 (62.5%)	571 (64.7%)	619 (60.6%)
Preoperative opioid users – n (%)	288 (15.1%)	145 (16.4%)	143 (14.0%)
Number of days in hospital – mean (SD)	2.3 ± 3.3	2.4 ± 2.4	2.2 ± 4.2
Pain score in rest at discharge – mean (SD)	2.0 ± 1.5	2.0 ± 1.5	2.1 ± 1.4
Readmission within three months – n (%)	106 (5.6%)	53 (6.0%)	53 (5.2%)

Table 2 – The six-months prevalence of long-term opioid use in the oxycodone and morphine cohort

	Intention to Treat		Per protocol	
Long-term opioid users	**Oxycodone (n=883)**	**Morphine (n=1021)**	**Oxycodone (n=569)**	**Morphine (n=786)**
Total group – n (%)	78 (8.8%)	72 (7.1%)	47 (8.3%)	48 (6.1%)
Preoperative opioid users – n (%)				
No	18 (2.0%)	22 (2.2%)	11 (1.9%)	14 (1.8%)
Yes	60 (6.8%)	50 (4.9%)	36 (6.3%)	34 (4.3%)

Conclusions: Postoperative pain management with morphine as the first-line opioid results in a small, although not statistically significant, decrease in the proportion of patients with long-term opioid use, particularly in the subgroup of patients with preoperative opioid use.

III-D.03

ANALGESICS USE OF PEOPLE WITH NON-CANCER MUSCULOSKELETAL PAIN IN FRANCE: RESULTS FROM THE CONSTANCES COHORT

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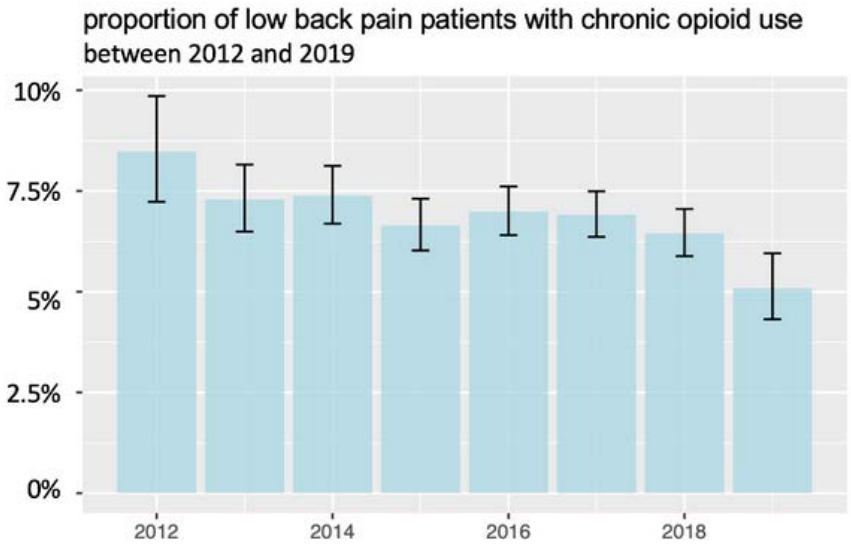
Background and aims: The aim is to evaluate analgesics drugs deliveries in individuals with non-cancer musculoskeketal pain, and to evaluate changes in opioids and gabapentinoids delivery over the 2012-2019 period.

Methods: This study is a cross-sectional study nested in the Constances cohort, involving individuals aged 18 to 69 at inclusion. Eligible individuals were participants with low back pain, neck, knee or shoulder pain lasting more than 30 days in the last 12 months, without cancer at inclusion. Chronic widespread pain (CWP) was defined as at least 4 out of 6 significant musculoskeketal pain locations. The analgesics deliveries in the 12 months prior to inclusion were considered. The morphine equivalent dose (MEQ) was calculated for all opioids, with high and very high doses defined by a MEQ > 50mg/day and > 90mg/day, respectively. To assess a trend overtime (2012 to 2019), a Cochran-Armitage trend test of chronic opioid and gabapentinoids deliveries was used.

Results: 155 312 people were included. Delivery of paracetamol, NSAIDs, nefopam, gabapentinoids, weak and strong opioids for localized musculoskeletal pain were very similar, and lower than participants without CWP (table). Chronic opioid were used in 6.8 to 6.8% of participants with localized musculoskeletal pain and 16% with CWP. Less than 2% of participants with localized pain had a high MEQ and 5.2% of those with CPW. There was a significant trend for decreasing chronic opioid users over the 2012-2019 period (Figure) but not for gabapentinoids.

Title table: Proportion of patients with at least one delivery of painkillers during 12 months before inclusion.

Delivery in 12 months	No musculoskeletal pain N=81 809	Back pain N= 41 639	Neck pain N= 29 305	Shoulder pain N= 33 781	Knee pain N=29 656	Chronic widespread pain N= 4626
Paracetamol	46.8	61.0	61.2	60.4	60.8	69.2
NSAIDs	33.5	52.9	52.5	53.1	53.2	59.1
Nefopam	0.5	1.5	1.5	1.6	1.4	2.9
Gabapentinoids	0.6	3.4	3.5	3.5	3.6	8.6
Weak opioids	12.3	27.9	26.3	27.4	27.5	40.5
Strong opioids	0.2	1.5	1.4	1.6	1.5	3.3
Chronic opioids	0.8	6.8	6.3	6.7	6.7	16.0
MEQ > 50mg / jour	0.1	1.3	1.4	1.4	1.5	3.5
MEQ > 90mg / jour	0.1	0.4	0.6	0.5	0.5	1.7



Conclusions: There was no argument for an opioid or gabapentinoids crisis in France during the studied period.

III-D.04

THE EFFECT THE ADDITION OF MAGNESIUM SULFATE IN AN INTRA-ARTICULAR INJECTION OF ROPIVACAINE HAS ON POSTOPERATIVE ANALGESIA IN PATIENTS SUBMITTED TO HIP ARTHROPLASTY

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Background and aims: To study the effect on postoperative analgesia, of adding Magnesium Sulfate in an intra-articular injection of ropivacaine during hip arthroplasty surgery of patients with femoral neck fractures.

Methods: Double blind prospective interventional study, duration 11 months.

Sample size: 72 patients >65 y/o subjected to hip arthroplasty under general or subarachnoid anesthesia.

Patients were randomised in two groups of 36:

Group 1 received 30ml ropivacaine 0.3% intra-articularly

Group 2 received 30ml ropivacaine 0.3% intra-articularly plus 50mg/kg Mg Sulfate

Groups 1&2 were subdivided according to anesthetic technique

Groups 1&2 A received general anesthesia

Groups 1&2 B received subarachnoid anesthesia.

The patients' postoperative pain was recorded using the VAS scale immediately after surgery, 30 minutes, 1,4,8,16 and 24 hours post-op. Opioid rescue use was also recorded (tramadol 50-100mg)

Results: VAS scores and opioid consumption were statistically higher for Group 1A compared to 2A on the 30 minute mark.

{Groups: 1A: 4.4+/- 0.9, 2A: 3.6+/- 0.9,

1B: 3.1+/- 1.1, 2B: 1.7+/-0.9}.

VAS scores were statistically higher for Group 1B than 2B on the 4 hour mark.

Rescue opioid consumption was statistically higher for Group 1B than 2B 1 hour after surgery but no difference was found for the other time marks.

Total opioid consumption 24h post-op:

Groups: 1A:145.11 mg/ 2A: 99.56 mg/

1B: 140.78 mg/ 2B: 54.11 mg.

Conclusions: The intraoperative intra-articular injection of ropivacaine combined with magnesium sulfate has superior analgesic effects during the first postoperative hours and leads to reduced opioid consumption on the first post-op day. It's also a simple, safe and easy technique.

III-D.05

DEVELOPING AN OPIOID EFFECT EXPECTATIONS QUESTIONNAIRE: STUDY PROTOCOL

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Background and aims: It is well-established that expectations about opioid drug effects can influence drug experience and analgesic efficacy. This may in turn influence drug-related behaviors. While some questionnaires for assessing opioid attitudes and beliefs exist, these are typically designed for specific patient groups or clinicians. We are developing a short (20-25 items), open access questionnaire that can be used to probe general expectations to acute opioid effects in anyone who has heard of an opioid. Ultimately, we will add conditional modules for specific contexts (e.g. experiments or surgery) and samples (e.g. chronic pain, addiction).

Methods: An initial item pool was generated by surveying opioid and pain experts. Over 200 suggested items were reduced to 43 following discussions in two expert panels (N=5 in each). Items could roughly be grouped into expectations about (1) 'pleasant' and (2) 'aversive' opioid effects; (3) 'worries' about and (4) 'motivation' for taking opioids, and (5) expectations about analgesic efficacy. In the upcoming months the questionnaire implemented in Qualtrics and distributed via Prolific (anonymous participation) will be tested in a pool of N~450 native English speakers (i.e. > 10 participants per item). Item response theory will be used to assess and reduce the item pool. The resulting version will be tested in representative samples from the US and UK (N~250 per group).

Results: Data will be collected and analyzed before March 2025.

Conclusions: Pending results

III-D.06

LEFTOVER OPIOIDS FOLLOWING AMBULATORY SURGERY IN A NORWEGIAN HOSPITAL

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Background and aims: Postoperative opioid prescriptions may contribute to unnecessary or persistent opioid use. A no opioid prescription policy after ambulatory surgery may restrict leftover opioids and subsequent misuse. Instead, patients receive a limited number, typically 2-6 units, of rescue opioids upon hospital discharge. In this study, we characterize the use of opioid rescue medication during the immediate recovery period (2 days) after ambulatory surgery.

Methods: Observational study in patients undergoing gynecological, orthopedic, abdominal or colorectal ambulatory surgery at a Norwegian Hospital during November 2021 - December 2022. Inclusion criteria: >18 years, American Society of Anesthesiology classification I-II and Norwegian speaking. Opioid use was recorded during a telephone interview on adherence to recommended pain treatment 2 days after discharge.

Results: Of the 220 patients included, 181 patients were analyzed (17.7 % missing). Further 5 patients were discharged without opioids. The remaining 176 patients were discharged with a total of 721 oxycodone 5 mg capsules: mean=4.10, SD=1.38. Only 196 capsules were used (27.2 %) by 83 patients (47.2 %). On average, opioid consuming patients used 2 -3 capsules (mean=2.36, SD=1.21).

Conclusions: About half of ambulatory surgery patients on a multimodal pain regimen needed opioid medication during the first two postoperative days. These patients used only 27.2 % of the rescue opioids handed out upon discharge. This leaves 2/3 of unused opioids in the patient population, with a potential risk of later misuse and at a significant cost for the health care system.

III-D.07

RECONSOLIDATION BLOCKADE WITH PROPRANOLOL AS A NOVEL TREATMENT FOR FIBROMYALGIA: A DOUBLE-BLIND PLACEBO-CONTROLLED FEASIBILITY STUDY

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Background and aims: Nociplastic pain, including fibromyalgia, is characterized by an increase in connectivity in the nervous system (notably in the amygdala) similar to that observed in patients with post-traumatic stress disorder (PTSD). Reconsolidation therapy is a treatment developed for PTSD that consists in reactivating pathologically hyperconsolidated synapses and blocking their reconsolidation using propranolol.

The aim of the study was to assess the feasibility of a modified version of reconsolidation therapy with propranolol or a placebo in 24 adults with fibromyalgia, and to gather preliminary data on the effect of the intervention on pain symptoms and physical function.

Methods: Study design: randomized double-blind placebo-controlled feasibility study

Population: 24 adults with fibromyalgia, with no contra-indication to reconsolidation therapy or propranolol and no comorbid PTSD.

Intervention: 6 weekly sessions of reconsolidation therapy (reactivation through narrative descriptions and mental imagery, and oral propranolol or placebo (40-80mg)).

Outcome measures:

Feasibility: recruitment rates, adherence, safety.

Effect of the intervention: pain intensity and physical function (Brief Pain Inventory), fibromyalgia symptoms (Fibromyalgia Impact Questionnaire).

Results: Feasibility: Recruitment of 24 participants took 7 months; 88 prospective participants were excluded (contraindication to propranolol (n=33); recent (<3 months) change in treatment (n=23); PTSD (n=14); other (n=18)). Four participants withdrew, and a fifth completed only 5 out of 6 visits. No serious adverse events were reported; mild adverse events possibly related to the intervention were observed in 8 participants.

Efficacy: Analyses to be completed in Feb 2025.

Conclusions: Discussion

While reconsolidation therapy as a treatment for fibromyalgia appears feasible, inclusion and exclusion criteria should be revised to improve generalisability.

III-D.08

INTRATRACHEAL OXYCODONE

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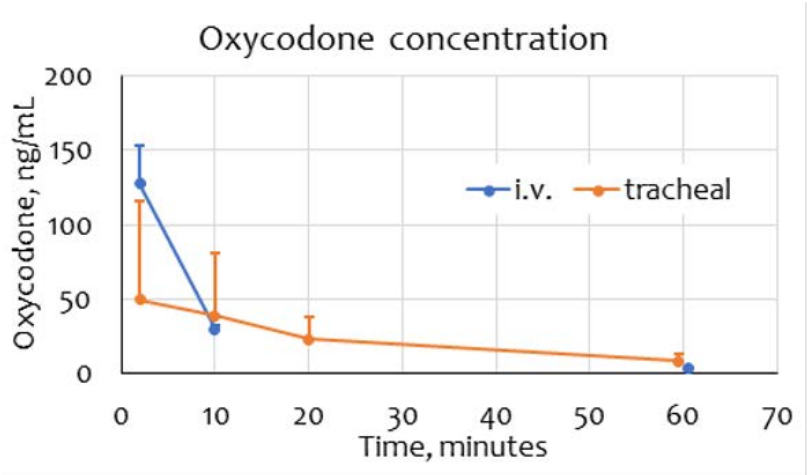
Background and aims: Bioavailability of some opioids, fentanyl and oxycodone, is high after transmucosal administration, and nasal and intraoral cavity administration are commonly used (1). However, after nasal and intraoral administration some of the drug is swallowed (2). Recently, there has been a growing interest on pulmonary opioid delivery, but for oxycodone there are no data on this administration route (3). Here we have evaluated pharmacokinetics of pulmonary oxycodone in a pregnant sheep model.

Methods: Five ewes received intravenous oxycodone 0.5 mg/kg and 7 ewes (9 dosing) tracheal oxycodone 0.1 mg/kg during a general anesthesia just before inhalation. Blood samples for oxycodone analysis were taken 2, 10, 20 and 60 minutes after oxycodone administration. Oxycodone concentrations were analyzed using liquid gas chromatography.

Results: After a single tracheal oxycodone 0.1 mg/kg dose the analgesic plasma oxycodone concentration 10 ng/mL was achieved within 2 minutes and may sustain above that for 50 minutes after administration (Fig). At 60 minutes after the tracheal dose the mean oxycodone concentration was 8.3 (5.4) ng/mL compared to 3.1 (0.4) ng/mL 60 min after dose adjusted intravenous dose of 0.1 mg/kg oxycodone.

Figure. Oxycodone concentrations after tracheal 0.1 mg/kg and intravenous dose -adjusted 0.1 mg/kg administration.



Conclusions: After tracheal oxycodone administration, plasma concentrations increased rapidly and were sustained sufficient for 50 minutes.

References:
1. Kokki et al. PMID: 16802855
2. Overhoff et al. PMID: 18686086
3. Farr et al. PMID: 17070614

III-D.09

AUDIT OF THE INDICATIONS AND EFFECTIVENESS OF LIDOCAINE MEDICATED PLASTERS (LMPS) IN CHRONIC PAIN PATIENTS

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Background and aims: LMPs are licensed for restricted use in post-herpetic neuralgia where first-line therapies are ineffective or intolerable. NICE Clinical Guideline CG173 does not recommend LMPs as a treatment for neuropathic pain due to the lack of clinical evidence. Special Interest Group on Neuropathic Pain also concluded limited, weak and low-quality evidence of clinical effectiveness of LMPs. Our audit aims to review the indications and effectiveness of LMPs in chronic pain patients.

Methods: We completed questionnaires for every patient attending chronic pain clinic from March till April 2024. The data was then analysed to review the indications and effectiveness of LMPs.

Results: Questionnaires of 75 patients were completed over the two-month period. Out of 14 patients (18.7%) who were prescribed LMPs, 2 were for localised neuropathic pain and only 1 experienced sensory skin changes. The other 12 (85.7%) were on LMPs for localised pain. We found only one case in our audit where prescription of LMPs is justifiable for localised neuropathic pain with allodynia or dysaesthesia.

Furthermore, no patients reported effectiveness greater than 20% for LMPs, including the two patients prescribed for localised neuropathic pain. 57.1% of patients reported zero benefit from LMPs. The other 42.9% reported less than 20% reduction in pain.

Conclusions: There were a considerable number of patients prescribed LMPs, with 85% of them being unlicensed indications. Based on our findings of either none or low clinical effectiveness of LMPs, we recommend to de-prescribe and review LMPs prescriptions regularly moving forward, with the ultimate aim of reducing our LMPs prescription cost.

III-D.11

BRAIN REGION-SPECIFIC EXPRESSION OF PROTEASOMAL SUBUNITS IN NEUROPATHIC PAIN: A POTENTIAL ROLE FOR PEPTIDE-BASED MODULATORS

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Background and aims: The c20S/i20S proteasomal complexes are pivotal in regulating inflammatory pathways by modulating the cytokine expression, antigen presentation, and synaptic plasticity. In neuropathic pain, microglial activation – accompanied by proteasomal subunit upregulation – triggers the release of proinflammatory mediators, amplifying pain signaling. Reduced synaptic plasticity linked with heightened proteasomal activity exacerbates neural dysfunction. We investigated the expression of proteasomal subunits across various brain regions involved in pain transmission, aiming to explore the potential use of inhibitor-based probes as modulators in a mouse model of neuropathic pain by chronic constriction injury (CCI) in future studies.

Methods: We employed RT-qPCR to examine the expression levels of c20S/i20S proteasomal subunits in the Striatum, Subcallosal Cingulate Cortex, Hippocampus, and Hypothalamus of control brain tissue, as well as in the same regions from subjects subjected to the chronic constriction injury (CCI) model. We performed a cell viability assay on lipopolysaccharide-stimulated HMC3 cells, to evaluate the toxicity of activity-based probes (ABPs), which show potential as therapeutic agents in neuropathic pain modulation. We aim to utilize ABPs to visualize the proteasomal activity of control and CCI tissue samples.

Results: RT-qPCR revealed upregulation of genes encoding proteasomal subunits in CCI model across all brain regions investigated. The cell viability assay identified a non-cytotoxic concentration range of ABPs for HMC3 cells.

Conclusions: Animals in the CCI model exhibit increased activity of proteasomal subunits, emphasizing their potential as molecular targets for pain modulation. Activity-based probes (ABPs) demonstrated potential as therapeutic agents in cell-based studies of neuropathic pain.

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III-D.12

LONGITUDINAL OUTCOME EVALUATIONS OF INTERDISCIPLINARY MULTIMODAL PAIN TREATMENT PROGRAMS FOR PATIENTS WITH CHRONIC MUSCULOSKELETAL PAIN: A LIVING SYSTEMATIC REVIEW

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Background and aims: Chronic pain management requires complex approaches due to its multidimensional nature. Interdisciplinary Multimodal Pain Treatment (IMPT) programs are recommended for chronic primary pain, prioritizing improved functioning and quality of life rather than merely reducing pain. This living systematic review (LSR) builds upon prior systematic review findings, aiming to (1) assess long-term effects of IMPT on both chronic primary and secondary musculoskeletal pain, adding health-related quality of life as an outcome, (2) refine IMPT by analyzing variations in treatment approaches, and (3) evaluate the value of the LSR approach in chronic pain research.

Methods: A comprehensive search was conducted in four databases. Two independent researchers performed study selection, data extraction, and methodological quality assessment. Eligible articles enrolled patients with chronic primary or secondary musculoskeletal pain and evaluated longitudinal IMPT effects. Analyses included pre-post, post-follow-up, and pre-follow-up effects across ten outcome domains. Patient and intervention characteristics were systematically detailed to investigate treatment heterogeneity.

Results: Eighty-four studies met eligibility criteria, comprising 112 cohorts. A general positive improvement was observed from pre- to post-treatment across all outcome categories, with benefits largely sustained at follow-up. High heterogeneity was evident due to variations in IMPT programs, participant characteristics, and outcome measures.

Conclusions: IMPT programs improve outcomes such as physical function and health-related quality of life. However, specific recommendations to optimize IMPT could not be established due to substantial heterogeneity. The LSR approach shows promise in chronic pain research, offering a timely method to bridge research and clinical practice.

III-D.13

EXPLORING THE EXPERIENCES OF CONSUMERS WITH CHRONIC PAIN AND SERVICE PROVIDERS IN THE USE OF EACH TELEHEALTH MODALITY TO FACILITATE A SHARED UNDERSTANDING OF GOALS

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Background and aims: Telehealth offers promising mechanisms to address the lack of timely access to chronic pain management. This research explored how consumers and service providers experienced the use of each telehealth modality in facilitating shared understanding around their goals.

Methods: This semi-structured qualitative research recruited two groups: (1) adults living with chronic pain who have experience receiving telehealth services via telephone, email, and video; (2) occupational therapists or physiotherapists who have used these three telehealth modalities to provide chronic pain management for over three months in Australia. Interpretative phenomenological analysis was used for the analysis.

Results: A total of 14 participants, seven from each group, participated in this research. Five themes—Barriers and Challenges in the Chronic Pain Journey and its Management, Optimizing Telehealth Approaches, Communication

and Patient Empowerment, and the Advantages and Drawbacks of the Three Telehealth Modalities—were identified, with 25 associated sub-themes. Despite some similar experiences reported by both groups, discrepancies were found, particularly in the understanding of chronic pain service delivery, overall telehealth use, and the use of each telehealth modality. Most importantly, the results showed an incongruity of values in the use of telehealth services and each modality between the groups, becoming a barrier to facilitating information sharing.

Conclusions: The incongruity of values and lack of mutual understanding around the use of each telehealth modality need to be addressed to facilitate shared understanding via telehealth for timely chronic pain management.

III-D.14

CLINICAL SUPERVISORS EXPERIENCE TEACHING PHYSIOTHERAPY STUDENTS TO SCREEN FOR SERIOUS PATHOLOGY – A FOCUS GROUP STUDY

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Background and aims: Screening for serious pathology is an essential task for the health professional who is the first contact for patients with musculoskeletal problems. In Denmark, physiotherapists increasingly become the first healthcare contact for patients with musculoskeletal conditions. This requires that Danish physiotherapists are qualified and trained to perform the initial screening, but little is known to what extent and how undergraduate physiotherapy students train this skill set during clinical placements.

This study aimed to explore the clinical supervisors' experiences in teaching physiotherapy students to screen for serious pathology.

Methods: A hermeneutic approach was used, and the data from two focus group interviews was analysed using inductive content analysis.

Results: Eleven clinical supervisors connected to undergraduate physiotherapy programmes representing two higher education institutions were interviewed.

When clinical supervisors teach physiotherapy students to screen for serious pathology, three main themes of meaning highlight the challenges that emerge: 1) the diversity of clinical settings, 2) to what extent the gut feeling can be taught? and 3) the importance of going beyond the first question.

Conclusions: Clinical supervisors experience challenges when teaching physiotherapy students how to screen patients for serious pathology. The fact that underlying serious pathologies are rare and that red flags definitions are vague is a challenge. The ability to obtain sufficient screening competencies includes collecting information during patient sessions and monitor symptom progression. Proper learning requires practice, a safe room for clinical reasoning, and discussions between the student and the clinical supervisor.

III-D.15

EFFECTIVENESS OF PILATES AND KINESIOTAPE IN OFFICE WORKERS WITH CHRONIC NECK PAIN: A RANDOMIZED CONTROLLED SINGLE-BLIND PILOT STUDY

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Background and aims: The aim of the study was to investigate the effectiveness of Pilates and Kinesiotape in office workers with chronic neck pain.

Methods: Thirteen office workers with neck pain (VAS>3) for the last 3 months were included in the study. They were randomly divided into 2 groups (Pilates and Kinesiotape) and received Pilates training for 16 sessions. In kinesiotape group, kinesiotape was applied to the neck after each Pilates session. Assessments were made by a blinded researcher before and after the training (Pain intensity by VAS, neck disability by Neck Disability Index (NDI), muscle strength by mechanical push pull dynamometer, Range of Motion (ROM) by digital inclinometer, core

endurance by prone bridge test and sit-ups tests). Statistical analyzes were performed by a blinded researcher using the Mann-Whitney U test and Wilcoxon test.

Results: Muscle strength (left-lateral flexion, extension), ROM (right-lateral flexion, flexion, extension), core endurance (sit-ups) values increased in Pilates group after training (p<0.05). In Kinesiotape group, VAS and NDI values decreased significantly; muscle strength (right-lateral flexion, flexion, extension), ROM (flexion, extension, right-rotation, left-rotation) and core endurance (prone bridge, sit-ups) values increased significantly (p<0.05). When comparing the differences between the pre-post scores between the groups, we found a significant difference in ROM left-rotation (p=0.022).

Conclusions: Pilates could be an effective method to improve pain, NDI, muscle strength, ROM and core endurance in office workers with chronic neck pain. However, kinesiotaping added to Pilates may not considered a significant contributor.

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III-D.18

EFFECTIVE PHYSIOTHERAPY INTERVENTIONS FOR REDUCING PAIN AFTER BURN INJURY: A SYSTEMATIC REVIEW

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Background and aims: Pain from burn injuries is a significant treatment challenge, often arising from tissue damage and burn-related hypersensitivity or allodynia. Physiotherapy is widely used to alleviate pain, improve function, and enhance burn patients‘ quality of life. However, evidence on its effectiveness for burn-related pain remains limited. The aim of this systematic review is to determine which physiotherapy interventions are effective in reducing pain associated with burn injuries.

Methods: Search criteria were developed using the PICO process. Four databases (PubMed, EBSCO, Web of Science, and Cochrane) were searched using a combination of keywords related to burns, physiotherapy, and pain. Studies involving adult subjects and published between 2013 and 2024 were included. Two researchers screened articles for eligibility and assessed study quality using the Cochrane RoB 2 tool.

Results: The search retrieved 560 papers. After filtering, removing duplicates, and assessing eligibility, 8 articles were included. Of two studies investigating the effects of massage therapy, one reported a positive effect. One study found manual joint mobilization to be effective. Two studies identified walking as a method for decreasing pain. Another study found respiratory therapy beneficial, and one reported that vibration training was effective. A study using Xbox Kinect alongside physiotherapy found no additional benefits.

Conclusions: Several physiotherapy interventions, such as massage, walking, and vibration training, may help reduce pain in burn injury patients. However, due to the scarcity of literature, many interventions remain understudied, and there is limited evidence to guide clinical decision-making.

III-D.20

IN-DEPTH ANALYSIS OF COMBINED MOTOR LEARNING AND BEHAVIOR CHANGE STRATEGIES TO ENHANCE MOVEMENT BEHAVIOR IN PATIENTS WITH CHRONIC MUSCULOSKELETAL PAIN

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Background and aims: Patients with chronic musculoskeletal pain (CMP) face challenges in their daily activities (ADL). Healthcare professionals combine motor learning (ML) and behavior change (BC) strategies to address

these challenges in movement behavior. It is unclear whether these combined strategies are effective, and unknown which techniques are used during intervention.

Aim: to identify and analyze the specific techniques used by health professionals within ML and BC strategies.

Methods: We searched Pubmed, Cinahl, and Embase databases for RCT's and CCT's. Inclusion criteria: CMP-patients; exercise intervention containing ML **or** BC; movement behavior or ADL outcomes. We screened papers with an AI-supported relevance ranking tool (ASReview). We conducted a content analysis for applied techniques using frameworks for ML and BC and self-management support (SMS). We also performed a best-evidence synthesis (see: EFIC-poster van Duijvenbode et al. 2025).

Results: We selected 409 papers with ASReview from the initial 48.820 papers. In a second round, nineteen papers were selected with both ML **and** BC intervention strategies. Internal focus of attention, observational learning, and movement imagery were used most for ML. For BC, these were goal setting, shaping knowledge, and problem solving. Terminology for BC and SMS techniques was often used interchangeably.

Conclusions: Professionals used a more explicit learning approach. They also applied a limited number of BC techniques. The frameworks for ML and BC provide a solid anchor for content analysis of techniques within RCT's and could enhance reproducibility of future trials. Healthcare professionals should apply a more diverse set of techniques in general, when treating CMP-patients.

III-D.21

EVALUATING THE EFFECTIVENESS OF COMBINED MOTOR LEARNING AND BEHAVIOR CHANGE STRATEGIES FOR MOVEMENT BEHAVIOR IN CHRONIC MUSCULOSKELETAL PAIN: A SYSTEMATIC REVIEW

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Background and aims: Patients with chronic musculoskeletal pain (CMP) face challenges in daily activities. To improve movement behavior in patient's context, healthcare professionals combine motor learning (ML) and behavior change (BC) strategies. The aim of this review was to assess the effectiveness of combined ML and BC strategies on movement behavior during activities of daily life for patients with CMP.

Methods: Databases Pubmed, Cinahl, and Embase were searched to identify relevant RCT's and CCT's. Inclusion criteria were adults with CMP; exercise intervention focused on ML and BC strategies; movement behavior or activities in daily life as outcome measures. Papers were screened using ASReview software. Two reviewers independently performed screening, extracted data, and assessed risk of bias (RoB2). A best-evidence synthesis was conducted for effectiveness. Separately, a technique composition analysis for applied techniques was performed (see: EFIC-poster Tuijt et al, 2025).

Results: We selected 409 papers with ASReview from the initial 48.820 papers. In a second round requiring ML and BC, nineteen papers were selected. The studies demonstrated heterogeneity in content, diagnoses, and dosage. The best-evidence synthesis emerged moderate evidence in favor of combined strategies on quality and insufficient evidence on quantity of movement behavior. For activities of daily life, inconsistent evidence was found.

Conclusions: A moderate level of evidence supports the effectiveness of combined strategies in improving quality of movement behavior. However, evidence regarding quantity of movement behavior is insufficient. For activities of daily life, the findings remain inconsistent, highlighting the need for further research to establish more definitive conclusions.

III-D.24

PHYSICAL THERAPY INTERVENTION IN PEOPLE WITH ANXIETY-DEPRESSION SYMPTOMS PRESENTING CHRONIC PAIN: A CASE SERIES

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Background and aims: Chronic pain conditions, especially musculoskeletal pain, are common and more pronounced in people with significant anxiety and depression symptoms. Their treatment is challenging, and the effects of adding physical therapy o routine pharmacological and psychological therapies have yet to be tested.

Methods: A case series study with pre-post analysis was conducted in a sample of 10 women presenting significant anxiety/depression symptoms with overlapping chronic musculoskeletal pain. The physical therapy intervention, consisting of pain education and therapeutic exercises, was developed over 8 weeks with on-site group sessions. Musculoskeletal pain intensity (NRS), clinical global impression (CGI-S, CGI-I), pain catastrophizing (PCS), kinesiophobia (TSK) and self-efficacy in the management of chronic pain (CPSS) were measured. A t-student analysis was used to compare pre- and post-intervention values.

Results: In the initial assessment, participants (aged 50 ± 11,08 years) perceived themselves as ranging from "mildly ill" to "severely ill", with mean pain intensities from 3 to 9 out of 10. After the intervention, six cases reported a clinical improvement, whereas pain intensity was reduced in five women, with four of them showing improvements in both aspects. A significant decrease in catastrophizing and kinesiophobia was observed in every participant and in the average values ($P<0.05$). Self-efficacy was also significantly increased on average ($P<0.05$) and reported by 8 participants.

Conclusions: These promising results highlight the need for clinical trials, with a larger sample size, to assess the efficacy of pain education and therapeutic exercise in helping patients with anxiety/depression symptoms manage their chronic pain.

III-D.25

PAIN MANAGEMENT AND EXPERIENCES IN SPINAL CORD INJURY: INSIGHTS FROM PATIENTS AND HEALTH-CARE PROFESSIONALS

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Background and aims: Chronic pain is a significant complication of spinal cord injury (SCI), severely impacting quality of life and rehabilitation outcomes. Despite treatment efforts, many patients experience refractory pain, leading to frustration for both patients and healthcare professionals (HCPs). This study aimed to explore the pain experiences of individuals with SCI during their first rehabilitation and examine HCPs' perspectives on chronic pain management.

Methods: A qualitative methodology was employed in two complementary approaches. To access individual experiences, semi-structured interviews were conducted with inpatients (4 men and 1 woman; aged 29–61 years) experiencing chronic pain to explore their experiences, coping strategies, and perceptions of pain management. Successively, three focus groups with HCPs involved in multidisciplinary pain management or neurorehabilitation used patient-based clinical vignettes (drawn from the interviews) to stimulate discussion. Data from both approaches were thematically analysed.

Results: Patients reported nociceptive, neuropathic, and care-related pain, often described as unbearable, significantly affecting morale, daily activities, and rehabilitation engagement. Pain relief, primarily reliant on medications, was often perceived as insufficient or losing effectiveness over time, prompting patients to explore alternative strategies.

Three themes emerged from HCPs: an underestimation of pain severity and its biopsychosocial complexity, the critical role of multidisciplinary settings in effective treatment, and the importance of patient-HCP collaboration through tailored care, communication, and education.

Conclusions: Pain profoundly impacts the rehabilitation process. Bridging patient experiences with HCP perspectives underscored the importance of multidisciplinary care, personalized treatment plans, and effective communication to improve outcomes for individuals with SCI.

III-D.26

EFFECTS OF EXPERIMENTALLY INDUCED LOCAL AND NONLOCAL ACUTE PAIN ON LUMBAR MOVEMENT CONTROL

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Background and aims: Low back pain is highly prevalent, with non-specific low back pain often linked to impaired lumbar movement control. While chronic pain is associated with lumbar movement control impairments, this study

investigates how experimentally induced pain influences lumbar and its potential role in the development and persistence of chronic non-specific low back pain.

Methods: Forty-five healthy, pain-free participants underwent three experimental conditions in randomized order: hypertonic saline injection to the lumbar spine (inducing acute local pain), hypertonic saline injection to the arm (inducing indifferent pain), and isotonic saline injection to the lumbar spine (serving as a control). A standardized, reliable and validated battery of eleven lumbar movement control tests was performed before, during and after each pain state and rated by an examiner blinded towards the condition. Perceived pain intensity was assessed every 30 seconds by the Numeric Rating Scale.

Results: Pain intensity was significantly lower in the control group than in both experimental groups ($p<0.0001$), whereas no significant difference was found between the two experimental groups ($p=0.105$). No correlations were found between pain intensity or duration with lumbar movement control tests. While initial analysis with the Friedman test revealed a significant overall effect ($p = 0.003$), post hoc pairwise comparisons showed no significant differences either within or between groups across the conditions.

Conclusions: In conclusion, the findings of this study indicate that experimentally induced acute pain does not significantly impair lumbar movement control. These results further suggest that impairments in lumbar movement control may not be solely attributable to the presence of pain.

III-D.27

THE CONSISTENCY OF THE ANALGESIC PLACEBO-RESPONSE ACROSS TIME AND PARADIGMS - RESULTS FROM A SHAM RANDOMIZED CLINICAL TRIAL OF CHRONIC-BACK-PAIN PATIENTS

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Background and aims: The consistency of the placebo-response has been investigated, yet it is unclear whether in the same context, distinct placebo-responses (across various pain models and measurement methods) are consistent. This study aimed to fill this gap in chronic-back-pain patients.

Methods: A total of 113 chronic back pain patients received a saline injection with verbal suggestion. Pain intensity (Visual-Analogue-Scale,0–100) was recorded at baseline, 30 minutes, and 24 hours post-injection. Average daily pain was evaluated pre- and 24 hours post-injection. Immediate (baseline minus 30-minutes) and delayed (baseline minus 24-hours) clinical placebo responses were calculated. Experimental placebo responses were based on changes in pressure-pain thresholds (PPTh) and tolerance (PPTol), measured using an algometer and a blood-pressure cuff.

Results: A significant reduction in back-pain intensity was observed across all clinical placebo-response measures (paired-sample t-test, $p<0.001$). No significant changes were found in experimental placebo-responses, except for a marginal trend in cuff-PPTh ($p=0.064$). Clinical placebo-responses were significantly correlated with each other, but the strength of the correlations varied: immediate and delayed current responses ($r=0.390;p<0.001$), immediate and delayed average responses ($r=0.196;p=0.043$), and delayed current and average responses ($r=0.612;p<0.001$). In the experimental placebo-response the cuff-PPTh was positively correlated with cuff-PPTol($r=0.230;p=0.014$). The relationship between clinical and experimental placebo-responses revealed a correlation only between the immediate clinical placebo-response and the change in algometer-PPTh ($r=0.248;p=0.026$).

Conclusions: Placebo-responses, both clinical and experimental, seem to be consistent when assessed within the same timeframe. These results highlight the importance of the timeframe of assessment (i.e. the context) in the consistency of the placebo-response.

III-D.28

THE PLACEBO RESPONSIVENESS QUESTIONNAIRE (PRQ): SELF OR PEER REPORTED?

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Background and aims: Placebo responsiveness varies, with some individuals not responding at all. Studies on psychological predictors of these differences yield heterogeneous results. Here, we develop and validate the

Placebo Responsiveness Questionnaire (PRQ), an instrument that measures behaviours potentially related to placebo responsiveness.

Methods: The PRQ was first validated and optimized through administration to 330 individuals, alongside 9 additional scales measuring psychological traits associated with placebo responsiveness. Subsequently, the predictive validity of the PRQ was assessed in both self-report and peer-report formats using a classic placebo analgesia experimental paradigm with thermal stimulation. Placebo analgesia was operationalized by evaluating changes in pain tolerance and Numeric Rating Scale (NRS) ratings of a noxious stimulus.

Results: The validation study identified 19 items organised in a three-factor structure as potential predictors: *Symptom Exaggeration*, *Seek for Support*, and *Alternative Medicine Beliefs.*

In the PRQ predictive validity study, participants (n=134) exhibited placebo analgesia on both tolerance (BF_{10} = 1.07e+08) and NRS (BF_{10} = 76400) outcomes, indicating the design successfully elicited the effect. Interestingly, these measures were not correlated (N=134, r= -0.009, BF01=9.210), suggesting that placebo responsiveness might vary depending on the pain modality. In contrast to our predictions, neither the self-report nor the peer report of the PRQ predicts placebo responsiveness.

Conclusions: To conclude, the PRQ did not predict placebo responsiveness, despite its promising validity and the successful elicitation of placebo analgesia. This finding suggests that behaviours commonly associated with placebo responsiveness by experts may not be predictive, at least within the context of experimentally induced pain.

III-D.29

OPTIMIZING PAIN RELIEF: OPEN-LABEL PLACEBOS REINFORCED BY OPERANT CONDITIONING

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Background and aims: Emerging research increasingly demonstrates the effectiveness of open-label placebos in reducing pain symptoms. As a more ethical alternative to traditional deceptive placebos, understanding and optimizing the use of open-label placebos is crucial. This study investigates whether the efficacy of non-deceptive placebos can be enhanced through operant conditioning. This method, chosen for its proven success in previous studies at inducing placebo hypoalgesia, may offer a robust mechanism for reinforcing placebo effects through direct experience.

Methods: The experiment comprises four groups: (1) open-label suggestion combined with operant conditioning (OLS+OC), (2) open-label suggestion only (OLS), (3) operant conditioning only (OC), and (4) a control group representing natural history. Participants progress through several phases: calibration, pretest, group-specific manipulation, and posttest. The open-label suggestion involves providing a transparent explanation about the placebo. During the conditioning phase, participants can choose to activate or deactivate a sham TENS device (placebo). Activation reduces pain intensity and is thus reinforced as a positive outcome, whereas deactivation keeps pain levels constant. Pain is rated by participants using the Numeric Rating Scale (NRS) at pretest, during conditioning, and in the posttest phase.

Results: Preliminary results showed no significant intergroup differences between conditions with active and inactive sham TENS in the posttest phase. Similarly, no differences have yet been found in the frequency of choosing the placebo or non-placebo condition between experimental groups.

Conclusions: Preliminary results indicate that operant conditioning does not seem to reinforce the open-label placebo effect; mere suggestion appears to be equally effective.

III-D.30

PAIN OVER EFFORT? NOCEBO HYPERALGESIA INDUCED BY OPERANT CONDITIONING WITH COGNITIVE EFFORT AS NEGATIVE REINFORCEMENT

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Background and aims: Building upon prior research demonstrating the ability of operant conditioning to induce placebo hypoalgesia, this experiment investigates its efficacy in eliciting nocebo hyperalgesia. Additionally, the

experiment explores the potential for reduced cognitive effort to function as negative reinforcement, contributing to the nocebo effect.

Methods: This study employs a two-group, randomized experimental design. Participants are assigned to either the experimental or control group. The procedure includes calibration, pretest, operant conditioning, and posttest phases. During operant conditioning, participants are presented with a sham TENS device (placebo) and choose to activate it (placebo condition) or not (non-placebo condition). In the experimental group, activating the placebo increases pain but is followed by lower level of effort, while rejecting it maintains pain but is followed by higher level of effort. In the control group, the consequences of placebo activation or deactivation (i.e., pain and effort levels) are randomly assigned (noncontingent).

Results: Preliminary findings suggest that operant conditioning effectively induces the nocebo effect, as the post-test assessment indicates higher pain ratings following the placebo condition compared to the non-placebo condition within the experimental group. However, participants were less likely to choose the placebo, even though such a choice was previously associated with reduced effort.

Conclusions: The finding regarding cognitive effort challenges existing knowledge of physical effort's impact on pain behaviors. Studies comparing the effects of cognitive and physical effort are needed to clarify their roles in shaping pain behaviors and placebo effects. Clinically, these insights could guide tailored pain management strategies considering effort avoidance and pain perception.

III-D.31

CAN PLACEBO HYPOALGESIA BE ACQUIRED THROUGH THE OBSERVATION OF OTHERS UNDERGOING OPERANT CONDITIONING?

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Background and aims: Placebo hypoalgesia has been studied primarily through classical conditioning. Recent research indicates that placebo hypoalgesia can also result from operant conditioning and vicarious learning. Traditionally, studies on observationally induced placebo effects involved models conditioned classically. However, it is hypothesized that placebo hypoalgesia can also be induced by observing rewarding outcomes delivered to the model responding to placebo (i.e., vicarious operant conditioning). Thus, this study investigates the role of vicarious operant conditioning (VOC) in inducing placebo hypoalgesia.

Methods: Participants are randomly assigned to experimental groups (OC: operant conditioning, VOC: vicarious operant conditioning) or corresponding control groups (ROC: random OC, RVOC: random VOC). During the manipulation phase, OC participants decide to accept or reject a placebo, with acceptance leading to reduced pain as reinforcement. VOC participants watch a model who accepts (75% of trials) or rejects (25% of trials) the placebo, receiving pain reduction for acceptance (as reflected in his verbal pain ratings). ROC participants are randomly reinforced for their choices, while RVOC participants watch a model with randomly distributed reinforcement. In the posttest, participants decide to accept or reject the placebo without any reinforcement delivered.

Results: The pilot study results indicate that placebo hypoalgesia was induced in both experimental groups, as the posttest pain ratings associated with placebo choice were lower than those associated with placebo rejection. However, in the group that observed the model, the effect was more resistant to extinction.

Conclusions: Pain relief in response to a placebo can be learned vicariously, through observing other people making pain-related choices that are rewarded.

III-D.33

AURICULAR VAGAL STIMULATION PREVENTS OXALIPLATIN-INDUCED NEUROPATHIC PAIN IN PRE-CLINICAL MODEL: PERIPHERAL AND CENTRAL MOLECULAR INSIGHTS

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Background and aims: Chemotherapy-induced neuropathic pain (CINP) severely impairs quality of life, and current treatments often lack effectiveness. We observed that preemptive use of the percutaneous auricular vagus

nerve stimulation (paVNS), before the oxaliplatin cycles, prevents the CINP in rats, accompanied by the inhibition of spinal glial and neuronal. We aim to investigate more deeply this effect of paVNS on CINP.

Methods: Male Wistar rats received six cycles of oxaliplatin (Oxa) or glucose solution (control) for two weeks, three times per week. Painful responses were assessed. paVNS on group was stimulated at two specific acupoints for 30 min, before each Oxa session. The paVNS off group received needles without stimulation. The spinal cord analysis focused on astrocytic dysfunction (EAAT2) and descending facilitation (5HT1a and 5HT3 receptors), and the sciatic nerve analysis focused on cytokine and chemokine expression (CEUA 2021-03).

Results: Oxa cycles induced thermal and mechanical hyperalgesia and allodynia ($p < 0.001$) in rats immediately and 7 days post-injections. paVNS on inhibited these phenomena, while the paVNS off showed temporary improvements. Only the paVNS on increased the spinal EAAT2 expression ($p = 0,0242$). Both paVNS off and paVNS on increased spinal 5HT1a expression ($p < 0,05$). In the sciatic nerve, Oxa treatment increased MCP-1 expression compared with control ($p < 0.001$), and only the paVNS prevented this response.

Conclusions: Our findings suggest that the preemptive effect of paVNS on Oxa-induced CINP involves the prevention of astrocytic dysfunction, activation of the descending analgesia, and inhibition of peripheral inflammation, elucidating its potential therapeutic value on CINP.

III-D.34

EFFICACY AND SAFETY OF PREEMPTIVE ANALGESIA WITH HYDROMORPHONE FOR PATIENTS UNDERGOING LAPAROSCOPIC CHOLECYSTECTOMY: A SYSTEMATIC REVIEW AND META-ANALYSIS

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Background and aims: The purpose of this systematic review is to compare the efficacy and safety of hydromorphone used in laparoscopic cholecystectomy.

Methods: After conducting a search across PubMed, Cochrane, Embase, Web of Science, CNKI, VIP, CBM, and Wanfang databases, several studies were selected. Following the screening of RCTs, a meta-analysis was performed using RevMan 5.4 software on the included studies.

Results: A total of 16 articles comprising 1,348 cases were included, with 674 cases in the hydromorphone (H) group and 674 cases in the control (C) group. The pain intensity was significantly lower in the H group compared to the C group ($P<0.05$).The time for spontaneous recovery of respiration and the time for extubation in the H group were both shorter than those in the C group ($P<0.05$). The fluctuations in heart rate and mean arterial pressure in the H group were less than those in the C group ($P<0.05$). The levels of inflammatory factors IL-1, IL-8, and TNF-α postoperatively in the H group were lower than those in the C group, with the differences being statistically significant ($P<0.05$).

Conclusions: Hydromorphone is applied in laparoscopic cholecystectomy and can effectively alleviate pain at 10, 30, 60 minutes postoperatively, as well as at 12 hours. It also has advantages in maintaining hemodynamic stability during surgery, improving postoperative recovery quality, reducing inflammatory responses, and significantly decreasing the incidence of agitation during the awakening period. However, it does not have an advantage in reducing nausea and vomiting.

III-D.37

SOCIAL MEDIA CAMPAIGN FOR CHRONIC PAIN PREVENTION: PROTOCOL FOR A QUASI-EXPERIMENTAL BEFORE-AFTER STUDY

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Background and aims: Chronic pain significantly impacts the health-related quality of life and well-being of citizens in the Ems-Dollard Region (EDR), a region characterized by lower socioeconomic status, rural demographics, and a high proportion of physically demanding jobs. To address these challenges, this protocol outlines the design and

planned implementation of a social media prevention campaign aimed at improving public knowledge and fostering shifts in attitudes and beliefs about pain.

Methods: This protocol describes a framework for evaluating the effectiveness of a social media prevention campaign targeting pain knowledge and attitudes. Conducted across three northern provinces of the Netherlands and Lower Saxony (Germany), with Flanders (Belgium), as the control region, the study will assess the campaign‘s impact on public understanding of biopsychosocial and biomedical pain perspectives. Key findings will include measures of knowledge, beliefs, and attitudes assessed by the Pain Concepts Questionnaire (PCQ) and healthcare utilization patterns via the Health Care Utilization Questionnaire. Questionnaires will be randomly distributed by an independent enterprise, ensuring unbiased data collection for evaluating both implementation and effectiveness.

Results: This protocol outlines a framework for designing, implementing, and evaluating a social media prevention campaign targeting pain knowledge, attitudes, and beliefs. A longitudinal intervention-control study with 1,200 participants per country and 800 in the control group will assess feasibility, effectiveness, and scalability. Linear regression analyses, with PCQ scores as the dependent variable, will evaluate the campaign’s impact while accounting for confounders.

Conclusions: The trial will be conducted over a period of 12 months, starting in January 2025 and ending in February 2026.

III-D.38

FREQUENCIES OF PERSISTENCE, ACTIVITY PACING, AVOIDANCE BEHAVIOUR AND GENERAL STRESS IN ACUTE NECK PAIN

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Background and aims: Neck pain (NP) is a common issue, persisting in 47% of cases. Activity patterns (persistence, pacing, avoidance) play a key role in pain continuation. Beyond avoidance, persistence and pacing also shape cognitive pain processing. Identifying persistence is challenging, as it aligns with societal values in today‘s performance-oriented world. Moreover, this behavior may be linked to heightened stress levels, negatively impacting the body. This study aims to assess the frequencies of activity pattern groups, general stress and to identify the group experiencing the highest stress levels in acute NP.

Methods: A total of 125 individuals aged 18-65 with acute neck pain (NP) were recruited. Subjective stress levels were assessed using the Stress and Coping Inventory (SCI), while hair cortisol concentrations (HCC) measured objective stress. Activity patterns were identified through the Avoidance-Endurance Fast Screen (AE-FS). The frequencies of actvity pattern groups were calculated and the frequency of general stress levels was examined and which activity pattern group experienced the highest stress levels was identified.

Results: Most participants were classified in the EER group (52%), followed by AR (22.8%), DER (19.5%), and FAR (5.7%). Subjective and objective stress levels were consistently below established reference values. The DER group exhibited the highest subjective stress levels, followed by FAR, while AR demonstrated the lowest levels overall. No clinically meaningful differences between the activity pattern groups were observed in the objective stress measurements.

Conclusions: This study underscores that persistence groups constitute the majority in cases of acute NP, and therefore, they warrant increased focus and targeted intervention in therapy.

III-D.39

A COMPARATIVE ANALYSIS OF THE SIDE EFFECTS OF PSYCHOTHERAPY IN CHRONIC PAIN PATIENTS

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Background and aims: Chronic pain is a significant medical challenge and a leading cause of disability and reduced quality of life (Wettstein & Tesarz, 2023). Traditional pain management primarily relies on medications,

which often have limited effectiveness and can cause adverse effects. A major issue in treating chronic pain is its frequent comorbidity with mental disorders like depression and anxiety (Velly & Mohit, 2018). Patients often spend considerable time searching for the underlying cause and effective treatment, frequently experiencing co-occurring mental health issues (Afari et al., 2014). Research shows that psychological therapy can be effective when combined with pharmacological approaches. While the efficacy of psychotherapy for chronic pain and associated mental health conditions is well-documented, there is limited research on its potential negative effects.

Methods: The PerPain project, funded by the German Federal Ministry of Education and Research (BMBF), explores personalised therapeutic approaches for patients with pain disorders. A total of 105 patients were randomly assigned to one of three psychotherapy groups: individual therapy, group therapy, and mobile phone-based therapy. Throughout the therapy, patients completed standardised questionnaires, and therapists documented each session. The NEQ and INEP were used to track potential adverse effects.

Results: This poster presents findings on potential side effects of psychological pain therapy, including changes in emotional regulation and somatic symptoms.

Conclusions: In conclusion, the PerPain project underscores the need to evaluate side effects of psychological therapies for chronic pain. While beneficial, identified adverse effects like changes in emotional regulation and somatic symptoms highlight the importance of careful monitoring and further research.

III-D.40

RECASTING PSYCHOLOGICAL INTERVENTIONS FOR CUSTOMIZING, OPTIMIZING, VALIDATING, AND ENHANCING RECOVERY OF CHRONIC PAIN PATIENTS (RECOVER PROJECT)

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Background and aims: Psychological interventions are essential in Chronic non-cancer pain (CP) management, though they show only modest effects on pain and related outcomes. These interventions comprise multiple components with varying therapeutic impacts, yet no established taxonomy exists to categorize these elements. There is a lack of clarity on which components drive efficacy and whether certain components work better for specific patient subgroups.

Project Principles:

1. Optimizing psychological treatments requires a precise understanding of the constituent components.
2. Improving efficacy necessitates identifying patient-level predictors of treatment response.

Methods: RECOVER will use individual participant data from multiple RCTs on psychological interventions for CP, applying advanced meta-analytic techniques, such as component network meta-analysis, to isolate and assess the effects of specific intervention components and their synergies, identifying the most beneficial elements for patient subgroups.

Results: RECOVER seeks to achieve the following results:

1. **Component Decomposition:** Systematically dissect psychological interventions for CP to identify and categorize their core components.
2. **Efficacy Reevaluation:** Assess the individual and combined contributions of these components to re-evaluate intervention efficacy.
3. **Patient-Level Predictors:** Identify patient characteristics (e.g., age, gender, pain history) predictive of differential responses to specific components or combinations.
4. **Personalized Treatment Tool:** Develop an open-access application that enables users to select effective treatment components tailored to individual characteristics.

Conclusions: RECOVER project aims to transform CP management with an evidence-based framework for component-specific, personalized psychological interventions. The project's outcomes seek to redefine best practices, providing clinicians with tools to tailor treatments, enhance patient outcomes, and improve quality of life.

III-D.41

IN BITS AND PIECES: EXPLORING PSYCHOTHERAPISTS' PERSPECTIVES WORKING WITH ADULT CLIENTS EXPERIENCING CHRONIC PAIN – AN INTERPRETATIVE PHENOMENOLOGICAL ANALYSIS

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Background and aims: We know a biomedical approach alone is not sufficient to alleviate the suffering of people living with chronic pain. Despite increasing recognition of the significance of psychosocial factors in the perpetuation of chronic pain, there is little research into the experiences of psychotherapists and psychologists working with patients with chronic pain. This research helps bridge this gap.

Methods: This research employs Interpretative Phenomenological Analysis (IPA) to explore psychotherapists' perspectives working with adult clients experiencing chronic pain. Semi-structured interviews were undertaken with four psychotherapists and two psychologists with extensive experience of working with chronic pain clients.

Results: Three master themes and six subthemes were identified.

The first master theme identified, *Gaslighting wherever they can*, highlights how experiences of invalidation and stigma in the medical system hinder the development of the therapeutic relationship.

The second master theme, *The person hasn't been met emotionally*, explores the relationship between chronic pain and a history of trauma and attachment wounds.

The third master theme, *They don't think much of themselves*, identifies a required change in momentum from patient hopelessness to empowerment.

Conclusions: There is an absence in the existing literature of the perspectives of professionals working psychologically with chronic pain. This research helps address this gap by contributing to our understanding of how psychotherapists and psychologists experience working with clients facing the challenges and complexity of chronic pain.

The findings highlight potential failures in identifying the significance of clients' unconscious communication; the importance of sensitive handling of referrals for psychological support; and the centrality of promoting client agency.

III-D.43

ASSESSING THE EFFECTIVENESS OF THE FEELING BETTER ASD PAIN MANAGEMENT PROGRAM FOR AUTISTIC CHILDREN

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Background and aims: Self-reporting pain is seen as the ‚gold standard' in pain assessment and management. However, self-report measures are not always accessible or feasible for use with autistic individuals, who may often

find it difficult to communicate pain and may express their pain in “atypical” ways such as changes in behaviour. As a result, pain may be unrecognised and untreated.The purpose of this study is to provide education for autistic children and their parents by teaching the skill of communicating pain and also learning skills and techniques such as relaxation, activity pacing, and distraction skills to help them cope with pain using the Feeling Better ASD pain management programme.

Methods: Participants were randomized into either the intervention group or a wait-list control group .Primary outcome measure included Pain communication and Pain-coping strategies. Clinical outcomes included, pain intensity,, pain interference with daily living, overall well-being, parental protectiveness, pain catastrophizing,adverse events and Parents‘ and participants‘ beliefs about the overall/global efficacy of the intervention.

Results: Pain is a significant problem for autistic people, with a large proportion of individuals unable to verbally communicate their pain. 35.6% of autistic individuals experienced chronic pain (pain lasting more than three months). Study currently on-going and pre-test is to be completed in March 2025. Results of programme will be discussed once programme has been completed.

Conclusions: Feeling Better ASD provides inclusive education for autistic children by teaching the skill of communicating pain and also learning skills and techniques such as relaxation, activity pacing, distraction skills to help them cope with pain.

III-D.44

ACCEPTANCE AND COMMITMENT THERAPY (ACT) FOR PAEDIATRIC CHRONIC NONCANCER PAIN: A SYSTEMATIC REVIEW

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Background and aims: Acceptance and Commitment Therapy (ACT) is an emerging intervention in the paediatric population but is also increasingly being applied across a range of conditions, including chronic noncancer pain (CNCP). The aim of this study was to evaluate the efficacy of ACT in paediatric CNCP.

Methods: A systematic review of English and Spanish articles. The search was conducted in January 2023 using Medline, APA PsycInfo, Psychology Database, APA PsycArticles, PubMed, and Web of Science. We included quasi-experimental pre-post studies and randomized controlled trials (RCT) based on ACT treatment for the paediatric population with a diagnosis of CNCP. Data were extracted by two of the authors using predefined data fields. The risk of bias was evaluated using the Study Quality Assessment Tools of the National Heart Lung Heart Lung and Blood Institute.

Results: Nine articles met the inclusion criteria, involving a total of 423 children and adolescents and 380 parents. The studies assessed variables related to the following areas: physical, psychological, and socio-academic, as well as parental interventions. At a moderate level of evidence, the following variables generally showed a significant change after the intervention: pain interference, anxiety, depression, pain catastrophizing, pain reactivity, and psychological flexibility in the children, adolescents, and their parents. However, overall, the studies had a moderate risk of bias.

Conclusions: Although in its early stages, ACT could be efficacious in the treatment of paediatric CNCP; furthermore, the inclusion of parents could lead to improved outcomes. While these findings are promising, further research is needed.

III-D.46

TRAINING PSYCHOLOGISTS IN PAIN REPROCESSING THERAPY: A PILOT STUDY ON THERAPIST PROFICIENCY, INTERVENTION QUALITY AND PATIENT OUTCOMES

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Background and aims: Pain Reprocessing Therapy (PRT) shows promise for managing neuroplastic pain conditions but requires skilled delivery. Access to expert personnel is limited in many regions, including Norway. In

preparation for a clinical trial of PRT for fibromyalgia, we designed a training program for psychologists with no prior PRT experience, incorporating an established online PRT course and practical application. With this pilot study, we aim to determine when therapists can effectively deliver high-quality PRT, identify factors influencing proficiency, and evaluate how intervention quality relates to patient outcomes.

Methods: Five therapists train with two patients followed by two-three pilot patients. Patient-reported outcomes include pain and mood levels recorded five times daily via Ecological Momentary Assessment (EMA). Therapists document techniques used and confidence levels, while external PRT experts evaluate session quality via video. Patient outcomes are analysed using a single-case experimental design, with mixed-effects modelling to assess the relationship between outcomes and intervention quality.

Results: Analysis of Brief Pain Inventory scores (10-point scale) from the initial five training patients showed a reduction in average pain in 3/5 patients (mean change 2.3), and reduction in highest pain in 4/5 patients (mean change 5.2). This was associated with improved depression and anxiety symptoms and a shift in causal attribution of pain from structural causes to brain processes.

Conclusions: Preliminary results indicate that effective PRT can be delivered already during therapist training. Data currently collected from the remaining pilot patients will provide further insights into the connection between intervention quality and outcomes.

III-D.48

PATIENTS' PERSPECTIVE ON STRENGTHS AND WEAKNESSES OF THE BERN AMBULATORY INTERPROFESSIONAL REHABILITATION (BAI-REHA), A MULTIMODAL PROGRAM FOR PATIENTS WITH CHRONIC MUSCULOSKELETAL PAIN

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Background and aims: BAI-Reha is a three-month rehabilitation for patients with chronic musculoskeletal pain. Patients provided written feedback on their experiences when they completed the program. Thus, the aim of this study is to analyse patients' experiences of the BAI-Reha. This leads to the primary research question: What strengths and weaknesses do participants report at the end of the program? Secondly, we are interested in determining the frequencies of the themes mentioned.

Methods: Participants received a feedback form at the end of the program with questions. To analyse the data we used a mixed method approach. The qualitative content analysis included inductive coding to determine main categories and themes. For the quantitative analysis, we conducted a frequency analysis in Microsoft Excel.

Results: We analysed 132 feedback forms with a total of 776 comments (421 strengths, 355 weaknesses). Frequently mentioned strengths of the program were *therapeutic content* (166), *humanity and competence* (124), the *framework of the program* (111), *developed strategies* (55), *positive peer support* (35), and *progress and positive personal outcomes* (29). Participants frequently reported *quantity, structure or missing content* (161), *organization* (128), and *therapeutic content* (54) as weaknesses.

Conclusions: Feedback from participants supports the framework of the program with aspects of versatility/holism, interprofessional collaboration and individual customisation. The organization was often criticised, which reflects the challenge of planning an ambulatory program in a hospital setting. The results emphasize the importance of human qualities and the value of motivated and competent health professionals. A major strength is the positive peer support.

III-D.49

EFFECTS OF PHYSICAL ACTIVITY ON NEUROPATHIC PAIN PREVALENCE AND INTENSITY: SYSTEMATIC REVIEW AND META-ANALYSIS

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Background and aims: Chronic Neuropathic Pain (NP) affects 1in20 people. Sensorimotor impairments linked to this pain lead patients to meet a physiotherapist for rehabilitation. To date, there is no clear scientific consensus on the contribution of rehabilitation for this type of pain. It has been demonstrated for several years that Physical Activity (PA) is effective to treat chronic pain and is associated with a better quality of life. Otherwise, there is no literature for chronic NP. The aim of this review was to determine the impact of PA on NP intensity and prevalence.

Methods: The PRISMA methodology was followed for this systematic review. Articles were searched on PubMed and Embase. These are original studies measuring PA impact on different types of neuropathic pain (central or peripheral). Each kind of encountered PA was assessed: aerobic, anaerobic strengthening or a combination of both types, special exercises, sport, leisure, daily commutes, physical job. Then, a subgroup analysis was conducted for the main diseases.

Results: About NP prevalence, average odds ratios are: 0,94to1,00(strengthening); 0,72(special exercises); 0,97(sport); 0,98(leisure); 1,21(daily commutes); 1,53(physical job). About NP intensity, average ratios are: 0,63to0,76(strengthening); 0,87(special exercises); 0,76(sport); 1,12(leisure).

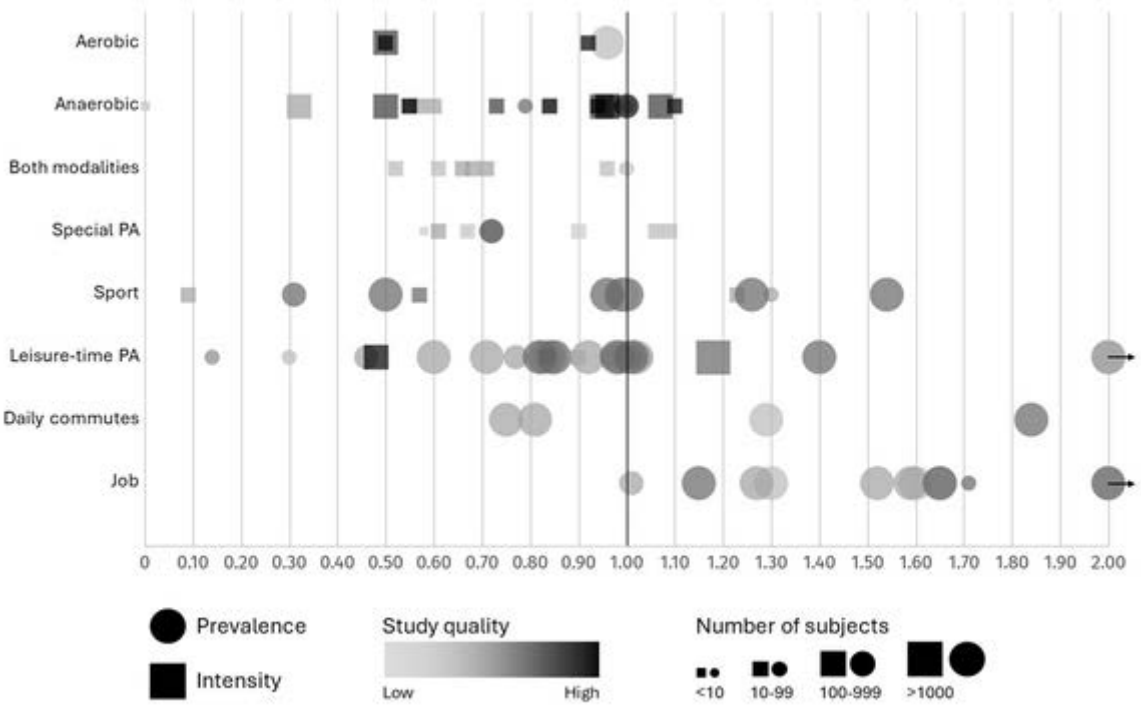

Figure : Effect of physical activity on neuropathic pain according to each article, by kind of practice

Conclusions: Supervised PA (strengthening and special PA) is associated to a NP decrease. Unsupervised PA (sport, leisure) is associated to various effects. Imposed PA (commutes, job) is associated to a PA increase. These results are important to define PA role in caring NP patients, and show an interest for PA supervised by professionals. Further studies are needed to assess the dose effect and mechanisms leading to these variations.

III-D.50

POTENTIAL ROLE OF BDNF IN THE ANALGESIC EFFECT OF A VIRTUAL WALKING AND THERAPEUTIC EXERCISE-BASED INTERVENTION IN PEOPLE WITH INCOMPLETE SPINAL CORD INJURY

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Background and aims: A spinal cord injury (SCI) can cause neuropathic pain, which may be prevented and corrected by strategies that enhance cortical reorganization. This study aimed to assess the effect of stimulating mirror neurons by combining virtual walking (VW) with physical exercise (PE) on pain intensity in people with incomplete SCI. Furthermore, we assessed the potential role of Brain Derived Neurotrophic Factor (BDNF) level as the biological mechanism underlying this beneficial effect.

Methods: This study is part of a larger study, approved by the Ethics Committee of the Universitat de València (1304149) and registered at ClinicalTrials.gov (NCT04809987). Three subjects performed 3 sessions per week during 8 weeks of VW combined with PE. Two assessments were performed: before intervention (T0) and after intervention (T1). Pain intensity was assessed through Brief Pain Inventory (BPI) and plasma BDNF levels by ELISA.

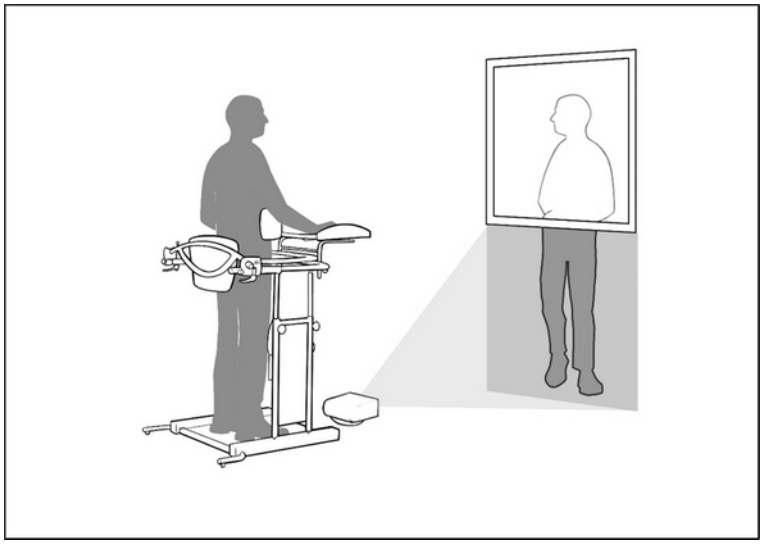

Figure 1. Protocol set-up

Results:

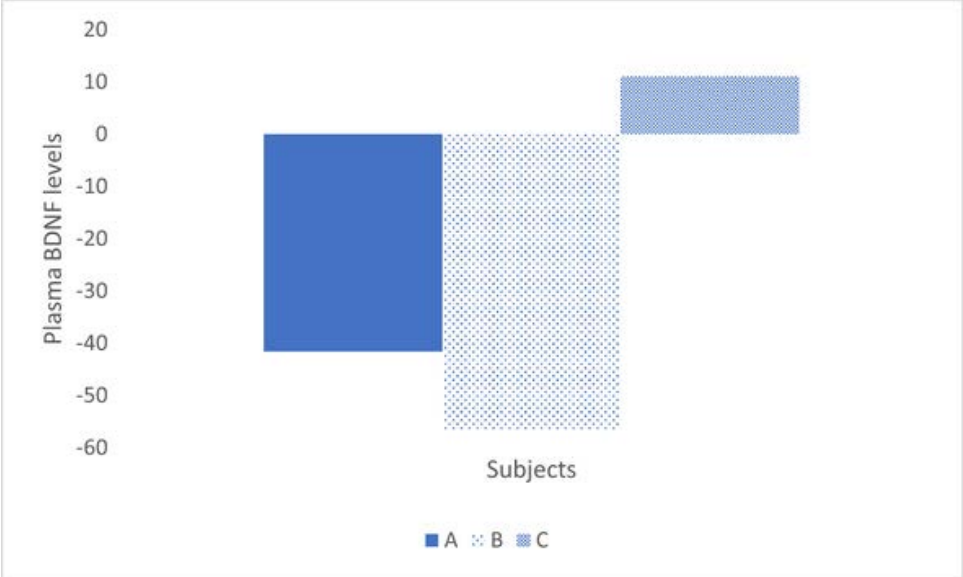

Figure 2. Brain-derived neurotrophic Factor differences between T0 and T1

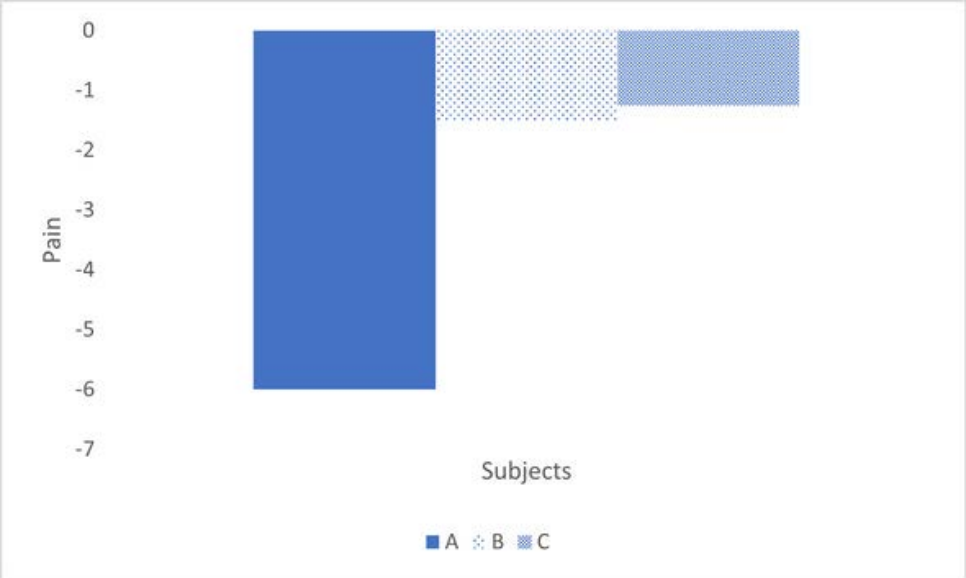

Figure 3. Pain differences between T0 and T1

Figures 2 and 3 show changes in BDNF levels and pain intensity between T0 and T1, respectively. Volunteer A and B, presenting a moderate baseline pain intensity, showed a decrease in pain intensity and BDNF levels, while volunteer C, presenting higher pain intensity at T1 showed a small change in both variables.

Conclusions: These preliminary results suggest that BDNF may be mediating the analgesic effect of the therapy, but only when moderate pain intensity is present.

III-D.51

TRANSCRANIAL DIRECT CURRENT STIMULATION IN PEOPLE WITH PATELLAR TENDINOPATHY. A PILOT STUDY

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Background and aims: Patellar tendinopathy (PT) is a painful knee condition aggravated by activities stressing the patellofemoral joint. Transcranial Direct Current Stimulation (tDCS) applies a mild direct electrical current to cortical

areas to modulate brain activity. This study aimed to investigate the effectiveness of tDCS prior to an exercise program on PT pain and functionality.

Methods: A pilot study was conducted. Subjects with PT were divided into two groups: i) the experimental group (EG) (n=5) received tDCS + exercise, and ii) the control group (CG) (n=7) received placebo tDCS + exercise. The interventions lasted for 8 weeks. Pain (Single-leg Squat test), and functionality (VISA-P Questionnaire) were analyzed at baseline, week 4, and week 8. The patient's perception of change was also recorded.

Results: Twelve participants (mean age=32.17 years) were included. At week 4, there was a reduction in pain in both groups, although the EG showed a greater reduction compared to the CG (66.67 % vs. 58.25 %). This trend was maintained at week 8 (59.26 % vs. 55.32%). In terms of functionality, the EG demonstrated a 47.45% improvement at week 4, which progressed to 63.50% by week 8. Conversely, the CG showed slight improvements (34.58% and 35.34%, respectively). Additionally, 40.00% of those in the EG and 14.29% in the CG reported "moderate improvement" by week 4. At week 8, these percentages had risen to 80.00% and 42.86%, respectively.

Conclusions: The addition of tDCS prior to an exercise program shows promising results in terms of pain and functionality in people with PT.

III-D.52

INTEGRATING PATIENTS WITH A RARE DISEASE IN ESTABLISHED PAIN REHABILITATION PROGRAMMES – EXPERIENCES FROM A FEASIBILITY STUDY CONDUCTED WITH PATIENTS WITH SKELETAL DYSPLASIAS

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Background and aims: Patients with rare diseases in need of rehabilitation for chronic pain face two challenges: they have fewer opportunities to get peer support from other patients with rare diseases; and health professionals have little knowledge about their disease and rehabilitation needs. Our aim was to adapt an existing pain rehabilitation program by adding guidance from a National Resource Centre for Rare Disorders. We assessed usability and feasibility of this programme.

Methods: Two groups of eight patients with different skeletal dysplasias were included as subgroups among a group of other pain patients and followed the ordinary pain rehabilitation programme. The National Resource Centre contributed with: Educating the Rehabilitation Centre and the patients and giving advice and guidance. Feasibility evaluation included an evaluation form, attendance, individual interviews with the patients about satisfaction, experiences with the programme and adaptions and group interviews with health care workers about their experiences with the adapted program.

Results: Preliminary results show good feasibility. The patients highlighted the opportunity of meeting others with similar challenges and appreciated the cooperation between the expert National Resource Centre and the rehabilitation clinic. They highlighted the need for adjustments in the teaching programme, more individualized training programmes, and adaptation of the physical environment.

Conclusions: When rehabilitating patients with a rare skeletal dysplasia, it is important to acknowledge their special needs, including the benefits of patients meeting others with similar diagnoses. Collaboration between existing rehabilitation centres' programmes and Resource centres for rare diseases can be a valuable solution when establishing a specialized rehabilitation programme for this group.

III-D.53

INTERDISCIPLINARY PAIN REHABILITATION WITH LANGUAGE INTERPRETERS FOR MIGRANT PATIENTS WITH CHRONIC PAIN: A LONG-TERM FOLLOW-UP

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Background and aims: Immigrants are reported to experience more frequent chronic pain and an increased risk of common mental health disorders compared to natives. Immigrants' higher risk of severe chronic pain may be mediated by mood disorders. Additionally, financial hardship has been identified as a risk factor for pain conditions. It is suggested that immigrants with chronic pain require interventions tailored to their bio-psycho-social status.

The aim was to investigate pain, psychological aspects, and quality of life in migrant patients with limited proficiency in Swedish and with chronic pain 1 year after interdisciplinary pain rehabilitation (IPR) with language interpreters, evaluate these outcomes separately in women and men and identify possible predictive factors for pain intensity and physician visits due to pain at follow-up.

Methods: Pain intensity (NRS), anxiety and depression (HADS), health-related quality of life (EQ5-D index), fear of movement (TSK), and number of doctor visits were evaluated after 1 year and compared with ratings before the program.

Results: 74 migrant patients (60 women and 14 men) with chronic pain in Sweden participated in the study. At one-year follow-up, patients improved significantly in pain intensity, depression, and fear of movement, number of physician visits were significantly reduced. However, anxiety increased significantly. The women showed significant improvements in most variables, while the men did not improve significantly in any.

Conclusions: The findings indicate that migrant patients patients with limited proficiency in Swedish and chronic pain benefit from an IPR with language interpreters. Further research is needed to address specific needs of men in and after such IPR.

III-D.54

A NOVEL FORM OF TRANSCUTANEOUS ELECTRICAL NERVE STIMULATION FOR DYSESTHESIAS CAUSED BY SPINAL CORD INJURY: RANDOMIZED N-OF-1 TRIAL

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Background and aims: Dysesthesia, including tingling and allodynia caused by spinal cord injury, is often ineffective for current therapeutic interventions. Dysesthesia-matched transcutaneous electrical nerve stimulation (TENS) is a novel TENS that matches the intensity and frequency of stimulation to the intensity and somatosensory profile of the patient's dysesthesias, and was reported to immediately improve dysesthesias in a case series study. The aim of this study was to investigate the effectiveness of a novel TENS in dysesthesias of people with spinal cord injury using an aggregated N-of-1 trials design.

Methods: A series of aggregated, randomized, placebo-controlled N-of-1-trials was performed in six patients with spinal cord injury. The intervention was dysesthesia-matched TENS, and the control was sham-TENS. Both the intervention and the control were applied for 60 minutes daily over a period of 7 days. Outcome measure was the Short-Form McGill Pain Questionnaire version-2 (SF-MPQ2) and analyzed using the generalized linear mixed model.

Results: In the baseline phase, the SF-MPQ2 items of tender, pain caused by light touch, tingling, numbness, and cold-freezing pain showed elevated scores. Compared to sham-TENS, dysesthesia-matched TENS improved scores for tender, pain caused by light touch, tingling, numbness, and total score. However, cold-freezing pain did not show improvement.

Conclusions: In a series of N-of-1 trials of dysesthesia-matched TENS vs placebo in people with spinal cord injury, there were reduction in dysesthesias. These results may suggest an effective treatment of dysesthesias in patients with spinal cord injury.

III-D.56

MECHANISM OF PAIN SCIENCE EDUCATION IN INDIVIDUALS AFTER TOTAL KNEE REPLACEMENT: CAUSAL MEDIATION ANALYSIS

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Background and aims: Recently, pain science education (PSE) before total knee arthroplasty (TKA) has demonstrated efficacy in reducing postoperative pain intensity and disability. However, the mediating factors that influence these outcomes remain unclear. This study investigated the mediating effect of PSE on postoperative pain and disability following TKA.

Methods: This retrospective study included 304 patients who underwent TKA. Patients were assigned to either the non-PSE group (n = 203), which received standard care, or the PSE group (n = 101), which received PSE in addition to standard care. A propensity score, based on preoperative pain intensity, age, sex, body mass index, osteoarthritis severity, TKA type, and C-reactive protein level 1 week after surgery, was calculated. A causal mediation analysis was performed. The outcomes, pain intensity and disability, were assessed 3 months after surgery. Total, pure natural direct, and total natural indirect effects were estimated.

Results: Propensity score matching produced a non-PSE group (males: 13, females: 83; mean age: 74.0 ± 7.6 years) and a PSE group (males: 13, females: 83; mean age: 74.1 ± 7.1 years). Causal mediation analysis revealed that catastrophizing has a significantly higher total natural indirect effect on pain intensity (−1.47 [−3.13–−0.25]) and disability (0.66 [0.17–1.38]).

Conclusions: Our findings indicate that catastrophizing mediates the effects of pain and disability following TKA.

III-D.57

EFFECTIVENESS OF COGNITIVE FUNCTIONAL THERAPY (CFT) FOR CHRONIC SPINAL PAIN: A SYSTEMATIC REVIEW WITH META-ANALYSIS

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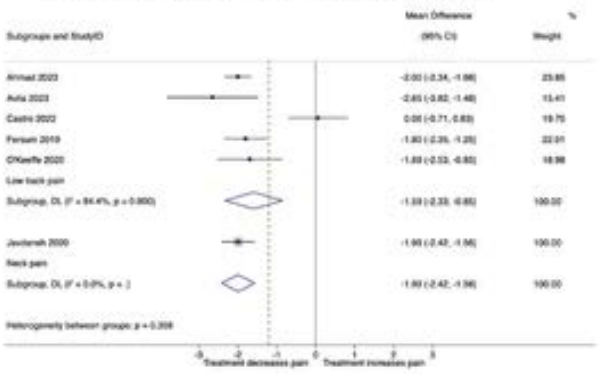
Background and aims: CFT has shown promising results in reducing pain, disability, and kinesiophobia in various chronic spinal conditions. However, systematic reviews on CFT's effectiveness in low back pain patients have yielded conflicting results. This study aims to conduct a systematic review (SR) with meta-analysis to investigate CFT's effectiveness on multiple clinical outcomes in cSP patients.

Methods: This SR followed Cochrane Handbook guidance and PRISMA statement. The protocol was prospectively registered in PROSPERO. We included only RCTs. Primary outcomes were disability and pain. Risk of bias was assessed using the Cochrane Risk of Bias tool. Certainty of evidence was assessed using the GRADE approach.

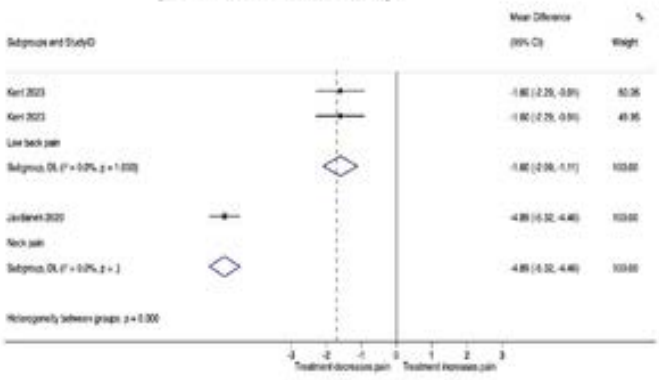
Results: Nine RCTs were analysed: 1,228 patients with chronic low back pain and 72 with chronic neck pain. The risk of bias was low in three studies, some concerns in five, and high in one. Compared to other conservative interventions, CFT may reduce disability with probable clinical relevance (mean difference [MD]: -9.41; 95% confidence interval [CI]: -12.56, -6.27 for low back pain; MD: -11; 95% CI: -13.21, -8.79 for neck pain) and pain (MD: -1.59; 95% CI: -2.33, -0.85 for low back pain; MD: -1.99; 95% CI: -2.42, -1.56 for neck pain) at short-term follow-up. Similar results, with larger effect sizes, were observed for CFT compared to minimal care. The evidence certainty varied between moderate and very low.

Outcome	Follow-up	Comparison	N	Sample size	MD (95% CI)	I^2	Certainty of evidence	Clinical relevance
Disability	Medium-term	CFT vs. other conservative interventions	4	461	-9.91 (-16.77, -3.05)	93.2%	Very low	Probable
	Long term	CFT vs. other conservative interventions	3	398	-4.77 (-10.03, 0.50)	77.6%	Very low	Possible
		CFT vs. minimal care treatments	1	491	-21.25 (26.26, -16.24)	0.0%	Moderate	Definitive
Pain	Medium-term	CFT vs. other conservative interventions	4	461	-1.25 (-2.19, -0.31)	85.5%	Very low	Possible
	Long-term	CFT vs. other conservative interventions	3	400	-0.40 (-1.24, 0.43)	70.1%	Low	Probable
		CFT vs. minimal care treatments	1	491	-1.65 (-2.13, -1.16)	0.0%	Low	Possibile
Fear of movement	Medium	CFT vs. other conservative interventions	3	301	-1.68 (-3.33; -0.04)	97.1%	Very low	
	Long-term	CFT vs. other conservative interventions	2	247	-0.61 (-1.18; -0.04)	79.4%	Very low	
		CFT vs. minimal care treatments	1	481	-6.40 (-7.38, -5.42)	0.0%	High	

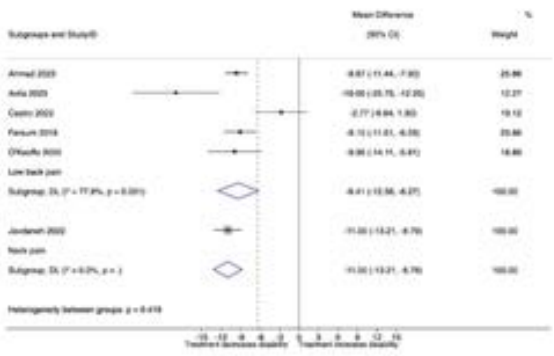
Forest plot for pain at short term
(CFT vs other conservative treatments)



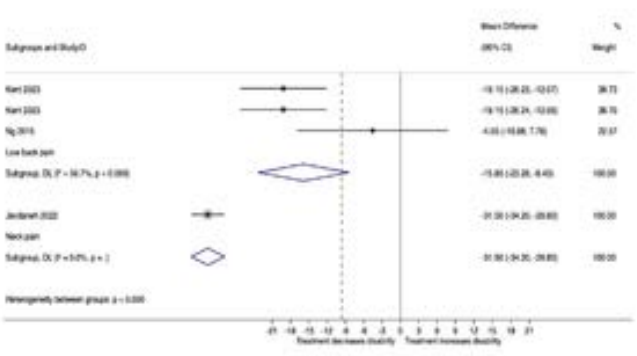
Forest plot for pain at short term
(CFT vs minimal care)



Forest plot for disability at short term
(CFT vs other conservative treatments)



Forest plot for disability at short term
(CFT vs minimal care)



Conclusions: CFT appears more effective for managing pain and disability in cSP patients than other treatments. For broader applicability, researchers should expand studies to other chronic musculoskeletal conditions.

III-D.58

MEANINGFUL CONTRIBUTIONS OF REHABILITATION FOR PEOPLE WITH PERSISTENT PAIN; A REFLEXIVE THEMATIC ANALYSIS

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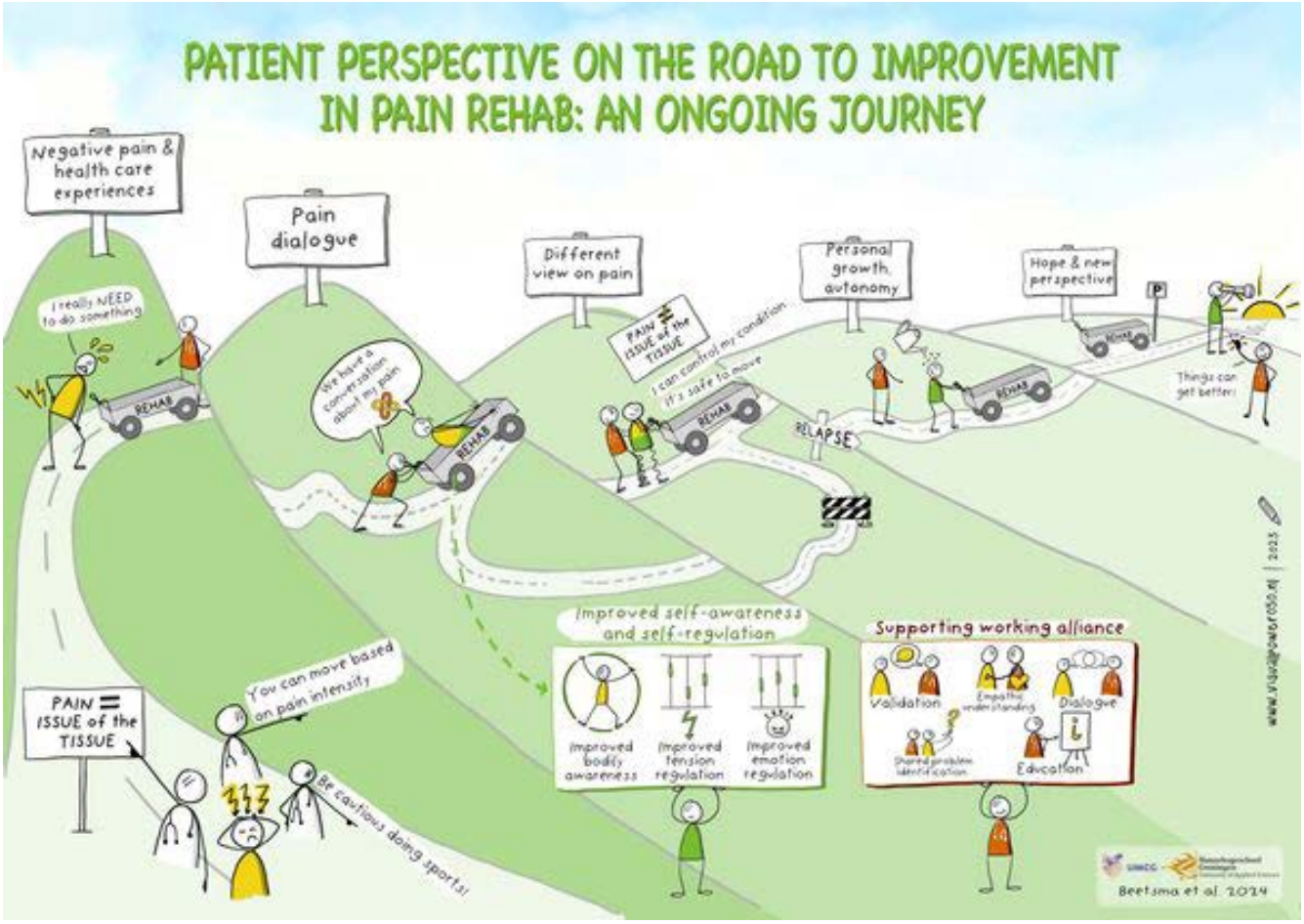
Background and aims: Despite the revised International Association for the Study of Pain (IASP) definition of pain and the promotion of person-centred care in rehabilitation guidelines, integrating the lived experience of pain remains a blind spot in pain rehabilitation. As a result, it remains unknown which aspects of pain rehabilitation patients experience as the main valuable contributions. Aim: This study aims to explore the meaningful contributions of rehabilitation for participants living with persistent pain.

Methods: A phenomenological methodology was used. Thirteen purposefully selected participants, who self-identified as substantially improved from persistent pain due to rehabilitation, were interviewed in-depth. Data were analyzed using reflexive thematic analyses.

Results:



Participants included three men and ten women, age ranging from 22–69 years, pain duration was 2-30 years. Seven interconnected themes were developed: 1) indication of negative pain and health care experiences, 2) supporting working alliance with healthcare professionals, 3) Pain Dialogue, 4) improved self-awareness and self-regulation, 5) different view on pain, 6) autonomy and personal growth and 7) hope and new perspective. Integration of these themes provided a framework for understanding meaningful contributions of rehabilitation from the participants' perspective.

Conclusions: The study identified seven interconnected themes enhancing meaningful contributions of rehabilitation for participants who have substantially improved from persistent pain. These findings provide a novel conceptual understanding of how rehabilitation can foster recovery. The themes strongly support person-centred care, an understanding of Pain Dialogue and personal growth through the lens of the lived experience. The quality of the therapeutic relationship is considered a central vehicle for improved health outcomes.

III-D.59

LOW-LEVEL LASER THERAPY AMELIORATED ACUTE PAIN BY REGULATING M1/M2 MACROPHAGES IN THE ACUTE PHASE OF CARRAGEENAN-INDUCED ARTHRITIS IN RATS

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Background and aims: Although the efficacy of low-level laser therapy (LLLT) on pain has been reported, the underlying mechanisms of pain alleviation remain unclear. This study aimed to investigate the mechanisms of LLLT on pain reduction using the carrageenan-induced arthritis model in rats.

Methods: Male Wistar rats were randomly divided into the arthritis group, LLLT group, and control group. Rats in the arthritis and LLLT groups were injected mixture of 3% kaolin and carrageenan into the knee joint, and rats in LLLT group applied LLLT irradiation (wavelength 830 nm, output intensity 60mW/cm^2) for 10 minutes in 6 days. Pressure pain threshold (PPT) and weight-bearing ratio was measured during experimental periods. The number of CD68-, CD11c-, and CD206-positive cells in the synovium, and the expression of IL-1β mRNA in the infrapatellar fat pad were evaluated 7 days after injection.

Results: In the LLLT group, PPT and weight-bearing ratio were significantly recovered from 4 days after injection compared to those of the arthritis groups. The number of CD68- and CD11c-positive cells in the LLLT groups was significantly decreased, while the number of CD206-positive cells was significantly increased compared to those of the arthritis groups. IL-1β mRNA significantly decreased in the LLLT group compared to that of the arthritis group.

Conclusions: Our results suggested that the mechanisms underlying LLLT-induced pain alleviation are the reduction of macrophage accumulation, downregulation of M1 macrophages and upregulation of M2 macrophages, and the subsequent reduction of IL-1β mRNA expression produced by M1 macrophages.

III-D.60

THE EFFECT OF IDEAL PHYSIOTHERAPY (IPRP-PT) STUDY PROTOCOL ON PAIN, FUNCTION AND KINESIOPHOBIA AFTER PLATELET-RICH PLASMA (PRP) ADMINISTRATION IN PATIENTS WITH SHOULDER IMPINGEMENT SYNDROME

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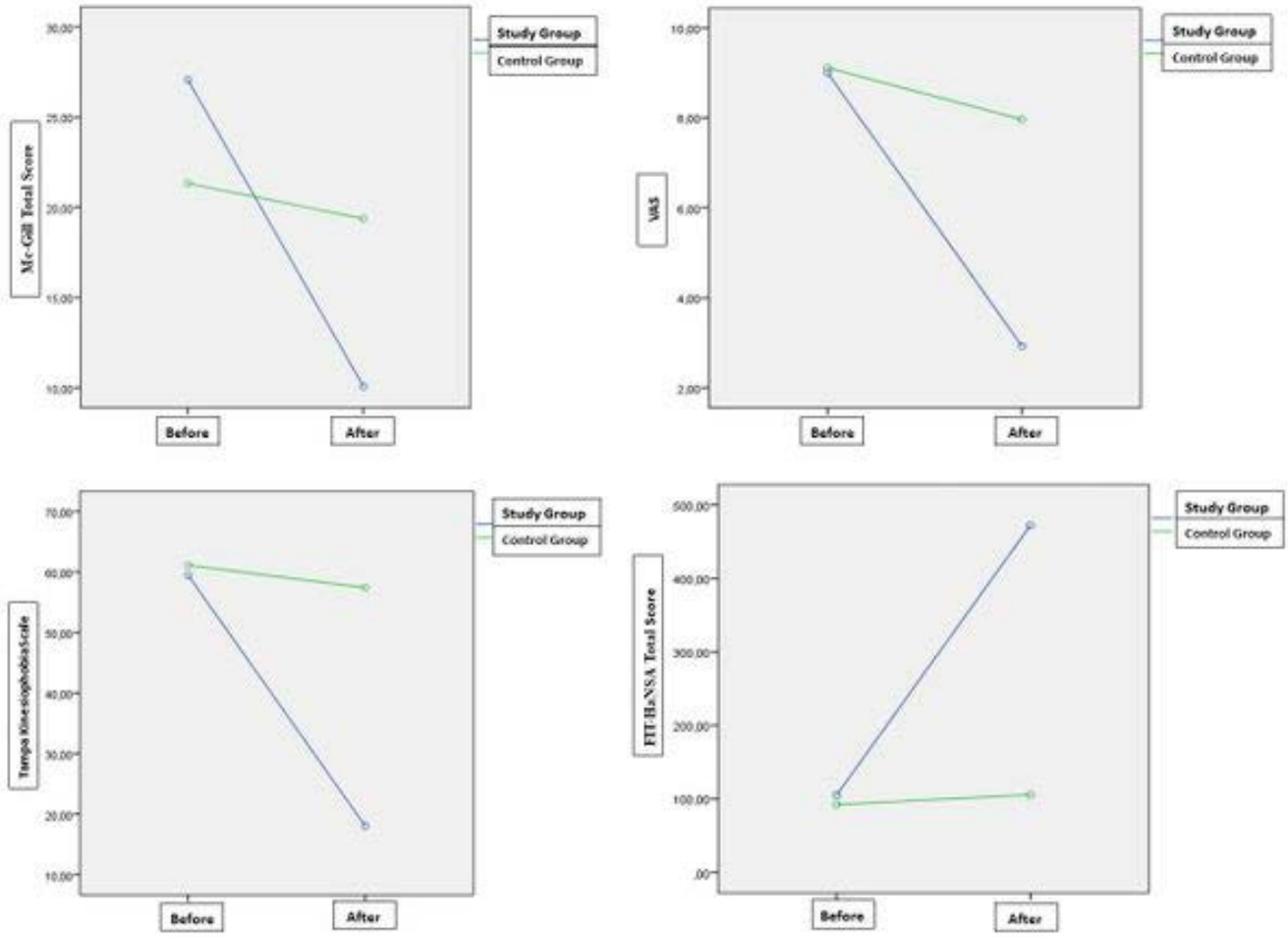
Background and aims: Shoulder impingement syndrome(SIS) is an important problem that decreases the quality of life of patients due to pain, seriously affects their DLA and creates problems in terms of functionality. Platelet Rich Plasma(PRP) injection has emerged as an alternative approach in SIS. There is need to develop physiotherapy approaches that will trigger and accelerate healing mechanism targeted by PRP. The aim of study was to investigate the efficacy of an ideal physiotherapy(IPRP-PT) study protocol after PRP in terms of pain, function and kinesiophobia in patients with SIS.

Methods: This study was conducted with 54 patients with SIS. The patients were randomly divided into two equal groups. For 21 days, study group received IPRP-PT study protocol and conventional physiotherapy, control group received only conventional physiotherapy. Evaluations were performed before and after treatment. Normal range of motion was assessed by universal goniometer, muscle strength was assessed by manual muscle test, posture was assessed by Corbin posture analysis. For pain assessment, Pain Questionnaire-SF, Visual Analogue Scale(VAS) , for functional assessment, Shoulder Score(CMS), Disability of the Arm, Shoulder and Hand Questionnaire(DASH), Functional Impairment Test-Hand and Neck/Shoulder/Arm(FIT-HaNSA), Fatigue Severity Scale and for kinesiophobia, Tampa Kinesiophobia Scale were used.

Results: Demographic and clinical characteristics and distribution of symptoms were similar in the both group (p>0.05). All outcome measures showed a significant improvement in favour of the study group (p<0.05) over the control group.



Conclusions: IPRP-PT protocol is effective in treatment of SIS after PRP in terms of pain, function, kinesiophobia and may be an alternative approach that can be applied.

III-D.61

COMPARISONS BETWEEN LOW-INTENSITY RESISTANCE TRAINING WITH BLOOD FLOW RESTRICTION AND HIGH-INTENSITY RESISTANCE TRAINING ON DELAYED ONSET MUSCLE SORENESS IN SEDENTARY WOMEN

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Background and aims: The sedentary population is often unable to exercise at high intensities. Alternatively, low-intensity resistance training with blood flow restriction (LRT-BFR) has emerged. This study aimed to compare the effects of LRT-BFR and high-intensity resistance training (HI-RT) on delayed onset muscle soreness (DOMS), and upper extremity functional performances.

Methods: Thirteen sedentary women performed 3 days/week for 6 weeks of two different exercise protocols unilaterally. Participants' arms were randomly divided into two groups according to the exercise protocols. One

arm of the participants performed LRT-BFR while the other performed HI-RT. The LRT-BFR group performed four sets, 20–30% of 1 repetition maximum [1RM]; and the HI-RT group performed three sets, 70-80% of 1RM. The two exercise protocols were performed in different sessions on the same day. DOMS, and Upper extremity functional performances were evaluated before and after training.

Results: There was a significant reduction in DOMs in both groups ($p<0.001$). However, the change in DOMS values was not significantly different between HI-RT and LRT-BFR groups ($p>0.05$). There is no statistical difference between the groups for the upper quarter Y balance test score ($p>0.05$).

Conclusions: We found that LRT-BFR had similar effects as HI-RT on DOMS AND functional performance. In cases where HI-RT can not be used, we believe LRT-BFR to be a viable alternative.

III-D.62

EFFECT OF ECCENTRIC STRETCHING ON PAIN, GRIP STRENGTH, AND FUNCTIONAL LEVEL IN PATIENTS WITH LATERAL EPICONDYLOPATHY

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Background and aims: Lateral Epicondylopathy(LE) is a condition characterized by pain on the lateral side of the elbow. The superiority of eccentric stretching over other interventions in managing LE is not definitively established. The aim of this study is to investigate the effect of eccentric exercise on pain, grip strength, and functional level in patients with LE.

Methods: 40 individuals with LE between the ages of 18-65 participated in the study. Participants were divided into a study group(SG)(n=20) and a control group(CG)(n=20). The CG received cold application, deep friction massage, a home exercise program(3 times/4 weeks). In addition to these interventions, the SG performed eccentric stretching. Pain(Visual Analog Scale(VAS)), hand grip strength(Jamar dynamometer), finger grip(pinchmeter), muscle mechanical properties (myotonometer), functional level(Quick Disabilities of the Arm, Shoulder, and Hand(Quick DASH) and The Patient-Rated Tennis Elbow Evaluation(PRTEE)) and quality of life (Nottingham Health Profile(NHP)) were measured.

Results: There were no significant differences between groups before treatment($p>0.05$). After treatment, groups significantly improved intra-group comparisons($p<0.05$). The study group showed a significant difference in pain(activity) DASH and PRTEE(pain) scores in inter-group comparisons. There was no significant difference between groups in myotonometer scores after treatment($p>0.05$), but there was a significant difference in the intra-group comparison of F scores for the study group($p<0.05$).

Conclusions: At the end of the study, the group undergoing eccentric stretching showed significant improvements in pain(activity), DASH and PRTEE(pain) scores, and myotonometer measurements. Therefore, eccentric exercise can be used in addition to conventional treatments for controlling pain, improving functional level, and altering muscle mechanical properties in patients with LE.

III-D.63

EFFECTS OF REGULAR EXERCISE ON SUBJECTIVE PAIN PERCEPTION AND ENDOGENOUS PAIN INHIBITORY SYSTEM IN THE ELDERLY: A RANDOMIZED CONTROLLED TRIAL

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Background and aims: Exercise-induced hypoalgesia (EIH), the reduction in subjective pain intensity and pain sensitivity induced by a single bout of exercise, has been widely reported in young healthy individuals and middle-aged chronic pain patients. However, its effects are diminished in the elderly. Therefore, the purpose of this study is to investigate whether regular exercise can improve subjective pain and the endogenous pain inhibitory system in the elderly.

Methods: This study recruited 47 elderly patients, aged 70 and above, with proximal femoral fractures post-surgery. Participants were randomized into either the exercise or control group. The exercise group engaged in aerobic exercise, consisting of pedaling for 15 minutes, three times a week, for 4 weeks. The control group performed

passive stretching for 15 minutes over the same period. The analgesic effects were evaluated weekly using the following measures: subjective pain perception (NRS), pressure pain threshold (PPT) in the affected hip and remote forearm, and conditioned pain modulation (CPM).

Results: Both groups had an average age of over 80 years. The NRS significantly decreased after 4 weeks but did not reach the minimum detectable change (MDC) in either group. PPT and CPM did not significantly change during the intervention period in either group.

Conclusions: The analgesic effects of regular exercise, as well as a single bout of exercise, were less likely to appear in the elderly. These findings may suggest the necessity of modifying exercise dosing and combining it with other treatments to improve subjective pain and endogenous pain inhibitory system in the elderly.

III-D.64

ROLE OF MUSCLE CONTRACTION IN EXERCISE-INDUCED HYPOALGESIA: AN EXPERIMENTAL STUDY USING ELECTRICAL MUSCLE STIMULATION

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Background and aims: Exercise-induced hypoalgesia (EIH) is characterized by a generalized reduction in pain sensitivity mediated through central and peripheral mechanisms. However, it remains unclear which components of exercise, such as muscle contraction, joint movement, and brain activity in the motor cortex, contribute to EIH. This study aimed to investigate the analgesic effects of muscle contraction with and without joint movement using electrical muscle stimulation (EMS) and voluntary muscle contraction, and to explore the mechanisms underlying muscle contraction-induced EIH by analyzing the influence of skeletal muscle mass index (SMI) and conditioned pain modulation (CPM).

Methods: Twenty-three healthy young adults participated in four interventions: muscle contraction with and without joint movement using EMS, voluntary muscle contraction with joint movement, and rest. SMI and CPM were measured before the first intervention. The pressure pain threshold (PPT) was evaluated in both contracted and non-contracted body parts before and after each intervention. Correlations between changes in PPT, SMI, and CPM were analyzed.

Results: The three muscle contraction interventions increased PPT at the contracted sites, while voluntary muscle contraction also increased PPT at the non-contracted sites. Specifically, muscle contraction alone without joint movement showed strong positive correlations between changes in PPT and SMI, but not with CPM.

Conclusions: These findings suggest that muscle contraction plays a significant role in EIH, alongside joint movement and brain activity in the motor cortex. Furthermore, the analgesic effects of muscle contraction appear to be predominantly mediated through peripheral mechanisms originating from muscle tissues, rather than the central nervous system.

III-D.65

HOW NERVE MECHANICAL INTERFACE TREATMENT IMPACT IN PRE-SURGICAL CARPAL TUNNEL SYNDROME PATIENTS? A RANDOMIZED CONTROLLED TRIAL

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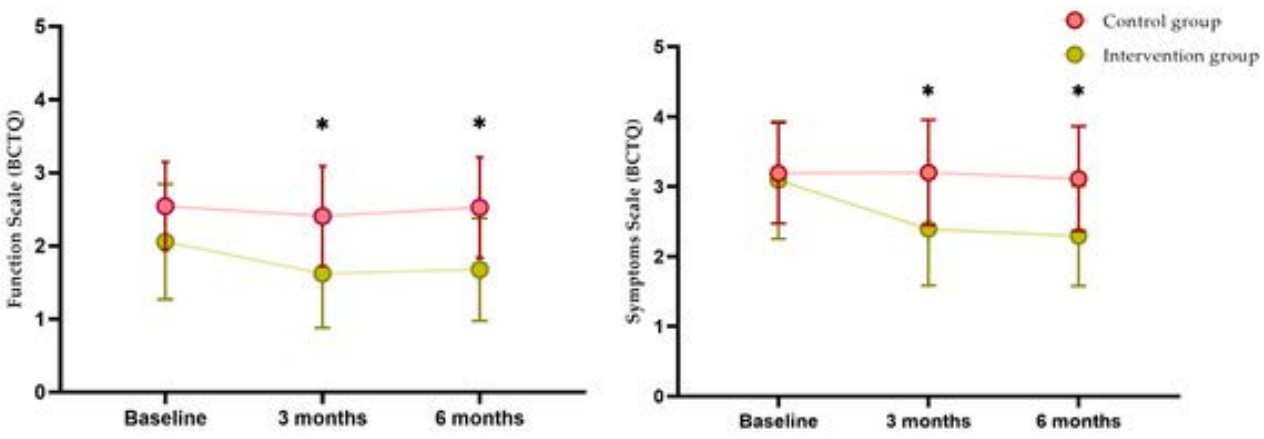
Background and aims: Carpal tunnel syndrome (CTS) have a high burden on the spanish healthcare system. No alternative treatment is provided during waiting period. In addition, severe patients with co-morbidities are underrepresented. To determine if nerve mechanical interface treatment improve symptoms, function, and quality of life in presurgical CTS patients.

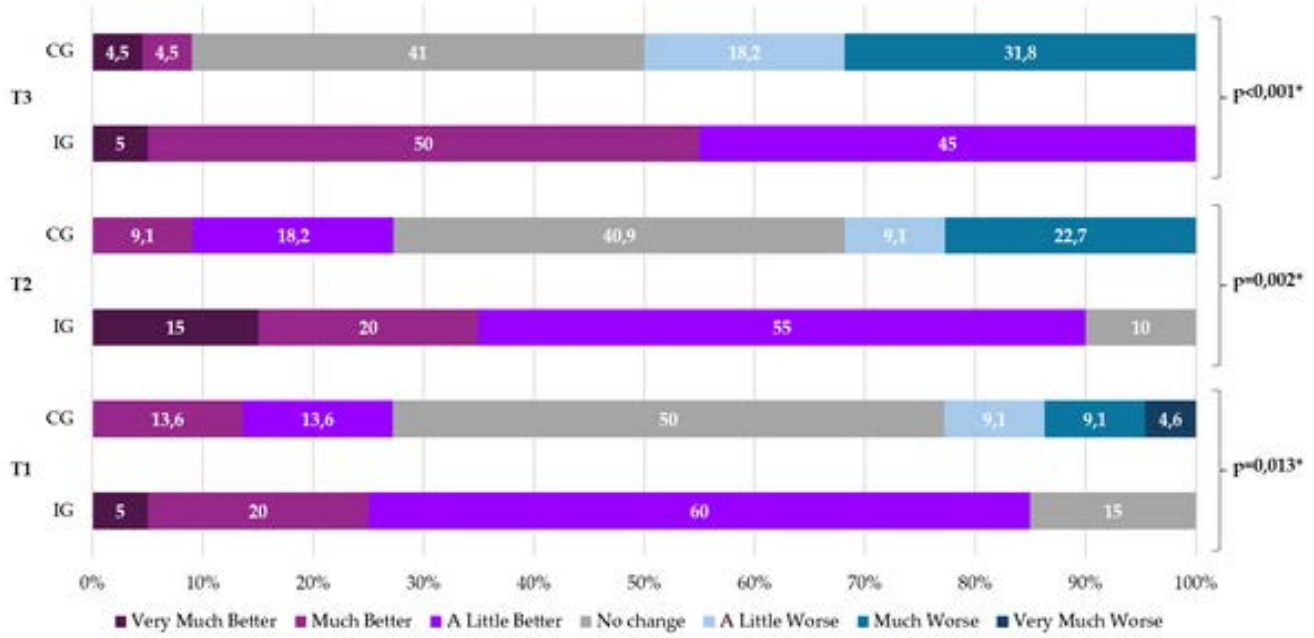
Methods: A randomized controlled trial and intention-to-treat analysis. Forty-two patients with an electrodiagnostic of carpal tunnel syndrome included in surgery waiting list of Spanish Public Healthcare System were analysed.

Intervention group (n=20) received a 45-min session/per week of instrumented-assisted manual therapy for 3 weeks. Control group (n=22) remained on the waiting list. Boston Carpal Tunnel Questionnaire (BCTQ) was the primary outcome. Pain, Paraesthesia and Nocturnal Symptoms intensity (Visual Analogue Scale), hand mechanical threshold, MOS-sleep scale and patient's satisfaction were assessing as secondary outcomes at 3- & 6-months follow-up.

Results: Intervention seems to be beneficial for BCTQ (Function and Symptoms scale), Pain, Paraesthesia and Nocturnal Symptoms intensity, at 3- and 6-months follow-up ($p<.05$). 5/8 items in the MOS-sleep reported significant differences at 6-month against control group ($p<.05$). There was a significant increase in the amount of sleep in the intervention group ($p=.006$; $\eta^2=.18$) at 6 month. Mechanical threshold at 3-months follow-up ($p=.048$; $\eta2=.10$). At 6 months, intervention group patients were satisfied (100%), as opposed to controls, who felt a worsening of their condition (50.1%).

		T2 – 3 Months				T3 – 6 Months			
		Mean±SD	F	p-value	η^2	Mean±SD	F	p-value	η^2
Boston Carpal Tunnel Questionnaire									
Symptoms Severity Scale (1-5)	CG	3.20±.76	11.99	**.001***	0.24	3.11±.75	13.24	**.001***	0.25
	IG	2.39±.81				2.29±.71			
Function Severity Scale (1-5)	CG	2.41±.68	7.44	**.010***	0.16	2.53±.69	8.47	**.006***	.23
	IG	1.62±.74				1.68±.70			
Pain intensity (mm)	CG	54.0±24.2	12.63	**.001***	0.25	56.4±24.6	21.56	**<.001***	0.36
	IG	28.4±23.5				24.0±20.2			
Paresthesia (mm)	CG	63.35±24.4	10.42	**.003***	1.03	60.6±27.3	19.63	**<.001***	1.23
	IG	31.6±28.9				23.6±19.2			
Nocturnal symptoms (mm)	CG	63.35±24.4	10.42	**.003***	1.03	60.6±27.3	19.63	**<.001***	1.23
	IG	31.6±28.9				23.6±19.2			
Hand mechanical threshold (1.65-6.65)	CG	3.24±.49	4.17	**.048***	0.10	3.10±.42	3.53	.068	0.08
	IG	2.96±.64				2.87±.46			
MOS-Sleep									
Sleep Disturbance (0-100)	CG	45.5±24.3	3.13	.085	0.07	44.1±22.7	9.60	**.004***	0.20
	IG	34.3±20.7				26.4±13.2			
Sleep Adequacy (0-100)	CG	54.1±10.5	.07	.792	0.01	58.8±21.0	.05	.826	0.01
	IG	57.5±21.4				63.9±13.5			
Daytime Somnolence (0-100)	CG	31.6±16.7	1.41	.242	0.04	34.3±11.9	.78	.383	0.02
	IG	23.8±20.0				29.9±15.1			
Snoring (0-100)	CG	40.6±34.2	.37	.547	0.01	40.7±31.4	.02	.885	0.01
	IG	49.0±33.2				45.2±32.5			
Awaken short of breath or headache (0-100)	CG	25.5±22.2	.36	.551	0.01	20.1±20.9	4.71	**.036***	0.11
	IG	16.2±23.9				6.7±9.2			
Sleep Problem Index I (0-100)	CG	40.6±13.7	.31	.583	0.01	38.8±15.8	6.22	**.017***	0.14
	IG	32.6±17.4				25.4±10.1			
Sleep Problem Index II (0-100)	CG	38.8±14.1	1.24	.272	0.03	39.8±15.9	7.74	**.008***	0.17
	IG	30.8±16.3				27.0±9.6			
Quantity of sleep (hours)	CG	6.1±1.5	.58	.452	0.02	5.8±1.6	8.40	**.006***	0.17
	IG	6.4±1.0				6.8±.7			





Conclusions: Nerve mechanical interface treatment is beneficial for pre-surgical CTS patients. One hundred percent of the treated patients, characterized by moderate andsevere CTS with associated comorbidities, were satisfied.

III-D.66

MULTIFACTORIAL RISK ASSESSMENT OF FALLS AND PRESENCE OF KINESIOPHOBIA IN POSTMENOPAUSAL WOMEN WITH OSTEOPOROSIS AND OSTEOPENIA

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Background and aims: A multidisciplinary and therapeutic approach is used for patients with osteoporotic bone fractures. Falls, leading to injuries, including bone fractures, are a common occurrence in early suffering from osteoporosis. Multifactorial risk postmenopausal women with osteoporosis and osteopenia is of great importance in identifying risk factors for the occurrence of falls, their removal and implementing preventive measures.

Methods: A total of 54 female patients with postmenopausal osteoporosis, 37 female patients with postmenopausal osteopenia and 63 age- and gender-matched controls were enrolled in this study. Demographic data of the participants was recorded. In all participants, the level of kinesiophobia, fear of falling, psychological status, health-related quality of life and osteoporosis self-efficacy were evaluated using the Tampa scale of kinesiophobia (TSK).

Results: Postmenopausal patients with osteoporosis and osteopenia had higher levels of kinesiophobia than controls ($p<0.05$). However, there was no difference between the levels of kinesophobia in patients with osteoporosis and osteopenia ($p>0.05$). Patients were divided into two groups according to their kinesiophobia levels: high and low kinesiophobia groups. All clinical parameters were negatively affected in patients in the high kinesophobia group ($p<0.05$).

Conclusions: Osteoporosis and osteopenia may cause kinesiophobia in postmenopausal women. Increased fear of falling, impaired psychological status, poor quality of life, decreased perception of self-efficacy and prolonged duration of menopause in postmenopausal women with osteoporosis and osteopenia seem to be associated with a higher level of kinesiophobia. As physical activity is essential for bone health, postmenopausal women with osteoporosis and osteopenia should be counselled about the importance of overcoming kinesiophobia.

III-D.69

COPING MECHANISMS MAY INFLUENCE SELF-MANAGEMENT STRATEGIES IN PATIENTS WITH CHRONIC LOW BACK PAIN: A KUWAITI-BASED STUDY

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Background and aims: Patients‘ engagement with self-management strategies (SMS) is crucial in managing chronic low back pain (CLBP) and relies on appropriate information from clinicians. However, patients have differing coping response strategies (CS) which may be influenced by culture and impact SMS success. The aim of this project was to explore patients` CS and their perceptions of SMS in Kuwait.

Methods: Semi-structured face-to-face interviews with 10 patients with CLBP were conducted in one public hospital setting in Kuwait by a single male physiotherapy researcher (MM), a Kuwaiti national. CLBP patients were recruited from Physiotherapy waiting lists. Interviews explored patients' perceptions of their CS utilised to manage their low back pain. Interview data were transcribed verbatim and codes and themes reported.

Results: Several different CS were reported between patients including medication use, levels of anxiety, and depression, and the use of active and passive CS. However, praying and hoping was a common spiritual CS among all patients who lead their life within the Islamic culture. Most patients reported a lack of information and guidance on home exercise programme (HEP) given to them by their physiotherapists.

Conclusions: There appear to be different CS employed in this CLBP population in Kuwait who may require different SMS. Adherence to a HEP appears to be linked to those exhibiting active CS and reduced reliance on medication. Clinicians need to be aware of the influence of culture on CLBP patients and which CS are employed by patients to develop appropriate targeted SMS for patients with CLBP.

III-D.70

BRAIN NETWORK ALTERATIONS FOLLOWING VR REHABILITATION FOR PHANTOM LIMB PAIN RELIEF - CASE REPORT

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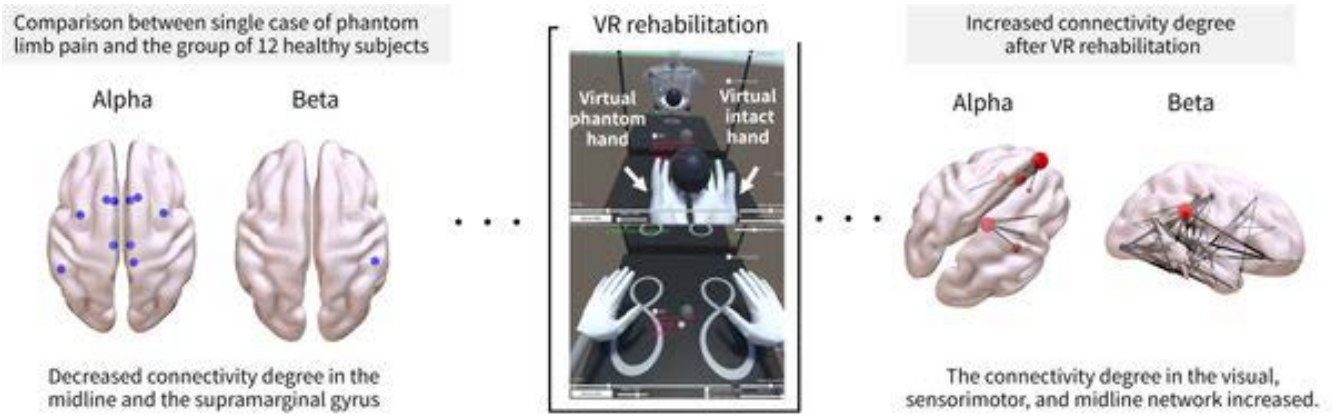
Background and aims: Phantom limb pain (PLP) occurs in the absence of sensory input, often following amputation or brachial plexus injury. Our previous studies showed that voluntary movement of the phantom limb is associated with lower PLP severity (Osumi, Sumitani et al., 2015) and that VR rehabilitation enabling such movement can reduce pain (Osumi, Sumitani et al., 2017, 2019). However, the brain mechanisms underlying these effects remain unclear. This study aimed to explore changes in brain networks associated with PLP relief after VR rehabilitation in a single case.

Methods: One male patient experiencing severe PLP after brachial plexus injury was studied. EEG (64 channels) was recorded during a 3-minute resting state, pre- and post-20-minute VR rehabilitation. After Preprocessing included artifact removal, source estimation was performed using sLORETA, followed by amplitude envelope correlation to calculate connectivity between 68 nodes (Desikan-Killiany atlas). Connectivity degree was calculated, representing the number of functional connections for each region. The patient's connectivity degree was compared with data from 12 healthy controls using the singcar tool (R package), and regions showing increased connectivity post-VR were identified.

Results:



The patient showed significantly lower pre-VR connectivity in midline and parietal regions compared to controls ($p < 0.05$). Post-VR, pain relief was observed along with increased connectivity in the visual, sensorimotor, and midline networks.

Conclusions: VR rehabilitation-induced pain relief appears to involve the visual, sensorimotor, and midline networks, consistent with the role of visual input in creating movement illusions and the midline default mode network in pain modulation.

III-D.71

FFECT OF MULTIMODAL HIGH-INTENSITY TRAINING COMPARED TO MODERATE-INTENSITY TRAINING ON INSPIRATORY MUSCLE FUNCTION IN PERSONS WITH CHRONIC NONSPECIFIC LOW BACK PAIN: PRELIMINARY RESULTS

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Background and aims: High-intensity training (HIT) is more effective than moderate-intensity training (MIT) in improving biopsychosocial outcomes for persons with chronic nonspecific low back pain (CNSLBP). However, the underlying mechanisms for these effects are still unknown. Therefore, this study aims to explore the underlying mechanisms by comparing the effects of HIT and MIT on inspiratory muscle (IM) function, as impaired diaphragm function has been associated with CNSLBP.

Methods: Sixty-four participants with CNSLBP will be randomly assigned to either HIT or MIT. Both groups undergo a 12-week exercise program consisting of two 1.5-hour sessions per week. Training sessions consist of multimodal physical training, including cardiorespiratory, general resistance, and core strength training, with the only difference between HIT and MIT being the exercise intensity. Primary outcomes are IM strength, IM endurance, and exercise-induced IM fatigue. All outcomes will be measured at baseline and after completing the 12-week exercise program.

Results: 40 participants have completed the program so far (HIT: n=20, MIT: n=20). Preliminary data indicate that IM strength increased by 9% and IM endurance improved by 28%, while exercise-induced IM fatigue increased by 1% in the HIT group. In the MIT group, MIP increased by 8%, IM endurance improved by 15%, and exercise-induced IM fatigue increased by 3%.

Conclusions: Preliminary results suggest that HIT may be more effective in improving IM endurance, while both HIT and MIT had similar positive effects on IM strength. A more detailed statistical analysis will be conducted upon the study's completion.

III-D.76

EFFICACY OF SPINE HIGH-VELOCITY-LOW-AMPLITUDE THRUST MANIPULATIONS IN PATIENTS WITH RADICULOPATHY: A SYSTEMATIC REVIEW WITH META-ANALYSIS

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Background and aims: Radiculopathy is a prevalent condition characterized by nerve root irritation, leading to pain, disability, and reduced quality of life. Despite existing multimodal approaches, the efficacy of individual interventions, such as High-Velocity Low-Amplitude Thrust (HVLAT) manipulations, remains unclear. This systematic review and meta-analysis aimed to evaluate the efficacy of HVLAT in reducing pain and disability in cervical, thoracic, and lumbar radiculopathy patients.

Methods: A systematic search of five databases (to May 2024) identified randomized controlled trials (RCTs) comparing HVLAT with sham interventions, non-recommended therapies, or physiotherapy. Primary outcomes included pain intensity and disability; secondary outcomes were range of motion (ROM) and quality of life (QoL). Risk of Bias (RoB) was assessed using the Cochrane RoB Tool, and the certainty of evidence was rated with GRADE. Data synthesis utilized a random-effects model.

Results: Eleven RCTs (991 participants) were included. HVLAT significantly reduced pain and disability in the short- and medium-term compared to sham (MD: -1.20, 95% CI: -1.90, -0.50) and non-recommended therapies (MD: -1.16, 95% CI: -1.54, -0.77). However, no benefits were observed in long-term follow-ups. HVLAT combined with physiotherapy showed improved outcomes versus physiotherapy alone. Evidence for thoracic radiculopathy was lacking. Overall RoB was high, and evidence certainty ranged from very low to moderate.

Conclusions: HVLAT may offer short- to medium-term benefits for cervical and lumbar radiculopathy, but long-term efficacy remains unclear. Methodological limitations in current studies necessitate high-quality RCTs to confirm findings and inform clinical guidelines.

III-D.77

THE IMPACT OF PHYSIOTHERAPISTS' COMMUNICATION SKILLS ON HEALTH OUTCOMES IN PATIENTS WITH CHRONIC MUSCULOSKELETAL PAIN

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Background and aims: Chronic pain, affecting 20% of adults worldwide, remains a leading cause of disability. Among the various factors influencing health outcomes in individuals with chronic musculoskeletal pain (CMP), the quality of communication between therapists and patients plays a particularly significant role. This study investigated the influence of physiotherapists' communication skills on the health outcomes of CMP patients.

Methods: A randomized controlled trial was conducted with 51 patients with CMP. Participants were allocated into three groups: Group A viewed a 5-minute video about pain, demonstrating „good" communication; Group B observed „poor" communication; and Group C (the control group) received no intervention. The communication provided was based on the Calgary-Cambridge Guide. Pre- and post-intervention evaluations included a series of validated questionnaires (CSI,STAI-40,BIPQ, VAS,TAMPA,PCS,PSQ,GRC,WAI-SR), objective assessment (pain pressure threshold measurements) and the distribution of pain were recorded.

Results: Repeated measures ANOVA indicated changes in pain variables, although most outcomes showed no statistically significant differences across groups. A significant difference in perceived pain change (GRC) was observed (F=8.45, p=0.001), with Group A reporting greater improvement (2.26±1.56) than Group B (1.78±1.62) and the control group (0.24±0.97) (p=0.001). Independent t-tests also showed a significant reduction in STAI trait scores in Group A compared to Group B.

Conclusions: Effective clinical communication skills demonstrated by therapists significantly enhance patients' perceived pain improvement and reduce anxiety levels as a personality trait, compared to poor communication practices, even during short-term interventions. Communication skills are essential for healthcare professionals, as they play a pivotal role in improving outcomes for patients with CMP.

III-D.78

EXPLORING THE COMBINED IMPACT OF OCULOMOTOR EXERCISES AND HANDS-ON THERAPY IN NON-SPECIFIC NECK PAIN

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Background and aims: This study aimed to evaluate the effectiveness of adding oculomotor techniques and hands-on treatments to routine exercise protocols for individuals with non-specific chronic neck pain (NSCNP).

Methods: A total of 38 volunteers (22 females, 16 males; mean age 35.92 ± 12.18 years) diagnosed with NSCNP were randomly divided into two groups: the Routine Exercise Group (REG, n=19) followed a conventional exercise program, while the Oculomotor and Hands-On Group (OHG, n=19) received additional oculomotor exercises and myofascial release techniques. Both groups underwent treatment for six weeks, with three sessions per a week. On non-session days, the REG performed routine exercises at home. Sociodemographic datas were collected using a structured questionnaire. Pain intensity was measured with a visual analog scale (VAS), and joint position sense (JPS) was assessed with using a laser pointer. The TAMPA Kinesiophobia Scale evaluated kinesiophobia, while the Bournemouth Neck Pain Disability Questionnaire assessed neck pain-related disability.

Results: Statistically significant improvements were found in both groups for VAS, Range of Motion (ROM), JPE, TAMPA, and Bournemouth Questionnaire scores at sixth week ($p<0.05$). The OHG had significantly greater improvement on the Bournemouth Questionnaire compared to the REG ($p<0.05$).

Conclusions: Oculomotor exercises target visual-motor control and cervical proprioception and myofascial therapies address soft tissue restrictions and improve circulation, which may alleviate pain and restore functional mobility for the multifaceted nature (musculoskeletal and neurosensory dysfunctions) of chronic neck pain. Incorporating these therapies not only enhances patient outcomes but also offers a cost-effective and accessible strategy for both clinicians and patients with chronic neck pain.

Acknowledgement: Support was provided by The Scientific and Technological Research Council of Türkiye (TÜBİTAK).

III-D.79

A RARE COMPLICATION OF LUMBAR MEDIAL BRANCH RADIOFREQUENCY AND DORSAL ROOT GANGLION PULSED RADIOFREQUENCY: A CASE OF BENIGN PAROXYSMAL POSITIONAL VERTIGO

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Background and aims: Lumbar MBRF(medial branch radiofrequency) is applied to the facet joints in facet-related pain and DRG(dorsal root ganglion) PRF(pulsed radiofrequency) is widely applied to radicular pain. Side effects and complications that may occur are also known. Among these effects, transient, localized burning pain and self-limiting back pain, spinal infection, light-headedness, flushing, sweating, nausea, hypotension, syncope and nonpostural headaches may occur after the procedure.

Although transient dizziness due to orthostatic hypotension is relatively common after lumbar MBRF and DRG PRF, we could not find any case of a patient developing Benign Paroxysmal Positional Vertigo (BPPV) in the literature. In this article, we, for the first time, report a case of a patient who developed BPPV after Lumbar MBRF and DRG PRF.

Methods: Lumbar MBRF and DRG(dorsal root ganglion) PRF(pulsed radiofrequency) treatments used for the treatment of low back pain have various risks of complications. A 69-year-old female patient applied to our clinic due to back and right leg pain. The patient developed dizziness immediately after the lumbar MBRF and DRGPRF procedure. The patient was diagnosed with Benign Paroxysmal Positional Vertigo by the ENT physician. After the Epley maneuver, the patient‘s dizziness completely resolved. It should be kept in mind that dizziness that develops after lumbar procedures is not always due to orthostatic hypotension, but may also develop due to BPPV.

Results: After the Epley maneuver, the patient‘s dizziness completely resolved.

Conclusions: Not only the vasovagal reaction but also the possibility of BPPV should be kept in mind in dizziness that develops during interventional pain procedures.

III-D.80

PREGABALIN AND LACOSAMIDE DO NOT ENHANCE OXYCODON INDUCED RESPIRATORY DEPRESSION: AN EXPLORATORY STUDY IN HEALTHY VOLUNTEERS

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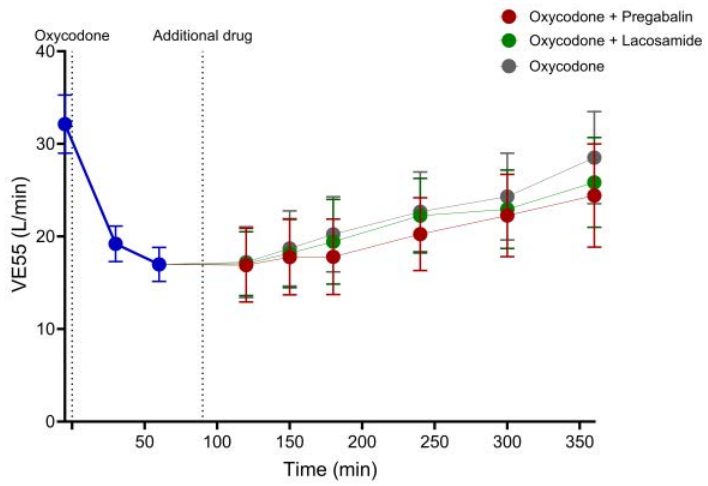
Background and aims: Opioids are commonly used to treat moderate to severe acute and chronic pain, but are associated with serious adverse effects such as respiratory depression. Often, adjuvant medication, such as anti-epileptics or anti-depressants, are prescribed for their opioid-sparing properties. Recent studies have observed increased mortality rates in patients on opioids combined with anti-epileptics, possibly due to an increased risk of respiratory depression. Here, we explored the additive effect of pregabalin and lacosamide on opioid-induced respiratory depression.

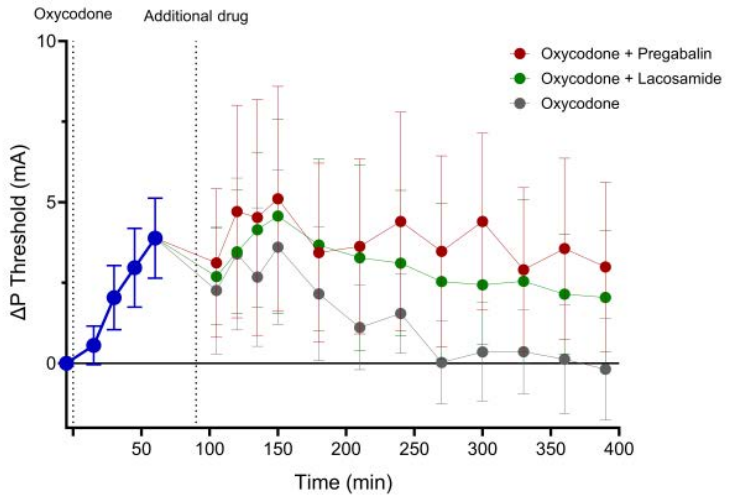
Methods: We conducted a double-blind, randomized trial in 24 healthy volunteers who received oxycodone (10 mg), followed by either pregabalin (150 mg) or lacosamide (150 mg) 90 minutes after oxycodone intake. Respiratory depression was measured using hypercapnic ventilatory responses at 30- to 60-minutes intervals. Furthermore, analgesic effect was obtained by electrical pain threshold and tolerance levels. A separate, non-randomized arm with oxycodone only was added to evaluate the oxycodone only effect on respiratory depression and pain relief.

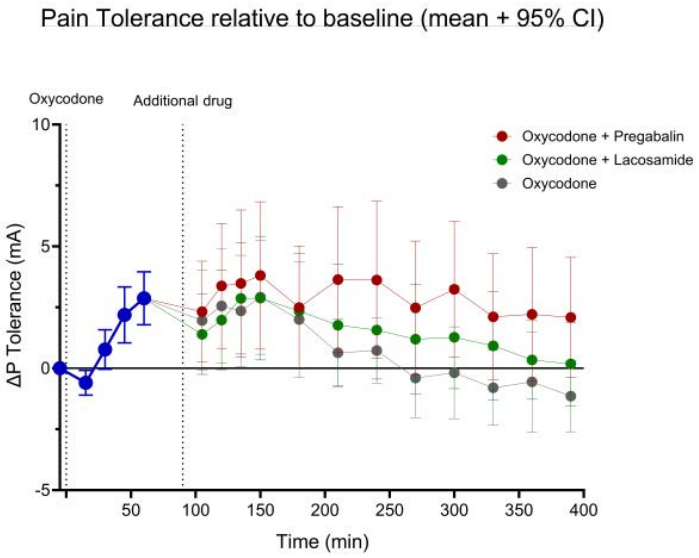
Results: Oxycodone induced significant respiratory depression (VE55 decline of 50.64% ($p < 0.001$)). Pregabalin and lacosamide did not induce additional respiratory depression. Oxycodone induced a significant analgesic effect on pain threshold ($p < 0.0001$) and pain tolerance ($p < 0.0001$). An additional analgesic effect was observed for pregabalin (pain threshold $p = 0.0228$; pain tolerance $p = 0.01$) but not for lacosamide.

VE55 (mean + 95% CI)



Pain Threshold relative to baseline (mean + 95% CI)





Conclusions: Pregabalin and lacosamide did not induce additional respiratory depression in volunteers with oxycodone-induced respiratory depression. An additive analgesic effect was observed for pregabalin but not for lacosamide.

III-D.82

EFFECT OF REMIMAZOLAM ON POSTOPERATIVE DELIRIUM AND COGNITIVE FUNCTION IN ADULTS UNDERGOING GENERAL ANESTHESIA OR PROCEDURAL SEDATION: A META-ANALYSIS OF RANDOMIZED CONTROLLED TRIALS

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Background and aims: Remimazolam is a short-acting benzodiazepine indicated for general anesthesia and procedural sedation. This study compared its effect on cognitive function to that of propofol in adult participants after surgery.

Methods: We searched electronic databases, including PubMed, EMBASE, CENTRAL, Web of Science, and SCOPUS, for relevant studies. The primary outcome was the proportion of participants who experienced delirium or cognitive dysfunction after surgery. Secondary outcomes included the hemodynamic stability and PONV. We estimated the odds ratio and mean difference with 95% confidence intervals using a random-effects model.

Results: A total of 1295 patients from 11 randomized controlled trials were included. The incidence of postoperative delirium was 7.1% in the remimazolam group and 10.4% in the propofol group, showing no significant difference (OR 0.74, 95% CI 0.39 to 1.42; P = 0.3692; I^2 = 32%). More favorable cognitive function was observed in the remimazolam group compared to the propofol group (MD 1.06, 95% CI 0.32 to 1.80; P = 0.005; I^2 = 89%). Remimazolam also lowered the incidence of hypotension and bradycardia compared to propofol. No significant difference was observed in PONV.

Conclusions: Remimazolam provided hemodynamic stability during surgery compared to propofol, did not increase the risk of postoperative delirium, and cognitive dysfunction. It may be a valuable choice for general anesthesia or procedural sedation. Well-designed studies are needed in the future to confirm these results.

III-D.84

„COMBINING ULTRASOUND GUIDED ERECTOR SPINAE PLANE BLOCK AND INTERSCALENE BLOCKS: A NEW INNOVATIVE ANAESTHETIC APPROACH FOR AXILLOBRACHIAL BYPASS SURGERY IN COMPROMISED PATIENTS"

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Background and aims: Upper extremity arterial occlusion,with an incidence of 8-25%, is less frequent than lower extremity occlusion and is treated with thrombectomy or bypass. Post-tuberculosis lung disease (PTLD) increases perioperative risks due to chronic respiratory issues.This case report aims to highlight the anaesthetic management of a 53-year-old obese female (BMI 30.0) with a history of PTLD presenting with severe left hand pain and chronic cough with a thrombus in left axillary artery being posted for axillary brachial artery bypass using a basilic vein graft, after an unsuccessful emergency thrombectomy.Considering her preoperative morbid status,regional anesthesia in the form of combined Erector spinae plane block(ESPB) and interscalene brachial plexus block (IBPB)was chosen.

Methods: Ultrasound-guided left ESPB was given at thoracic T1-T2 spinal level with 28 ml 0.5% bupivacaine and 4 mg dexamethasone along with left IBPB with 6 ml 0.5% bupivacaine and 4 mg dexamethasone to anaesthetise the surgical incisions extending from axilla to medial side of left upper arm up to elbow and 5-6cm incision beneath left clavicle.

Results: The ESPB and IBPB provided effective surgical anaesthesia and postoperative analgesia for eight hours. No additional intraoperative supplementation was required.The surgery was uneventful without any complications.

Conclusions: Regional anaesthesia, specifically combining ESPB and interscalene blocks, can provide effective and safe anaesthesia for axillary brachial artery bypass in patients with compromised pulmonary function, avoiding the risks associated with general anaesthesia.

III-D.85

EVALUATION OF THE RESULTS OF EARLY AND LATE POSTOPERATIVE PAIN IN ELECTIVE TOTAL HIP ARTHROPLASTY

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Background and aims: Investigate the morphine consumption and the pain NRS at discharge and 6 weeks after hip replacement surgery in aspects of ERAS and patient early mobilization.

Methods: A prospective parallel group, randomized study is conducted at the Hospital of Traumatology and Orthopaedics from March 2023.

Patients who have eligible and agreed to participate were guided according to ERAS principles, which include local infiltration analgesia with 0.2 % Ropivacaine solution and intravenous Dexamethasone 8 mg were administered to patients before surgery. After surgery, patients were prescribed multimodal analgesia Acetaminophen as well as Etoricoxib 90 mg p/o administrated.

If the pain NRS exceeded 6 patients received Morphine 10 mg s/c, which was noticed in the protocols. Morphine consumption throughout the hospitalization period is measured. SG (study group) patients receiv full meal at least 2 hours after surgery and are verticalized to standing on the day of surgery 5-6 hours after surgery. DVT prophylaxis with enoxaparin 3d and Rivaroxaban for 4w for CG (control group) and Aspirin 100 mg X 2 for 6 weeks for patients.

Pain NRS at rest and during movement on the day of discharge and 6 weeks after surgery is evaluated.

Results:

Measurement/group	Study (N 41)	Control(N46)	Significance
Pain at rest discharge (NRS) Median (IR)	0 [0; 1],	2.0 [1; 3]	0.000
Pain at mov discharge (NRS) Median (IR)	2.0 [0; 5]	3.0 [1;7]	0.000
Pain during movement 6 weeks. Median (IR)	0 [0; 1],	1.0 [0; 7]	0.046
Total morphine consumption mg Median (IR)	10.0 [0; 50]	20.0 [0; 130]	0.007

Conclusions: Early patient mobilization and a multi-functional approach contribute to better patient well-being and lower pain intensity.

Lower opioid consumption was observed in SG patients.

Lower pain intensity was observed in SG patients on the day of discharge and 6 weeks after surgery.

Low pain intensity is not related to the use of pain killers.

III-D.87

REAL WORLD EXPERIENCE OF INDIRECT DECOMPRESSION WITH AN INTERLMINAR DEVICE TO TREAT NEUROGENIC CLAUDICATION AND RADICULOPATHY

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Background and aims: Low back pain is the leading cause of medical visits in the US, accounts for approximately $100 billion dollars in care each year.

Sciatic-like pain is a debilitating, incapacitating condition, common treatment is spinal fusion but fear of the procedure and high rate of postoperative 'Chronic Pain Syndrome' has related mental health consequences.

StabiLink® is an Interlaminar Spinal Fixation System (ILFS), requiring Minimally Invasive Surgery (MIS) the device is placed between the spinous processes, away from the neural elements creating decompression of the affected nerves.

AIMS:

1. Define the characteristics of patients eligible for an interlaminar fixation system (ILFS) in the treatment of neurogenic claudication and radiculopathy.
2. Report on the rate of pain improvement at 12 days post-operation

Methods: Self-controlled Case Series data from patients who underwent ILFS from 10/21/2022 to 11/21/2024.

Patients eligible for the procedure include those with diagnosis of degenerative disc disease, lumbo-sacral spinal stenosis and radiculopathy.

Ineligible patients were those with more than grade I instability, or with pars defect.

Pain was measures with the Visual Analog Scale (VAS) 0-10, pre-procedure and 12 days post-procedure.

Improvement categories were as VAS Score: -1 to-3- Mild, -4 to -6- Moderate; <-7 Excellent Pain improvement

Results: Seventy-two patients underwent the procedure of which 9.73% had excellent pain relief, 22.22% moderate, 61.11% mild, 6.95% no change and only one patient (1.39%) had mild worsening of the pain.

Conclusions: StabiLink® requires a minimally invasive option with promising sciatic-like pain reduction even at the immediate post-operatory period.

AUTHOR INDEX

A

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B

C

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D

E

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H

I

J

K

L

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M

N

Ö

Ø

P

Q

R

S

Ü

U

V

W

X

Y

Z

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