The 2nd Pain Science in Motion Colloquium at a glance

Mira Meeus, Mari Lundberg

After the successful first edition of Pain Science in Motion in Brussels in March 2015, the second edition will be hosted by Karolinska Institutet in Stockholm in March 24 to 25, 2017. The goal of the colloquium is again to provide a platform for PhD students to discuss their work, meet fellow pain researchers, to learn from leaders in the field of pain science, and to facilitate collaboration in pain sciences across various disciplines.

The focus of the research colloquium is on research methodology in pain sciences from different fields, rather than on research findings or (clinical) applications. Both junior PhD students in the early stage of preparing their first study as well as more experienced researchers in the final year of their PhD submitted their work. The PhD students will hence get the opportunity to present their research hypothesis, research design, eventual (preliminary) results, and to discuss possible risks or barriers and solutions and to receive valuable input.

Next to the presentations of the PhD students, attendees can learn from leaders in the field of pain science. The following pain experts will lecture about their specific research skills and guide attendants in various topics during their “Meet the Expert” workshops.

(1) Christina Opava (full professor in Physiotherapy at Karolinska Institutet) will lead a workshop on how to write successful grant applications based on her role as vice president of the European League Against Rheumatism (www.eular.org).

(2) Geert Crombez (full professor of Health Psychology at the Ghent University) will reflect on his experiences of combining clinical and experimental pain research.

(3) Michel Coppieters (full professor in Musculoskeletal Physiotherapy at Vrije Universiteit Amsterdam) will reflect on academic research, in Stockholm.

(4) Karin Grävare Silbernagel (assistant professor Physical therapy at the University of Delaware) will give a workshop on what to think about before you submit your paper, based on her experiences as an associate editor for JOSPT.

All together, the program will encompass the plenary key note lectures and “Meet the Expert” workshops, and the selected 36 oral parallel presentations and 36 interactive poster discussions presented by the PhD students. This will all take place at Karolinska Institutet, Sweden’s single largest center of medical academic research, in Stockholm.

Below we will present the short abstracts of the selected oral presentations. More information about the present colloquium, the 2015 version and future editions can be found at the website of Pain in Motion: http://www.paininmotion.be/education/pain-science-in-motion and practical information and registrations for the present edition can be found at http://ki.se/en/nvs/pain-science-in-motion-2017.

On behalf of the Scientific Committee

Prof Dr Mira Meeus
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Chair of the Scientific Committee

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Rehabilitation

Decreased pressure pain sensitivity following a modern neuroscience approach in patients with chronic spinal pain: a randomized controlled trial

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Introduction: This study evaluated the effects of a modern neuroscience approach vs usual care physiotherapy on pain measurements in patients with chronic spinal pain.

Methods: One hundred fifteen patients with chronic low back and neck pain were randomized into the experimental or control therapy. Before and after, patients underwent pressure pain thresholds (PPTs). Endogenous pain modulation was measured with a cold pressor test.

Results: Patients exhibited increased primary PPTs after therapy in both therapy groups (P < 0.001), but the increase was larger for the experimental therapy (P = 0.035). Similar effects were found for the secondary PPTs, with an increase for both groups (P < 0.001) and a larger increase for the experimental therapy (P = 0.035). Endogenous pain inhibition did not significantly improve (P > 0.05).
Discussion: The results showed that PPTs increased after therapy for both therapies, with larger increases for the experimental group.

Process evaluation: Several patients were not able to complete the cold pressor test because of increased sensitivity.

Surface electromyographic activity of the upper trapezius before and after a single dry needling session in female office workers with trapezius myalgia

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Introduction: Dry needling (DN) is a common myofascial treatment technique. However, the working mechanisms and importance of local twitch responses (LTRs) remain unclear.

Methods: Twenty-four women with work-related trapezius myalgia were asked to perform 2 typing tasks, which were respectively followed by a resting pause and DN treatment. Electromyographic activity was measured before and after each typing task and intervention.

Results: The increase in electromyographic activity was significantly smaller 10 minutes after DN, compared with rest. These differences were independent of eliciting LTRs.

Discussion: Because of the physiological effects of DN, the muscle may recover more quickly after the typing task, compared with rest. Eliciting LTRs may be associated with the degree of irritability of the MTrP.

Process evaluation: Because of the electrodes, it was not possible to palpate the MTrP during DN. However, a thorough palpation and marking of the MTrP before electrode placement minimised this problem.

Determining predictive outcome factors for a multimodal treatment program in patients with low back pain: a retrospective cohort study

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Introduction: Multimodal treatment programs are widely recommended for rehabilitation of low back pain (LBP), but no studies have adequately explored the factors that predict treatment outcome.

Methods: Predictive outcome factors were identified in 153 acute and 412 chronic LBP patients who participated in a multimodal treatment program.

Results: Acute LBP patients with kinesiophobia and elderly chronic LBP patients with high levels of depression, back pain intensity, and disability were at risk for poor treatment outcome.

Discussion: These specific patients with LBP may need different or adapted treatment approaches to improve their chances on favorable treatment outcomes.

Process evaluation: Baseline variables were selected based on previous reports and may not be the most relevant.

Validity and test–retest reliability of the Dutch modified Perceived Deficits Questionnaire to examine cognitive symptoms in women with chronic whiplash, nontraumatic idiopathic neck pain, and fibromyalgia

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Introduction: The Perceived Deficit Questionnaire (PDQ) investigates self-perceived cognitive problems on 4 subdomains. Its validity and reliability were investigated by Takasaki et al., resulting in a modified PDQ (mPDQ). The objective of this study is drawing up a valid and reliable Dutch version of the mPDQ for patients with chronic neck pain.

Method: Forward translation, committee approach, and backward translation were combined. A 2-way random intra-class correlation coefficient evaluated test–retest reliability. Internal consistency, discriminative power, and correlations between mPDQ and objective cognitive tests were evaluated.

Discussion: The research by Takasaki et al. was not repeated on a Dutch version of the PDQ. A pretest phase on a pilot group was not performed.

Process evaluation: The application of a bilingual phase contained the possibility of a recall bias and was replaced by the Cronbach alpha.

An interdisciplinary study on the relation between fear, attention, and sensorimotor control in back pain chronicity: movement-related factors

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Introduction: Persistent low back pain (LBP) is studied across several research domains, and is often associated with the presence of disturbed sensorimotor control of the trunk muscles, and maladaptive psychological factors (eg, fear, hypervigilance). The goal of this interdisciplinary study is to combine the knowledge of 2 research domains, ie, Psychology and Rehabilitation Sciences, to investigate connections between the abovementioned factors and differences across several LBP populations.

Methods: Four groups of subjects—chronic LBP, recurrent LBP during a pain flare, recurrent LBP in a pain-free period, and healthy volunteers—will be examined with a rapid arm task paradigm. Feedforward activation of the trunk muscles will be measured with surface electromyography. Furthermore, fear for movement will be induced through an electrical nociceptive stimulus to the back and sensory processing will be evaluated with electroencephalography.

Discussion: The type of LBP and amount of fear are hypothesized to influence feedforward and sensory processing. In addition, sensorimotor control, sensory processing, and fear of pain are expected to be related to each other.

Process evaluation: The biggest challenge during the set-up of the study design was the necessity to combine several evaluation techniques, which each have their limitations.
Influencing pain-free neck range of motion with virtual reality: unravelling the role of fear
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Introduction: Harvie (2015) revealed that altering visual feedback in a virtual reality (VR) environment influences pain-free range of motion (ROM) in patients with neck pain. The relatively large variability between participants in this study suggests that some patients are more prone to this manipulation than others. This study aims to identify whether patient characteristics, such as fear of movement or the duration of pain, are associated with the amount of change in pain-free ROM in a VR environment.

Methods: Patient characteristics are assessed using the Tampa scale, PFActS-C, FABQ, NDI, and NPRS. Patients wear VR glasses and rotate their head until the onset of pain. Visual feedback about the amount of movement is either equal, 20% less, or 20% greater than the actual rotation. Regression analyses are used to determine which characteristics are associated with changes in pain-free ROM.

Discussion: Based on associative learning theories, we hypothesize that individuals who report their pain to be threatening will be more prone for this illusion.

Trait sensory processing and anxiety profiles in people with central sensitisation in a chronic low back pain population—a mixed methods study
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Introduction: This study investigates whether an individual’s trait sensory sensitivity may have predisposed them to central sensitization (CS). The aim, across a nonspecific chronic low back pain (NSCLBP) population, is to (1) identify the range of CS, trait anxiety and sensory profiles, and any relationships between them; and (2) explore the context in which CS develops.

Methods: This is a mixed methods study using a quantitative (QUAN) theoretical driver and a concurrent nested qualitative (QUAL) design. Adults (N = 200) with NSCLBP and CS are recruited from physiotherapy clinics in New Zealand, England, and Ireland. Outcome measures: Central Sensitisation Inventory; Adult Adolescent Sensory Profile; State-Trait Anxiety Inventory; Marlowe Crowne Social Desirability questionnaires. Descriptive and correlation statistics will identify the sensory processing and anxiety profiles, and their interrelationships. The QUAL semi-structured interviews will be analysed using thematic analysis.

Discussion: The use of a nested QUAL exploration enhances the depth of understanding of context, and may highlight further research areas.

Process evaluation: The philosophical challenges of mixed methods research can be solved using the nested design following the same theoretical driver (QUANT) in both components.

Pain mechanisms in patients with nonspecific low back pain
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Introduction: Neuropathic, nociceptive, and central pain mechanisms can play a role with low back pain. Diagnosing these pain mechanisms in clinical practice is important. For this means, a classification scheme is proposed. Clinimetric features of this scheme are, however, to be determined.

Method: Hundred participants with chronic nonspecific low back pain will be included. Data regarding signs, symptoms (eg, pain intensity, provocations, and bodily location), functional and psychosocial characteristics will be gathered. These data will be interpreted by 2 clinical experts to determine the interrater reliability of the scheme. Besides, quantitative sensory testing (QST) measurements (thermal and mechanical pain thresholds) will be taken to determine the validation of the scheme. Quantitative sensory testing will be assessed at local and remote sites: L4, Achilles tendon, and wrist.

Results: Results of the research project are suspected to be available by April 2017.

Discussion: To minimize bias, the researcher performing the QST measurements will be blind to case/control status. Besides the QST, the interrater reliability of the algorithm will be determined by 2 independent investigators.

Which factors influence mobility, pain, and functioning in patients with adhesive capsulitis of the shoulder: a prospective study
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Introduction: The involvement of central sensitization (CS) in patients with adhesive capsulitis (AC) of the shoulder remains unclear. The study aimed to assess what the evolution was in the clinical presentation, the pain cognitions, and the parameters indicating CS. Also the relation between CS and pain cognitions relative to the clinical presentation of AC was investigated.

Methods: Patients with AC of the shoulder were included. Pain cognitions were assessed with the Pain Catastrophizing Scale and the Pain Vigilance and Awareness Questionnaire. Mobility and strength of shoulders were measured and for investigation of CS pressure algometry, conditioned pain modulation and temporal summation were applied.

Discussion: No strong conclusions were made. The results suggested that no pain catastrophizing and hypervigilance were present in patient population. No specific conclusions could be made after interpreting the correlations. A conditioned pain modulation effect and positive pain cognitions seemed to be good indicators for the progression in the clinical presentation in patients with AC.

Process evaluation: This is a continuation of other research project (2015) which reported results obtained from baseline. It compares these baseline measurements with a 9-month follow-up.
**Patient-led goal setting is an effective treatment of chronic low back pain**

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**Introduction:** The aim of this study was to establish the difference in clinical effectiveness and costs of a patient-led goal setting intervention compared with usual care in chronic low back pain.

**Methods:** Assessor-blinded randomized controlled trial with 2 arms (1) patient-led goal setting (2) usual care.

**Discussion:** Our findings confirm that a patient-led goal-setting intervention is an effective intervention for the management of chronic low back pain. Several study design components should be considered in future research.

**Process evaluation:** Recruitment of participants was difficult and initial high drop-out rate with usual care participants was experienced. Protocol was amended to maximize usual care retention with good effect. One investigator conducted the intervention group which supports a consistent method however limits the generalizability for the intervention across multiple clinicians. Questionnaire data collection was lengthy and time consuming. Future studies should consider improved formatting and an online platform to collect data.

**The energetic efficiency of walking in geriatric low back and radicular leg pain**

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**Introduction:** Age-related mobility decline may be driven by energetic inefficiency; this may be augmented directly or indirectly by painful conditions. We hypothesize that among older adults with low back and radicular leg pain i.e., directly provoked with walking: (1) efficiency will worsen with pain onset and (2) condition presence will be related to inefficiency in pain-unprovoked states.

**Methods:** In a comparative study of older adults with and without this condition, metabolic gas analysis will be used to measure the energy cost of walking (walking economy) on a standard walking course. Pain intensity will be measured at each lap. Walking economy will be measured for early (pain-unprovoked) and late (pain-provoked) states of walking.

**Discussion:** Preliminary data support our hypotheses. Walking economy worsens with pain onset, but remains unchanged in the controls; condition presence is linked to inefficiency in pain-unprovoked states. However, more data are needed.

**Process evaluation:** Sample size estimates and recruitment are challenging, but collaborations with statisticians and MDs are proving fruitful.

**How feasible is the biopsychosocial primary care intervention “Back on Track”?**

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**Introduction:** When a new therapeutic intervention is developed, it is of utmost importance to systematically evaluate its feasibility, whether the intervention is provided as intended, and found health effects are attributable to the intervention. The purpose of this study is to perform a process evaluation of a new biopsychosocial physiotherapist–led primary care intervention (Back on Track) for a subgroup of patients with nonspecific chronic low back pain.

**Methods:** Process evaluation will be conducted in patients (n = 18), primary care physiotherapists (n = 4), and physiatrists to (n = 4) either receiving, providing, or referring to the Back on Track program. Qualitative and quantitative analysis will be performed in terms of treatment expectations and credibility (Credibility and Expectancy Questionnaire), treatment fidelity and dose delivered (audio recordings of therapy sessions), reach (attendance lists), dose received (ie, exposure and satisfaction; evaluative questionnaire for patients, focus groups for physiotherapists, and physiatrists).

**Results:** Data collection is ongoing as patients still receive therapy.

**Discussion:** If the primary care intervention seems feasible for this subgroup of patients, findings will be used to optimize and implement the intervention.

**Process evaluation:** Each measurement has its practical (time-consuming) procedures with specific expertise needed to perform adequate evaluations. The process evaluation will be executed in the upcoming months.

**Association between health care utilization and musculoskeletal pain. A 21-year follow-up of a population cohort**

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**Introduction:** Individuals with musculoskeletal pain have an increased health care utilization (HCU) but longitudinal data on the association between HCU and pain are limited. The aim of this study was to investigate HCU associated with musculoskeletal pain in a 21-year follow-up.

**Methods:** A sample of 3928 subjects, aged 20 to 74 years, was selected in 1995 (response rate 62%). Surveys were sent out after 3, 8, 12, and 21 years, included chronic pain prevalence, HCU, and general health. Logistic regression analysis was used to calculate odds ratio (95% confidence interval) for baseline variables associated with HCU.

**Results:** The predictors for high HCU are chronic pain, female sex, and increasing age. The defined trajectories for HCU are stable low, stable high, increasing, and decreasing over time.

**Discussion:** The results will be discussed in the light of the course of musculoskeletal pain, trajectories for HCU, and clinical implications.

**Process evaluation:** Challenges and demands for follow-ups.

**Levels of physical activity and sedentary behaviour among patients with degenerative disk disease who are to undergo spinal fusion surgery**

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Sensitization in individuals with adhesive capsulitis

Expanded distribution of pain as a sign of central sensitization, perceptions, catastrophizing, and daily functioning among patients who are to undergo lumbar fusion surgery.

Method: Physically active and sedentary behaviour were assessed with GT3X+ accelerometers for 66 patients. Data were compared with the WHO’s recommendations on PA for health.

Results: On average, the patients spent 186 minutes on moderate-intensity and 6 minutes on vigorous-intensity PA level per week. Patients averaged 542 minutes of sedentary behaviour per day.

Discussion: Nearly half of the study population did not reach the WHO’s recommendation for moderate-intensity PA per week and two-thirds of the patients did not spend any time in vigorous-intensity PA. Increasing PA must be considered when designing prehabilitation protocols for this patient group.

Facial emotion recognition and theory of mind in musculoskeletal persistent pain patients: a cross-sectional study

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Introduction: Patients with persistent pain show different brain activities in “emotional” areas. We investigated the explicit recognition of facial expressions and Theory of Mind in persistent pain.

Methods: This study consisted of 10 patients with persistent musculoskeletal pain and 10 healthy participants, matched by sex and age. To evaluate explicit emotional processing, we used the Ekman database (happiness, anger, sadness, disgust, and fear). The Reading the Mind in the Eyes (RMET) was used to evaluate the recognition of mental states. We acquired accuracy and response time.

Results: In explicit emotional processing, the incorrect responses were 30% in the patient group and 16.5% in the control group. The patient group had more difficulty in recognizing faces of anger, sadness, and disgust. The average response time was 1776.19 (milliseconds) in the patient group and 1400.1 in the control group. In the RMET, the incorrect response was 51.9% in the patient group and 41.6% in the control group. The average response time was 7239.40 (milliseconds) in the patient group and the 7974.76 in the control group.

Discussion: The results showed that patients with persistent pain might have impairments in recognition of other’s emotions, as well as in representing other people’s affective mental states.

Expanded distribution of pain as a sign of central sensitization in individuals with adhesive capsulitis

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Introduction: The role of central sensitization (CS) in adhesive capsulitis (AC) is unknown. Expanded distribution of pain is a sign that CS and pain drawings might be useful to identify pain distribution in AC. The primary aim is to quantify the distribution of pain with pain drawings and evaluate its test–retest reliability in AC. The association between pain drawings and clinical symptoms and measures of CS will be explored.

Methods: Subjects with primary AC will be included. All participants will complete pain drawings, questionnaires, and quantitative sensory testing. Spearman correlation coefficients between the pain area and clinical symptoms and CS measures will be calculated.

Discussion: Pain drawings might constitute an easy way for early identification of CS in AC pain costly laboratory equipment is usually necessary for diagnosis of CS.

Process evaluation: The study design is cross sectional, so firm conclusions about the predictive role of pain drawings on AC will not be drawn.

A multiple case study design for measuring effects of transdisciplinary pain neuroscience education

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Introduction: Effects of pain neuroscience education (PNE) are underlined in meta-analyses, unknown however remains which parts of the process of PNE are important. The aim of this multiple case study is to evaluate the changes regarding central sensitisation, perceptions, catastrophizing, pain sensitivity, and functioning following the process of transdisciplinary PNE.

Methods: Ten adult patients with chronic neck–shoulder pain will be included at a transdisciplinary pain management centre in the Netherlands. Digital questionnaires will measure aspects of central sensitization, perceptions, catastrophizing, and daily functioning. Furthermore, pressure pain thresholds and mechanical pain thresholds will be tested. Data will be collected 4 times before the intake, before the first PNE session, before the second PNE session, a week and 4 weeks after this PNE session.

Discussion: By this approach, the individual process of PNE is evaluated giving insight in possible effects or noneffects during this process. This will give insight in patients’ profiles, effects, and the therapeutic process.

Process evaluation: There is no process evaluation yet, possible limitations are the duration and repetition of questionnaires and selection bias.

Basic science

No cardiovascular abnormalities during physical activity in chronic fatigue syndrome

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Introduction: Evidence suggests an association between pain modulation and cardiovascular systems. Therefore, it is possible that alterations in cerebral blood flow (CBF) and heart rate variability (HRV) during physical activity can explain pain and postexertional malaise in patients with chronic fatigue syndrome (CFS).

Methods: A randomized cross-over experiment including 20 CFS and 20 healthy subjects was used to examine the change in temporal summation of pressure pain (pain modulation), CBF, and HRV during physical and emotional stress (to control for potential bias), as well as their association mutually as with postexertional malaise.

Results: Results indicate that patients with CFS do not show altered CBF/HRV in previous research and do not provide evidence for their role in explaining pain (increases) during and after exercise in these patients.

Discussion: These results refute the suggested alterations of CBF or HRV in previous research and do not provide evidence for their role in explaining pain (increases) during and after exercise in these patients.

Precise somatosensory functional magnetic resonance imaging—mapping of finger tips in complex regional pain syndrome patients with upper limb affection

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Introduction: Impaired somatosensory perception is a typical clinical finding in patients with complex regional pain syndrome. Interrelation between hands representation size in the somatosensory cortex (S1) and sensory deficits are suspected, but studies using new high spatial resolution functional magnetic resonance imaging (fMRI) to measure hand representation in S1 are rare.

Methods: Ten patients participated in this study. Functional MRI measurements were performed on a 3 Tesla MRI scanner. Pneumatic stimulus fingertips were used to deliver tactile stimuli to the finger tips. Data analysis was performed using an automated analysis protocol. Two-point discrimination threshold was tested with a wheel discriminator.

Results: Patients showed a negative correlation on d1–d5 distance and 2-point discrimination (r = −0.70; P = 0.01).

Discussion: Using high spatial resolution fMRI and our analysis protocol, it is possible to display the exact position of each finger in S1. This may be an interesting tool for further studies dealing with neuropathological changes due to chronic pain.

Process evaluation: Increased statistical power with more patients will be necessary to detect further associations between behavioural and imaging parameters in these patients.

Elevations in pressure pain threshold by exercise are reduced by blood flow occlusion to that limb in healthy adults

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Introduction: The mechanisms underlying exercise-induced hypoalgesia (EIH) are incompletely understood.

Methods: Pressure pain thresholds (PPTs) were assessed over the quadriceps of one leg and the first dorsal interosseous of both arms in 36 healthy adults before and after 5 minutes of leg cycling exercise and rest. During the 5-minute period, blood flow to one arm was occluded by a cuff. Pain ratings during occlusion were also measured.

Results: Pain ratings increased over time similarly between exercise and rest (P > 0.40). PPTs at all sites were similar before and after rest (P > 0.51), but, consistent with exercise-induced hypoalgesia (EIH), increased significantly after exercise at the leg and arms (all P < 0.02). However, the increase in PPT in the occluded arm was significantly smaller (−14.4%, P < 0.001) than in the nonoccluded arm.

Discussion: Blocking blood flow to a limb during exercise attenuated EIH in that limb, suggesting that peripheral factors contribute to EIH.

Process evaluation: Short duration exercise was used to minimise the time participants spent with their arm occluded, but it was unknown whether it would be sufficient to elicit EIH. It was also unclear whether blood flow occlusion would influence PPT through a conditioned pain modulation effect.

Decreased regional gray matter volume in women with chronic whiplash-associated disorders: relationships with cognitive deficits and disturbed pain processing

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Introduction: Functional magnetic resonance imaging data were obtained from a participant with complex regional pain syndrome (CRPS) while completing hand grasping movements with her CRPS-affected and unaffected hands, both before and after a session of pain neuroscience education (PNE) and a control condition session of exercise education (CEE).

Methods: Voxelwise analysis was conducted using a single General Linear Model in which each scan was coded as belonging to either the CRPS-affected hand or unaffected hand for each of the following conditions: pre-CEE, post-CEE, pre-PNE, post-PNE. Fixed-effects analyses contrasted activity across hands and conditions. Subjective pain rating scales were administered before and after each session.

Results: Pain ratings were not influenced by either intervention. Both PNE and CEE reduced activity during affected hand movements in areas outside the classic “pain matrix” that modulate with perceived pain. Pain neuroscience education increased activity in perceptive-attention regions of the brain. Nocticeptive regions also increased in activity after PNE.

Discussion: Changes across “pain matrix” regions were found post-PNE. The increased nociceptive and perceptive-attention regions suggest that a single session of PNE may be able to influence activity in nociceptive brain regions, perhaps through a top-down influence centered on decreased threat perception.

Process evaluation: Limitation in analysis of single-subject design.

Pain neuroscience education effect on pain matrix processing in an individual with complex regional pain syndrome: a single-subject research design

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Introduction: Functional magnetic resonance imaging data were obtained from a participant with complex regional pain syndrome (CRPS) while completing hand grasping movements with her CRPS-affected and unaffected hands, both before and after a session of pain neuroscience education (PNE) and a control condition session of exercise education (CEE).

Methods: Voxelwise analysis was conducted using a single General Linear Model in which each scan was coded as belonging to either the CRPS-affected hand or unaffected hand for each of the following conditions: pre-CEE, post-CEE, pre-PNE, post-PNE. Fixed-effects analyses contrasted activity across hands and conditions. Subjective pain rating scales were administered before and after each session.

Results: Pain ratings were not influenced by either intervention. Both PNE and CEE reduced activity during affected hand movements in areas outside the classic “pain matrix” that modulate with perceived pain. Pain neuroscience education increased activity in perceptive-attention regions of the brain. Nocticeptive regions also increased in activity after PNE.

Discussion: Changes across “pain matrix” regions were found post-PNE. The increased nociceptive and perceptive-attention regions suggest that a single session of PNE may be able to influence activity in nociceptive brain regions, perhaps through a top-down influence centered on decreased threat perception.

Process evaluation: Limitation in analysis of single-subject design.
Introduction: This study examined alterations in gray matter volume (GMV) in patients with chronic whiplash-associated disorders (CWAD) compared with chronic idiopathic neck pain (CINP) and healthy controls (HC). In addition, relationships between GMV, and measures of cognition and pain were assessed.

Methods: Ninety-three women (28 HC, 34 CINP, 31 CWAD) were enrolled. First, T1-weighted magnetic resonance images (MRI) were acquired to examine GMV alterations in brain regions involved in processing of cognition and pain. Next, cognitive deficits, maladaptive pain cognitions, central sensitization symptoms, and hyperalgesia were assessed.

Results: Gray matter volume of the lateral orbitofrontal, supramarginal, and posterior cingulate cortex was decreased in CWAD compared with HC. In addition, GMV of the superior supramarginal, and posterior cingulate cortex was decreased in CINP compared with HC. Lower regional GMV correlated with higher cognitive deficits in CINP (r = 0.515 to -0.657). Lower regional GMV correlated with higher cognitive deficits in CWAD (r = -0.499 to -0.619).

Discussion: No conclusions can be drawn on the causality of the observed relationships.

Process evaluation: Poor MRI data quality was revealed in 12 participants. Accordingly, these data were excluded.

Influence of morphine and naloxone on pain modulation in rheumatoid arthritis, chronic fatigue syndrome/fibromyalgia, and controls

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Introduction: The exact effects of frequently prescribed opioids on central pain modulation in patients with central sensitization pain are still unknown.

Methods: A randomized, double-blind, placebo-controlled cross-over trial was set. Ten chronic fatigue syndrome (CFS)/fibromyalgia (FM) patients, 11 rheumatoid arthritis (RA) patients, and 20 controls were randomly allocated to the experimental (10 mg morphine or 0.2 mg/mL naloxone) or placebo (2 mL Aqua) group. Pressure pain thresholds and temporal summation were assessed by algometry. Conditioned pain modulation efficacy and deep tissue pain pressure were assessed by adding ischemic occlusion at the opposite upper arm.

Discussion: This study revealed antihyperalgesia effects of morphine and placebo in CFS/FM and RA patients. Nonetheless, the opioid system seems not dominant in (enhanced) bottom-up sensitization (temporal summation) or (impaired) endogenous pain inhibition (conditioned pain modulation) in patients with CFS/FM or RA.

Process evaluation: The inclusion criteria strengthened the methodological quality.

Risk factors of pain in breast cancer survivors: a systematic review and meta-analysis

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Introduction: Breast cancer remains the number one lethal malignancy. With rising incidence and decreased mortality, the number of breast cancer survivors has increased. Consequently, sequelae and complications, such as pain, are becoming more important. The aim of this review was to identify risk factors for the development of pain in breast cancer survivors.

Methods: PubMed and Web of Science were systematically screened for studies encompassing risk factors for pain in breast cancer survivors. Meta-analyses were performed for the risk factors described in more than one article. Sensitivity analysis was performed in case of high heterogeneity across studies.

Results: Twelve studies were found eligible. Meta-analysis was performed for 13 factors. Significant differences for the odds of developing chronic pain were found for age (odds ratio [OR]: 0.61, 95% confidence interval [CI]: 0.44–0.86, P = 0.004), body mass index (BMI) (OR: 1.42, 95% CI: 1.13–1.77, P = 0.002), education (OR: 1.27, 95% CI: 1.10–1.47, P = 0.001), lymphedema (OR: 2.58, 95% CI: 1.93–3.46, P < 0.00001), axillary dissection (OR: 1.27, 95% CI: 1.10–1.47, P = 0.001), chemotherapy (OR: 1.54, 95% CI: 1.15–2.06, P = 0.004), hormone therapy (OR: 1.35, 95% CI: 1.17–1.56, P < 0.0001), and radiotherapy (OR: 1.39, 95% CI: 1.12–1.72, P = 0.003). Sensitivity analyses were performed for age, BMI, radiotherapy, and type of surgery. Age (<50–55), BMI (>30), and radiotherapy remained significant risk factors.

Prognosis

The influence of self-efficacy on the prognosis of rheumatoid arthritis: a systematic review and meta-analysis

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Introduction: Self-efficacy has been suggested as a factor of poorer outcome in rheumatoid arthritis. The aim of this study was to evaluate the role of self-efficacy on the prognosis of rheumatoid arthritis.

Methods: A systematic review with meta-analysis (Prospero registration CRD42016046432) was performed, using electronic databases. Observational studies investigating the effect of self-efficacy on the prognosis of rheumatoid arthritis were included.

Results: Twenty-three studies were included. Higher levels of self-efficacy were associated with better quality of life and lower pain, disability, disease severity, fatigue, and psychological measures.

Discussion: The findings of this study may contribute to understand the role of self-efficacy on the prognosis of rheumatoid arthritis, permitting a better understanding of this pathology and elicit a large amount of information to establish new treatment strategies.

Process evaluation: N/A.
Discussion: Lack of uniformity across studies in defining pain, follow-up, measurement tools, and cut-off values for the diagnosis of pain was found, resulting in greater inter-study variability.

Psychology

Cross-cultural adaptation and validation of the Fear Avoidance Beliefs Questionnaire (FABQ) among survivors of torture
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Introduction: Pain-related fear, avoidance behaviour, and hypervigilance are all concerns that affect the refugee that has been tortured, and can lead to disuse and disability.

Methods: Two physiotherapists, 2 occupational therapists working with refugees/survivors of torture, and 10 English-speaking refugees attending Center for Victims of Torture were invited to assist in the cross-cultural adaptation of the original FABQ. A professional Swahili translator and native Swahili-speaking health professionals were consulted for the forward and back translation process.

Results: Swahili FABQ showed good face and content validity. It also showed excellent internal consistency (with Cronbach alpha = 0.741 as a whole). The intraclass correlation coefficients (95% CIs) to establish test–retest reliability for the subsections of the FABQ (physical activity subscale and work subscale) were as follows: physical activity: 0.741 (0.598–0.842); work: 0.779 (0.673–0.861).

Discussion: The Swahili version of the FABQ can be recommended as a simple, valid, and reliable tool for use among Swahili-speaking survivors of torture with chronic pain.

Perceived injustice and external attribution in chronic pain
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Introduction: Perceived injustice (PI) is linked to greater pain intensity, mental health problems, and poor recovery outcomes in treatment. External attribution (EA) might be a possible mediator, as EA may lead to increased feelings of distress, helplessness, and more pain. This study aims to investigate the link between PI and EA.

Methods: The link between PI and EA is investigated by a correlational study including 124 chronic pain patients. The following outcomes are used in this study: intensity/extensiveness of pain, perceived injustice (IEQ), and the perceived causes for the pain given by the patients (IPQ-R). The causes are classified into categories (eg, internal/external/psychological/somatic) and Pearson correlations are calculated.

Discussion: A possible limitation of this study is the fact that patients often provide short and crude answers when asked for the causes of their pain, leaving these answers open for interpretation by the researcher. Therefore, 2 independent researchers will classify the causes and discuss the differences.

Process evaluation: Currently, all data have been collected and entered into SPSS Statistics and the classifying of the causes will commence soon.

Assessment

The quality of measurement properties of physical capacity tasks designed to assess functioning in persons with low back pain: a systematic review using the COSMIN checklist/standards
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The influence of physical activity and fatigue on the nociceptive flexion reflex in healthy subjects: a randomized cross-over study
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Introduction: The nociceptive flexion reflex (NFR) is a polysynaptic reflex induced by painful stimuli resulting in a withdrawal response. This study aims to examine whether physical activity and fatigue influence the NFR.

Methods: To detect the NFR threshold, electrocutaneous stimulation is applied over the sural nerve and the stimulation intensity which elicits an involuntary contraction of the hamstrings is recorded using electromyography. Fifty healthy people and their NFR threshold will be measured prior and following a rest period and 2 fatiguing tasks (physical and cognitive). To evaluate the influence of physical activity, subjects will wear an accelerometer.

Discussion: It is hypothesized that fatigue leads to reduced NFR thresholds, whereas a more active lifestyle causes increased NFR thresholds.

Process evaluation: It was challenging to select the type and duration of the cognitive task. To exclude any effect due to...
repetitiveness of the NFR measurement, a rest protocol was added.

**Individual quality of life in people with Amyotrophic lateral sclerosis/motor neuron diseases, with and without pain**

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**Introduction:** Amyotrophic lateral sclerosis is a motor neuron disease (MND) and affected people usually die within 3 to 5 years. Except for the typical neurological symptoms, pain is common, although sparsely scientifically documented in terms of suffering and association with quality of life (QoL). This study aims to explore important areas for QoL for people with amyotrophic lateral sclerosis/MND with and without pain and if there are any differences in the quantitative experiences between the 2 groups.

**Methods:** Fifty participants diagnosed with MND were selected from specialist teams in Sweden during 1 year. At their ordinary visit to the specialist team, participants were interviewed once in accordance with The Schedule for the Evaluation of Quality of Life-Direct Weighting (SEIQoL-DW). The Brief Pain Inventory—Short Form (BPI-SF) was completed by the patient after the visit. The analyses include both qualitative and quantitative analyses.

**Discussion:** SEIQoL-DW with the mixed method design contributes to valuable knowledge, because it involves both the individual perspective of QoL, but also quantitative calculations.

**Process evaluation:** One challenge when several research assistants are involved in data collection is the interrater reliability of the interview procedure. Another challenge is to reach credibility of the qualitative analyses.

**Does conditioned pain modulation predict the outcome of carpal tunnel surgery?**

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**Introduction:** Carpal tunnel release is the most commonly performed hand surgery; however, up to 25% of patients are unimproved. Conditioned pain modulation (CPM) is a risk factor for chronic postsurgical pain but has not been investigated in carpal tunnel surgery (CTS).

**Methods:** A CPM paradigm was developed following a systematic review; normative data generated from a control study. Conditioned pain modulation was tested before and after surgery in 25 patients using pressure pain threshold as test stimulus and heat pain at 46.5°C as conditioning stimulus. Additional measures included the patient-completed Boston Carpal Tunnel Questionnaire (BCTQ), numerical pain scales, Neuropathic Pain Symptom Inventory (NPSI), and global rating of change. Analysis will include CPM effect and correlation of CPM effect with pain, NPSI and BCTQ scores, and surgical outcome.

**Results:** Pending.

**Discussion:** Before surgery, patients with CTS have long-standing pain; endogenous pain modulation may be depleted. CPM has not been previously investigated in CTS; efficiency of CPM may be associated with surgical outcome and persistent pain.

**Process evaluation:** Defining an appropriate CPM paradigm in CTS was challenging.

**Article history:**

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