



PAIN SCIENCE IN MOTION III

Savona University Campus, May 31st – June 2nd, 2019.

Savona University Campus

The University Campus of Savona, detached site of the University of Genova, was built in the first nineties by a renewal intervention of an old military site. It is a smart Campus powered by an autonomous microgrid and renewable energy sources. This allows it to be almost self-sustained.

The Campus also counts a state-of-the-art new smart building that is completely self-powered by both solar and geothermal energy.

It hosts about 1800 students attending bachelor and master courses in Management and Energy Engineering, Sports Science, Communication Science and Physiotherapy.

It is equipped with a library and a Canteen and provides about 100 places for resident students.

Several research laboratories and research consortiums conduct studies mainly in the field of energy engineering and environmental monitoring and collaborate with technologic enterprises, also them hosted in two of the buildings of the Campus.

Here in the academic year 1999-2000, thanks to a collaboration with the Vrije Universiteit Brussels, was established the first Italian [master in Musculoskeletal Physiotherapy](#) that opened the door for the creation of a new specialization in Physiotherapy in Italy. Thanks to its success (it enrolls 128 students each year) a few years ago was created a clinical outpatients service and a research laboratory (ReheLab - Rehabilitation and Engineering Laboratory) where three post docs fellows and five PhD students work. Main study fields are about the use of the technologies to develop and validate new low-cost devices for rehabilitation, about placebo in physiotherapy and about the body perception and representation in chronic pain.



Scientific Program

OPENING DAY: FRIDAY, MAY 31ST. SIBILLA CONFERENCE HALL – PRIAMAR FORTRESS

16.30	Delegates Registration
17:45	Institutional opening
18:00	Opening Lecture PLACEBO AND NOCEBO: DIFFERENT CONTEXTS, DIFFERENT PAINS Speaker: Prof. Fabrizio Benedetti
18:45	Welcome cocktail

DAY 1: SATURDAY, JUNE 1ST, 2019. UNIVERSITY CAMPUS OF SAVONA, ITALY

8.00	Delegates Registration and poster set-up – CAMPUS LIBRARY	
9.00 - 9.45	Keynote lecture – ROOM AN1 IMPROVING THE TIMELINESS AND EFFECTIVENESS OF REHABILITATION IN CHRONIC MUSCULOSKELETAL PAIN Speaker: Prof. Rob Smeets – Chair: Marco Testa	
9.55 - 10.55	Oral Session 1 – ROOM LA218 Pain and physical activity, physical function and aerobic capacity Chair: Andrea Dell'Isola 1. The influence of physical activity on the nociceptive flexion reflex in healthy adults: a cross-sectional study. <i>Evy Dhondt</i> (Belgium) 2. Association between central sensitization and lifting and aerobic capacity in patients with chronic low back pain. <i>Jone Ansuategui Echeita</i> (the Netherlands) 3. Daily physical activity levels are predictive of the effectiveness of conditioned pain modulation. <i>Sophie Van Oosterwijck</i> (Belgium)	Oral Session 2 – ROOM MA218 Chronic low back pain Chair: Mira Meeus 1. What is the influence of low back pain on muscular activity and movement during a cyclical dynamic task? <i>Andy Sanderson</i> (UK) 2. Chronic low back pain and nutrition in adults: a cross-sectional observational study. <i>Ömer Elma</i> (Turkey/Belgium) 3. Comparison of the impact of central sensitization between patients with chronic low back pain and knee osteoarthritis. <i>Katsuyoshi Tanaka</i> (Japan) 4. Cognitive behavioral therapy for insomnia within a comprehensive treatment approach for chronic spinal pain: a randomized controlled trial. <i>Eveline Van Looveren</i> (Belgium)

11.00 - 11.25	Coffee Break – CAMPUS LIBRARY, GROUND FLOOR				
11.25 – 12.30	Poster sessions – CAMPUS LIBRARY, GROUND FLOOR				
	S1 - Poster session 1: Pain Management Chair: Margot De Kooning Tour starting at: 11:25 P1. Comparison of Acceptance & Commitment Therapy (ACT) to a multi-modal Physical Therapist intervention (PT) and ACT/PT combination for chronic pain. <i>Jennifer Gansen</i> (USA) P2. The effectiveness of Robot-Erigo to reduce the pain in patients with advanced MS (EDSS ≥7). <i>Mehrnaz Hamedani</i> (Italy) P3. P4. Innovation in pain management: using a participatory design method to develop a relapse prevention intervention. <i>Stefan Elbers</i> (The Netherlands) P5. A multi-parameter approach for objective measurement of pain. <i>Yacine Hadjiat</i> (Singapore)	S2 - Poster session 2: Quantitative sensory testing Chair: Angelo Schenone Tour starting at: 12:00 P6. Inter-rater reliability of temporal summation, thermal and pressure pain thresholds in a musculoskeletal trauma population. <i>Nicola Middlebrook</i> (UK) P7. Effects of conditioned pain modulation on the nociceptive flexion reflex in healthy adults: a systematic review. <i>Evy Dhondt</i> (Belgium) P8. Central pain modulation in children with functional abdominal pain related disorders. <i>Roselien Pas</i> (Belgium) P9. Quantitative Sensory Testing in Breast Cancer Patients: validity and reliability. <i>Lore Dams</i> (Belgium) P10. Thermographic patter of the hand and its relationship with the pressure pain threshold in Fibromyalgia patients. <i>Antonio Casas</i> (Spain)	S3 - Poster session 3: Spinal pain Chair: Jessica Van Oosterwijck Tour starting at: 11:25 P11. Modulation of the time of action of a placebo analgesic cream in neck pain patients. <i>Eleonora Maria Camerone</i> (Italy) P12. Health history, trigger points and widespread pressure pain hypersensitivity in subjects with chronic neck pain: a preliminary study. <i>Matteo Castaldo</i> (Italy) P13. Investigating the variability of spinal movement during walking in people with chronic neck pain. <i>Feras Alsultan</i> (UK) P14. Efficacy of Pain neuroscience education plus cognition-targeted motor control to improve cervical motor control: secondary analysis of a RCT. <i>Ward Willaert</i> (Belgium) P15. The interaction between chronic spinal pain and sleep quality in people with chronic spinal pain and comorbid insomnia: a systematic review. <i>Eveline Van Looveren</i> (Belgium)	S4 - Poster session 4: Culture Chair: Kayleigh De Meulemeester Tour starting at: 12:00 P16. Religious Beliefs and Practices in Relation to Chronic Pain among Multiethnic Communities. <i>Charbel Najem</i> (Lebanon) P17. P18. The culture-sensitive and standard pain neuroscience education improve pain, disability, and pain cognitions in first-generation Turkish migrants with chronic low back pain: a pilot randomized controlled trial. <i>Dorine Lenoir</i> (Belgium) P19. Development of culturally sensitive Pain Neuroscience Education materials for Hausa patients with chronic spinal pain: A modified Delphi study. <i>Naziru Bashir Mukhtar</i> (Belgium)	S5 - Poster session 5: Cognitive and lifestyle factors related to pain Chair: Anneleen Malfliet Tour starting at: 11:25 P20. Chronic Pain and Nutrition in Breast Cancer Survivors: A Cross-sectional Study. <i>Sevilay Tumkaya Yilmaz</i> (Turkey/Belgium) P21. Pain intensity, central sensitization and pain catastrophizing in Raynaud's phenomenon: a case-control study. <i>Rosa Maria Tapia</i> (Spain) P22. Associations Between Symptoms of Central Sensitization and Cognitive Behavioral Factors In People With Chronic Low Back Pain: A Cross-Sectional Study. <i>Eva Huysmans</i> (Belgium) P23. The role of nutrition in chronic musculoskeletal pain: a systematic review. <i>Ömer Elma</i> (Turkey/Belgium)
12.30 - 13.30	Lunch – CAMPUS CANTEEN				

13.30 – 14.15	Keynote lecture – Room AN1 EXERCISE FOR NECK PAIN: TARGETING MECHANISMS AND FUNCTIONAL IMPAIRMENTS Speaker: Prof. Deborah Falla Introduction: Mira Meeus	
14.20 – 15.20	Oral Session 3 – Room LA218 Assessment Chair: Iris Coppieters - Offset analgesia in patients with migraine and healthy controls. <i>Tibor Szikszay</i> (Germany) - Who is more prone to experimentally-induced central sensitization amongst subjects with temporomandibular disorders and healthy individuals? <i>Timothée Cayrol</i> (Belgium) - Investigating the repeatability and stability of exercise induced hypoalgesia in healthy adults. Pauline Kuithan (UK) - Parallel versus sequential conditioned pain modulation testing using various parameters: does it make a difference? <i>Roland Reezigt</i> (the Netherlands)	Oral Session 4 – Room MA218 Cancer-related pain Chair: An De Groef - Relations between nutrition and chronic pain in cancer patients and cancer survivors. <i>Sevilay Tumkaya Yilmaz</i> (Turkey/Belgium) - The effectiveness of pain neuroscience education (PNE) for pain-related disability after breast cancer surgery (EduCan Trial): study protocol for a randomized controlled trial. <i>Lore Dams</i> (Belgium) - Reliability, Validity, Responsiveness and Minimal Clinically Important Change of the Dutch Version of the Pain Disability Index (DV-PDI) in Female Breast Cancer Patients. <i>Elien Van der Gucht</i> (Belgium) - Using a humanoid robot to distract children with cancer undergoing painful procedures: a pilot randomized controlled trial. <i>Emma Rheel</i> (Belgium)
15.20 – 15.45	Coffee Break – CAMPUS LIBRARY, GROUND FLOOR	
15.50 – 16.35	Meet the expert 1 – Room LA218 Important lessons for getting the most out of your PhD trajectory Prof. Rob Smeets Chair: Tommaso Geri	Meet the expert 2 – Room MA218 Strategies to increase publication success Prof. Deborah Falla Chair: Marco Testa
16.40 – 17.40	Oral Session 5 – Room LA218 Basic Science Chair: Angelo Schenone - Noninvasive intracranial pressure monitoring in patients with chronic migraine. <i>Denise Martineli Rossi</i> (Brazil) - Epigenetics of BDNF and its relationship with central sensitization in patients with chronic widespread pain and chronic fatigue syndrome. <i>Andrea Polli</i> (Italy/Belgium) - Assessment of the effects caused by mechanical stimulation in peripheral nervous system. <i>Giacomo Carta</i> (Italy) - Self-reinforcement mechanism of the placebo effect in painful paraesthesia. <i>Waclaw Adamczyk</i> (Germany)	Oral Session 6 – Room MA218 Pain Neuroscience Education Chair: Paul Van Wilgen - Pain neuroscience education for children with functional abdominal pain related disorders: a randomized controlled pilot study. <i>Roselien Pas</i> (Belgium) - Pain education for patients with low back pain in Nepal: results from PNE-LBP feasibility clinical trial. <i>Saurab Sharma</i> (Nepal) - Effectiveness of pain neuroscience education and physiotherapy in subjects scheduled for a total knee arthroplasty: randomized clinical trial. <i>Marc Terradas-Monllor</i> (Spain) - Effects of virtual reality-based rehabilitation in patients with total knee arthroplasty: a randomized controlled trial. <i>Silvia E. Gianola</i> (Italy)
17.45 – 18.45	Social Events: Pesto&Wine, Local craft beer & Focaccia	
20.00 – 23.00	Social Dinner	

DAY 2: SUNDAY, JUNE 2ST, 2019. UNIVERSITY CAMPUS OF SAVONA, ITALY

8.00	Delegates Registration and poster set-up – CAMPUS LIBRARY	
9.00 - 9.45	Keynote lecture – ROOM AN1 ASSESSING CENTRAL AND PERIPHERAL MECHANISMS OF PAIN AND FATIGUE Speaker: Prof. Jessica Van Oosterwijck Introduction: Anneleen Malfliet	
9.55 - 10.55	Oral Session 7 – ROOM LA218 Improving treatment responses Chair: Jo Nijs 1. Barriers and facilitators with regard to the usability of a blended intervention in patients with medically unexplained physical symptoms. <i>Suze Toonders</i> (the Netherlands) 2. Rehabilitation intervention in randomized controlled trials for low back pain: are they statistically significant and clinically relevant? <i>Greta Castellini</i> (Italy) 3. A Delphi study to identify care priorities for South African patients suffering with phantom limb pain after limb amputation. <i>Katleho Limakatso</i> (South Africa) 4. The use of symptomatic medication is associated with the degree of sensitization in patients with tension type headache. Matteo Castaldo (Denmark)	Oral Session 8 – ROOM MA218 Pain and surgery Chair: Marco Testa 1. Associations between health-related quality of life and nociceptive modulation and employment status in patients with lumbar radiculopathy. Wouter Van Bogaert (Belgium) 2. Central pain processing, psychosocial and lifestyle factors as potential moderators of outcome after rotator cuff repair: a protocol. <i>Ariane Schwank</i> (Switzerland/Belgium) 3. Which factors influence the central sensitization inventory in patients of the total hip replacement waiting list? <i>Leandro Fukusawa</i> (Brazil) 4. The role of pain cognitions in health care utilization in patients undergoing surgery for lumbar radiculopathy: a randomized controlled trial. <i>Eva Huysmans</i> (Belgium)
11.00 - 11.25	Coffee Break – CAMPUS LIBRARY, GROUND FLOOR	

Poster sessions – CAMPUS LIBRARY, GROUND FLOOR					
11.25 – 12.30	S6 - Poster session 6: Spinal pain Chair: Rob Smeets Tour starting at: 11.25 P24. Central sensitization and physical activity in patients with chronic low back pain. <i>Jone Ansuategui Echeita</i> (The Netherlands) P25. Functional brain alterations in low back pain: a systematic review of EEG studies. <i>Sophie Van Oosterwijck</i> (Belgium) P26. Movement Evoked Pain in Patients with Chronic Low Back Pain: Is There a Role for Transcutaneous Electrical Nerve Stimulation? A Pilot Study. <i>Ömer Elma</i> (Belgium) P27. Risk factors for developing insomnia in chronic spinal pain patients: a systematic review and meta-analysis. <i>Thomas Bilterys</i> (Belgium) P28. Morphological differences in the upper trapezius muscle between female office workers with and without trapezius myalgia: facts or fiction? <i>Kayleigh De Meulemeester</i> (Belgium)	S7 - Poster session 7: Psychology & pain Chair: Kelly Ickmans Tour starting at: 12.00 P29. Reliability and validity of the Dutch Injustice Experience Questionnaire in patients with chronic pain. <i>Rinske Bults</i> (The Netherlands) P30. Parental involvement during children's painful medical procedures: a systematic review. <i>Emma Rheel</i> (Belgium) P31. The knowledge of contextual factors as triggers of placebo and nocebo effects in patients with musculoskeletal pain: findings from a national survey. <i>Giacomo Rossettini</i> (Italy) P32. Explicit and implicit experience of one's own body in musculoskeletal and rheumatic disorders: a scoping review. <i>Antonello Viceconti</i> (Italy) P33. Theological and philosophical concepts of hope and their clinical application in a holistic treatment of chronic pain. <i>Lena Maria Lorenz</i> (UK)	S8 - Poster session 8: Basic Science Chair: Iris Coppieters Tour starting at: 11.25 P34. Reactive postural responses of patients with migraine – A controlled study. <i>Gabriela Ferreira Carvalho</i> (Brazil) P35. Offset analgesia: affected by exercise and delayed onset muscle soreness? <i>Tibor Szikszay</i> (Germany) P36. Noxious stimuli in the neck does not inhibit tactile acuity function. <i>Waclaw Adamczyk</i> (Germany) P37. Infrared thermography of the hand and its relationship with the symptomatology in patients with Fibromyalgia. <i>Antonio Casas</i> (Spain) P38. Pressure pain sensitivity, pain magnitude and vascular impairment in Raynaud's phenomenon. <i>Rosa Maria Tapia</i> (Spain)	S9 - Poster session 9: Clinical assessment Chair: An De Groef Tour starting at: 12.00 P39. Diagnosis of frozen shoulder: value of the coracoid pain test. A research proposal. <i>Michel Mertens</i> (Belgium) P40. Development of the Illustrated Scale of Fear of Activities Related to the Shoulder in subjects with shoulder persistent pain. Pilot-Testing. <i>Walter Ansanello</i> (Spain) P41. Evaluating Upper Limb Performance after Breast Cancer Surgery through Tri-Axial Accelerometers. <i>Elien Van der Gucht</i> (Belgium) P42. Advancing the clinical assessment of sensitivity to physical activity. <i>Arthur Woznowski-Vu</i> (Canada) P43. Multidimensional evaluation of patients with Low Back Pain in public hospital - Preliminary results of a cross-sectional study. <i>Leandro Fukusawa</i> (Brazil)	S10 - Poster session 10: Surgery Chair: Sanneke Don Tour starting at: 11.25 P44. Treatment recommendations for phantom limb pain in people with amputations: an expert consensus Delphi study. <i>Katleho Limakatso</i> (South Africa) P45. The influence of pain cognitions on conditioned pain modulation in patients with lumbar radiculopathy scheduled for surgery: a cross-sectional study. <i>Wouter Van Bogaert</i> (Belgium) P46. The role of expectations in patient reported outcomes following shoulder arthroplasty: A prospective cohort study (The Shoulder Diary). <i>Brechtje Hesseling</i> (Netherlands) P47. Predicting outcome of total knee replacement surgery in patients with knee osteoarthritis: a prospective study on the role of altered central pain processing, structural, functional, metabolic, inflammatory

					and psychological factors. <i>Lotte Meert</i> (Belgium) P48. Analysis of the prognostic factors of functional results in patients undergoing cuff rotator repair. <i>Felipe de Souza Serenza</i> (Brazil)
12.30 - 13.30	Lunch – CAMPUS CANTEEN				
13.30 – 14.20	Keynote lecture – ROOM AN1 PAIN AND THE REPRESENTATION OF THE BODY IN THE BRAIN; A COMPLEX RELATIONSHIP Speaker: Prof. Alberto Gallace Introduction: Marco Testa				
14.30 – 15.30	Oral Session 9 – ROOM LA218 Non-specific factors in therapy Chair: Albere Koke 1. Observing transdisciplinary pain neuroscience education practice: what kind of processes are involved? <i>Amarins Wijma</i> (the Netherlands) 2. Measuring therapeutic alliance in multidisciplinary pain rehabilitation. <i>Davy Paap</i> (the Netherlands) 3. Influence of education level on the effectiveness of pain neuroscience education: a secondary analysis of a randomized controlled trial. <i>Thomas Bilterys</i> (Belgium) 4. Modulation of the time of action of a placebo analgesic cream in healthy adults. <i>Eleonora Maria Camerone</i> (Italy)			Oral Session 10 – ROOM MA218 Psychology in Pain Chair: Paul Van Wilgen 1. Pain-related sensory and psychological factors may contribute to walking impairment in adults with low back pain. <i>Katie Butera</i> (USA) 2. Spinal Cord Injury and emotional responses: a topography in empathy for pain. <i>Giulia Caffini</i> (Italy) 3. Body Perception in fibromyalgic patients: a mixed-method research study. <i>Antonello Viceconti</i> (Italy)	
15.40 – 16.25	Meet the expert 3 – ROOM LA218 How to continue a career in academia: You have a PhD, now what? Prof. Jessica Van Oosterwijck Chair: Dorien Goubert			Meet the expert 4 – ROOM MA218 Research in human somatosensation: methods and potentialities Prof. Alberto Gallace Chair: Paul Van Wilgen	
16.35 – 17.30	Summary and Awards of Best Oral and Poster Presentation – ROOM AN1 PSiM 2021 announcement				
17.30	Closure of conference – ROOM AN1				

Offset analgesia: affected by exercise and delayed onset muscle soreness?

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Introduction Offset analgesia (OA) is a frequently used paradigm to assess the functionality of the endogenous pain modulation system. It has been defined as a disproportionately large decrease in pain intensity in response to a small decrease in the intensity of a noxious stimulus. A recent meta-analysis indicated that pain-free subjects showed a larger OA compared to patients with chronic pain [2]. Since the OA effect has not yet been successfully influenced experimentally [3], neither by medication nor by other approaches, it was investigated if an intensive training stimulus and the subsequent delayed-onset muscle soreness (DOMS) can affect OA. In a randomized controlled trial, the influence of an intense muscle exercise for the back extensors was compared to a control group. Young healthy volunteers were invited to three separate examination sessions: a baseline appointment, one day later and 7 days later. At baseline, volunteers were randomized into two groups: an exercise group (n=21) and a rest group (n=21). Endogenous pain modulation - OA and conditioned pain modulation (CPM) - were evaluated at the volar forearm and the back, before and after the intervention in both groups. While OA was evaluated using a three-step protocol with individualized temperature (VAS 5/1) and a control trial, CPM was evaluated with pressure pain as the test stimulus and the cold-pressure test as the conditioning stimulus. In addition, the intensity of DOMS was measured at follow-up appointments. The order of tests and body regions was randomized and counterbalanced. This study is aiming to contribute to a better understanding of the mechanisms of endogenous pain modulation. So far, the underlying mechanisms of OA related to experimental pain have not yet been fully understood. **Process evaluation** Data collection is completed. During the analysis and the previous meta-analysis [2] it became evident that numerous analytical methods of OA were used. In an additional project, all analytical methods were systematically summarized and compared to a new data set (n=42) with regard to variability and reliability [3]. We found that different methods to analyze OA result in different levels of variability and reliability. This becomes particularly evident when theoretical considerations according to the OA definition are taken into account. There is a strong demand for a standardized method to analyse the OA effect to facilitate comparable future research results. [1.] Szikszay, T. M., Adamczyk, W. M., & Luedtke, K. (218). The Magnitude of Offset Analgesia as a Measure of Endogenous Pain Modulation in Healthy Subjects and Patients with Chronic Pain-A Systematic Review and Meta-analysis. The Clinical journal of pain. [Epub ahead of print]. [2.] Hermans, L., Calders, P., Van Oosterwijck, J., Verschelde, E., Bertel, E., & Meeus, M. (216). An overview of offset analgesia and the comparison with conditioned pain modulation: a systematic literature review. Pain physician, (6), 37-326. [3.] Szikszay, T. M., Adamczyk, W. M., & Luedtke, K. (218). Offset analgesia – a dilemma between the definition and the method of analysis. Submitted to The Journal of Pain.

Offset Analgesia in patients with migraine and healthy controls

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Introduction Migraine is one of the most disabling diseases in under 5-year olds [1]. Underlying mechanisms are not yet fully understood, but endogenous pain modulation seems to be an important factor [2]. A frequently used method to quantify pain modulation is offset analgesia (OA), defined as a disproportionally large decrease in pain intensity in response to a small decrease in the intensity of a heat stimulus [3]. To date, no study was published that investigated the OA effect in migraine. In this study, we want to assess the OA response in patients with migraine and healthy controls, applied to the forehead and the forearm. **Methods** In a case-control design, subjects with migraine (n=21) who had headache for at least 2 years and at least 8 days a month were included. Patients with migraine who were in the ictal migraine phase, taking medication on more than 1 days a month or taking medication 24 hours before the examination are excluded. Age and sex matched controls (n=21) were included which were not suffering from acute or persistent pain. On the examination day, various questionnaires were filled out evaluating sleep behavior, physical activity, depression and allodynia. Subsequently, subjects were examined using a selected test battery from the quantitative sensory testing protocol. Volunteers completed three offset analgesia trials and three constant temperature trials in a randomized order using a noxious heat stimulus. The offset trials consisted of three consecutive phases: an initial painful stimulus (VAS 5/1) of 5 seconds (T1), +1°C higher painful stimulus for 5 seconds (T2) and an identical temperature stimulus identical to T1 for 2 seconds (T3). The constant trial consisted of 3 seconds of the identical temperature of T1. During each trial, subjects continuously rated pain intensity using an electronic visual analog scale. Both QST and the OA paradigm were examined on both sides of the forehead, and both forearms in a randomized order. **Discussion and process evaluation** To date, 15 patients in the interictal migraine phase and 15 healthy controls have been included. As the project has not yet been completed, no data analysis has yet been carried out. This project can contribute sustainably to the understanding of endogenous pain modulation in migraine by investigating the difference between trigeminal and extra-trigeminal areas as well as the dominant and non-dominant side of headache. [1.] Steiner, T. J., Stovner, L. J., & Vos, T. (2016). GBD 2015: migraine is the third cause of disability in under 5s. *The Journal of Headache and Pain* (2016) 17:14. [2.] Nosedá, R., & Burstein, R. (2013). Migraine pathophysiology: anatomy of the trigeminovascular pathway and associated neurological symptoms, cortical spreading depression, sensitization, and modulation of pain. , 44-S53. [3.] Grill, J. D., & Coghill, R. C. (2002). Transient analgesia evoked by noxious stimulus offset. *Journal of neurophysiology*, (4), 225-228.

Treatment recommendations for phantom limb pain in people with amputations: an expert consensus Delphi study

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Phantom Limb Pain (PLP) is a common phenomenon reported by 55-8% of people with limb amputations (1). Several pharmacological and non-pharmacological interventions have been shown to reduce PLP (2). However, the best practice for PLP management in people with amputations is unclear. The aim of this proposed study is to reach consensus amongst experts regarding the important components of PLP management strategies in people with amputations. Methods and analysis We will conduct a Delphi study consisting of 3 sequential rounds of anonymous online questionnaires with an expert panel of pain clinicians and researchers from various health disciplines and countries. During the first round, the panellists will be asked to provide all important components of a treatment strategy for patients with PLP. Responses to these questions will be used to design a standardised questionnaire that will form the basis for the second round of the Delphi. During the second round, panellists will be asked to rank each item of the questionnaire on a 5-point Likert-type scale (where 1 and 5 represent “strongly agree” and “strongly disagree” respectively) and provide justification for their ranking. In the final round, panellists will receive a questionnaire that includes all responses summarised from the second round and will be asked to review their responses in light of the group’s opinion. Data will be analysed by calculating measures of central tendency (median and interquartile range). A consensus will be reached when the interquartile range is ≤ 1 , indicating an agreement of more than 5% (3). Panellists who maintain a rating outside the interquartile ranges (25 and 75 percentile) after the final round will be asked to provide a brief justification for their rating. This study is currently under development. Ethical approval to conduct this study will be sought from the Faculty of Health Sciences, Human Research Ethics Committee at the University of Cape Town. The results of this study are expected to contribute towards the effective management of PLP in people with amputations, and direct future research on this subject. References 1. Sherman RA, Sherman CJ, Parker L. Chronic phantom and stump pain among American veterans: results of a survey. *Pain*. 1984;18(1):83-95. 2. Alviar M, Hale T, Dungca M. Pharmacologic interventions for treating phantom limb pain. *Cochrane Database Syst Rev*. 211;12. 3. Ramos D, Arezes P, Afonso P. Application of the Delphi Method for the inclusion of externalities in occupational safety and health analysis. *Dyna*. 216;83(196):14-2.

A Delphi study to identify care priorities for South African patients suffering with phantom limb pain after limb amputations.

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In recent years, strategies have been implemented to promote patient involvement in healthcare. It is proposed that involving patients in clinical decision-making may improve patient clinical outcomes, adherence to treatment, accountability and efficient health-service delivery. Thus far, there is no published literature that aimed to identify healthcare priorities in patients who have undergone limb amputations. Therefore, this study will seek consensus from patients with phantom limb pain regarding their treatment outcome priorities. Methods and analysis A three-stage Delphi study will be conducted using a convenience sample of patients who have undergone limb amputations at Groote Schuur Hospital and are suffering from phantom limb pain. During the first round, the recruited participants will be invited to participate in a focus group to provide their opinions regarding their treatment preferences after limb amputations. Responses from the first round will be used to design a standardised questionnaire (with a list of health outcomes) that will form the basis for the second round of the Delphi. During the second round, patients will be asked to rank each item of the questionnaire in order of priority (1). In the final round, patients will be given feedback on group-level responses from the preceding round and asked to reconsider their rankings. A subsample of participants will be chosen randomly and interviewed to provide a rationale for their ranking. Data collected from the interviews will be analysed qualitatively using an open coding process (2). The rest of the data will be analysed by calculating measures of central tendency (median and interquartile ranges). A consensus will be reached when the interquartile range is ≤ 1 , indicating an agreement of more than 5% (3). In addition, patient priority outcomes will be compared by sex (male vs female) and ethnicity. This proposed study is currently in development. Ethical approval to conduct this study will be sought from the Faculty of Health Sciences' Human Research Ethics Committee at the University of Cape Town. The results of this study are expected to identify priority treatment outcomes for patients who have undergone limb amputations and seek treatment for PLP. References 1. Fredericksen RJ, Edwards TC, Merlin JS, Gibbons LE, Rao D, Batey DS, et al. Patient and provider priorities for self-reported domains of HIV clinical care. *AIDS care*. 215;27(1):1255-64. 2. Blair E. A reflexive exploration of two qualitative data coding techniques. *Journal of Methods and Measurement in the Social Sciences*. 215;6(1):14-29. 3. Schneider P, Evaniew N, Rendon JS, McKay P, Randall RL, Turcotte R, et al. Moving forward through consensus: protocol for a modified Delphi approach to determine the top research priorities in the field of orthopaedic oncology. *BMJ open*. 216;6(5):e1178

Religious Beliefs And Practices In Relation to Chronic Pain among Multiethnic Communities.

charbel najem¹,

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Introduction : There is a growing concern that pain is not only an affection to the body, pain is not just a history of the nervous system, it's not a natural object that can be isolated it's more a multidimensional experience resulting from the interaction between biological, psychological, social and spiritual factors. The identification of its "causes" by the physical therapist is based on its expertise in clinical observation and in cultural competency. In a country with 18 different religious ethnicity ranging between Christianity and Islam and in a country where religion has its impact on every aspect of daily life activities, could it have also an impact on pain perception? This study is to identify the religious factors and believes that are related to pain perception in the Lebanese society, what are the differences between the 2 main religions? What are the religious coping strategies? And what is the relation between pain perception and religious attitudes.

Methods : In order to view how patient perceive the impact of spirituality on their pain we will use a multicenter cross-sectional survey and analyze data from different outpatient pain centers located in west and east Beirut. The survey will include a demographic assessment, an assessment for pain, for religious practice as well as assessment about believes, attitudes and coping strategies. The diagnosis of chronic pain will be based on self-report in response to questions about the pain if it has been lasting for more than 6 months and if the condition was diagnosed by a health professional as well as the use of pain catastrophizing scale. The illness perception will be assessed using the IPQ-A scale, the religious practice or commitment will be measured using the religious commitment inventory (RCI-1), the believes and attitudes will be measured using the SpREUK-15 scale (Spiritual and Religious Attitudes in Dealing with Illness), these 2 scales should be translated and validated to ensure linguistic and cultural validation. The survey will allow to determine the differences and similarities between Christians and Muslims who had been living side by side for centuries in term of dealing with chronic pain and if these coping strategies had a correlation with chronic pain. The results of this study could highlights the relation between religious attitudes and pain in a cross cultural community and if these results are similar to European communities. Büssing A, Ostermann T, Matthiessen PF: Role of religion and spirituality in medical patients: confirmatory results with the SpREUK questionnaire. Health Qual Life Outcomes 25; 3: 1

Explicit and implicit experience of one's own body in musculoskeletal and rheumatic disorders: a scoping review.

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Introduction: our body experience is organized at twofold levels, perceptual and cognitive-emotional, that are clearly different from the primary sensory processing of somatic stimuli (somatosensation). However, most of the available studies in musculoskeletal and rheumatic disorders (MRDs) have mainly investigated the mechanisms of somatosensation. The limited knowledge on perceptual and cognitive body experience calls to systematically map this research field. The aim of this study is to review and to examine the magnitude and the nature of the available evidences. **Materials and Methods:** the six-stage methodology suggested by Arksey and O'Malley and the PCC (Population, Concept, and Context) method will be adopted. Thirteen electronic databases will be investigated since their inception. The search strategy will be peer reviewed as a quality assurance step. All records retrieved will be screened by two independent reviewers. The PRISMA will be used for results reporting. **Discussion:** the scoping design approach has been selected for its appropriateness in overviewing the literature published on an emergent complex and fragmented research area that has not been systematically studied before. Phenomena of disturbed somatoperception somatorepresentation have been documented in a variety of clinical neuropathic pain conditions affecting the musculoskeletal system, and particularly in complex regional pain syndrome and phantom limb pain, but remain undiscovered for MRDs. Moreover, while compelling preliminary evidence about interactions between body representation and space perception have been published in CRPS, this interaction remains to be clarified in MRDs. **Process Evaluation:** differently from systematic reviews, an iterative search process rather than a fixed and pre-established one characterize scoping reviews. Thus, our search strategy and the eligibility criteria may be changed and updated during the development of the review, following the feedback of the research team. Moreover, the scoping design lacks of a well-defined PICOS research question and the eligibility criteria may results not clear enough for reviewers involved in screening and selection processes. For this reason, before starting both the screening step for titles/abstracts and the selection process for full-texts, the researchers will perform a pilot test, pre-formal screening for a random 1% of the records retrieved as a calibration exercise. 1. Moseley GL, Gallace A, Spence C. Bodily illusions in health and disease: physiological and clinical perspectives and the concept of a cortical "body matrix." *Neurosci Biobehav Rev.* 212 Jan;36(1):34–46. 2. Longo MR, Azañón E, Haggard P. More than skin deep: body representation beyond primary somatosensory cortex. . 21 Feb;48(3):655–68. 3. Arksey H, O'Malley L. Scoping studies: towards a methodological framework. *Int J Soc Res Methodol.* 25 Feb 1;8(1):19–32.

Reactive postural responses of patients with migraine – A controlled study

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Migraine is a primary headache characterized by neuronal hyperexcitability, and it can be associated with musculoskeletal pain, vestibular symptoms and balance changes. Previous studies verified that those patients present an impairment of the sensorial orientation systems (i.e. vestibular, visual and somatosensorial),^{1, 2} but it is unknown if their reactive postural responses are similar to controls. Ninety women with migraine aging between 18 to 55 years old and diagnosed according to the ICHD-III were recruited from a tertiary headache clinic in Brazil. They were distributed equally into three groups according with the migraine subtype: migraine with aura (MA), without aura (MoA) and chronic migraine (CM). Thirty headache-free controls were also recruited. They performed the Motor Control Test in the Equitest System, guided by a blinded examiner. The latency to react from a platform sway (milliseconds) and the sway area (cm) was measured in six conditions: small, medium and large platform excursion to forward (FS, FM and FL, respectively) and to backward (BS, BM and BL, respectively). Furthermore, a composite score considering all the trials was calculated. Migraine and control groups were compared through ANOVA test in the SPSS 21. software, with significance level of 5%. The effect size of differences was estimated. Patients with MA had a greater composite score than controls (MA: 142.8, CG: 133.8, ES: .81, $p=.5$) and took more time to react after the platform perturbation than controls in the situations: FM (MA: 143.7, CG: 135.5, ES: .78, $p=.1$), BS (MA: 132.1, CG: 133.8, ES: .49, $p=.4$), BM (MA: 138., CG: 124.8, ES: .63, $p=.1$) and BL (MA: 13., CG: 122.7, ES: .46, $p=.4$). Furthermore, the sway area of the MA group was greater than controls for all situations (MA: 14.4, CG: 6.6, ES: 1.4, $p<.5$). No differences among migraine groups were verified except in the BM condition, where MA patients exhibited greater sway area than CM and MoA groups ($p<.4$). Previous studies demonstrated impairment in the sensory systems and also greater prevalence of falls of patients with migraine, specially in the presence of aura.³ However, these patients also present a delay and greater sway area after reactive postural tasks. The postural responses are an important balance component since it is related directly to the postural stability and falls occurrence after unexpected situations, such as walking on slippery or irregular surfaces. Process evaluation So far little is known regarding the postural reactions in patients with migraine and possibly greater sample sizes would be necessary to verify if there are further differences among the other subtypes of migraine and controls. Patients with MA present an impairment of the postural responses after ground perturbations compared to controls. These results would shed light regarding the need of tailored assessment and rehabilitation strategies in this population. Akdal G, Donmez B, Ozturk V, Angin S. Is balance normal in migraineurs without history of vertigo? *Headache* 29;49:419-425. Panichi R, Cipriani L, Sarchielli P, et al. Balance control impairment induced after OKS in patients with vestibular migraine: an intercritical marker. *European archives of oto-rhino-laryngology : official journal of the European Federation of Oto-Rhino-Laryngological Societies* 215;272:2275-2282. Carvalho GF, Almeida CS, Florencio LL, et al. Do patients with migraine experience an increased prevalence of falls and fear of falling? A cross-sectional study. *Physiotherapy* 218.

Self-reinforcement mechanism of the placebo effect in painful paraesthesia

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Classical conditioning can elicit a strong placebo effect. This concept is not entirely correct for a clinical setting, because the way subjects are exposed to classical conditioning in typical experiments is extremely artificial, usually implying that subjects learn that one stimulus immediately elicits a response. In real life patients learn that e.g. a given drug's action is slowly developing. This creates conditions in which patients learn not only a single response but also that the subsequent responses will depend on the first. We hypothesise that real conditioning elicits larger placebo responses by a self-reinforcement mechanism, i.e. gradual learning of relief which in turn reinforces subjects that the drug is effective and an even larger effect can be expected over time. Healthy volunteers will be exposed to series of ischemic stimuli delivered by an electronic sphygmomanometer to their non-dominant arm. In the pretest and posttest phase -the same for each subject irrespective of group allocation- they will receive a series of three identical stimuli (12mmHG). Pain and paraesthesia will be measured continuously by two computerized VAS scales. Physiological correlates of bodily symptoms will be measured by skin conductance. After the pretest phase, subjects from group 1 will receive a placebo cream together with verbal suggestions on its effectiveness (tingling reduction). Then, they will undergo a conditioning procedure (immediate increase of pressure) to make them believe that tingling is reduced. In group 2, a conditioning will include a self-reinforcement in which pressure will be surreptitiously increased but gradually. In group 3 verbal suggestion alone will be used and in group 4 no intervention takes place (control). So far, a pilot study was performed to investigate pressure parameters required to efficiently induce paraesthesia. We surprisingly found that higher pressure paradoxically causes less paraesthetic symptoms and lower pressure induces paraesthesia of higher and long-lasting intensities. The study is elucidating a new mechanism by which the placebo effect might be induced. It is based on a self-reinforcement procedure, in which subjects learn not only the association between symptoms of less intensity and the treatment, but also that subsequent trials are linked to continuous improvement on a trial-by-trial basis. Process evaluationThe study is at the stage of developing the protocol for data collection. Montgomery GH, Kirsch I. Classical conditioning and the placebo effect. *Pain*. 1997, 72(1-2):17-13.

Observing Transdisciplinary Pain Neuroscience Education Practice: What kind of processes are involved?

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Introduction The explanation of central sensitization and contributing factors to patients with chronic pain is known as pain neuroscience education (PNE). PNE aims to address and reconceptualize the patient's cognitions about his/her pain, thereby decreasing the perceived threat of pain. PNE provides an opportunity to explain pain as changes in the nervous system. Whilst at the same time allowing the integration of perpetuating factors, such as behavioural, psychological and environmental aspects in the continuation of pain. As PNE is a 'talk-modality' many interpersonal aspects contribute to the outcome of the treatment. However, there has, to our knowledge, not yet been a study investigating the interaction between the patient and healthcare professional(s) during the PNE session. Therefore, the purpose of this study was to investigate the interaction between the patient and healthcare professionals and influence of these interactions on the outcome of the PNE. Even more specific: to understand and comprehend if and when patients with chronic pain accept PNE and which processes lead to this acceptance. Based on Constructive Grounded Theory (CGT) a heterogenic convenience sample eight respondents were recruited from a transdisciplinary outpatient center between March 215 and December 216. We conducted an observational qualitative study to grasp and theorize the practice of PNE. Nine unobtrusive video observations of the interactions of a physiotherapist, psychologist and patients with chronic pain during the PNE in a transdisciplinary setting were made. The observations are currently analyzed according to CGT. Quality of the study is assured by following the trustworthiness criteria of Lincoln and Guba. The outcome of the study will be a theoretical framework and construct. Results Not yet available

Discussion Observing practice according to CGT is not often performed within chronic pain practice. Within the field of PNE this is to our knowledge the first study. Nonetheless, understanding how healthcare professionals implement and integrate evidence-based practices such as PNE is crucial for the further development.

Process evaluation One of the limitations of this study is that the observations are made in transdisciplinary care, whilst PNE is often performed in a monodisciplinary manner. Furthermore, the observations were only from one PNE session and not from the intake and prior PNE session the patient had with the pain physician. Last, performing observational qualitative research is lengthy.

ASSOCIATION BETWEEN CENTRAL SENSITIZATION AND LIFTING AND AEROBIC CAPACITY IN PATIENTS WITH CHRONIC LOW BACK PAIN

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Central Sensitization (CS) can be present in Chronic Low Back Pain (CLBP). Functional capacity of patients with CLBP is limited; the association of CLBP with functioning assessed via lifting and aerobic capacity tests has been moderately explained and results are contradictory. The prediction of pain response following strenuous exercise is also limited. Finally, whether CS is associated with lifting and aerobic capacities is unknown. The study aims therefore to: Analyze the relationship between CS, and lifting and aerobic capacities in patients with CLBP. Describe pain response to strenuous exercise in patients with CLBP. Observational longitudinal study. Adult patients diagnosed with non-radicular CLBP are assessed at baseline and discharge of a pain rehabilitation program. CS: Central Sensitization Inventory (CSI) part A; sum score. Lift capacity: floor-to-waist lifting test; maximal amount of weight lifted (kg). Aerobic capacity: Cardiopulmonary Exercise Test (CPET) performed in a cycle ergometer following a defined ramp protocol; peak oxygen uptake (VO₂max) per kg (ml/min/kg). Pain response: Pain response questionnaire; pain intensity of 4 predefined locations before, immediately after, and 24h after CPET. Statistical analyses: Stepwise-forward regression: change between baseline and discharge of lift and aerobic capacities (dependent), and of CSI (independent). Repeated-measures ANOVA: pain intensity before CPET compared to immediately and 24h after; at baseline and discharge. Results (preliminary) Data collection is ongoing. Currently longitudinal data of 11 patients are collected, but 25 are anticipated for May 2019. A trend of decreased CSI associated with increased performance is seen in lifting but not in aerobic capacity. Immediate pain responses at intake and discharge show decreasing trend in low back while significantly increasing in legs. Discussion (preliminary) Patients with CLBP may show some influence of CS level on their lifting capacity. Following strenuous exercise leg pain may increase as opposed to low back pain; diffuse noxious inhibitory control could possibly explain the effect. Process evaluation Limited sample size due to care as usual situation, as it is subject to the availability of therapists, CPET lab, and center procedures; however, due to its design the sample is reflective of the target population. Additionally, there may be some population bias due to their motivation to perform CPET. Kindler LL, Bennett RM, Jones KD. Central sensitivity syndromes: mounting pathophysiologic evidence to link fibromyalgia with other common chronic pain disorders. *Pain Manag Nurs* 21;12(1):15-24. Smeets RJEM, Wittink H, Hidding A, Knottnerus JA. Do patients with chronic low back pain have a lower level of aerobic fitness than healthy controls?: are pain, disability, fear of injury, working status, or level of leisure time activity associated with the difference in aerobic fitness level?. *Spine* 26;31(1): 9-97. Soer R, Groothoff JW, Geertzen JH, van der Schans CP, Reesink DD, Reneman MF. Pain response of healthy workers following a functional capacity evaluation and implications for clinical interpretation. *J Occup Rehabil* 28; 18(3): 29-298.

CENTRAL SENSITIZATION AND PHYSICAL ACTIVITY IN PATIENTS WITH CHRONIC LOW BACK PAIN

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Central Sensitization (CS) can be present in Chronic Low Back Pain (CLBP). Dysfunctional physical functioning, including Physical Activity (PA), is one of the main consequences of CLBP. Physical Activity (PA) subjective measures show CLBP patients being less active than their healthy counterparts. PA objective measures show that differences between groups may not be in overall PA but in the pattern. Research is immature and studies vary on methodology; furthermore, PA levels have not been linked to CS. The study aims to analyze the relationship between CS and PA, including CS severity in patients with CLBP. Observational cross-sectional study. Adult patients diagnosed with non-radicular CLBP are measured at baseline of a pain rehabilitation program. CS: Central Sensitization Inventory (CSI) part A; sum score and CS severity. PA: accelerometer worn on the hip for a full week. The device records overall PA (total sum of counts of the Vector Magnitude (VM) each day (counts/min)), as well as the time spent on sedentary, light, and moderate activities (min). Statistical analyses: Visualization: overall PA, PA levels, activity distribution per day. Simple regression: PA levels (dependent), CSI levels (independent). Results (preliminary) Data collection is ongoing. Currently data of 26 patients are collected, but 4 are anticipated for May 2019. Patients spend most of their daytime in sedentary and light PA; being generally most active at noon. In the weekends they start to be active later in the day. Also, the least active day of the week is Sunday. Longest time is spent in sitting and standing position, lying is least common. Higher CSI is associated with more overall activity measured. The CS group spending most time on sedentary activities is of patients with moderate CS and on light activities patients with mild CS. All groups spend similar time on moderate activities. Discussion (preliminary) Higher CSI is associated with more overall activity measured. Differences in PA distribution and in PA levels per CS severity may be seen. Process evaluation The accelerometers used for this study collect data are programmed on accelerometer, magnetometer, and gyroscope. This setting depletes battery of accelerometer devices in about 24hr. Although patients are instructed to charge the devices every night during the measurement period, it is not unusual that accelerometers are returned with insufficient time measured for data analyses. Kindler LL, Bennett RM, Jones KD. Central sensitivity syndromes: mounting pathophysiologic evidence to link fibromyalgia with other common chronic pain disorders. *Pain Manag Nurs* 211;12(1),15-24. Griffin DW, Harmon DC, Kennedy NM. Do patients with chronic low back pain have an altered level and/or pattern of physical activity compared to healthy individuals? A systematic review of the literature. *Physiotherapy* 212;98(1):13-23. Ryan CG, Grant PM, Dall PM, Gray H, Newton M, Granat MH. Individuals with chronic low back pain have a lower level, and an altered pattern, of physical activity compared with matched controls: an observational study. *Aust J Physiother* 29;55(1):53-58.

Noxious stimuli in the neck does not inhibit tactile acuity function

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A growing body of evidence suggests that chronic pain is associated with perceptual changes, for example impaired tactile acuity and mental imagery [1]. A recent study on low back pain showed that such impairments occur immediately after acute pain induction [2]. Biologically, acute pain should lead to beneficial rather than negative changes in tactile acuity [2]. In this double-blinded experiment, 3 healthy volunteers attended three experimental sessions (injection, sham-injection and control condition) separated by one week each, to investigate the effect of acute nociception on tactile acuity and mental imagery. In the injection condition, acute pain was induced by hypertonic saline solution (.5ml) injected into the mid portion of the trapezius muscle. Tactile acuity was measured by two-point discrimination (TPD) and two-point estimation task (TPE), before and during the pain experience. Mental imagery was assessed by left/right judgement task. In the sham condition neck pain was mimicked by a sham-injection, in the control condition no intervention took place between tactile acuity assessments. The order of tests and experimental conditions (days) was randomised. General Linear Model was used to investigate the effect of session and assessment. Results showed that tactile acuity remained intact with a trend for improvement in all three conditions ($P=.5$), indicating that nociceptive neck pain did not affect tactile precision. The time needed to complete the mental imagery task (average time score) improved over-time in all conditions reflecting a learning effect. We conclude that in contrast to the lower back, acute neck pain does not result in perceptual distortions, possibly reflecting a higher protection demand for the neck, a body region in close anatomical proximity to neural centres responsible for vital functions. Process evaluation Study was completed with no adverse events. [1]. Ehrenbrusthoff, K., Ryan, C.G., Grüneberg, C., Martin, D.J. (2018). A systematic review and meta-analysis of the reliability and validity of sensorimotor measurement instruments in people with chronic low back pain. *Musculoskeletal Science & Practice*, 35: 73-83.[2]. Adamczyk, W.M., Saulicz, O., Saulicz, E., & Luedtke, K. (2018). Tactile acuity (dys)function in acute nociceptive low back pain: a double-blind experiment. , 159: 427-436.

What is the Influence of Low Back Pain on Muscle Activity and Movement during a Cyclical Dynamic Task?

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: Globally, low back pain (LBP) is a leading cause of disability with recent point-prevalence estimates suggesting that 54 million people experience 'activity-limiting' LBP. High-density electromyography (HDEMG) has revealed differences in the spatial distribution of back muscle activity during movements in both static and dynamic tasks in people with LBP. However these studies have only considered a small portion of the erector spinae (ES) during tasks which were either static or mono-planar (2, 3) This study combines HDEMG and kinematic analysis to investigate the effect of LBP on the spatial distribution of ES activity during a dynamic lifting task. Ethical approval was granted by the University of Birmingham ethics committee. Sixteen people with chronic LBP (8 male, age: 26.9 ± 1.8 years) and sixteen age and gender-matched controls (7 male, age: 31.7 ± 14 years) completed the study. HDEMG signals from the ES were detected with four 64-channel semi-disposable adhesive 13x5 electrode grids (2 grids bilaterally) covering the lumbar and thoraco-lumbar ES. Kinematic surface markers were placed over the back in triangular arrangements, creating lumbar and thoracic segments to track lumbar and thoraco-lumbar movement. HDEMG and kinematic data were recorded continuously during a dynamic task which involved the cyclical lifting of a 5kg box between 6 shelves for 1 cycles (~7 minutes). The shelves were arranged around the participant, at knee and sternal height with one pair of shelves anterior to the participant (S1 lower, S2 upper) and two pairs lateral; one left (S3 lower, S4 upper) and one right (S5 lower, S6 upper). To the beat of a metronome, the participant moved the box between shelves returning to the central shelf each time. : Data collection is complete and data analysis is underway; we intend to present full results at the conference. This study will have an impact on our understanding of the neuromuscular adaptations to LBP during a functional lifting task. Process Evaluation: Due to the technology used, and the lengthy, dynamic nature of the task, the data analysis for this project has been challenging. To progress, we need to balance accuracy in our results with succinctness, due to the large volume of HDEMG and kinematics data. 1. Hartvigsen J, Hancock MJ, Kongsted A, Louw Q, Ferreira ML, Genevay S, et al. What low back pain is and why we need to pay attention. *Lancet*. 218;391(1137):2356-67. 2. Abboud J, Nougrou F, Page I, Cantin V, Massicotte D, Descarreaux M. Trunk motor variability in patients with non-specific chronic low back pain. *Eur J Appl Physiol*. 214;114(12):2645-54. 3. Falla D, Gizzi L, Tschapek M, Erlenwein J, Petzke F. Reduced task-induced variations in the distribution of activity across back muscle regions in individuals with low back pain. *Pain*. 214;155(5):944-53.

Inter-rater reliability of temporal summation, thermal and pressure pain thresholds in a musculoskeletal trauma population

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: In the United Kingdom, approximately 2, people experience a musculoskeletal injury annually following a traumatic incident. Sub optimal recovery is common - with persistent pain, low return to work rate and reduced activities of daily living reported. Quantitative sensory testing (QST), a psychophysical method to quantify pain, has been found to be useful in predicting outcome in populations such as whiplash and osteoarthritis. Early assessment of sensory changes could be beneficial in predicting outcome within a musculoskeletal trauma population however; no study has evaluated reliability of QST measures in a musculoskeletal trauma population. The aim of this study is to establish the inter-rater reliability of multiple QST tests including temporal summation, thermal and pressure pain thresholds in a musculoskeletal trauma population. METHODS: People with acute musculoskeletal trauma will be recruited from a major trauma centre hospital in the United Kingdom. Two sessions (one per rater) will be conducted on the same day with a minimum of two hours between sessions. Measurements will be taken at a local site and remote site to the primary injury. The site, rater and modality will be randomised. Statistical analyses include intra-class correlation coefficients (ICC 3,2), 95% confidence intervals (CI), standard error of measurement (SEM) and Bland Altman for limits of agreement between raters. RESULTS: Data has currently been acquired from 17 participants. The majority (N=14) of participants presented with lower limb fractures. Five participants requested to stop temporal summation testing due to pain. ICC, Bland Altman plots and SEM will be calculated when the full 2 data sets have been included in order to have adequate statistical power and will be presented in full at the conference. DISCUSSION: This valuable study aims to establish inter-rater reliability of QST measures in a complex population in an acute hospital setting, making this useful for clinicians in practice. Preliminary results have shown the challenges of collecting data within the hospital setting. PROCESS EVALUATION: A limitation of this study so far is that 64.3% of participants have reached the safety limit of the equipment for cold pain threshold as well as five participants finding temporal summation testing too painful and requested testing to stop, indicating the average pressure pain threshold values used could be higher than the participants pain threshold. REFERENCES: Rushton AB, Evans, DW, Middlebrook N, Heneghan NR, Small C, Lord J, Patel J, Falla D. Development of a screening tool to predict the risk of chronic pain and disability following musculoskeletal trauma: protocol for a prospective observational study in the United Kingdom. BMJ Open. 218; 8(4)

THE ROLE OF NUTRITION IN CHRONIC MUSKULOSKELETAL PAIN: A SYSTEMATIC REVIEW

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THE ROLE OF NUTRITION IN CHRONIC MUSKULOSKELETAL PAIN: A SYSTEMATIC REVIEW Ömer Elma, Sevilay Tumkaya Yilmaz, Peter Clarys, Tom Deliens, Jo Nijs & Anneleen Malfliet 1 Vrije Universiteit Brussel, Belgium; 2 Pain in Motion, international research group; University Hospital Brussel, Belgium; Research Foundation Flanders, Belgium; Ghent University Introduction: Chronic musculoskeletal pain disorders account for approximately 4% of all chronic conditions and result in a high burden on individuals, families, society and health associations (1). Chronic musculoskeletal pain has not been fully unravelled in literature, but evidence shows a bi-directional association with several intrinsic and extrinsic factors, like stress, smoking, sedentary behaviour, and nutrition (2). Some dietary patterns (i.e. the Mediterranean diet) and specific dietary intakes (i.e. omega-3) have are known to induce pain relief among chronic musculoskeletal pain sufferers. Yet, the specific mechanisms and associations are not clear (3). A clear overview of studies investigating the association between nutrition and chronic musculoskeletal pain is needed. Therefore, aim of this systematic review is to investigate the association between nutrition and chronic musculoskeletal pain conditions. This systematic review will be conducted following PRISMA guidelines. The search strategy will be based on the PECO framework (PATIENTS= people with chronic musculoskeletal pain, EXPOSURE= (Behavioural) nutrition, COMPARISON= non-comparison or comparison with healthy pain free group, OUTCOME= outcomes on the association between nutrition and pain). Three online databases (PubMed, Web of Science and Embase) will be searched. Additionally, forward and backward tracking of relevant studies will be performed. Observational studies, case reports, clinical trials (all phases), randomized controlled studies, comparative studies written in English will be considered. Study selection will be performed in two phases (title/abstract/keyword and Full-text) by two independent researchers (O.E. and S.T.Y.). Methodological quality of each included studies will be assessed by two independent reviewers (O.E. and S.T.Y.). A consensus meeting will be held between both reviewers at each step, in case of disagreement, the third (A.M.) and fourth reviewer (T.D.) will make the final decision. Results: This review is still ongoing. During the congress results will be ready to be presented. Results of this systematic review possibly will give important insights into the associations between musculoskeletal pain and nutrition. Process Evaluation: At the beginning, preliminary searches with the search terms were giving us more than 5. hits. However, by consulting colleagues and by checking protocol of the relevant articles, number of the hits were reduced from 5. to 2.. 1. Cimmino MA, Ferrone C, Cutolo M. Epidemiology of chronic musculoskeletal pain. Best practice & research Clinical rheumatology. 211;25(2):173-83. 2. Dean E, Söderlund A. What is the role of lifestyle behaviour change associated with non-communicable disease risk

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Prevalence and risk factors of sleep disorders in breast cancer survivors: systematic review and meta-analyses.

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Abstract text: Introduction: Breast cancer remains the most frequently diagnosed malignancy among women worldwide. Despite the 1-year survival of 8%, an important portion of the breast cancer survivors (BCS) will face sleep disorders (SD), which impacts the quality of life negatively. Therefore, the purpose of this review was to determine the prevalence and risk factors for the development of SD in BCS. Methods: PubMed, Web of Science and Pedro were systematically screened. Meta-analyses were performed for prevalence numbers and risk factors described in more than one article. In case of high heterogeneity ($I^2 > 5\%$) amongst studies [1, 2], subgroup analyses were performed based on the total NOS-score, study design, type of SD and the use of a measurement tool. Results: 27 studies were found eligible. The pooled prevalence for SD was .4 (95% confidence interval (CI) [.29-.52], $p < .1$), ranging from .14 (95% CI = [.4-.24]) to .93 (95% CI = [.91-.95]). Subgroup analyses did not reduce the heterogeneity. Meta-analyses were performed for 7 risk factors. Significant differences for the odds of developing SD were found for hot flashes (pooled OR (OR=%, $p=.9$)), race (OR=%, $p=.47$) and menopause (OR=%, $p=.7$). After withdrawing the studies that did not rely on the use of a measurement tool with strong psychometric properties, the heterogeneity of pain (OR=27%, $p=.25$), depressive symptoms (OR=%, $p=.63$) and fatigue (OR=2.82, 95% CI = [1.98-4.2], $I^2=$ %, $p=.6$) decreased significantly. Discussion: Due to high heterogeneity ($I^2=1\%$) it was impossible to provide the prevalence of SD among BCS. Different reasons can be held attributable for this. First, the criteria of the International Classification of SD (ICSD-3) were not always applied correctly to come to the diagnosis of SD [3]. Second, most of the included studies relied on the EORTC QLQ-C3 for the diagnosis of insomnia, which has not been validated for it. Third, the presence of sleep problems before cancer diagnosis might be neglected [4]. Last, there is a high age difference among the included BCS [5]. Process evaluation: Language restrictions, dichotomizations and the use of the adapted NOS version for cross-sectional studies might influence the results. In the future, studies should not only rely on the ICSD-3 but also on measurement tools that are validated to come to the diagnosis of SD. 1. Deeks, J.J., J. Higgins,

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Functional brain alterations in low back pain: a systematic review of EEG studies

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Although low back pain (LBP) is a major health issue, its underlying mechanisms remain unknown. Research has shifted from examining solely peripheral factors to studying possible central mechanisms. Neuroplastic brain alterations can occur when pain becomes persistent. While evidence regarding structural and functional brain alterations in LBP assessed using Magnetic Resonance Imaging has already been summarized, evidence regarding functional brain changes in LBP measured using electroencephalography (EEG) remains unclear. Methods. This systematic review analyzed the available literature on functional brain alterations in LBP measured with EEG. Four electronic databases were systematically searched the 1 of March 218, resulting in 12 included studies. Studies showed a risk of bias of 37.5%-75% using the Newcastle-Ottawa Scale for case-control studies. Results. Limited evidence was found regarding increased EEG-amplitude of several balance-related potentials, and early somatosensory evoked potentials (SEP) to noxious stimuli in chronic LBP (CLBP). Furthermore, smaller feedback-related negativity and P3 potentials were observed during decision-making tasks in CLBP. Late-phase SEPs to noxious stimuli and auditory evoked potentials do not seem to be altered in LBP, whereas ambiguous results were found regarding the P26 SEP. Discussion. Most studies examined non-specific or mixed CLBP populations, hence little to no evidence is present regarding EEG-quantified brain activity in (sub)acute or recurrent LBP. These findings suggest altered decision making processes in CLBP and postural strategies requiring a higher cortical attention-demand. Furthermore, limited evidence for decreased habituation to painful and auditory stimuli was found. This review increases the understanding of the LBP brain and directs future EEG-research in LBP. Process evaluation. Despite these findings further research regarding functional brain changes with EEG is recommended. More specifically, different types of LBP and less heterogeneous LBP populations, as well as other functional tasks still need to be examined.

Reliability and validity of the Dutch Injustice Experience Questionnaire in patients with chronic pain

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Reliability and validity of the Dutch Injustice Experience Questionnaire in patients with chronic pain

Perceived injustice (PI) has been defined as “an evaluation of the severity of pain-related loss, blame and a sense of unfairness” (2). PI has a negative impact on health and is associated with poor recovery outcomes in pain rehabilitation programs (3). In order to measure PI, the Injustice Experience Questionnaire (IEQ) was developed. Thus far, the reliability and validity of the Dutch version of the IEQ is unknown. This study aimed to study the test-retest reliability and construct validity of the Dutch IEQ. Included patients were adults with multifactorial chronic pain (> 3 months) from two health care settings. All patients filled out questionnaires that measured perceived injustice (IEQ), pain characteristics, central sensitization, disability, pain catastrophizing, pain acceptance, depression, anxiety and PTSD-symptoms, anger, and perceived illness threat. Thirteen hypotheses on the strength of the correlations between the IEQ and the other measurements were formulated a priori. Correlations were calculated using Pearson correlation coefficients. To test test-retest reliability, the IEQ was assessed 2 weeks later and intra-class correlations were computed. All measurements, apart from pain duration and number of pain sites, were significantly correlated with the IEQ. Eleven out of 13 hypotheses were confirmed. Intraclass correlation between the first and second assessment of the IEQ was .96. The results support the construct validity of the Dutch IEQ and suggest that test retest reliability is excellent. Process Evaluation The study is in its final stage and writing is being finished. A limitation of this study is that this is a cross-sectional study and correlational data cannot provide information about the direction of the relationship between perceived injustice and other constructs.

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Comparison of the impact of central sensitization between patients with chronic low back pain and knee osteoarthritis

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In the treatment of chronic musculoskeletal pain, pain-related disability is one of the most important outcomes, which is influenced by various factors, including psychosocial factors and central sensitization (CS). CS is defined as the increased responsiveness of nociceptive neurons in the central nervous system to normal or subthreshold afferent input. Although CS-related symptoms (e.g. mechanical hyperalgesia, allodynia, and/or referred pain) are found in chronic musculoskeletal pain, the disease-specific characteristics of CS are unclear. The aim of the present study was to investigate a difference in the impact of CS between types of disorders, chronic low back pain (CLBP) and knee osteoarthritis (KOA). One hundred and four CLBP subjects and 5 KOA subjects completed the Central Sensitization Inventory (CSI), the Brief Pain Inventory (BPI; contains pain intensity and pain interference), EuroQoL 5-dimension (EQ5D), and the Pain Catastrophizing Scale (PCS). The BPI, EQ5D, PCS, and CSI were compared between the groups, and correlations between the CSI, BPI, EQ5D, and PCS were investigated. In addition, we used the receiver operating characteristic curve for the CSI score to calculate the area under the curve (AUC) and cutoff points in order to discriminate pain interference in each group. The reference standard cases were set by the median partitioning of the pain interference score. The CSI was significantly higher for the CLBP group than for the KOA group (25.5 ± 12.2 and 17.6 ± 1.3 ; $p < .1$). The CSI was significantly correlated with pain intensity (CLBP, $p = .37$; KOA, $p = .35$), pain interference (CLBP, $p = .42$; KOA, $p = .53$), EQ5D (CLBP, $p = -.46$; KOA, $p = -.57$), and PCS (CLBP, $p = .59$; KOA, $p = .58$) for both groups (all $p < .1$). The AUCs were .73 for CLBP and .75 for KOA. Cutoff points of the CSI score were 34 for the CLBP (sensitivity = .47, specificity = .87) and 18 for the KOA (sensitivity = .68, specificity = .76). Our results showed that CS-related symptoms were associated with pain-related symptoms in both the CLBP group and KOA group. However, there was a difference with cutoff point of the CSI score between the groups. These results suggest that the impact of CS on pain-related disability differ between CLBP and KOA. Process evaluation When the CSI is used to estimate the influence of CS on pain-related disability, we should consider the difference with cutoff point depends on patient group.

Effectiveness of Pain Neuroscience Education and Physiotherapy in subjects scheduled for a Total Knee Arthroplasty: Randomized Clinical Trial.

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Introduction: Total knee arthroplasty (TKA) has become one of the most common orthopedic surgery. Despite its evident benefits, only a third of patients report no functional problems following surgery, and approximately 2% develop persistent postoperative pain. Among all studied risk factors, pain catastrophism and preoperative knee pain emerge as two of the most important predictors of persistent pain after TKA. The evidence has shown that patients with high preoperative levels of pain catastrophism and pain are at higher risk of having persistent postoperative pain. These risk factors are modifiable, and it is believed that a preoperative intervention based on the preoperative risk factors management could improve postoperative outcomes after a TKA. The aim of this study is to investigate the effectiveness of two different preoperative physiotherapy interventions in patients scheduled for a TKA with pain catastrophizing and moderate to severe knee pain. **Methods:** This study is a three-arm parallel group trial design including 45 subjects with high levels of pain catastrophizing and moderate to severe pain, scheduled for total knee arthroplasty due to primary osteoarthritis. Patients eligible for participation will be randomized in three arms, usual care, usual care and pain neuroscience education, or usual care and multimodal physiotherapy. Usual care is made up of preoperative biomedical education, hospital and domiciliary rehabilitation. Pain neuroscience education consists in 3 individual sessions focusing on understanding the neurophysiology of pain, whereas the multimodal physiotherapy consists in 6 individual sessions of manual therapy, therapeutic exercise and pain neuroscience education. Measurements will be taken 4 months and 2 weeks before surgery, and 3 and 6 months after surgery. Primary outcome will be pain measured with VAS (Visual Analogue Scale), whereas secondary outcomes include physical function and psychosocial factors such as Kinesiophobia, quality of life and self-management. **Discussion:** There are no studies that have investigated the effectiveness of a physiotherapy intervention on patients with preoperative risk factors before a TKA. This trial will provide new evidence regarding the existing health care recommendations on patients scheduled for a TKA. **Process Evaluation:** In order to minimize the differences between subjects and to evaluate the results, variables like analgesic intake, comorbidities, treatment adherence and perception will be also recorded. 1. Katz J, Burns L, Ritvo S, Ferguson M, Clark H, Seltzer Z. Pain catastrophizing as a risk factor for chronic pain after total knee arthroplasty: a systematic review. *J Pain Res.* 215;8:21. 2. Lewis GN, Rice DA, McNair PJ, Kluger M. Predictors of persistent pain after total knee arthroplasty: A systematic review and meta-analysis. *Br J Anaesth.* 215;114(4):551–61. 3. Louw A, Zimney K, Puentedura EJ, Diener I. The efficacy of pain neuroscience education on musculoskeletal pain: A systematic review of the literature. *Physiother Theory Pract.* 216;32(5):332–55.

Investigating the repeatability and stability of exercise induced hypoalgesia in healthy adults

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Exercise leads to temporary hypoalgesic changes in pain sensitivity, which has been demonstrated in the form of increased pain thresholds following exercise - also known as exercise induced hypoalgesia (EIH). No previous study has evaluated the reproducibility of EIH over more than two sessions with the same intervention or the extent of EIH with repeated exposure to the same exercise. Thus, the aim of this study is to investigate the reliability and stability of the effects of EIH with a repeated endurance or a resistance exercise protocol. **Methods** This study examines two exercise interventions using a test-retest quantitative sensory testing (QST) design, which will be repeated six times over three weeks. Healthy participants will be randomly allocated to one of the two exercise interventions consisting of either a brisk treadmill walking task at a level of 7% heart rate for 15 minutes or an individually calibrated isotonic lifting task including four sets of eight repetitions. To assess EIH before and after the exercise intervention, extensive QST will be conducted locally over the back and over remote body regions including thermal pain thresholds and temporal summation, pressure pain thresholds and tolerance, and the nociceptive withdrawal reflex. Furthermore, we will record mood and expectations of exercise before the task, and perceived exhaustion following the task. For data analysis, the intra-class correlation coefficients for intra-rater reliability, and Bland Altman plots for limits of agreement will be calculated. Furthermore, we will conduct a repeated measures analysis of variance using partial eta squared for effect size followed by a post hoc analysis. **Results/ Discussion** This study has been approved by the Ethics Committee of the University of Birmingham, UK. Healthy participants (18-55 years) will be recruited from the University of Birmingham and preliminary results will be presented, as data collection is under way. Findings of this study will be important for future considerations and research in people with musculoskeletal disorders to examine how EIH is modified in people with chronic pain. Stability and reliability of results will further inform clinical decision making and elucidate its impact on patient outcomes to exercise. **Process Evaluation** QST has been shown to display high inter-individual variability, therefore we have focussed on the percentage change rather than the individual scores.

The knowledge of contextual factors as triggers of placebo and nocebo effects in patients with musculoskeletal pain: findings from a national survey.

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Background: Contextual factors (CFs) have been recently proposed as triggers of placebo and nocebo effects in musculoskeletal pain (1). CFs are represented by the features of the: clinician (e.g., uniform), patient (e.g., expectations), patient-clinician relationship (e.g., verbal communication), treatment (e.g., overt therapy) and healthcare setting (e.g., design) (2,3). To date the Italian patients' knowledge about CFs role in musculoskeletal pain treatment is lacking. The aim of this study was to investigate attitudes and beliefs of Italian patients with musculoskeletal pain, regarding the use of CFs in clinical practice. **Methods:** A national sample of Italian patients with musculoskeletal pain was recruited from 12 outpatients' private clinics in Italy. An invitation to participate in an online survey was sent to patient presenting: 1) musculoskeletal pain; 2) 18-75 years; 3) valid e-mail account; 4) understanding of Italian language. Survey Monkey software was used to deliver the survey. The questionnaire was self-reported and composed by 22 questions and 2 clinical vignettes regarding the patients' behaviour, beliefs and attitudes about the adoption of CFs in clinical practice. Descriptive statistics and frequencies described the actual number of respondents to each question. **Results:** 1112 patients participated in the survey. 574 participants were female (52%). Patients' mean age was 41.7 ± 15.2 years. Patients defined CFs as an intervention with an aspecific effect (64.3%), but they believed in their clinical effectiveness. They identified several therapeutic effects of CFs for different health problems. Their use was considered ethically acceptable when it exerts beneficial psychological effects (6.4%), but was banned if considered deceptive (51.1%). During clinical practice patients desired to be informed about the use of CFs (46.%) that is positively accepted as addition to other interventions to optimize clinical responses (39.3%). Moreover, patients explained the power of CFs through body-mind connections (37.1%). **Discussion:** Patients with musculoskeletal pain perceived as ethical the adoption of CFs in clinical practice. They mostly had positive attitudes towards their use and effectiveness when associated with evidence-based therapy. **Process Evaluation:** A problem encountered regarded the recruitment of patients with musculoskeletal pain in different regions of Italy. Rossetтини, G., Carlino, E., Testa, M. 218. Clinical relevance of contextual factors as triggers of placebo and nocebo effects in musculoskeletal pain. *BMC Musculoskelet Disord* 19,27 Testa, M, Rossetтини, G. 216. Enhance placebo, avoid nocebo: How contextual factors affect physiotherapy outcomes. *Man Ther* 24:65-74 Rossetтини, G., Testa, M. 218. Manual therapy RCTs: should we control placebo in placebo control?. *Eur J Phys Rehabil Med* 54,5-51

Central Pain Processing, Psychosocial and Lifestyle Factors as Potential Moderators for Outcome after Rotator Cuff Repair: A Protocol

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Prognosis for outcome after a rotator cuff repair (RCR) is predominantly established on the base of predicting biomedical and unmodifiable factors (e.g. tear size). Current state of the art presents a need for further investigation towards factors that are modifiable and psychosocial in character, to explore their potential as pain drivers and maintainers after RCR. Also, the role of central pain processing (CPP) in shoulder pain after RCR has not been studied sufficiently to draw firm conclusions. Further study on moderating factors for outcome after RCR seems required. This longitudinal cohort study will analyse 141 (power 9%, $\alpha=.5$, dropout 12.5%) usual care datasets of preoperative (2 weeks (T1)) and postoperative (12 weeks (T2), 12 months (T3)) measures, of adult patients undergoing RCR at a hospital in Switzerland. Mean change from T1, T2 and T3 of primary (Western Ontario Rotator Cuff Index) and secondary outcomes (Constant- Score, max. pain on numeric rating scale and quality of life) will be analysed using linear regression models. A Stepwise inclusion of the 6 potential moderators will be conducted using linear and logistic regression models. Potential moderators are obtained by quantitative sensory testing and central sensitisation inventory (for CPP), pain catastrophising scale, illness perception questionnaire, perceived stress scale and questions about expectations and sleep. There is a vast yearly increase (141%) of RCR procedures in the United States and Europe, with heterogenous reports about outcome satisfaction (38-95%). Results from this study may disclose moderators for outcome after RCR and foster a more disease specific knowledge to support an individualised rehabilitation approach. Finally, the results of the present study may affect the recovery rate for shoulder pain. This longitudinal study supported the reorganisation of usual care for RCR patients. Hence, the research processes elicited a chain of changes in clinics, which slowed down the start for data collection. The clinical setting also limited test capacity to 3min, and required a restriction of integrated measures. Nonetheless, this engaged a profound exploration of the most potent measures for the project purpose, including exchanges with external experts, and it continuously supports unbiased completeness of patient rated measures. To safely handle the large data sets and facilitate high data quality, REDCap software is used.

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THE INFLUENCE OF PHYSICAL ACTIVITY ON THE NOCICEPTIVE FLEXION REFLEX IN HEALTHY ADULTS: A CROSS-SECTIONAL STUDY

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The nociceptive flexion reflex (NFR) is a spinal reflex induced by painful stimuli resulting in a withdrawal response. The NFR is considered to be an objective physiological correlate of spinal nociception. Previous research has already demonstrated that physical activity (PA) levels can influence pain assessments. However, no studies have directly examined the relationship between PA and spinal nociception. Hence, this study aimed to investigate whether the NFR threshold can be predicted by self-reported and objective measures of PA in healthy adults. PA levels and NFR thresholds of 58 healthy adults were cross-sectionally determined. PA was evaluated during 7 consecutive days by self-report using the International Physical Activity Questionnaire, and by objective accelerometry data obtained using an activity monitor. The NFR was quantified by a biceps femoris muscle electromyogram following transcutaneous electrical stimulation of the sural nerve. The stimulus intensity required to elicit a reflex was registered as the NFR threshold. Hierarchical linear regression analyses were performed to determine the relationship between PA and the NFR, while controlling for demographic and cardiovascular confounders. Results indicate that healthy adults leading a more active lifestyle are less sensitive to pain which is expressed as higher NFR thresholds. Specifically, individuals who perform more daily step counts show higher NFR thresholds. Furthermore, those who expend more energy and time on activities of moderate intensity levels exhibit higher NFR thresholds. The current study provides preliminary evidence indicating that a physically active lifestyle may be beneficial for spinal nociception in healthy adults. More specific, larger amounts of step counts and performing moderate-intensity activities seem to have inhibitory effects on the NFR. These findings help improve our understanding on the endogenous effects of exercise. Given their potential to reduce spinal nociception, walking and moderate-intensity activities could be useful in the treatment of chronic pain patients in which increased spinal nociception has already been demonstrated. Process evaluation
Developing the NFR-assessment set-up was challenging. Statements concerning causal mechanisms are precluded since PA was not manipulated in the present study. Future research on the effects of exercise training on nociceptive processing would be an important next step. 1. Skljarevski V, Ramadan NM. The nociceptive flexion reflex in humans -- review article. 22; 96(1-2): 3-8. 2. Cowen R, Stasiowska MK, Laycock H, et al. Assessing pain objectively: the use of physiological markers. 215; 7(7): 828-847. 3. Naugle KM, Ohlman T, Naugle KE, et al. Physical activity behavior predicts endogenous pain modulation in older adults. 217; 158(3): 383-39.

Efficacy of a pain neurophysiology education program in patients with osteoarthritis knee chronic pain

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: osteoarthritis is the most common form of arthritis. Although its diagnosis is based on the degree of joint wear evidenced by radiological images, the reason for medical consultation is pain and functional disability. For a long time it has been thought that the pain was due to the degeneration of the joint cartilage but today it is known to be multifactorial, osteoarthritis is framed within the diseases that generate chronic pain. The first line treatments that are recommended are exercise, weight loss and education. For other conditions of chronic pain education in neurophysiology of pain has shown efficacy in reducing disability, behavioral and cognitive aspects associated with pain and even pain levels. Framed in a biopsychosocial approach, our research proposes a treatment program for knee osteoarthritis patients based on pain neurophysiology education combined with physical exercise.: A randomized single-blind clinical trial is designed with a sample of 48 patients with knee osteoarthritis randomized in control group and experimental group, of 24 subjects each group. The age of the sample is established between 4 and 75 years and the following exclusion criteria were established: patients scheduled for knee prosthesis, those with a diagnosis of rheumatoid arthritis, fibromyalgia, diabetes, neuropathy or other diseases that present with chronic pain, also people with cognitive impairment. The intervention group will be divided into 4 groups of 6 people each group, they will receive 4 lessons of one hour, one per week for a month, based on pain education and physical exercise, at the end of each class will provide them with a guide book to read at home. The control group is subdivided in the same way and they will receive the same hours of training and physical exercise but the education will be based on classic concepts of the biomedical model of osteoarthritis. Measurements of the following scales will be taken: WOMAC, pain catastrophe scale, Tampa scale of kinesiophobia, arthritis self-efficacy, the pain anxiety symptom scale and EVA. The measurements will be taken immediately before the first class, after the completion of the last class, 3 months after and at 6 months. Discussion and evaluation: We hope to obtain an improvement in the post-treatment results and that they will be maintained at 3 and 6 months, in this way evidencing the effectiveness of pain education in knee osteoarthritis, given the lack of evidence so far. Mora J, Przkora R, Cruz-Almeida Y. Knee osteoarthritis: pathophysiology and current treatment modalities, *Journal of Pain Research*. 2018; 11:2189-96. Traeger AC, Lee H, Hübscher M, et al. Effect of Intensive Patient Education vs Placebo Patient Education on Outcomes in Patients With Acute Low Back Pain A Randomized Clinical Trial. *JAMA Neurol*. Published online November 5, 2018. doi:10.1111/jamaneurol.2018.3376. Hurley M, Dickson K, Hallett R, et al. Exercise interventions and patient beliefs for people with hip, knee or hip and knee osteoarthritis: a mixed methods review. *Cochrane Database of Systematic Reviews* 2018, Issue 4. Art. No.: CD1842. DOI: 10.1111/14651858.CD1842.pub2.

The effectiveness of Pain Neuroscience Education (PNE) for pain-related disability after breast cancer surgery (EduCan Trial): study protocol for a randomized controlled trial.

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: Breast cancer is the most frequent malignancy among women worldwide. Given the continuous increase in survival, attention is warranted towards the debilitating problems accompanying this disease and its treatment. Pain, the second most common side effect, results in difficulties in daily life functioning, both at short and long term. Despite the effectiveness of currently postoperative applied physical therapy modalities, a significant proportion of women still experiences pain. Over the past decades, awareness on the important role of educational interventions in the management of pain has increased. However, they are often restricted to a biomedical approach. Only recently, increased knowledge on pain mechanisms has led to a modern educational approach, also known as Pain Neuroscience Education (PNE). This explains the ability of the nervous system to modulate pain experience, as well as the potential influences on pain and thereby targets a reconceptualization from a biomedical or structural model to an actual biopsychosocial one. This could enhance the effectiveness of the currently applied physical therapy modalities for treatment and prevention of pain-related disabilities after breast cancer treatment, compared to a traditional biomedical intervention. Methods: A double-blinded randomized controlled trial will be conducted in the university hospitals of Leuven. 184 participants need to be recruited. All participants receive standard physiotherapy once or twice a week during intensive phase (4 months postoperatively) and once or twice a month during maintenance phase (4-8 months postoperatively). Additionally, participants in both the intervention and control group attend three 3-minute individual educational sessions (intervention: PNE, control: biomedical education) during the intensive phase and three 'booster sessions' during the maintenance phase. The primary outcome parameter is pain-related disability 1 year after surgery assessed with the Pain Disability Index. Secondary outcomes are other dimensions of pain, physical-, mental- and work-related functioning up to 18 months after surgery. Process evaluation: Currently 82 patients are included with an inclusion rate of 1.9 patients per week, 1 drop-out. Despite the fact that this inclusion rate is below the initially estimated rate of 2.5 patients per week, it is feasible to finish the project within the intended time span.

EFFECTS OF CONDITIONED PAIN MODULATION ON THE NOCICEPTIVE FLEXION REFLEX IN HEALTHY ADULTS: A SYSTEMATIC REVIEW

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The nociceptive flexion reflex (NFR) is a spinal reflex induced by painful stimuli resulting in a withdrawal response. Previous research has shown that the NFR is inhibited through endogenous pain inhibitory mechanisms. One of these mechanisms is the pain-inhibits-pain phenomenon called Conditioned Pain Modulation (CPM). Both NFR and CPM can be experimentally induced and assessed. Although accumulating research suggests that the NFR can be affected by CPM, no clear overview of the current evidence exists. Therefore, the current review aimed at providing such a synthesis of the literature. In addition, the influence of personal factors on CPM of the NFR was investigated. A systematic review was performed and reported following the PRISMA-guidelines. Predefined search terms regarding the NFR were used in five electronic databases to identify relevant studies. Retrieved studies were screened on eligibility using predefined inclusion criteria. Risk of bias of individual articles was investigated according to the modified Newcastle-Ottawa Scale. A level of evidence was allocated using the guidelines of the Dutch Institute for Healthcare Improvement (CBO). Subsequently, these evidence levels were used to determine the level of conclusion after clustering studies with comparable types of conditioning stimuli. Forty articles, with a mean risk of bias score of 62%, were included. There is some evidence that CPM produced by thermal or mechanical stimuli induces inhibitory effects on the NFR. However, inconclusive evidence exists regarding CPM of the NFR induced by electrical stimuli. While several personal factors do not affect CPM of the NFR, increased cognitive interference is associated with reduced NFR inhibition by CPM. The present review demonstrates that certain types of nociceptive conditioning stimuli have the potential to depress, at the spinal level, nociceptive stimuli elicited from distant body regions. Although CPM of the NFR seems to be robust to the influence of several personal factors, it can be affected by cognitive influences. Process evaluation The lack of uniform protocols for performing CPM impedes comparison between, and combining data from, several studies. In addition, there was substantial heterogeneity in NFR protocols which precluded quantitative synthesis. These limitations emphasize the need for standardized CPM and NFR protocols to enable proper comparisons of results between various research studies. 1. Sandrini G, Serrao M, Rossi P, et al. The lower limb flexion reflex in humans. *Prog Neurobiol* 25; 77(6): 353-395. 2. Villanueva L, Le Bars D. The activation of bulbo-spinal controls by peripheral nociceptive inputs: diffuse noxious inhibitory controls. *Biol Res* 1995; 28(1): 113-125. 3. Liberati A, Altman DG, Tetzlaff J, et al. The PRISMA statement for reporting systematic reviews and meta-analyses of studies that evaluate health care interventions: explanation and elaboration. *PLoS Med* 29; 6(7): e11.

Daily physical activity levels are predictive of the effectiveness of conditioned pain modulation

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Whereas literature on the association between physical activity and pain sensitivity is well depicted, research into the association between physical activity and conditioned pain modulation (CPM) is less extensive. Previous research has demonstrated that individual differences in the efficacy of CPM among healthy persons can be accounted for by personal factors.¹ A limited amount of studies also suggest that physical activity may be associated with CPM efficacy. However, these results await confirmation using objective physical activity measures. In this cross-sectional study, during 7 days prior to CPM assessment, physical activity levels of 15 healthy adults were registered through continuous accelerometry and self-report using the validated International Physical Activity Questionnaire. CPM was evaluated using a standardized heterotopic noxious conditioning stimulation (HNCS) protocol during which the influence of a noxious conditioning stimulus on a noxious test stimulus was assessed. Before, during, and after immersion of the non-dominant hand into hot water (i.e. conditioning stimulus) pressure pain thresholds (i.e. test stimulus) were evaluated at the dominant hand, neck, and leg. Hierarchical regression was conducted to determine a predictive relationship between physical activity and CPM efficacy, meanwhile controlling for potential confounders of experimental pain testing. The HNCS protocol was effective in eliciting a CPM response. The magnitude of this CPM response was positively correlated with the physical activity levels. Higher self-reported levels of moderate physical activity (e.g. cycling <16km/h) significantly predicted greater CPM magnitude. When the number per steps per day, as registered with accelerometry, was ≥ 1 . (= active) or ≥ 12.5 (= highly active) this significantly predicted more efficacious CPM. These findings highlight the importance of physical activity in enhancing inhibitory endogenous pain modulation. Additionally, physical activity might be useful in the treatment of chronic pain patients in whom dysfunctional CPM is established. Performing activities of moderate intensity and walking are achievable for such patients and can be implemented in activity management programs to indirectly improve CPM and reduce or prevent pain. Process evaluation: Replication of hierarchical regression analysis in analogy to previous studies was challenging due to unclear descriptions. Hermans L, Van Oosterwijck J, Goubert D, Goudman L, Crombez G, Calders P, et al. Inventory of Personal Factors Influencing Conditioned Pain Modulation in Healthy People: A Systematic Literature Review. *Pain Pract.* 216;758–69. Shiro Y, Ikemoto T, Terasawa Y, Arai Y-CP, Hayashi K, Ushida T, et al. Physical Activity May Be Associated with Conditioned Pain Modulation in Women but Not Men among Healthy Individuals. *Pain Res Manag* [Internet]. 217;217:1–8. Available from: <https://www.hindawi.com/journals/prm/217/95914/> Naugle KM, Riley JL. Self-reported Physical Activity Predicts Pain Inhibitory and Facilitatory Function. *Med Sci Sports Exerc.* 214;46(3):622–9.

THE ROLE OF PAIN COGNITIONS IN HEALTHCARE UTILIZATION IN PATIENTS UNDERGOING SURGERY FOR LUMBAR RADICULOPATHY: A RANDOMIZED CONTROLLED TRIAL

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Surgery for lumbar radiculopathy often leads to high healthcare use (HCU). Maladaptive pain cognitions, which are present in subgroups of patients with radiculopathy, might be part of the mechanism behind HCU in this population, as suggested in other populations(1, 2). Therefore, we aim to reveal the possible mediating role of pain cognitions in HCU in patients undergoing surgery for lumbar radiculopathy. Methods: Eligible patients (n=12) are randomized to a perioperative pain neuroscience education (targeting pain cognitions) group or control group. HCU, Tampa Scale for Kinesiophobia (TSK), Pain Catastrophizing Scale (PCS) and Pain Vigilance and Awareness Questionnaire (PVAQ) are assessed at baseline and until 2 years post-surgery (5 timepoints). Baseline associations between pain cognitions and HCU are explored. Next, therapy effects are investigated by repeated measures AN(C)OVA. Last, causal interactions are examined using multivariate regression. Preliminary baseline findings are available for 1 patients. Mean TSK, PCS and PVAQ scores are, respectively, 43/68, 26/52 and 41/9, with 9% and 32% scoring above the cut-off of the TSK ($\geq 37/68$) and PCS ($\geq 23/52$), respectively. Patients scoring above the PCS cut-off use more types of analgesics ($p=.17$). A high number of neurosurgeon visits is associated with worse catastrophizing ($p=.69$) and especially rumination ($p=.23$). Strong opioid use is also related to higher PCS rumination scores ($p=.76$). Using analgesics in general is related to higher scores on the PVAQ attention to pain subscale ($p=.94$). Discussion: Preliminary baseline findings underscore the hypothesis that there might be an association between pain cognitions and HCU. However, based on these explorative analyses no strong conclusions can be made. Further analyses will provide insight in the clinical relevance of these relationships and possible causal interactions between pain cognitions and HCU in this population. These results will be available and presented by the time of the colloquium. Process evaluation: Recruitment (ongoing) is highly challenging as it depends on the, often last minute, scheduling of surgeries. Therefore, high flexibility is asked from researchers and patients. The largest limitation lies in the use of self-reported diaries and recall questionnaires for the assessment of HCU, implying possible (recall) bias, however these methods have been found to be reliable in previous research(3). 1. Joud A, Bjork J, Gerdle B, Grimby-Ekman A, Larsson B. The association between pain characteristics, pain catastrophizing and health care use - Baseline results from the SWEPAIN cohort. *Scandinavian journal of pain*. 217;16:122-8. 2. Hirsch O,

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The culture-sensitive and standard pain neuroscience education improve pain, disability, and pain cognitions in first-generation Turkish migrants with chronic low back pain: a pilot randomized controlled trial

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Introduction: Due to a growing understanding of brain changes in addition to spinal impairments in chronic low back pain (CLBP) and an increased acceptance of the biopsychosocial model of pain, a contemporary pain neuroscience approach targeting both physical and psychological aspects of pain has gained importance for the treatment of CLBP. Over the past two decades, several studies focusing on the ethnic and cultural disparities in pain beliefs and cognitions, have indicated that ethnicity and socio-cultural factors may have a major influence on understanding and evaluating pain, as well as on the behavioral and emotional responses. These findings resulted in the hypothesis that the content of pain neuroscience education should undergo cultural adaptations before handing them out to the target population. Therefore, the aim of this research is to compare the effectiveness of the culture-sensitive to the standard pain neuroscience education (PNE) on knowledge of pain, pain intensity, disability, and pain cognitions in first-generation Turkish migrants with chronic low back pain (CLBP). **Methods:** Twenty-nine Turkish first-generation migrants with CLBP were randomly assigned to the culture-sensitive (n=15) or standard PNE (n=14) groups. Primary (pain knowledge, pain intensity, and disability) and secondary outcomes (pain beliefs, catastrophization, and fear of movement) were evaluated at baseline, immediately after the second session of PNE (week 1), and after 4 weeks. **Results:** A significant main effect of time was found in pain knowledge ($p < .1$), pain intensity ($p = .3$), perceived disability ($p = .2$), pain beliefs ($p = .2$, $p = .1$), catastrophization ($p = .2$), and fear of movement ($p = .2$). There was a trend for the culture-sensitive group to score better in the r-NPQ immediately after PNE and at the first month, but the between-group interaction was non-significant ($p > .5$). Both the standard education as the culturally adapted PNE are effective in Turkish migrants with CLBP. However, the improvements in all parameters were similar between the culture-sensitive and standard PNE groups. Therefore, maybe migrants do not need cultural adaptations, while these adaptations might be essential for the autochthonous population in Turkey. Further research is required to investigate the effects of the culture-sensitive PNE in Turkish natives with CLBP. **Process evaluation:** The pain neuroscience education material was tested in Turkish migrants who might have already adapted to Belgian beliefs and culture. Cultural integration in the host country includes learning a new language, creating a new social network, obtaining new values, beliefs, attitudes, and changing the lifestyle patterns. Therefore, migrants could be less in need of cultural adapted therapy than patients living in their own culture. Due to low adherence rates of migrants to physiotherapy programs, only short-term results were provided in the present study due to feasibility reasons. Further research should also focus on long-term effects of the culture-sensitive and standard PNE programs in Turkish migrants. **References:** 1. Brady, B., Veljanova, I., Schabrun, S., Chipchase, L., 218. Integrating culturally informed approaches into physiotherapy assessment and treatment of chronic pain: a pilot randomised controlled trial. *BMJ Open* e21999. 2. Campbell, C.M., Edwards, R.R., 212. Ethnic differences in pain and pain management. *Pain Manag* 2 (3), 219-23. 3. Nijs, J., Meeus, M., Cagnie, B., et al., 214. A modern neuroscience approach to chronic spinal pain: combining pain neuroscience education with cognition-targeted motor control training. *Phys Ther* 94 (5), 73-738.

Associations Between Symptoms of Central Sensitization And Cognitive Behavioral Factors In People With Chronic Low Back Pain: A Cross-Sectional Study

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Introduction: Central sensitization (CS) can be present in certain chronic nonspecific low back pain (CLBP) patients and might explain their pain and symptoms(1). Cognitive behavioral factors may contribute to and sustain the mechanism of CS(2). The objective of this cross-sectional study is to analyze the relationship between symptoms of CS and important cognitive behavioral factors in a CLBP sample. **Methods:** Participants with CLBP for at least 3 months were eligible for participation. Outcome measures were the Central Sensitization Inventory (CSI), Brief Illness Perception Questionnaire, Quebec Back Pain Disability Scale, Visual Analogue Scale (pain), Pain Catastrophizing Scale, Tampa Scale for Kinesiophobia and One-Minute-Stair-Climbing Test (pain behavior). Correlations were used to analyze associations between symptoms of CS, measured by the CSI, and the assessed cognitive and behavioral factors. Next, a between groups analysis was performed to compare patients with and without clinically relevant symptoms of CS. **Results:** Data from 38 subjects were analyzed. Significant associations were found between symptoms of CS and all other outcomes, especially with current pain ($r=.51$; $p=.1$), mean pain during the last 7 days ($r=.55$; $p=.1$) and catastrophizing ($r=.518$; $p=.1$). Patients with clinically relevant symptoms of CS scored significantly worse on all outcomes compared to persons without relevant symptoms of CS, except for functioning ($p=.128$). **Discussion:** These results clearly indicate a relationship between symptoms of CS and cognitive behavioral factors in patients with CLBP. Although we can not conclude anything about causality based on this cross-sectional design, it can be assumed that the revealed associations add a more biopsychological level to the onset and maintenance of chronic pain problems in this population: it is possible that heightened CS may affect and be affected by pain cognitions, perceptions and behavior, resulting in a vicious circle leading to chronic pain and disability. **Process Evaluation:** The present study was a secondary analysis of baseline data of another project. We were therefore relying on the existing sample and protocol of the latter. This implied a rather small sample size. However, our post hoc power calculations showed a strong minimal power of .88. Also, only the CSI was available as a measure of

symptoms of CS, which is found to be insufficient for the identification of CS itself(3). 1. Nijs J, Apeldoorn A, Hallegraeff H, Clark J, Smeets R, Malfliet A, et al. Low back pain: guidelines for the clinical classification of predominant neuropathic, nociceptive, or central sensitization pain. *Pain Physician*. 215;18(3):E333-46. 2. Roussel NA, Nijs J, Meeus M, Mylius V, Fayt C, Oostendorp R. Central sensitization and altered central pain processing in chronic low back pain: fact or myth? *Clin J Pain*. 213;29(7):625-38. 3. Nijs J, Torres-Cueco R, van Wilgen CP, Girbes EL, Struyf F, Roussel N, et al. Applying modern pain neuroscience in clinical practice: criteria for the classification of central sensitization pain. *Pain Physician*. 214;17(5):447-57.

Body perception in Fibromyalgic patients: a mixed-method research study

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preliminary observations report “phantom sensations” of swelling hands and feet (1) in fibromyalgic patients, a condition called macrosomatognosia (2). Patients may not refer this kind of ‘bizarre’ perceptual disturbances, if not directly questioned, for fear of being considered mentally disturbed. Moreover, a specific test or validated questionnaires are not available thus, the only way to explore this phenomenon remain the patient’s history taking itself. To the best of our knowledge, this is the first study investigating body perception experience in these patients. Methods: a mixed-method design study will be conducted (3) on a convenience sample of 1 adult patients recruited accordingly with the Diagnostic Criteria of the American College of Rheumatologists. Neurological or psychiatric diseases will be considered exclusion criteria. It will be administered the Brief Pain Inventory, the Fibromyalgia Impact Questionnaire, the Neuropathic Pain Symptoms Inventory, and a customized survey investigating the presence of body perception disturbances. Patients reporting at least two affirmative answers in this last, will be considered eligible for the qualitative inquiry. Subjective experience of own’s body perception will be carried up through semi-structured interviews: answers will be audio-recorded and transcribed verbatim to perform the descriptive phenomenological analysis. The sampling will be based on the saturation of themes emerging from the interviews. Frequency distribution of items composing the customized survey will inform on the prevalence of body perception disturbances. Discussion: in this kind of research design quantitative and qualitative data collection are sequential (3): findings emerging will represent the integration of both datasets. A better knowledge about body perception may be useful 1) as a starting point to obtain prevalence data on perceptual dysfunctions in FM patients; 2) to study a possible correlation between the presence of perceptual disorders and the duration of symptoms (or other clinical and demographic features; 3) to improve the therapeutic relationship between patients and clinicians through a better understanding of body perception experienced by patients; 4) to develop future disease-specific questionnaire, designed directly on perceptual dysfunctions referred by patients. Process Evaluation: “responded validation” will be performed in a subgroup of patients in order to increase validity of results (3). 1. McCabe, C.S., Haigh, R.C., Shenker, N.G., Lewis, J., Blake, D.R., 24. Phantoms in rheumatology. Novartis Found. Symp. 26, 154–174; discussion 174-178, 277–279. 2. Lewis, J.S., Kersten, P., McCabe, C.S., McPherson, K.M., Blake, D.R., 27. Body perception disturbance: a contribution to pain in complex regional pain syndrome (CRPS). Pain 133, 111–119 3. Andrew, S., Halcomb, E.J., 29. Mixed Methods Research for Nursing and Health Sciences. John Wiley & Sons, Ltd.

Using a humanoid robot to distract children with cancer undergoing painful procedures: a pilot randomized controlled trial.

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: Childhood cancer is associated with a range of painful medical procedures. Puncturing a portal catheter (PAC) for administration of chemotherapy is a prime example of this. Literature shows that cancer survivors (both children and adults) have a greater chance of developing chronic pain (1). These chronic pain complaints may not only arise from treatments and medications but also from children's pain memory (2). The use of a humanoid robot has proven to be effective in reducing healthy children's pain and distress during vaccinations (3). Still, whether these benefits generalize to children with cancer and pain memories, needs to be examined. This pilot RCT aims to examine the effect of distraction with a humanoid robot compared to usual care during a PAC puncture on pain-related outcomes in children with cancer. : Children with a PAC aged 8-12y and their parents will be recruited at the University Hospital Brussels. Baseline assessments include child's anticipated pain and fear, self-efficacy, attention control, attention bias, pressure hyperalgesia, energy-balanced behavior, child's and parent's catastrophizing about the child's pain, parental emotional and behavioral responses to children's pain. Stratified block randomization will be used to assign patients to the control group (usual care) or intervention group (robot distraction). Immediately after the PAC procedure child's experienced self-reported pain and fear and parent's pain catastrophizing and emotional response will be assessed. Two weeks post-PAC-procedure the participating children will be contacted by telephone for a short interview in order to assess child's pain and pain-related fear memory as well as future pain expectancies using the same pain and fear scales as administered immediately after the PAC-procedure. Recalled pain and fear ratings that are higher compared to initial reports are considered indicative of negative memory biases. : This randomized controlled trial is the first one to examine the effect upon child pain memory and future pain expectancies by using a humanoid robot to distract children with cancer compared to usual care when undergoing painful procedures. PROCESS EVALUATION: The first phase of this research has started. Preparatory documents are finalized (e.g. informed consent), the robot is programmed and the request for advice is ready to submit to the medical ethics committee of the Vrije Universiteit Brussel. 1. Boland EG, Ahmedzai SH. Persistent pain in cancer survivors. *Curr Opin Support Palliat Care*. 21;11(3):181-9. 2. Noel M, McMurtry CM, Chambers CT, McGrath PJ. Children's memory for painful procedures: the relationship of pain intensity, anxiety, and adult behaviors to subsequent recall. *J Pediatr Psychol*. 21;35(6):626-36. 3. Beran TN, Ramirez-Serrano A,

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Development of culturally sensitive Pain Neuroscience Education materials for Hausa patients with chronic spinal pain: A modified Delphi study

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Researchers in the pain field are advocating on the importance of teaching people how to live well with pain and pain neuroscience education (PNE) which teaches patients about the biology and physiology of their pain experience including processes such as central sensitization, peripheral sensitization, allodynia, inhibition and facilitation is becoming popular in pain management. PNE is gaining more attention with a growing evidence for its efficacy in decreasing pain, disability, fear-avoidance, pain catastrophization, limited movement, and health care utilization in people struggling with pain. Though popular, neither the translation nor the culturally adapted version of PNE is available in any of the African languages and Hausa is considered the 2 most populous African language which is widely spoken across the West African sub region. A modified Delphi study was carried out with three consecutive experts' rounds and one additional language review round. Two (male and female) pain education teaching materials and one home education interview were drafted through focus group meetings and sent to experts. The experts were from the fields of; PNE, African cultural adaptation studies, therapists managing Hausa patients with chronic spinal pain (CSP) and native Hausa patients with CSP. Responses were collected using online questionnaires. A total of 18 experts completed the 3 rounds of the Delphi with 19 (79%), 18 (1%) and 18 (1%) experts completing the 1, 2 and 3 rounds respectively. A predefined consensus of 75% was used for each round and suggestions of experts were used in modifying the contents such as the drawings, metaphors, examples and the scope. The final materials had the consensus of the experts on its clinical usefulness for Hausa patients with CSP and 2 Hausa language experts in the field of Hausa language and culture reviewed the final materials. We focused on cultural adaptation rather than translation because of the strength and recommendations of cultural adaptations over translation especially as relates patients information. The home education leaflets used by other researchers may not be appropriate in the Hausa population due to low literacy level and we provided an alternative in an audio form. Process evaluation: Computer literacy/internet access challenges were encountered among some participants but resolved by a research assistant that helped with computer/internet logistics. Key references: 1. Louw A, Puentedura EJ, Zimney K, Cox T, Rico D. The clinical implementation of pain neuroscience education: A survey study. *Physiother Theory Pract.* 217;33(11):869-79. 2. Moseley GL, Butler DS. Fifteen Years of Explaining Pain: The Past, Present, and Future. *The journal of pain : official journal of the American Pain Society.* 215;16(9):87-13. 3. Orhan C, Cagnie B, Favoreel A, Van Looveren E, Akel U, Mukhtar NB, et al. Development of culturally sensitive Pain Neuroscience Education for first-generation Turkish patients with chronic pain: A modified Delphi study. *Musculoskeletal Science and Practice.* 219;39:1-9.

Parental involvement during children's painful medical procedures: a systematic review.

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: When children have to undergo a painful medical procedure, many parents are eager to stay with the child to reassure and comfort them. The question is, whether the presence of parents during such procedures is advantageous with regard to child's pain behavior? Research regarding this topic is unequivocal (1, 2) and additional questions arise such as whether levels of parental involvement may play a role as well. Because of the conflicting evidence about the influence of parental presence during children's painful medical procedures, we will review the evidence and will provide a systematic overview on the effects of different levels of parental involvement on child's pain-related outcomes. : A systematic search in PubMed, Web of Science and PsycARTICLES is conducted. The search strategy is based on the PECO approach (P: pediatric population (-18y) undergoing (painful) medical procedure; E: parental presence or involvement; O: child pain-related outcomes). Inclusion criteria regarding study types are RCTs and controlled clinical trials. We will consider studies that include healthy children as well as sick children from any ethnic origin aged between -18y. Only articles involving painful medical procedures in which the child is under no or a mild sedation will be included. Studies including children with developmental or psychiatric disorders will be excluded. Two researchers will independently screen titles and abstracts of all identified articles. Full-texts of potentially relevant articles will be retrieved and screened. Information will be extracted from included papers by two independent reviewers. The quality of each included study will be assessed by two independent reviewers using the Cochrane Collaboration Risk of Bias tool. A narrative synthesis of the findings will be provided. If data permit, a meta-analysis will be undertaken on a section of the data. The review protocol is submitted for registration in Prospero (protocol number currently awaited). : This systematic review will be conducted in order to be able to formulate specific recommendations to parents and health care providers with the aim of optimizing pain-related outcomes in children undergoing painful medical procedures. PROCESS EVALUATION: Originally Embase would have been a fourth database, but since we already included 3 complementary databases and thereby comply with the AMSTAR checklist (3), additional search in this database was omitted. 1. Matziou V, Chrysostomou A, Vlahioti E, Perdikaris P. Parental presence and distraction during painful childhood procedures. *Br J Nurs*. 2013;22(8):47-5. 2. Foertsch CE, O'Hara MW, Stoddard FJ, Kealey GP. Parent participation during burn debridement in relation to behavioral distress. *J Burn Care Rehabil*. 1996;17(4):372-7; discussion 1. 3. Shea

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Diagnosis of frozen shoulder: value of the coracoid pain test. A research proposal.

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: Frozen shoulder (FS) is a condition characterized by progressive inflammation and fibrosis of the joint capsule and rotator cuff interval, resulting in restriction of shoulder movement. The prevalence of Diabetes Mellitus (DM) in FS patients is 3% and diabetic patients are 5 times more likely to develop FS compared to non-diabetics. DM is closely connected to autonomic dysfunction and this may play a role in diagnosing FS patients. Unfortunately, the diagnosis of frozen shoulder is difficult, especially in the freezing phase. Frozen shoulder is diagnosed mainly on clinical criteria by confirming the characteristic pattern of limitation and exclusion of other pathologies. However, Carbone et al. found a contribution of coracoid palpation in the diagnosis of FS, with almost excellent clinimetric properties. Although the clinimetric properties seem promising, validity still needs to be established. The aim of our study is to study the discriminative validity of the coracoid pain test for assistance in the diagnosis of FS during the freezing phase. : Fifty patients with frozen shoulder in the freezing phase and 5 healthy age-matched controls will complete a general questionnaire, the Composite Autonomic Symptom Score (COMPASS-31) and the coracoid pain test. During the coracoid pain test pressure will be elicited on the area of the coracoid process, the acromioclavicular joint and the anterolateral subacromial area. The participants score the severity of pain for each area on the numeric pain rating scale. A positive test is obtained when there is a difference in severity of at least 3 points between the coracoid area and the other 2 areas. The test is performed on both affected and unaffected side. The discriminative validity will be obtained by comparing patients and healthy participants. The autonomic dysfunction and presence of DM will be used as covariates to determine whether the coracoid pain test has different value in subgroups of frozen shoulder patients. Finally, the sensitivity, specificity and the accuracy for correct classified subjects (frozen shoulder or healthy) will be calculated. : frozen shoulder, diagnostic, coracoid pain test, Diabetes Mellitus, autonomic dysfunction 1. Tamai K, Akutsu M, Yano Y. Primary frozen shoulder: brief review of pathology and imaging abnormalities. Journal of orthopaedic science : official journal of the Japanese Orthopaedic Association. 21;19(1):1-5. 2. Avery NC, Bailey AJ. Enzymic and non-enzymic cross-linking mechanisms in relation to turnover of collagen: relevance to aging and exercise. Scandinavian journal of medicine & science in sports. 25;15(4):231-4. 3. Carbone S, Gumina S, Vestri AR, Postacchini R. Coracoid pain test: a new clinical sign of shoulder adhesive capsulitis. International orthopaedics. 21;34(3):385-8.

The role of expectations in patient reported outcomes following shoulder arthroplasty: A prospective cohort study (The Shoulder Diary)

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This multicenter prospective observational cohort study aims to examine (1) the direct effect of patients' expectations on postoperative pain, shoulder function, quality of life (QoL) and satisfaction, (2) the direct effect of early postoperative pain on persistent postoperative pain at six months, and (3) how patients experience the first eight weeks after shoulder arthroplasty with regard to pain, shoulder function and QoL. We aim to include 2 shoulder arthroplasty patients. Preoperatively, patients complete questionnaires on probability-based and value-based expectations, shoulder function, pain, QoL, frailty, optimism, catastrophizing, fear of pain, and central sensitization. These questionnaires are repeated at six and twelve months postoperatively, also including questions on satisfaction and expectation fulfillment. In addition, patients complete a daily diary during the first eight weeks after surgery. The diary contains questions regarding pain, pain medication and sleep (every day), QoL (twice per week), shoulder function, and use of physiotherapy, home, and doctor care (every week). One week after surgery, a researcher calls each patient to enquire whether he/she experiences any problems with the diary. To examine how patients experience the first eight weeks after shoulder arthroplasty and to investigate whether different subgroups exist regarding trajectories of pain, function and QoL, we will analyze the diary data with latent class growth analysis (LCGA). To investigate the direct effect of patients' expectations on postoperative pain, shoulder function, QoL and satisfaction, while taking the level of catastrophizing, dispositional optimism, and central sensitization into account, we will run separate structural equations models (SEM). We will also use SEM to investigate the influence of the pain trajectory during the first two weeks on persistent pain (numeric rating score ≥ 4) at six months after surgery. The results of this study can provide insight into whether influencing expectations preoperatively might improve postoperative outcomes. The study results might improve our understanding of the mechanism of persistent postoperative pain. In addition, preoperative patient education may be optimized using the results of the LCGA from the diary data. Process evaluation In the first diaries, some days were not completed. We added a second telephone call to remind patients of completing the diary every day. Dyck BA, Zywiell MG, Mahomed A, Gandhi R, Perruccio AV, Mahomed NN. Associations between patient expectations of joint arthroplasty surgery and pre-and post-operative clinical status. Expert review of medical devices. 21 Jul 11;11(4):43-15. Nagin DS, Odgers CL. Group-based trajectory modeling in clinical research. Annual review of clinical psychology. 21 Mar 24;6. Berlin KS, Parra GR, Williams NA. An introduction to latent variable mixture modeling (part 2): Longitudinal

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Influence of education level on the effectiveness of pain neuroscience education: A secondary analysis of a randomized controlled trial

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Introduction: Current evidence supports the use of pain neuroscience education (PNE) in several chronic pain populations, including people with chronic spinal pain (CSP). However, the effects of PNE at group level are rather small and little is known about personal factors (e.g. level of education [LoE]) potentially influencing the effectiveness of PNE. **Methods:** A total of 12 people with nonspecific CSP (i.e. neck and back pain) were randomly assigned to the control or experimental group. Every participant received 3 education sessions of PNE or neck/back school. The Pain Disability Index is the primary outcome measure. The Pain Catastrophizing Scale, Tampa Scale for Kinesiophobia, Illness Perception Questionnaire, and Pain Vigilance and Awareness Questionnaire were used as secondary outcome measures. Among the participants, 3 LoE could be distinguished: lower secondary, higher secondary and higher education. Based on both LoE and group allocation, 6 groups were formed. Descriptive statistics will be presented for all variables of interest. Normality of data will be checked with a histogram, a Q-Q plot and the Kolmogorov-Smirnov test. Differences between groups will be checked using repeated measures analysis of variance (mixed methods ANOVA). In case of a significant group*time interaction effect, post-hoc test using Bonferroni corrections will be performed. **Results:** Analyses are ongoing. Results will be ready to present at the congress. **Discussion:** This is the first study to provide insight in the influence of LoE on the effectiveness of PNE. No follow-up measurements are available, resulting in the inability to investigate long-term effects. The strengths of this study are the triple-blind randomized design (i.e. allocation masked for outcome assessor, participants and statistician) with balanced treatment arms and valid, reliable treatment outcomes. The results from this study may contribute to the identification of patients who benefit the most from PNE and

those who are less susceptible, based on LoE. Process evaluation: Since this is a secondary analysis, the used data are not collected to address our research question. A consequence of this may be the underrepresentation of participants with the lowest educational levels (no education and lower secondary), a fixed number of participants, and a potential lack of power to indicate differences between groups. Also, the results cannot be generalized to other chronic pain populations. Louw A, Zimney K, Puente-dura EJ, Diener I. The efficacy of pain neuroscience education on musculoskeletal pain: A systematic review of the literature. *Physiother Theory Pract*. 2016 Jul;32(5):332-55. Malfliet A, Kregel J, Meeus M, Roussel N, Danneels L, Cagnie B, Dolphens M, Nijs J. Blended-Learning Pain Neuroscience Education for People With Chronic Spinal Pain: Randomized Controlled Multicenter Trial. *Phys Ther*. 2018 May 1;98(5):357-368.

Risk factors for developing insomnia in chronic spinal pain patients: a systematic review and meta-analysis

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Introduction: Insomnia is a major problem in the chronic pain population, including people with chronic spinal pain (CSP), and has a negative impact on health and well-being. The purpose of this systematic review is to identify risk factors for developing insomnia in CSP patients. **Methods** Systematic searches will be conducted on 3 databases. First, all articles will be screened for eligibility on title and abstract, and then on full text. An article will be considered eligible if it meets following inclusion criteria: (1) participants have to be human adults diagnosed with nonspecific CSP (neck or back pain present for at least 3 months); (2) papers have to report outcomes related to insomnia; and (3) articles have to be full-text reports or original research (no abstracts, case-reports, reviews, meta-analysis, letters, or editorials). Reference lists of the relevant articles will be hand-searched for additional eligible papers. The methodological quality, will be evaluated using the Newcastle-Ottawa Scale (NOS) for cohort and case-control studies, the adapted NOS for cross-sectional studies and the revised Cochrane risk of bias tool for randomized trials. Screening, study selection, quality assessment and data extraction will be done by three independent reviewers. Disagreements will be resolved by consensus or a fourth reviewer. The odds ratios of every investigated factor by the eligible studies will be presented. Data will be pooled in meta-analysis if possible. A statistical

analysis for heterogeneity will be performed. When a high heterogeneity between studies is present, subgroup analyses will be conducted based on study design, pain location or used measurement tool. Results Review is ongoing. Main results will be ready to present at the congress. Discussion: To our knowledge, this is the first review investigating risk factors associated with the development of insomnia in CSP patients. Findings may contribute to early detection of persons at risk, and to the development of new treatment and prevention strategies. Process evaluation: To have a proper search result, a balance between a highly sensitive search strategy and a precise search strategy was needed. Otherwise, this may lead to a too broad or, on the other hand, an incomplete search. Insomnia is not always defined in the same way, which could lead to a variety in used measurement tools and heterogeneous results. Subgroup analyses are proposed to counter this problem. Nijs J, Mairesse O, Neu D, Leysen L, Danneels L, Cagnie B, Meeus M, Moens M, Ickmans K, Goubert D. Sleep Disturbances in Chronic Pain: Neurobiology, Assessment, and Treatment in Physical Therapist Practice. *Phys Ther*. 2018 May 1;98(5):325-335. Stang A. Critical evaluation of the Newcastle-Ottawa scale for the assessment of the quality of nonrandomized studies in meta-analyses. *Eur J Epidemiol*. 2005 Sep;25(9):63-5. Higgins JP, Thompson SG, Deeks JJ, Altman DG. Measuring inconsistency in meta-analyses. *Bmj*. 2002;327(7414):557-6.

Relations Between Nutrition and Chronic Pain in Cancer Patients and Cancer Survivors

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Chronic pain is one of the most prevalent and complex comorbidities in cancer patients and cancer survivors. Besides pain, cancer patients and survivors often show significant nutritional deficiencies which crucially impact their quality of life. It is just lately that the influence of nutrition on brain plasticity and function has been investigated. Evidence shows that specific dietary factors (like omega-3 fatty acids, curcumin, salmon and turmeric) are significant modifiers of brain plasticity and may have an influence on central nervous system health and disease. Given the role of the central nervous system and central sensitization in cancer-related pain, it becomes relevant to focus on the association between pain and nutritional aspects in this population. To date, no clear overview exists on the relation between chronic pain and nutrition in cancer patients and cancer survivors. Therefore, the aim of this systematic review is to identify relevant evidence regarding this association to provide guidance for future research in this field. Methods: This systematic review will be performed according to the Preferred Reporting Items for Systematic review and Meta-Analyses (PRISMA) guidelines. PubMed, Web of Science and Embase databases will be searched. Firstly, titles and abstracts of the obtained articles will be screened and then second screening will be based on full-text. The Cochrane Collaboration's tool (for randomised controlled trials) and, the Newcastle-Ottawa Scale (for observational studies) will be used for risk of bias assessment of studies. Data will be extracted using a data extraction form, according to collected data, analytical or descriptive synthesis will be performed. Results: Results are not available yet, as the search is ongoing. Results will be available for presentation during the PSiM congress. Discussion: This review is important to see if nutritional interventions might be useful in pain management for cancer patients and survivors. Using nutrition as a modality in pain management can give the capability to regulate pain related systems in the body, while getting long lasting responses from treatment with changing daily diet according to the needs. Process evaluation: Due to the limited number of studies related to this topic and the variety of nutritional methods used, the collected data might not be enough coming with a clear conclusion. 1. Bouhassira D, Luporsi E, Krakowski I. Prevalence and incidence of chronic pain with or without neuropathic characteristics in patients with cancer. *PAIN*. 217;158(6):1118-1125. 2. Doyle C, Kushi L, Byers T, Courneya K, Demark-Wahnefried W, Grant B et al. Nutrition and Physical Activity During and After Cancer Treatment: An American Cancer Society Guide for Informed Choices. *CA: A Cancer Journal for Clinicians*. 26;56(6):323-353. 3. Gomez-Pinilla F, Gomez AG. The Influence of Dietary Factors in Central Nervous System Plasticity and Injury Recovery. *Pm&r*. 211;3(6).

Chronic Pain and Nutrition in Breast Cancer Survivors: A Cross-sectional Study

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Introduction: Breast cancer is one of the most frequently diagnosed cancer types globally but has increasing survival rates in the last decades. In these breast cancer survivors, cancer-related chronic pain keeps being a survivorship issue with great impact on quality of life. Besides pain, it has also become clear that cancer survivors show crucial nutritional deficiencies. It is just lately that the influence of nutrition on brain plasticity and function has been investigated. Evidence shows that specific dietary factors (like omega-3 fatty acids, curcumin, salmon and turmeric) are significant modifiers of brain plasticity and may have an influence on central nervous system health and disease. Given the role of the central nervous system in the underlying pain-mechanisms in breast cancer survivors, investigating the association between pain and nutritional aspects in this population becomes relevant. Therefore, the aim of this study is to examine the association of pain and (behavioural) nutrition in breast cancer survivors. **Methods:** A cross-sectional study will be carried out in 2 breast cancer survivors, 1 women with chronic pain (lasting at least 3 months) and 1 pain-free women as controls. The demographic and clinical history of participants will be collected. The study will include questionnaires and assessments on behavioural nutritional aspects (Food Frequency Questionnaire, body composition, physical activity), pain (Visual Analog Scale, Central Sensitisation Inventory, Douleur Neuropathique 4 Questionnaire, pain drawing app) and quality of life (36-Item Short Form Health Survey) to determine associations. Data will be analysed by using SPSS. **Discussion:** Currently, there is a lack of studies to formulate evidence-based nutritional guidelines for pain management in breast cancer survivors. Including a nutritional intervention may make an important contribution to improving pain and quality of life of a chronic pain sufferer. Yet, the first step towards developing such an intervention is understanding the associations between chronic pain and nutrition. Still, in the future (randomized) interventional studies with a specific nutritional focus will be required. **Process evaluation:** The effect size calculation for sample size calculation could not be performed based on previous research due to the lack of similar studies in this regard. Therefore, the sample size was calculated arbitrary using the effect size $d = .4$ and power $.8$. 1. Rondanelli M, Faliva MA, Miccono A, Naso M, Nichetti M, Riva A, et al. Food pyramid for subjects with chronic pain: foods and dietary constituents as anti-inflammatory and antioxidant agents. *Nutr Res Rev.* 218;31(1):131-51. 2. Polak R, Dacey ML, Phillips EM. Time for Food--Including Nutrition on Physiatrists' Tables. *PM R.* 216;8(4):388-9. 3. Hamood R, Hamood H, Merhasin I, Keinan-Boker L. Chronic pain and other symptoms among breast cancer survivors: prevalence, predictors, and effects on quality of life. *Breast cancer research and treatment.* 218;167(1):157-69.

Noninvasive intracranial pressure monitoring in patients with chronic migraine

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Recent studies have suggested a possible relationship between the dysregulation of cerebrospinal fluid and intracranial pressure in the central nervous system with symptoms such as allodynia and hyperalgesia (1). The role of increased intracranial pressure has been investigated in patients with chronic migraine (CM). Migraine affects about 12% of the population and is a primary brain disorder whose pathophysiology comprises a complex neurovascular dysfunction. Abnormalities of cerebrospinal fluid pressure waves were demonstrated in patients with CM through invasive monitoring by a lumbar needle (2). However, these alterations have not been further investigated considering the risks of the invasive methods of the intracranial pressure measurement. The aim of this study is to investigate possible alterations in the waveform morphology through noninvasive intracranial pressure (ICP-NI) measurement in patients with CM. In a cross-sectional study design, women with CM (n=3) who had headache at least 15 days within a month in the last six months will be included. Patients with diabetes mellitus, arterial hypertension, gestational period, diagnosis of idiopathic intracranial pressure, secondary headaches, cardiovascular diseases, and habitual use of corticosteroids will be excluded. Age matched controls (n=3) will be included if they do not report acute or chronic pain, without prior history of alcohol abuse in the last six months, less than 3 points in the Part A of the Central Sensitization Inventory, and no diagnosis in Part B. On the examination day, disability and allodynia questionnaires will be administered. Subsequently, the ICP-NI monitoring will be performed by a valid method patented by Brazilian researchers (3). It consists of an extracranial deformation sensor positioned in the patients' scalp, which will allow registration of intracranial pressure waveforms. Data will be continuously and simultaneously collected with the blood pressure and heart rate measurements during 2 minutes, after 1 minutes-resting, in the supine position. Parameters obtained from the waveforms will be analyzed and compared between groups such as, P1 slope and P2/P1 index. Discussion and process evaluation The project is in initial phase of pilot testing, so no data analysis has been carried out. This project can contribute to the investigation of the role of cerebrospinal fluid and intracranial pressure in chronic migraine by noninvasive methods. 1. Hulens M, Rasschaert R, Dankaerts W, Stalmans I, Vansant G, Bruyninckx F. Spinal fluid evacuation may provide temporary relief for patients with unexplained widespread pain and fibromyalgia. *Med Hypotheses* [Internet]. 218;118(June):55–8. Available from: <https://doi.org/1.116/j.mehy.218.6.17> 2. Bono F, Salvino D, Tallarico T, Cristiano D, Condino F, Fera F, et al. Abnormal pressure waves in headache sufferers with bilateral transverse sinus stenosis. *Cephalalgia*. 21;3(12):1419–25. 3. Cabella B, Vilela GHF, Mascarenhas S, Czosnyka M, Smielewski P, Dias C, et al. Validation of a New Noninvasive Intracranial Pressure Monitoring Method by Direct Comparison with an Invasive Technique. In 216. p. 93–6. Available from: <https://www.ncbi.nlm.nih.gov/pubmed/27165884>

The influence of pain cognitions on conditioned pain modulation in patients with lumbar radiculopathy scheduled for surgery: a cross-sectional study.

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Author 9: Iris Coppieters (Department of Physiotherapy, Human Physiology and Anatomy, Faculty of Physical Education & Physiotherapy (KIMA), Vrije Universiteit Brussel) Introduction: Lumbar radiculopathy is a common condition with prevalence rates up to 43% worldwide. A key factor of such neuropathic pain is maladaptive endogenous nociceptive modulation. Certain cognitions and beliefs related to pain are described as having an influence on the experience of pain via these endogenous nociceptive modulatory processes. (1) Therefore, the aim of this study is to examine the association between pain cognitions and pain outcome measures that reflect endogenous nociceptive modulation in lumbar radiculopathy patients. Methods: This cross-sectional study is a secondary analysis of baseline data of a multi-centric randomized controlled trial (RCT) comparing perioperative pain neuroscience education with back school in patients undergoing surgery for lumbar radiculopathy. (anticipated n= 12) (2) Assessments take place during the week prior to surgery. Endogenous nociceptive inhibition is measured by means of a conditioned pain modulation (CPM) paradigm where electrical stimulation as a test stimulus is given to three distal body sites. Subsequently a cold pressor task is added as the conditioned stimulus. Additionally, pain cognitions are assessed by 3 self-reported scales: the Pain Catastrophizing Scale, Pain Vigilance and Awareness Questionnaire, and Tampa Scale for Kinesiophobia. Multi-variate analysis is used to investigate associations between CPM and pain cognition scales, as well as in-between the pain cognition scales. Results: Data has been collected for 19 patients and recruitment is still ongoing. Results for the present research questions will be available and presented by the time of the colloquium. Discussion: Findings may provide more insight in the associations between different constructs of pain cognitions and endogenous nociceptive inhibition processes in patients with lumbar radiculopathy. Process evaluation: Recruitment for this project is challenging as it is depending on the scheduling of surgeries. Furthermore, not all patients are very keen to complete the conditioned pain modulation protocol, during the already stressful period around surgery. 1. Meeus M, Nijs J. Central sensitization: a biopsychosocial explanation for chronic widespread pain in patients with fibromyalgia and chronic fatigue syndrome. Clin Rheumatol. 27;26(4):465-73. 2. Ickmans K, Moens M, Putman K, Buyl R, Goudman L, Huysmans E, et al. Back school or brain school for patients undergoing surgery for lumbar radiculopathy? Protocol for a randomised, controlled trial. Journal of physiotherapy. 216;62(3):165.

Associations between health-related quality of life and nociceptive modulation and employment status in patients with lumbar radiculopathy.

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Introduction: Low back pain (LBP) is a health problem which greatly affects people's health-related quality of life (QOL). (1) A possible neurophysiological mediator of low health-related QOL might be the malfunctioning of the endogenous nociceptive modulatory system. Socio-economic factors such as employment status and sick leave duration also appear to be associated with health-related QOL. The primary aim of this study is to compare health-related QOL of patients with lumbar radiculopathy to a group of healthy subjects. Secondary aims are to assess the association between the patients' health-related QOL and 1) altered endogenous nociceptive modulation and 2) their employment status and sick leave duration. **Methods:** This cross-sectional study is a secondary analysis of baseline data of a multi-centric randomized controlled trial (RCT) comparing the effect of perioperative back school versus brain school (i.e. pain neuroscience education) in patients undergoing surgery for lumbar radiculopathy. (anticipated n=12) (2) Data for an equal amount of age- and gender-adjusted healthy subjects was obtained via the Belgian Health Care Knowledge Center. Health-related QOL is measured by the Short form 36 item Health Survey (SF-36). Endogenous nociceptive modulation was tested via an electrical pain stimulation testing protocol where patients' electric detection thresholds (EDT) and electric pain thresholds (EPT) were evaluated. Conditioned pain modulation paradigm and temporal summation protocol were used to assess endogenous nociceptive inhibition and wind-up, respectively. Employment status and sick leave duration were evaluated using self-reported questionnaires. Mean scores of the SF-36 scales were compared between patients and the healthy group. Within the patient group multi-variate analyses were used to find associations between the SF-36 and endogenous nociceptive modulation, employment status and sick leave duration. **Results:** So far, 19 patients of the original RCT completed the baseline assessments. Recruitment is still ongoing. Results for the present research questions will be available and presented by the time of the colloquium. **Discussion:** It is hypothesized that patients with lumbar radiculopathy will report lower values for health-related QOL. (3) An association between lower health-related QOL and disturbed endogenous nociceptive modulation, longer sick leave duration and unemployment is expected. **Process Evaluation:** One limitation arose as patient recruitment proved to be challenging in all participating hospitals. 1. Smart KM, Blake C, Staines A, Doody C. Self-reported pain severity, quality of life, disability, anxiety and depression in patients classified with 'nociceptive', 'peripheral neuropathic' and 'central sensitisation' pain. The discriminant validity of

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Effects of early Virtual Reality-based Rehabilitation in Patients with Total Knee Arthroplasty: a randomized controlled trial

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Introduction: In the last years the use of virtual reality in rehabilitation is growing and improving thanks to the development of new technologies (1-3). The aim of this study is to assess the efficacy of an early inpatient rehabilitation performed by the virtual reality-based rehabilitation versus the traditional rehabilitation provided by physical therapists after primary Total Knee Arthroplasty (TKA). **Methods:** This was a phase 3, two-armed, single-center, randomized, controlled trial, registered with clinicaltrials.gov (NCT2413996). We included subjects, aged 45 to 8 years old, receiving primary TKA who were randomly assigned to either virtual-based or traditional rehabilitation for at least 5 sessions, 6 minutes each one. The primary outcome was pain intensity as measured on a visual analogue scale. The secondary outcomes were changes in scores for: knee disability, health-related quality of life, global perceived effect, functional independent measure, medications use, isometric strength of quadriceps and hamstrings, flexion range of motion, and proprioception. Outcomes were assessed at baseline and at discharge (around 1 days after surgery). a total of 85 patients received either virtual reality-based (n = 44) or traditional (n = 41) rehabilitation; there were 11 drop-outs (9 in the virtual reality-based rehabilitation group). No significant difference in pain reduction or other outcomes was found between the groups (mean difference 5.9, 95% confidence interval [CI] -4.6 to 16.5, p=.266), whereas a statistically significant improvement in global proprioception after virtual reality-based rehabilitation (mean difference 13.6, 95% CI 5.2 to 22., p=.2) was noted. **Discussion and Process evaluation:** virtual reality-based rehabilitation is not superior to traditional one for pain relief, medications use or other functional outcomes but it seems to improve the global proprioception in TKA patients. This major strength of this study is the pragmatic setting. Among its limitations are the impossibility to conduct a double-blind trial and the high dropout rate. The latter reflects the uncomfortable attitude toward the virtual reality maybe due to contextual factors such as patient's expectations, therapeutic touch. We suggest to use virtual-based rehabilitation as adjuvant therapy in acute phase, to enrich the proprioception stimuli, and alone in the sub-acute phase, where proprioception has a central role and the influence of pain is relative. 1. van Egmond MA, van der Schaaf M, Vredevelde T, Vollenbroek-Hutten MMR, van Berge Henegouwen MI, Klinkenbijn JHG, et al. Effectiveness of physiotherapy with telerehabilitation in surgical patients: a systematic review and meta-analysis. *Physiotherapy*. 218;14(3):277-98. 2. Russell TG, Buttrum P, Wootton R, Jull GA. Internet-based outpatient telerehabilitation for patients following total knee arthroplasty: a randomized controlled trial. *The Journal of bone and joint surgery American volume*. 211;93(2):113-2. 3. Piqueras M, Marco E, Coll M, Escalada F, Ballester A, Cinca C, et al. Effectiveness of an interactive virtual telerehabilitation system in patients after total knee arthroplasty: a randomized controlled trial. *Journal of rehabilitation medicine*. 213;45(4):392-6.

CHRONIC LOW BACK PAIN AND NUTRITION IN ADULTS: A CROSS-SECTIONAL, OBSERVATIONAL STUDY

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CHRONIC LOW BACK PAIN AND NUTRITION IN ADULTS: A CROSS-SECTIONAL, OBSERVATIONAL STUDY Ömer Elma, Sevilay Tumkaya Yilmaz, Peter Clarys, Tom Deliens, Jo Nijs & Anneleen Malfliet 1 Vrije Universiteit Brussel, Belgium; 2 Pain in Motion, international research group; University Hospital Brussel, Belgium; Research Foundation Flanders, Belgium; Ghent University Chronic low back pain is one of the leading causes of disability and decrease in quality of life with its huge economical, psychological and social impacts on individuals, society and health institutions(1). It is well known that chronic low back pain is associated with many factors including mental health, lifestyle factors, and cognitive factors etc(2). One of the lifestyle factors might be nutrition(3). However, this association is not clear yet. Thus, aim of this study is to investigate association between dietary intakes, and diet quality with the chronic low back pain by comparing healthy-pain free control group. Participants: There will be two groups; (1) adults diagnosed with chronic low back pain, have no any other known disease and (2) control group, adults and healthy, pain free participants. With effect size set to .5, power to .8, and using a two tail and two independent means, T test, the calculated sample size was in total 128 (64 for pain group and 64 for healthy control group). Data Collection: Volunteers will be examined at the Vrije Universiteit Brussel. The examination will include general health interview, dietary interview, body composition measurements and pain measurements. Outcome measures: Nutritional data will be collected with a validated food frequency questionnaire to find out Mediterranean Diet Score, Healthy Eating Index-2015 score, specific nutrient intakes and plant-based diet score of participants. Visual analogue scale, central sensitization inventory, pressure pain threshold, temporal summation test and conditioned pain modulation test will be used as pain outcome measures. Additionally, body composition (body mass index, fat mass, muscle mass, hydration level, external and internal water ratio), physical activity level and quality of life will be examined by using "IN BODY" body composition device, international physical activity questionnaire and sf-36 questionnaire, respectively. Data Analysis: Data will be analysed by using SPSS program. Results: This study is still ongoing. Discussion: Results of this study might give us an important insight about the association between dietary intakes, diet quality, and chronic low back pain condition. Process Evaluation: During the protocol preparation, it was difficult to decide how many participants to recruit. Because there was no any similar study to interpret the effect size. However, by consulting experts in this field the problem was solved. 1. Hoy D, Brooks P, Blyth F, Buchbinder R. The epidemiology of low back pain. Best practice & research Clinical rheumatology. 21;24(6):769-81. 2. Dean E, Söderlund A. What is the role of lifestyle behaviour change associated with non-communicable disease risk in managing musculoskeletal health

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Quantitative Sensory Testing in Breast Cancer Patients: validity and reliability

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Introduction: Quantitative sensory testing (QST) is a non-invasive evaluation method to quantify functioning of the somatosensory nervous system. Literature describes it as a promising tool for assessing mechanisms that contribute to the development and/or maintenance of chronic pain. However, research on reliability and validity of QST in pain assessment is essential for translating the results from QST into evidence and clinical practice. In a population of breast cancer, only Andersen et al., 215 assessed reliability of QST. The QST protocol demonstrated good reliability for comparison of sensory function between patients, but less so for individual follow-up after breast cancer surgery. Evaluation of pressure pain thresholds, temporal summation or conditioned pain modulation was not included.⁽¹⁾ The aim of the current study is to examine the test-retest reliability of a comprehensive QST protocol including all sensory parameters and evaluate its concurrent validity in women treated for breast cancer. **Methods:** For the test-retest reliability, QST will be administered in 3 women who underwent unilateral breast cancer surgery. The QST battery will investigate 9 sensory parameters including thermal/mechanical detection and pain thresholds, pressure pain thresholds, temporal summation and conditioned pain modulation. Parameters will be evaluated bilaterally at the inner upper arm, axilla, pectoral region and Quadriceps. The assessment will be repeated by the same assessor (intra-rater reliability), as well as by a second researcher (inter-rater reliability). In the same study population concurrent validity of the QST protocol will be assessed by exploring correlations with questionnaires assessing signs and symptoms of different pain mechanisms (Douleur Neuropathique en 4 Questions, Central Sensitization Inventory, Pain Catastrophizing Scale, Depression Anxiety and Stress scale and Brief Pain Inventory). Furthermore, known-group validity will be examined by comparing QST results between breast cancer patients with pain, without pain and a group of 3 healthy controls. **Process evaluation:** Patients will be recruited from a cohort of patients participating in a clinical trial on the effectiveness of educational interventions after breast cancer treatment at the Multidisciplinary Breast Centre of the University Hospitals Leuven. An amendment to the protocol was submitted to the Ethical Committee of the University Hospitals of Leuven. : 1.Andersen KG, Kehlet H,

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ASSESSMENT OF THE EFFECTS CAUSED BY MECHANICAL STIMULATION ON PERIPHERAL NERVOUS SYSTEM

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Introduction: Since 199 low back pain and neck pain are the leading causes of disability worldwide(1). The increase in interventional procedures and opioid prescriptions has not led to a lessening of the burden of chronic pain, so new pathways needs to be followed and testing novel approach in a reliable and feasible way is of paramount importance. In the last decades it has been shown that the selective repeated tension of the Peripheral Nervous System (PNS), also known as neurodynamic treatment (NDT) can be successful in pain modulation of patients affected by chronic and acute back and neck pain. Although NDT is effective on pain and disability nowadays the biological effects involved are still unknown and no standard protocol is available. The study aims to assess the effects of NDT on PNS cells in order to develop a protocol of treatment for animal models of acute and chronic pain. **Methods:** Based on the principle of the 3R (Refinement, Replacement, Reduction) the research was started using in vitro models, in particular immortalized cell lines of motor and sensitive neurons (NSC34 and 5B11). A repeated 4 arms randomized controlled trial was performed for each immortalized cell line. To assess the behaviour of the PNS's cell populations to repeated mechanical stimuli, a bioreactor was developed and used ad hoc. Protocols were tested starting from those reported in literature and refined by previous trials results. Experiments were performed using pre-coated silicone membranes and cells were seeded on them and repeated tension protocols were administered using the bioreactor. Morphological, gene and protein expression analysis were performed. **Results:** A standardized protocol of NDT was possible to be defined. Preliminary results have shown that NDT seems to have no side effects and can affect neurites orientation, cell differentiation and avoids apoptosis. Interestingly, a protocol of NDT downregulates the expression of TLR2(2), a gene linked to mechanical allodynia. **Discussion:** Results from our preliminary experiments are promising and they suggest that NDT can be standardized being immediately translatable in clinical practice and promote the regeneration processes in motor and sensory neurons. **Process evaluation:** even if cell lines experiments looks distant from clinical practice, all variables on which the NDT protocol was defined (amplitude of elongation, number of repetition, speed etc.) still are very suitable to be translated in clinical settings. 1. Abajobir AA, Abate KH, Abbafati C, Abbas KM, Abd-Allah F, Abdulkader RS, et al. Global, regional, and national incidence, prevalence, and years lived with disability for 328 diseases and injuries for 195 countries, 199–216: a systematic analysis for the Global Burden of Disease Study 216. *Lancet*.217;39(11):1211–59. 2. Cobos EJ, Nickerson CA, Gao F, Chandran V, Bravo-Caparrós I, González-Cano R, et al. Mechanistic Differences in Neuropathic Pain Modalities Revealed by Correlating Behavior with Global Expression Profiling. *Cell Rep*. 218

Central pain modulation in children with functional abdominal pain related disorders

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Introduction: Functional abdominal pain related disorders (FAPD) are common among young individuals. To date, relatively little is known regarding the function of the central pain mechanisms in this vulnerable group. Therefore, this study aimed to compare conditioned pain modulation (CPM), pressure algometry and psychosocial variables in young children (aged 6-12 years) with FAPD and healthy controls.

Methods: Thirty-nine children diagnosed with FAPD were compared with 36 age- and sex matched pain-free controls. Pressure algometry was used to assess pressure pain thresholds at both symptomatic (umbilicus) and non-symptomatic (trapezius and tibia) test sites. CPM was recorded as an increase in the pain pressure threshold at the trapezius test site in response to experimental conditioning pain imposed by the cold pressure task ($12^{\circ}\text{C} \pm 1^{\circ}\text{C}$). The assessors were blinded to the type of subject assessed. Parent-proxy and/or self-reported questionnaires were used to assess pain intensity, functional disability, pain-related fear and parental pain catastrophizing. **Results:** Compared with pain-free controls, young children with FAPD showed lower pressure pain thresholds at all test sites ($P < .05$), a less efficient CPM response ($P = .2$), more functional disability ($P < .01$) and pain related fear ($P < .01$). Parents of children with FAPD catastrophized more about their child's pain than parents of healthy controls ($P < .01$). **Discussion:** Young children with FAPD demonstrated less efficient central pain modulation. Future research should control for psychosocial variables while testing CPM, given their direct effect on descending pain modulation through activation of the facilitatory pathways. **Process evaluation:** The full-out written manuscript of this study is currently under review by all co-authors prior to the submission process. Developing a standardized CPM paradigm for our study population, as well as selecting the proper questionnaires to assess for psychosocial variables was challenging, given their young age (6-12 years). Other experienced problems related to this study can mainly be categorized as practical problems, such as patient recruitment and availability of the assessors and the testing room. **References:** Morris MC, Walker LS, Bruehl S, Stone AL, Mielock AS, Rao U. Impaired conditioned pain modulation in youth with functional abdominal pain. *Pain* [Internet].

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Pain Neuroscience Education for children with functional abdominal pain related disorders: a randomised controlled pilot study

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Introduction: Pain Neuroscience Education (PNE) is an educational intervention aimed to increase a person's knowledge about the neurophysiological basis of pain. Research in adults provides firm evidence regarding its positive effects on pain ratings, dysfunctions, fear-avoidance –and pain catastrophizing, limitations in movement, pain knowledge and healthcare utilization. The aim of this study was to explore the effectiveness and feasibility of a PNE program for children with functional abdominal pain-related disorders (FAPD). **Methods:** Children aged between 6-12 years and diagnosed with FAPD were randomly assigned to either the experimental or control group, both receiving two treatment sessions with a 3-week time interval between the sessions. Treatment was directed towards the child, while the parent was present. The experimental group received; 1) usual care including bio-medical directed education about the gastro-intestinal system and breathing exercises and 2) a PNE session (PNE4Kids). Similar to adult PNE, PNE4kids included the explanation about the cause of pain, a brief summary of relevant pain mechanisms and the integral role of psychosocial and physical factors in precipitating and maintaining pain. The control group received two usual care sessions. Pressure algometry and conditioned pain modulation were assessed at baseline and three weeks' follow-up. The child's pain intensity, functional disability, pain-related fear, as well as parental pain catastrophizing were assessed at baseline, after each treatment session and three weeks' follow-up. Data analysis of the intervention outcomes will include linear mixed models and descriptive statistics for feasibility outcomes. **Results:** Twenty-eight participants were allocated to either the experimental (n=14) or control group (n=14). Intervention and feasibility outcomes concerning the study design and procedures such as; participation willingness, participation rates, loss to follow-up, assessment timescale, and assessment procedure are pending and will be presented at the congress. **Discussion:** Data resulting from this explorative study will lay the foundation for larger randomized trials in the future. **Process evaluation:** Due to the lack of a control group receiving no intervention, this study will not provide data regarding the isolated effect of PNE4Kids. The main limitation of this study is the use of parent-proxy questionnaires to assess pain-related outcomes in children. **References:** Pas R, Meeus M, Malfliet A, Baert I, Oosterwijck SV, Leysen L, et al. Development and feasibility testing of a Pain Neuroscience Education program for children with chronic pain: treatment protocol. *Brazilian J Phys Ther.*

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Pain-related sensory and psychological factors may contribute to walking impairment in adults with low back pain

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Introduction: Low back pain (LBP) is a leading cause of disability. However, disability is measured via self-report, and thus, understanding of functional performance is poor. Further, studies rarely consider the collective impact of nervous system factors (e.g. sensory, psychological) on functional tasks. Therefore, the purpose of this study was to determine whether nervous system factors were associated with a critical functional task—walking—in adults with LBP. **Methods:** 37 adults with LBP (18 males; mean age=45) underwent pain sensitivity testing (pressure pain thresholds) and psychological construct testing (positive coping and catastrophizing) via questionnaires. Participants also rated pain during walking and completed the Oswestry Disability Index. Walking was assessed using a 12-camera motion analysis system to quantify speed during a ‘fastest-comfortable’ and ‘obstacle negotiation’ condition. Walking data were separated via median split into fast and slow groups for each condition (4 groups total). For each condition, separate one-way ANOVAs tested slow vs. high group differences on pain sensitivity, pain during movement, psychological constructs, and disability. **Results:** All four groups reported low disability (range: 11-23%). The slow groups were .6m/sec slower than fast groups for both walking conditions (clinically meaningful difference; $p < .05$). The slower group for the ‘fastest comfortable’ condition demonstrated higher pain sensitivity, lower positive coping, higher pain during walking, and higher disability (all $p < .05$). The slower group for the ‘obstacle negotiation’ condition demonstrated higher pain sensitivity, higher catastrophizing, lower positive coping, higher pain during walking, and higher disability (all $p < .05$). **Discussion:** Pain sensitivity, pain during movement, and psychological constructs collectively may contribute to walking impairment in individuals with LBP. Despite this samples’ low self-reported disability, nervous system factors representing different constructs were associated with walking speed during two conditions. These findings may indicate which factors are potentially involved in the transition from functional impairment to disability. **Process Evaluation:** Future work will utilize multivariate approaches to establish specific contributions of nervous system factors to walking tasks. Factor clusters may effectively characterize LBP clinical phenotypes and guide personalized interventions to optimize function. 1. Centers for Disease Control and Prevention. Prevalence of disabilities and associated health conditions among adults--United States, 1999. *Morbidity and Mortality Weekly Report*. 21 Feb 23;5(7):12. 2. Butera KA, Fox EJ, George SZ. Toward a transformed understanding: from pain and movement to pain with movement. *Physical Therapy*. 2016 Oct 1;96(1):153-7.

Spinal Cord Injury and Emotional Responses: a Topography in Empathy for Pain

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Spinal Cord Injury (SCI) determines changes in cognitive functions, especially those linked to the body and motion.[1] Another feature associated to cognitive functions is Pain, as it's shown by those studies about Complex Regional Pain Syndrome and SCI.[2] This study wants to go beyond the sensorimotor side of Pain[3], by analysing empathy for pain (EfP) in SCI in order to consider also the affective and emotional aspect of it. Objective This study aims to investigate: 1) if the sensorimotor functions in Complete Paraplegics can influence EfP; 2) if the affective emotional component of pain has a somatotopographic organization too; 3) implicit responses, compared to explicit ones. Material and methods This is an experimental study conducted by the NPSY-Lab-VR. 49 subjects participated: 21 were excluded, 28 were included (n=14 experimental group - Complete Paraplegics; n=14 control group - Healthy). Each participant was asked to watch videos in virtual reality in the Oculus Rift DK1 showing a dangerous stimulus (syringe pic) or a neutral stimulus (Q-tip touch) applied to the target body part (hand or foot) or to a neutral target (fruit). For each video, the perspective was offered in first-person (1PP) or third-person (3PP). Physiological responses of GSR (Galvanic Skin Response), EMG of the Corrugator and Zygomaticus, and answers to the NRS questionnaire were recorded. Results GSR analysis revealed that there was a significative difference between the two groups in the responses they had for dangerous stimuli applied to the feet [z(GRS), $p=.16$]. EMG analysis suggest that in both groups the 1PP creates more negative emotional response than the 3PP both for the condition foot-syringe [z(Cor)-z(Zyg), $p<.1$] and hand-syringe [zCor-zZyg, $p<.1$]. This data was confirmed by subjects' explicit answers regarded ownership: "how much did you feel that that hand/feet was part of you?". Our findings support the hypothesis that EfP has a somatotopographic organization, linked to afferent and motor efferent signals. The sense of body ownership in first-person supports the hypothesis that there is an influence between the emotional component of pain and sensorimotor functions. Process of evaluation We had some problems with the recordings of physiological responses, linked to the equipment we used. 1. Di Rienzo, F., Collet, C., Hoyek, N., & Guillot, A. (214). Impact of neurologic deficits on motor imagery: a systematic review of clinical evaluations. *Neuropsychology review*, 24(2), 116-147. 2. Scandola, M., Aglioti, S. M., Pozeg, P., Avesani, R., & Moro, V. (217). Motor imagery in spinal cord injured people is modulated by somatotopic coding, perspective taking, and post-lesional chronic pain. *Journal of neuropsychology*, 11(3), 35-326. 3. Avenanti, A., Buetti, D., Galati, G., & Aglioti, S.M., (25). Transcranial Magnetic Stimulation Highlights the Sensorimotor Side of Empathy for Pain. *Nature Neuroscience* 8 (7): 955–6.

Rehabilitation intervention in randomized controlled trials for low back pain: are they statistically significant and clinically relevant?

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Rehabilitation intervention in randomized controlled trials for low back pain: are they statistically significant and clinically relevant? Greta Castellini, Silvia Gianola, Davide Corbetta, Lorenzo Moja. Introduction: An observed statistically significant difference between two interventions does not necessarily imply that this difference is clinically important for patients. We aimed to assess if treatment effects of randomized controlled trials (RCTs) for low back pain (LBP) are statistically significant and clinically relevant, and if RCTs were powered to achieve clinically relevant differences on continuous outcomes. Methods: We searched for all RCTs included in Cochrane Systematic Reviews focusing on the efficacy of rehabilitation interventions for LBP and published until April 217. RCTs having sample size calculation and a planned minimal important difference were considered. We calculated the proportion of RCTs classified as “statistically significant and clinically relevant”, “statistically significant but not clinically relevant”, “not statistically significant but clinically relevant”, and “not statistically significant and not clinically relevant”. Then we investigated how many times the mismatch between statistical significance and clinical relevance was due to inadequate power. Results: From 2 eligible SRs including 11 RCTs, we identified 42 RCTs encompassing 81 intervention comparisons. Overall, 6% (25 RCTs) were statistically significant while only 36% (15 RCTs) were both statistically and clinically significant. Most trials (38%) did not discuss the clinical relevance of treatment effects when results did not reached statistical significance. Among trials with non-statistically significant findings, 6% did not reach the planned sample size, therefore being at risk to not detect an effect that is actually there (type II error). Discussion: Only a minority of positive RCT findings was both statistically significant and clinically relevant. Scarce diligence or frank omissions of important tactic elements of RCTs, such as clinical relevance, and power, decrease the reliability of study findings to current practice. Process evaluation: A treatment leading to non-relevant results for patients is often an unsuccessful treatment, resulting in frustration, discontinuation of therapies and waste of resources. Ethics committees should mandatory require researchers to provide the preliminary data or a referenced study assessing the MID of the outcome used for the determination of the sample size calculation besides an adequate reporting. The same process should be followed during the editorial assessment of a scientific report before its publication. Hoffmann TC, Thomas ST, Shin PN, Glasziou PP. Cross-sectional analysis of the reporting of continuous outcome measures and clinical significance of results in randomized trials of non-pharmacological interventions. *Trials*. Sep 17 214;15:362. van der Roer N, Ostelo RW, Bekkering GE, van Tulder MW, de Vet HC. Minimal clinically important change for pain intensity, functional status, and general health status in patients with nonspecific low back pain. *Spine*. Mar 1 26;31(5):578-582. Castellini G, Gianola S, Bonovas S, Moja L. Improving Power and Sample Size Calculation in Rehabilitation Trial Reports: A Methodological Assessment. *Arch Phys Med Rehabil*. Jul 216;97(7):1195-121.

Epigenetics of BDNF and its relationship with central sensitisation in patients with Chronic Widespread Pain and Chronic Fatigue Syndrome

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Introduction: Central sensitisation (CS) is one of the mechanisms that is proposed to contribute to Chronic widespread pain (CWP). The logical next step would be to further unravel those mechanisms known to increase the sensitivity of the central nervous system. One such factor is Brain-derived Neurotrophic Factor (BDNF). BDNF is a protein produced by neurons and immune cells, able to increase central sensitization. We aimed to explore the relation between BDNF and CS and its possible role in CWP, as well as investigate epigenetic mechanisms that might be responsible for BDNF protein expression. **Methods.** Fifty-four women (28 people with CFS and CWP; 26 age-, sex, physical activity-matched healthy subjects, HSs) were enrolled. Participants were assessed twice within 5 days. Assessment included clinical questionnaires, assessment of thermal and mechanical pain thresholds, analysis of BDNF protein levels in serum, and measurements of DNA methylation of the BDNF gene. **Results.** Patients and HSs were comparable on age, sex, body-mass index, and physical activity. CS inventory was strongly associated to pain thresholds in both assessments. ICCs showed good stability of pain thresholds and BDNF levels (Cronbach's α > .8). RM ANOVA were performed for between-group analysis, controlling for time and within-group variability of measures. BDNF was significantly higher in people with CFS in both assessments ($F=11.13$, $p=.02$). On average, BDNF concentration in serum was 17.23 (4.45) ng/ml in patients, and 14.3 (3.89) ng/ml in HSs. BDNF levels correlated with CS inventory ($r=.366$, $p=.07$). Correlations were found between BDNF levels and pain thresholds. We found no between-group differences in DNA methylation of BDNF gene nor significant correlation between BDNF expression and BDNF gene methylation. **Discussion.** BDNF protein concentration is stably higher in patients with CFS and it is associated with CS. However, the epigenetic mechanisms investigated in this research do not seem to be able to explain the difference in BDNF expression. More research investigating the role of BDNF and epigenetic mechanisms is warranted as it could provide important clinical insights. **Process Evaluation.** Measuring epigenetic mechanisms is challenging as most methods are yet to be validated. We suggest to employ a replicated design when assessing any biological measure, in order to account for reliability and temporal stability of the measure. Meeus M. & Nijs J. Clin. Rheumatol. 26, 465–473 (2006). Nijs J. et al. Expert Opin. Ther. Targets 19, 565–576 (2015). Polli A., et al. Arch Phys Med Rehabil In press, (2018).

Measuring Therapeutic Alliance in Multidisciplinary Pain Rehabilitation.

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Therapeutic alliance has been defined as; agreement on goals and tasks, and the development of a personal bond between patient and healthcare professional. Therapeutic alliance is a central component of the therapeutic process and is a determinant of treatment outcome. There is a lack in research for therapeutic alliance in multidisciplinary pain rehabilitation. A multidisciplinary treatment poses different dynamics on the therapeutic alliance compared a mono-disciplinary treatment. A strong theory about the therapeutic alliance(s), especially in a multidisciplinary context is lacking, which makes hypotheses testing difficult. Aim of this study is to acquire a better understanding how patients with persistent pain, perceive their therapeutic alliance with a team of rehabilitation professionals in order to provide a theoretical model regarding therapeutic alliance in a multidisciplinary setting. Methods. Twenty-one patients with persistent pain were semi-structured interviewed. Prior to the interview the Working Alliance Inventory-Rehabilitation Dutch Version (WAI-ReD), Adults Attachment Style Questionnaire and the Interpersonal Circumplex Questionnaire was filled in by patients. Patients were asked to reflect upon the answers given related to the different professionals, the treatment provided, comfort with negative feeling and negotiable stance, and their own role in the treatment process. Data collection and analyses were performed according to Grounded Theory. Analyses of data was conducted by open, axial and selective coding. The questionnaires were used for within patient's analyses. (Primarily) results. At the first glance patients experienced a strong therapeutic alliance, however deeper reflection gave more nuances, and relation ruptures came to light. Attachment style of the patient may have influenced the strength of the therapeutic alliance. Avoiding of confrontation in treatment occurred consciously and unconsciously, and lead to ruptures in the therapeutic alliance. Discussion. It is unclear if type of attachment style affects the WAI-ReD scores. The context and the system of patients and healthcare professionals is important for strength of therapeutic alliance, it seems that these aspects are not measured within the existing therapeutic alliance measurements. Process evaluation. Twenty-one interviews have been completed. More interviews are needed and performed momentarily, because no data saturation has occurred yet. (1). Scott W, Milioto M, Trost Z, Sullivan M.J.L. The Relationship between perceived injustice and the working alliance: a cross-sectional study of patients with persistent pain attending multidisciplinary rehabilitation. *Disability and Rehabilitation*. 216; 38 (24): 2365-2373. DOI: 1.319/9638288.215.1129444. (2). Paap D, Schrier E, Dijkstra PU. Development and validation of the Working Alliance Inventory Dutch version for use in rehabilitation setting. *Physiotherapy theory and practice*. 218: 1-12. DOI:1.18/9593985.218.1471112. (3). Hennink M, Hutter I, Bailey A. *A qualitative research methods*. London: Sage Publications Ltd; 211.

Efficacy of Pain neuroscience education plus cognition-targeted motor control to improve cervical motor control: secondary analysis of a RCT

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Persistent neck pain has been associated with alterations in cervical motor control and may be associated with pain intensity, disability and fear of neck motion. In the context of interventions aimed at reducing pain, disability in chronic neck pain, it may be hypothesized that patients who have greater symptom reduction, may demonstrate greater improvement in cervical motor control. Cervical motor control was measured in 64 subjects with chronic neck pain. Cervical muscle strength, cervical mobility, neuromuscular control and balance were derived. Correlations between these measures and self-reported (pain intensity, function and pain cognitions) and clinical pain measures were conducted. To assess the difference between groups in response to treatment, a random-intercept linear mixed models analysis, using Bonferroni Post-hoc analyses was applied. An increase in neuromuscular control of the deep cervical flexors was the only significant treatment x time interaction effect found, favoring pain neuroscience education (PNE) combined with cognition-targeted motor control training at 3 months (mean group difference: 1.982; 95% CI, .779 – 3.185). Significant main effects of time were found for mobility, with an increase in all directions (flexion, extension, side bending) and for the neuromuscular capacity of scapulothoracic muscles. PNE combined with cognition-targeted exercise training does not appear to be more effective than usual care physiotherapy for improving different aspects of cervical motor control in people with chronic neck pain and few of the variables for cervical motor control were associated with changes in pain, function and pain cognitions. Given the established effectiveness of this treatment to improve pain, function and pain cognitions, these findings question the clinical relevance of motor control features in this population. Process evaluation: This study is the first to report the efficacy of a PNE plus cognition-targeted motor control training intervention on cervical motor control in chronic neck pain patients. In addition, the generalizability of our results is enhanced by the fact that participants were randomly allocated to the different interventions, conducted in multiple primary care centres. A limitation is that it is a secondary analysis of a randomized controlled trial which was not adequately powered to detect changes in cervical

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Innovation in pain management: using a participatory design method to develop a relapse prevention intervention

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INTRODUCTION: The translation from scientific evidence to clinical practice is a complex process, in which crucial factors such as conflicting stakeholder perspectives have a negative impact on uptake and implementation. As a consequence, only a fraction of developed interventions finds its way into clinical practice [1]. To increase the chance of successful dissemination, a broad and flexible approach is required throughout the development process of new interventions. Co-design, a participatory design method that focuses on empathizing with each stakeholder, integrating conflicting requirements and quickly transforming ideas to testable prototypes, could offer a solution [2]. By systematically reflecting on each phase of an eighteen-month design process, we aimed to describe the value and function of participatory design strategies within the development of relapse prevention strategies for interdisciplinary multimodal pain treatment. **METHODS:** We performed an exploratory case study, where we captured and recorded all participatory design methods and techniques that have been used during the project. Data were obtained by all researchers, who kept notes to register their experiences during design and research activities. In addition, a focus group session was held to discuss barriers and facilitators during key stages of the project. We analysed the data by means of an inductive approach and searched for meaningful patterns within the dataset related to our objective. **RESULTS:** A broad chronological overview of the development process was created, including an analysis of how participatory design techniques (e.g. system mapping, and contextual interviewing) influenced the development of the intervention. In specific, the role of participatory design on stakeholder involvement, insight generation, and transformation of ideas to testable prototypes was described. **DISCUSSION:** Co-design offers the possibility to continuously involve all stakeholders throughout all stages of the development process. Consequently, these various perspectives have been fully integrated in the two prototypes that have been developed during this project. Challenges include the difficulty of quantifying results and the time-consuming process of involving all participants. [1] Chambers, CT. From evidence to influence: dissemination and implementation of scientific knowledge for improved pain research and management. *Pain*. 218;159:S56-S64. DOI: 1.197/j.pain.1327 [2] Sanders, EB, Stappers, PJ. Co-creation and the new landscapes of design. *Co-design*. 28;4(1):5-18. DOI: 1.18/1571887187568

MEDICAL DOCTORS' VIEWS ON FIBROMYALGIA ACROSS THE GLOBE: CONSENSUS ON DIAGNOSTICS AND TREATMENT OR JUST A MATTER OF CULTURE?

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Fibromyalgia (FM) is an idiopathic syndrome characterized by chronic and widespread musculoskeletal pain. The global prevalence for FM is estimated at 6% with a higher prevalence in some non-western countries. FM may be considered a global phenomenon although worldwide differences seem to exist e.g. impact of the illness, beliefs about illness, self-care behaviours and treatment options. These differences might be explained by the cultural background of the health care professionals and patients. Thus, for a better explanation of this phenomenon, the cultural background should be taken into account not only of patients but also of physicians, in terms of perceptions about FM and clinical management. This study aims to explore the beliefs and awareness about causes, clinical manifestations and treatment on FM among medical doctors (MD) among continents. A survey was conducted among medical doctors residing in several countries in the world using snowball sampling with and without intermediaries. The survey contained questions on socio-demographic factors (age, gender, nationality, place of work and years practicing), and five open-ended questions regarding FM (if FM is known, if FM is diagnosed in their country, clinical manifestations, causes and treatment). The survey was developed in English and translated into several local languages by native speakers. Data analysis is done, taking into account the continents, and qualitative analyses will be performed comparing the open ended questions. In total, two hundred and eighty-nine participants responded to the survey from Africa (N=16), Asia (N=83), North America (N=9), South America (N=71), Europe (N=17) and Oceania (N=4). Data categorization and analyses is ongoing. The possible differences among continents will be discussed taken into account the limitations of the study. Process evaluation: Possible limitations are the sampling and the heterogeneity of the sample size of the continent groups.

Health history, trigger points and widespread pressure pain hypersensitivity in subjects with chronic neck pain: a preliminary study.

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Neck pain is one of the most frequent musculoskeletal disorders, in which an important phenomenon is central sensitization (CS): it is often found in whiplash (WAD), while it is not a main feature in mechanical neck pain (MNP). Health history (medical conditions, comorbid musculoskeletal pain, surgical operation, continuous intake of medications) may contribute to CS, as well as Trigger Points (TrPs). Our aim was to investigate the association between pressure pain thresholds (PPTs) and health history, and the role of active TrPs on PPTs. Consecutive subjects with chronic neck pain (both traumatic and mechanical) were screened, and completed an interview about their health history, were assessed for the presence of TrPs in the upper trapezius muscle, and for PPTs with over the upper trapezius, extensor carpi radialis longus, and tibialis anterior muscles. The final sample included 68 subjects with chronic neck pain: 34 were classified as MNP and 34 as WAD. Significant correlations were observed between the 4 health history condition duration (time passed with/from that specific condition) and the PPTs locations (all, $P < .02$): the longer the subjects had been suffering from a medical condition, have been taking continuous medication, the time passed from surgical operation, the longer have been suffering from a comorbid musculoskeletal pain, the more widespread hypersensitivity (i.e. sign of CS). Subjects with active TrPs in the upper trapezius exhibited lower widespread PPTs (all, $P < .01$) than those with latent TrPs. Discussion The current study found that widespread pressure pain hypersensitivity was associated with the duration of health history conditions in a mixed sample of chronic neck pain subjects. It has previously been found that pain duration is an important factor in the transition to widespread pain condition: our result seems to confirm the role of time (with a health history condition) in this transition. Further, as previously reported, active TrPs may facilitate the continued afferent barrage to the central nervous system, acting as peripheral nociceptive constant stimuli, and may promote further widespread hypersensitivity. Process evaluation PPTs only assess one part of the sensitization process, while we know that combining them with other quantitative-sensory test, may give a better picture of the CS process. TrPs were only investigated in one muscle. References Woolf CJ. Central sensitization: implications for the diagnosis and treatment of pain. *Pain*. 2011;152:S2-15. Walton DM, Kwok TSH, Mehta S, Loh E, Smith A, Elliott J, Sterling M. Cluster Analysis of an International Pressure Pain Threshold Database Identifies 4 Meaningful Subgroups of Adults With Mechanical Neck Pain. *The Clinical Journal of Pain*. 2017; 33(5), 422–428. Fernández-de-las-Peñas C, Benito-González E, Palacios-Ceña M, Wang K, Castaldo M, Arendt-Nielsen L. Identification of subgroups of patients with tension type headache with higher widespread pressure pain hyperalgesia. *The Journal of Headache and Pain*. 2017; 18(1), 43.

Analysis of the prognostic factors of functional results in patients undergoing cuff rotator repair

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Psychosocial factors affect the recovery of patients with rotator cuff (RC) injury. Shoulder pain patients with pain catastrophizing, stress and anxiety present a higher risk of poor functional recovery after conservative treatment” (1–3). However, in patients submitted to surgery, the relationship between psychosocial factors and function is not entirely established. The objective of this study is to analyze prognostic factors for functional recovery after performing RC repair, considering physical and psychosocial aspects. The study is a prospective 12-month follow-up cohort which will be conducted between June 218 and June 221. Evaluations will be performed four times: Preoperative (T1), 3 months after surgery (T2), 6 months after surgery (T3) and 12 months after surgery (T4). The study was approved by the local Ethics Research Committee (2.79.383/218). Patients who underwent RC repair, older than 18 years and with shoulder pain lasting for more than 3 months were included. Patients with other shoulder disorders, rheumatic diseases, neurological dysfunctions and previous shoulder surgery were excluded. The primary outcome is shoulder function assessed by the Disability of the Arm, Shoulder and Hand (DASH) and Constant Murley Score questionnaires. Secondary outcomes include: Tampa Scale of Kinesiophobia, Central Sensitization Index, Pain Catastrophizing Scale, RC muscle strength with handheld dynamometer and shoulder range of motion. Other potential prognostic factors are: dominant side, pain visual scale, previous history of pain (yes or no), treatments previously received (no treatment, drug treatment, injections, physiotherapy) and expectation of improvement (to 1, = no expectation of improvement and 1 expectation of complete recovery of function), work status (away, working, retired, able to work), educational level (Illiterate, 4th grade, 8th grade, 2nd grade), body mass index, hypercholesterolemia (yes or no) and smoking (yes or no). Discussion and conclusion The establishment of prognostic factors may suggest the development of new studies, with interventions directed to specific groups, under the assumption of a causal relationship between the findings and the subsequent result. 1. Chester R, Jerosch-Herold C, Lewis J, Shepstone L. Psychological factors are associated with the outcome of physiotherapy for people with shoulder pain: A multicentre longitudinal cohort study. *Br J Sports Med.* 216;1–8. 2. Lentz TA, Barabas JA, Day T, Bishop MD, George SZ. The relationship of pain intensity, physical impairment, and pain-related fear to function in patients with shoulder pathology. *J Orthop Sport Phys Ther.* 29;39(4):27–7. 3. Cho C-H, Song K-S, Hwang I, Warner JJP. Does rotator cuff repair improve psychologic status and quality of life in patients with rotator cuff tear? *Clin Orthop Relat Res.* 215;473(11):3494–5.

Thermographic patter of the hand and its relationship with the pressure pain threshold in Fibromyalgia patients

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. Fibromyalgia syndrome (FMS) is a complex disease, with unknown etiology, characterized by chronic widespread musculoskeletal pain. New hypothesis postulate blood microcirculation alterations in FMS patients by changes in innervation to the arterio-venous anastomoses (AVAs) located deep in the dermis of the hands, affecting to the thermoregulation process that might explain the generalized symptoms of FMS patients. . A total of 3 women with a diagnosis of FMS and 3 women healthy controls were enrolled in this case-control study. Hypothenar eminence temperature with infrared thermography camera (FLIR Systems, INC., USA) and pain pressure thresholds (PPTs) were evaluated. In order to evaluate the differences between the hypothenar eminence temperature with the PPTs, both populations were divided according to their medians. The correlation between both variables was assessed using the Pearson correlation coefficient (r). . FMS patients showed a higher hypothenar eminence temperature and lower pressure pain thresholds than in healthy controls ($p < .05$). The correlation analysis showed a positive significant association between hypothenar temperature and trochanter's pain pressure thresholds ($r = .237$, $p = .26$) in FMS patients. . Our results showed that FMS patients with a low hypothenar eminence temperature of the hands correlated with a low trochanter's pain pressure thresholds. Supporting the results of our study, scientific literature evidences that arteriolar vasoconstriction mediated by system sympathetic is combined with AVAs independent vasodilation which releasing substance P and calcitonin gene related peptide at blood flow in order to reduce heat loss caused by cold conditions. When there is a cold stimulus, AVAs are closed and there are a high resistance bypass between venules and arterioles which would further increase blood flow to the peripheral capillaries. So, the blood flow to the venous plexus system would be reduced and it would result in an insufficient blood flow to the musculoskeletal tissue. Process evaluation. We should recognize some limitations. Firstly, due to its cross-sectional design, no causal conclusions can be drawn. Secondly, only women were included in the study due to the higher prevalence of FMS population among them. Finally, initial examination of temperature was included based on the median, so relevant results could be found including extreme percentiles in the future researches 1. Albrecht PJ, Hou Q, Argoff CE, et al. Excessive Peptidergic Sensory Innervation of Cutaneous Arteriole-Venule Shunts (AVS) in the Palmar Glabrous Skin of Fibromyalgia Patients: Implications for Widespread Deep Tissue Pain and Fatigue. *Pain Medicine*. 2013; 14(6):895-915. 2. Ring F. Thermal imaging technique – protocol and sources of error in thermal imaging. In: A case book of infrared imaging in clinical medicine. Jung A, Žuber J, Ring F. editors. Warsaw: Medpress; 2013. p. 8–9. 3. Chesterton LS, Sim J, Wright CC, et al. Interrater reliability of algometry in measuring pressure pain thresholds in healthy humans, using multiple raters. *Clin J Pain*. 2007; 23(9):76-766.

Pain intensity, central sensitization and pain catastrophizing in Raynaud's phenomenon: a case-control study.

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Raynaud's phenomenon (RP) it is characterized by sudden, transient and recurrent episodes of changes in skin colour that typically affecting fingers and toes, although it can also affect other areas such as ears or nose. Physiologically, it is an increased vasospasmic response of the arteries when exposed to a cold or stressful stimulus. Traditionally, pain in RP population has been mainly associated with vascular alterations; however, pain experience depends of multiple factors such as catastrophic thinking or central sensitization (CS) which have been poorly investigated. Since subjects with RP show pain, it would be interesting to evaluate CS, catastrophizing and pain intensity between a sample of subjects with primary and secondary RP and healthy controls. This was a case-control study with a total sample of 36 participants. We registered sociodemographic and clinical data such as: age, sex, number of RP attacks per week and the presence of comorbidities; pain variables (pain intensity, CS and catastrophizing). Results were analysed by ANOVA and Pearson correlation. Participants with RP had higher pain intensity ($p \leq .1$) in comparison to healthy controls. SRP participants showed a significantly higher level of CS compared to control and PRP participants ($p = .1$). Level of catastrophizing was higher in PRP and SRP ($p \leq .1$) groups than controls. Both RP groups showed higher levels of pain intensity, CS and catastrophizing compared to control. Therefore, the catastrophizing process will play an important role in the pain experience and development of chronic pain among this population. Previous studies highlighted that catastrophizing plays an important role in pain experiences in rheumatic processes. Moreover, catastrophic thinking has been related to maladaptive belief about pain and more central sensitization. Process evaluation: The present study has limitations. There were significant age differences between groups. This issue could make it hard to determine if pain effects are specific to RP rather than to participants' age. We included age as a covariate in ANCOVA analysis. Hence, the results should be interpreted with caution. The present findings can support future studies that provide valuable information to improve the diagnosis and treatment of this pathology.

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Pressure pain sensitivity, pain magnitude and vascular impairment in Raynaud's phenomenon

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Raynaud's phenomenon (RP) is a microvascular disorder characterized by changes in skin colour and pain due to an increased vasospastic response of the arteries in a cold environment or stressful situations. Typically involves hands and feet, but it can also affect other distal-acral parts of the body such as nose, ears and tongue. To compare vascular impairment, pain magnitude and threshold and pressure pain sensitivity between subjects with RP and healthy controls was the main objective of this study. This was a case-control study with a total sample of 15 participants with RP and 15 healthy controls. We registered socio-demographic data that included: sex, age, number of attacks per day. The administrations of all evaluations instrument followed the next order: firstly the temperature assessment was performed; subsequently pain magnitude and pain threshold were evaluated; finally we administered algometry. To measure the temperature we used Infrared Thermography; pain magnitude and pain threshold were evaluated with the electrical stimulation device Pain Matcher; and pressure pain sensitivity were assessed with a digital algometer bilaterally at the following points: over C5-C6 zygapophyseal joints, the second metacarpals, the deltoid muscles and the tibialis anterior muscles, according to previous published protocol. Finally we performed the statistical analysis. Participants with RP showed lower temperature (more vasoconstriction) in their hands ($p \leq .1$), higher electrical pain magnitude ($p < .1$) and lower electrical pain ($p < .1$) thresholds and lower pressure pain ($p \leq .2$) in comparison to healthy controls. Discussion: Our results suggested that patients with RP showed a decrease temperature of their hands, higher levels of pain intensity and decrease pressure pain levels, suggesting the existence of a bilateral hypersensitivity pattern. The current thermography results were consistent with previous studies in RP subjects, electrical pain thresholds were also consistent with studies in subjects with acute oral pain, whiplash pain disorders or chronic pain and the pain thresholds also seem to be indirectly related to pain intensity in other chronic pain populations. Process evaluation: This study presents limitations as the small size of the sample; would be necessary future studies with a larger sample to analyse more deeply the relationship between vascular alterations and the pain processes of this pathology. Fernández C, Cantarero I, Fernández C, Del Moral R, Menjón S, Arroyo M. Widespread mechanical pain hypersensitivity as a sign of central sensitization after breast cancer surgery: comparison between mastectomy and lumpectomy. *Pain Med.* 211;12(1):72-8. Käll LB, Kowalski J, Stener E. Assessing pain perception using the Painmatcher[®] in patients with whiplash-associated disorders. *J Rehabil Med.* 28;4(3):171-7. Mirbod SM, Sugiura H. A non-invasive technique for the evaluation of peripheral circulatory functions in female subjects with Raynaud's phenomenon. *Ind Health.* 217;55(3):275-84.

Infrared thermography of the hand and its relationship with the symptomatology in patients with Fibromyalgia

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. Fibromyalgia syndrome (FMS) is defined by chronic widespread musculoskeletal pain accompanied by a complex set of symptoms such as hyperalgesia, allodynia, fatigue, stiffness, anxiety, depression, headache, sleep disorders, and cognitive problems. New hypothesis postulate blood microcirculation alterations in FMS patients by changes in innervation to the arterio-venous anastomoses (AVAs) located deep in the dermis of the hands, affecting to the thermoregulation process that might explain the generalized symptoms of FMS patients. . A total of 3 women with a diagnosis of FMS and 3 women healthy controls were enrolled in this case-control study. The Spanish version of the Fibromyalgia Impact Questionnaire (FIQ) was used to assess the impact of FMS symptoms. Hypothenar eminence temperature with infrared thermography camera (FLIR Systems, INC., USA) was evaluated. In order to evaluate the differences between the hypothenar eminence temperature with the symptomatology in FMS patients and healthy controls, both populations were divided according to their medians. The correlation between both variables was assessed using the Pearson correlation coefficient (r). . The correlation analysis showed a negative significant association between hypothenar temperature and FIQ-R.1($r=-.269$, $p=.11$) and FIQ-R ($r=-.239$; $p=.26$) in FMS group. . Our results showed that FMS patients with a low hypothenar eminence temperature of the hands correlated with an increase activity level and symptoms of the FIQ. FMS patients share similar characteristics of Raynaud's phenomenon such as cyanosis, vasospasm of the hands and worsening of the symptoms due to cold condition. When there is a cold stimulus, AVAs are closed and there are a high resistance bypass between venules and arterioles which would further increase blood flow to the peripheral capillaries. So, the blood flow to the venous plexus system would be reduced and it would result in an insufficient blood flow to the musculoskeletal tissue. Process evaluation. We should recognize some limitations Firstly, due to its cross-sectional design, no causal conclusions can be drawn. Secondly, only women were included in the study due to the higher prevalence of FMS population among them. Finally, initial examination of temperature was included based on the median, so relevant results could be found including extreme percentiles in the future researches

1. Albrecht PJ, Hou Q, Argoff CE, et al. Excessive Peptidergic Sensory Innervation of Cutaneous Arteriole-Venule Shunts (AVS) in the Palmar Glabrous Skin of Fibromyalgia Patients: Implications for Widespread Deep Tissue Pain and Fatigue. *Pain Medicine*.213; 14(6):895-915.
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Development of the Illustrated Scale of Fear of Activities Related to the Shoulder in subjects with shoulder persistent pain. Pilot-Testing

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Introduction: The fear-avoidance model is considered an explanatory model for the course of persistent musculoskeletal pain. Shoulder pain is highly prevalent, set among the three most prevalent musculoskeletal pain complaints. The Tampa Scale of Kinesiophobia was designed for fear-avoidance assessment and is validated for different populations in developed countries. However, some patients could experience difficulties to answer to Tampa scale (1), specially among those with low sociocultural level. The objective of the present study was to present the pilot test step of the Illustrated Scale of Fear of Shoulder-Related Activities (FeAR-Shoulder) in Brazil. **Methods:** The development followed the recommendations of the practical guide (2). A committee of experts selected items to be photographed to evaluate the fear-avoidance construct in patients with persistent pain in the shoulder. The items were chosen from the Activities and Participation of the International Classification of Functioning, Disability, and Health published by the World Health Organization (3). Subsequently, experienced clinicians and patients with persistent shoulder pain were asked to judge the degree of importance of the items. We selected 13 patients with persistent pain in the shoulder for the pilot test of the illustrated scale. The convergent validity was analyzed using the Pearson correlation for the final stage of the pilot test. In this analysis, it was considered the alternation of two words in the question anchored the illustrations for the graduation of the construct; they are "fear" and "avoidance." All participants signed the Free and Informed Consent Form approved by the Research Ethics Committee (CAAE) 79517717...5414. **Results and Discussion:** The experts agreed on the activities with a Kappa value greater than .8. Regarding the choice of clinicians and patients, a content validity index of 8% was considered. Thus, 21 activities were deemed to be adequate or very adequate for patients. There was a strong correlation between the scales ($r: .74$) in the pilot test considering the word "avoidance" in the question for construct measurement. The correlation was moderate by using the word "fear" in the question. Although the fear-avoidance model involves avoidance behaviour connected to the emotion of fear, the direct question to the patient seemed to generate a confusion of interpretation to fear related to the pain to the fear that they sometimes experienced. 1. Pool JJM, Hiralal S, Ostelo RWJG, Veer K Van Der, Vlaeyen JWS, Bouter LM, et al. The applicability of the Tampa Scale of Kinesiophobia for patients with sub-acute neck pain : a qualitative study. 29;773–8. 2. de Vet HC, Terwee CB, Mokkink LB, Knol DL. Measurement in medicine. A practical guide. In New York: cambridge university press; 211. p. 22. Available from: <http://www.cambridge.org/nl/academic/subjects/statistics-probability/statistics-life-sciences-medicine-and-health/measurement-medicine-practical-guide?format=HB&isbn=9785211182#YJoi53z7hjBZ9VK.97> 3. Farias N, Buchalla CM. A classificação internacional de funcionalidade, incapacidade e saúde da organização mundial da saúde: conceitos, usos e perspectivas. Rev Bras Epidemiol [Internet]. 25;8(2):187–93. Available from: http://www.scielo.br/scielo.php?script=sci_arttext&pid=S1415-79X25211&lng=pt&tlng=pt

Reliability, Validity, Responsiveness and Minimal Clinically Important Change of the Dutch Version of the Pain Disability Index (DV-PDI) in Female Breast Cancer Patients

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Breast cancer is the most frequent malignancy among women worldwide. Since both prevalence and survival rate are continuously increasing, more women have to face the debilitating consequences accompanying this disease. One of the most prevalent, long lasting, and more importantly, impairing problems reported by breast cancer survivors is pain, which can persist for years after surgery. During this time, pain severely hampers quality of life, resulting in, and from, disabilities on every domain of ones functioning. Seen that pain encompasses more than the mere physical aspect, its evaluation should be multifactorial as well. A commonly used instrument to evaluate disability associated with pain is the Pain Disability Index (PDI). This self-report method measures the degree of interference with normal role functioning on seven different life domains caused by pain. Although reliability, validity, responsiveness and minimal clinically important change of the PDI have been previously researched in various pain population groups, up to now it has not yet been investigated in female breast cancer patients. Both a cross-sectional and a prospective cohort study will be conducted within the University Hospitals of Leuven. In order to assess reliability, test-retest reliability and measurement error will be determined. Therefore, 3 female breast cancer patients will fill out the PDI twice with a 24-hour interval. Validity will be examined through both construct and known-groups validity. Construct validity is deemed sufficient if a minimum of 75 percent of the hypothesized correlations is met and known-groups validity will be achieved if the PDI can successfully discriminate between participants with and without pain. Responsiveness and minimal clinically important change will be assessed through an anchor-based approach over a four-month period. For this, we will follow a cohort of 3 participants, both at baseline (one week after surgery) and 4 months thereafter. At these time points, the women will fill out the PDI and a self-reported global perceived effect scale. Responsiveness will be considered sufficient when the area under the receiver operating characteristic curve exceeds .7. In order to determine the minimal clinically important change, we will calculate the optimal cut off point and its sensitivity and specificity. Process evaluation: Up till now, 11 participants have completed the assessments.

Pain characterization in chronic orofacial pain: an observational study.

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Chronic orofacial pain is common in patients with temporomandibular joint (TMJ) disorders; nevertheless its multifactorial ethiopathogenesis is still complex and not well understood. The aim of the study is to understand correlations between characteristics of pain, psychological symptoms and pressure pain threshold in chronic orofacial pain subjects (COPS). We enrolled 16 COPS caused by TMJ disorders and 16 age- and sex-matched healthy subjects (HS). All COPS were classified according with DC/TMD Axis I and II, with at least 3 points pain at the Numeric Rating Scale (NRS) lasting more than 6 months. Oral symptoms were evaluated using Oral Health Impact Profile (OHIP). Psychological features of pain were evaluated using Coping Strategies Questionnaire (CSQ), Pain Catastrophizing Scale (PCS), and Central Sensitization Inventory (CSI). Objective assessment of pain was measured by the pressure pain threshold (PPT) evaluated using manual algometer over facial and peripheral sites. HS were evaluated for PPT testing the same areas. PPT mean values between COPS and HS were compared using t-test. Spearman coefficient was used to find correlation between pain features and clinical measures in COPS sample. Twelve COPS were female. The mean age was 5 ± 12 years and 75% have bilateral pain. The median pain duration was 36 months with mean intensity of 6 ± 1 at the NRS. Significant lower PPT was found in COPS compared to HS ($p < .1$). In COPS a positive correlation was found between oral and Axis II psychological symptoms ($p = .79$, $p < .1$) and PCS and CSQ ($p = .59$, $p < .5$). A reduction in jaw function is correlated with lower PPT in upper trapezius ($p = .84$, $p < .1$) and thenar eminence ($p = .73$, $p < .1$). In COPS positive correlations were found between thenar PPT and condyle ($p = .79$, $p < .1$) and masseter muscle ($p = .64$, $p < .1$). Pain in COPS lasts for years after its onset and seems to be associated with psychological disorders as found in literature. A reduction in PPT in COPS may indicate widespread sensitization phenomena and seems to be related to higher jaw function impairment. Lower PPT in facial and peripheral sites may be considered a positive sign of hyperalgesia in patients with chronic orofacial pain. Process evaluation These findings are preliminary and have to be verified in a larger sample. Hypothesis about sensitization phenomena need to be verified in a cohort without other chronic systemic comorbidities. 1. Furquim BD, Flamengui LM, Conti PC.. TMD and chronic pain: A current view. Dental Press J Orthod. 215; 2:127-33. 2. Dworkin SF, Le Resche L. Research diagnostic criteria for temporomandibular disorders: review, criteria, examinations and specification, critique. J Craniomandib Disord. 1992; 6:31-55. 3. Fernandez-de-las-Penas C, Galan-del-Rio F, Fernandez-Carnero J, Pesquera J, Arendt-Nielsen L, Svensson P. Bilateral widespread mechanical pain sensitivity in women with myofascial temporomandibular disorder: evidence of impairment in central nociceptive processing. J Pain. 29; 1:117-8.

Barriers and facilitators with regards to the usability of a blended intervention in patients with medically unexplained physical symptoms

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Introduction: Medically unexplained physical symptoms (MUPS) are physical complaints (e.g. musculoskeletal pain, fatigue or dizziness) for which no medical condition can be found after medical examination and last longer than a few weeks. For 2.5% of all patients with MUPS-related symptoms complaints are chronic, with high healthcare costs as a result. To prevent chronicity, a new intervention (PARASOL) has been developed. This intervention consists of a proactive, blended and multidisciplinary program in which healthcare professionals work together and coordinate the care for their patients with MUPS. eHealth is used to provide care efficiently, as 'blended' intervention and to stimulate self-management. In developing new complex interventions, it is important to go through different phases, moving from the development phase, through the implementation phase to an evaluation phase. This study focuses on the evaluation phase in which the usability of the program is examined from a patient's perspective.

Methods: Semi-structured interviews were held with patients that completed the entire PARASOL intervention program. Using the system usability scale, both patients with high and low satisfaction were included. The topic list served as a guide in the interviews, and was compiled based on a conceptual framework for evaluation of eHealth and determinants of implementation of health care innovations.

Results: A total of 13 patients were interviewed after which saturation was achieved. Five patients with low user satisfaction, 4 patients with average and 4 patients with high user satisfaction were interviewed. The following themes emerged from the analysis of the interviews: expectations, goals and motivation, usability of online platform, patient involvement, involvement from disciplines, added value treatment.

Discussion: Usability was moderate. Several themes were identified to improve the intervention. Based on identified factors, the intervention can be further improved. Furthermore, the study can offer valuable insights for future proactive and preventive blended health care programs.

Process evaluation: We are still in progress and situated in the last phase of coding where themes emerged. Now we are challenging to make the connection between the study results and further implementation.

Do contemporary measures of physical function enhance the prediction of ongoing pain and disability following a whiplash trauma: protocol for a prospective observational study

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Introduction Precise knowledge of prognostic factors for ongoing pain following whiplash trauma is incomplete. In particular, there is very little investigation of the predictive ability of changes in motor function and muscle behavior. Therefore, the aim of the study is to identify individuals at risk of developing persistent pain and disability following acute whiplash trauma by combining contemporary measures of physical function together with established psychological and pain-related predictive factors. **Methods** A prospective observational study will recruit 15 consecutive patients experiencing whiplash-related symptoms, admitted to a Major Trauma Centre in the United Kingdom within 7 days of their injury. Participants will be followed longitudinally for 12 months. The absolute risk of poor outcome will be measured using the Neck Disability Index measured at 6 months (scores $\geq 3\%$ (1,2)). Candidate predictors include patient characteristics, pain extent extracted from electronic pain drawings, and self-reported questionnaires of psychosocial factors. Furthermore, contemporary physical factors will be evaluated including the smoothness of neck movement, force steadiness, and neck muscle co-activations. Candidate predictors will be collected at baseline, 3, 6, and 12 months. In addition, fortnightly data collection of pain intensity, fear of movement, and performance on active movement tasks will be requested remotely through a developed smartphone app to monitor patient recovery trajectories. Logistic regression analysis will be performed to identify factors that are associated with poor outcomes on NDI. This is the first protocol to describe, a priori, the methods and analysis of developing a prognostic screening tool to predict outcomes and monitor recovery trajectories following acute whiplash trauma. The knowledge gained through this study can assist in the identification of personalized interventions to facilitate recovery and therefore minimize the transition to chronic whiplash. **Process evaluation** The selection of candidate predictors to be included in the protocol was challenging given conflicting results of their predictive ability. Candidate predictors were chosen based on contemporary evidence showing their association with the poor outcomes whilst being reliable, valid, and clinically applicable. Another challenge was the definition of poor outcome following whiplash. For this we choose 6 months as a cut-off to define poor outcome based on the NDI, since there is a plateau in recovery status after 6 months (3). 1. Williamson E, Williams MA, Gates S, Lamb SE. Risk factors for chronic disability in a cohort of patients with acute whiplash associated disorders seeking physiotherapy treatment for persisting symptoms. *Physiotherapy*. 215;11(1):34-43. 2. Vernon H. The Neck Disability Index: state-of-the-art, 1991-28. *Journal of manipulative and physiological therapeutics*. 28;31(7):491-52. 3. Sterling M, Hendrikz J, Kenardy JJP. Compensation claim lodgement and health outcome developmental trajectories following whiplash injury: a prospective study. 21;15(1):22-8.

Movement Evoked Pain in Patients with Chronic Low Back Pain: Is There a Role for Transcutaneous Electrical Nerve Stimulation? A Pilot Study.

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Introduction: Transcutaneous Electrical Nerve Stimulation (TENS) and heat are widely used for pain management. However, their clinical effectiveness remains controversial. Lately, researchers suggested beneficial effect for TENS in reducing pain during movement (1). Therefore, we aimed to investigate the effects of HeatTENS on movement evoked pain (MEP), representing a dimension of pain experience that is distinct from other pain measurements that are frequently used in this kind of research (pre-post measurements). An experimental study with cross-over design. 2 patients with chronic nonspecific low back pain will be tested for MEP relief in 2 conditions: while using the HeatTENS application and without using it. Primary outcome: MEP will be measured using the Back Performance Scale (BPS) and a 5 minute walk test (5MWT). Participants will first perform 5 functional tasks asked to rate their pain before, during, and after each movement task on a numeric rating score scale. The same principle will be used for the 5MWT: for each walking-minute, 3 pain measurements will be assessed. MEP will then be calculated in 2 ways: First, an index of sensitivity to movement evoked pain (SMEP) will be computed as the increase in pain reported by participants over the 5MWT(2). SMEP refers to an increase in pain in response to repeated physical activity. The difference between pre- and post-walking pain ratings will be used to calculate SMEP. Second, the mean of peak scores during each movement task (both 5MWT and BPS) will be used for mean MEP (3). Following secondary outcomes will only be assessed at baseline: pain at rest, pressure pain thresholds, temporal summation, conditioned pain modulation, CSI-, FABQ- and QoL-questionnaires.

DISCUSSION: The results of this pilot study will be used to estimate true sample size and evaluate feasibility. We hope to gain more insights in potential working mechanisms of TENS and MEP. These analgesic effects can possibly lead to an increased understanding of dimensions of pain experience as well as to more comprehensive clinical assessments and treatment of LBP.

PROCESS EVALUATION: During the study, rather high resting pain ratings occur. This is possibly because, before participants give their “pain at rest”, they are to lie down in a supine position for 5 minutes. Lying down can be a pain provoking activity for some patients. I could instruct the participant: to choose a position in which he/she can stay comfortable for 5 minutes.

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Modulation of the time of action of a placebo analgesic cream in healthy subjects

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Positive verbal information regarding the analgesic effectiveness of a given placebo treatment have been shown to lead to reduced pain perception, this is referred to as placebo analgesia. The present study aims to investigate whether manipulation of temporal information associated with the given treatment (placebo cream) modulates the onset of action of a placebo analgesic cream. A total of 8 subjects will be enrolled. Somatosensory stimulator with 3 ms duration and 5 Hz frequency will be used to induce a stable moderate pain sensation in the low back area (NRS=6). Placebo cream will be applied and different efficacy times information will be given to each group. Specifically, that the cream will be effective immediately (anticipated expectation group), after 5 minutes (matched expectation group) and after 1 minutes (postponed expectation group). In all groups, intensity of stimulation will be gradually reduced after 5 minutes from cream application. Expected Results The onset of placebo cream analgesia is expected to vary accordingly with the temporal content of the verbal information given. In the anticipated expectation group, pain ratings are expected to decrease immediately after cream application even if the intensity of the stimulation remains the same. In the matched expectation group, pain ratings are expected to decrease after 5 minutes from cream application because expectations of cream onset match with the real decrease of intensity stimulation. In the postponed expectation group, pain ratings are expected to decrease at a slower rate compared to the matched expectation group because there is a mismatch between expectations of cream onset and real stimuli intensity. Demonstrating that temporal information modulate the onset of placebo analgesia will be a pioneering finding that will lead the way towards a new stream of research: not only temporal suggestions could be used to maximise placebo analgesia effectiveness, but these could enhance drugs' effectiveness, anticipating their onset. Process Evaluation So far I have collected some preliminary data to establish the best frequency (Hz) and ms duration to induce a stable moderate pain sensation via somatosensory stimulator. I encountered some initial problems because pain ratings were not stable and subjects were able to feel when I increased the intensity of the stimulator. However, I have now established a good combination of duration (3 ms) and frequency (5 Hz) that gives a satisfying pain sensation that gradually increase over time. Data collection will start in few days. We expect to finish data collection by March. Kaptchuk TJ, Stason WB, Davis RB, Legedza ATR, Schnyer RN, Kerr CE, et al. Sham device versus inert pill: Randomised controlled trial of two placebo treatments. *Br Med J*. 2003;327(7338):391–4. Piedimonte A, Guerra G, Vighetti S, Carlino E. Measuring expectation of pain: Contingent negative variation in placebo and nocebo effects. *Eur J Pain (United Kingdom)*. 2017;21(5):874–85.

Modulation of the time of action of a placebo analgesic cream in Neck Pain patients

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Positive verbal information regarding the analgesic effectiveness of a given placebo treatment have been shown to lead to reduced pain perception, this is referred to as placebo analgesia. This is a clinical study investigating whether the temporal content of the positive information given influences the onset of placebo cream analgesia in chronic neck pain patients. A total of 92 chronic neck pain patients will be included. Neck mobility and pain intensity will be assessed at the beginning of the experiment. Placebo cream will be applied and different efficacy times information will be given in each group. Specifically, that the cream will be effective after 5 minutes (placebo 5' group) and after 3 minutes (placebo 3' group). Patients in the control group will be told that the cream is inert. Neck mobility and pain intensity will be reassessed in all groups after 5 and after 3 minutes. All patients will then complete standard physiotherapy sessions. Post-treatment assessments and follow ups will also be conducted. Expected Results The onset of placebo cream analgesia is expected to vary accordingly with the temporal content of the verbal information given. Mobility and pain intensity are expected to ameliorate after 5 minutes in the placebo 5' group and after 3 minutes in the placebo 3' minutes group. No symptoms amelioration is expected in the control group. This would be the first study to investigate the role of the temporal content of verbal information in modulating the onset of placebo cream analgesia on a clinical population. If the findings are in line with what expected, temporal suggestions could be used to maximise placebo analgesia efficacy, as well as to enhance analgesic drugs' effectiveness, anticipating their onset. These findings are particularly interesting in the context of chronic pain, where there is a need for new treatments. Process Evaluation This project will start after Ethical Committee gives approval. We estimate this will be in May/June 2019. We have now discussed the protocol in detail, overcoming several issues such as outcome variables choice, script details, role assignation to physiotherapists involved in the study in order to ensure that evaluators remain blind. However, further details will be discussed in the new year before starting the trial. We have programmed a period of time prior the start of the trial devoted to train the physiotherapist in order to ensure everyone behaves and interacts with the patients as expected. By the time of the conference, we might not have preliminary data to present; it will depend on the Ethical Committee. Benedetti F. Perspective Placebo Effects : From the Neurobiological Paradigm to Translational Implications. *Neuron* [Internet]. 2014;84(3):623–37. Available from: <http://dx.doi.org/10.1016/j.neuron.2014.11.023> Fuentes J, Armijo-Olivo S, Funabashi M, Miciak M, Dick B, Warren S, et al. Enhanced Therapeutic Alliance Modulates Pain Intensity and Muscle Pain Sensitivity in Patients With Chronic Low Back Pain: An Experimental Controlled Study. *Phys Ther* [Internet]. 2014;94(4):477–89. Available from: <https://academic.oup.com/ptj/article-lookup/doi/10.1093/ptj/213118> Kaptchuk TJ, Stason WB, Davis RB, Legedza ATR, Schnyer RN, Kerr CE, et al. Sham device versus inert pill: Randomised controlled trial of two placebo treatments. *Br Med J*. 2006;332(7538):391–4.

Investigating the variability of spinal movement during walking in people with chronic neck pain

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Introduction: Chronic neck pain (CNP) is a common musculoskeletal disorder that many individuals experience in their life (1). In addition to neck pain, functional impairments and biomechanical changes may be present. Few studies have examined the functional task of walking in people with CNP, although initial findings suggest that gait can be modified in people with CNP, including range of neck and trunk rotation during gait (2, 3). In addition to the quantity of motion, the quality of neck and trunk movement could provide further insight into biomechanical changes occurring in people with CNP which may have relevance for ongoing pain. Thus, this study investigated the variability of trunk and neck rotation during walking in people with CNP compared to asymptomatic individuals. **Methods:** The sample of 44 subjects included 2 asymptomatic individuals and 24 people with CNP of idiopathic or traumatic origin. Subjects performed six trials of rectilinear walking (3 meters); three trials with the head in a natural position and three trials whilst rotating the head at a natural speed. Trunk and head rotation angles (deg) were averaged across gait cycles for the trials performed with a neutral head position. Data were in time (% gait cycle) and the average variability of the angular distribution along the cycle extracted. The same analysis was conducted for the trials walking whilst rotating the head using the head rotation angular peaks as events to define the gait cycles. **Results:** When walking with the head in a neutral position, there were no group differences for the variability of ($p=.862$) or neck rotation ($p=.427$). Also, no difference was observed between groups for the variability of neck rotation ($p=.636$) whilst walking and rotating the head. However, the CNP group displayed reduced variability of trunk rotation ($p=.21$) whilst walking and rotating their head. **Discussion:** People with CNP displayed a reduction in the variability of their trunk movement when walking whilst simultaneously rotating their head; a common functional demand. These findings could be interpreted as evidence of a protective strategy or adapted when faced with a more challenging condition. **Process evaluation:** Further research is suggested to investigate the variability of neck and trunk movement during neck rotation at a standardized speed during walking and evaluate movement variability in further functional tasks in people with CNP. **References** 1. Sremakaew M, Jull G, Treleaven J, Barbero M, Falla D, Uthairakul S. Effects of local treatment with and without sensorimotor and balance exercise in individuals with neck pain: protocol for a randomized controlled trial. *BMC musculoskeletal disorders*. 218;19(1):48. 2. Falla D, Gizzi L, Parsa H, Dieterich A, Petzke F. People with chronic neck pain walk with a stiffer spine. *Journal of orthopaedic & sports physical therapy*. 217;47(4):268-77. 3. Uthairakul S, Sunkarat S, Khamsaen K, Meeyan K, Treleaven J. The effects of head movement and walking speed on gait parameters in patients with chronic neck pain. *Manual therapy*. 214;19(2):137-41.

Who is more prone to experimentally-induced central sensitization amongst subjects with temporomandibular disorders and healthy individuals?

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Central sensitization (CS) is increasingly understood as a main contributor to temporomandibular disorders (TMD). Furthermore, a predisposition to develop more CS in response to nociceptive input may play a role in the maintenance of pain. The aim of this study is to assess the response of chronic TMD subjects and healthy individuals to high frequency stimulation (HFS). HFS is an experimental procedure inducing CS manifesting itself by secondary hyperalgesia, a large area skin surrounding the stimulated site becoming more sensitive to mechanical pinprick stimuli. To be included TMD subjects will have to fulfil the DC/TMD criteria; they may present with other musculoskeletal disorders but chronic TMD pain will have to be their main complain. Exclusion criteria will include a history of orofacial surgery and any coexisting psychiatric, inflammatory, neurological or metabolic comorbidities. HFS will be used to induce CS in subjects with TMD and healthy controls. The spatial extent and the duration of secondary hyperalgesia will be measured. Pain ratings, spontaneous pain and allodynia in the area of secondary hyperalgesia will also be assessed. Correlations between the response to HFS and a range of secondary outcomes will be assessed in subjects with TMD, including pain distribution, conditioned pain modulation, pressure pain thresholds and physical symptoms (Central Sensitization Inventory, Symptom Severity Scale, Widespread Pain Index, Graded Chronic Pain Scale and Patient Health Questionnaire-15), functional limitations (Jaw Functional Limitation Scale), and psychological factors (Generalized Anxiety Disorder-7, patient health questionnaire-9). It is expected that some individuals in both groups will develop more CS in response to nociceptive input. Characteristics of secondary hyperalgesia may be correlated with the secondary outcomes in subjects with TMD. HFS has the potential to be a new, safe, and well-controlled technique assessing the tendency to develop CS in TMD, which could later be taken into account for patient management. Process evaluation The protocol is about to be submitted to an ethical committee. In parallel, the validity of measuring the area and the extent of secondary hyperalgesia induced by HFS is being studied in healthy subjects. The success of these steps is mandatory before conducting a power analysis and launching the study.

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PSYCHOLOGICAL FLEXIBILITY AND BELIEFS ABOUT ILLNESS IN PATIENTS WITH FIBROMYALGIA: ARE THERE DIFFERENCES AMONG PATIENTS FROM LATIN AMERICA AND SPAIN?

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Fibromyalgia (FM) is a chronic musculoskeletal pain condition with a myriad of cognitive and somatic symptoms. FM patients usually present catastrophizing perceptions and experiential avoidance, among other negative beliefs and illness behaviours. According to epidemiological data, FM may be considered a global phenomenon with a high prevalence even in some non-western countries. Although differences among patients from different regions seem to exist in terms of impact of the illness, beliefs about illness and illness behaviours, these differences might be explained by the cultural background. The aim of this study is to explore the beliefs about causes, symptoms and treatment among fibromyalgia patients from Latin America and Spain. A survey was conducted among FM patients from Latin American countries and Spain. The sampling were carried out in fibromyalgia or chronic pain associations or groups from Spain and Latin American countries approached by mailing, telephone or social networks. Patients without a FM diagnostic were excluded. The survey contained questions on socio-demographic factors (age, gender, nationality, marital status, educational level, socioeconomical level, years with the illness and other illnesses); a list of symptoms related with his/her FM based on the Illness Perception Questionnaire-Revised (IPQ-R) Spanish version; the Acceptance and Action Questionnaire-II (AAQ-II) Spanish version, which measures the psychological flexibility; and three open-ended questions regarding fibromyalgia (believed causes of his/her illness, the most relieving pharmacological and non-pharmacological treatments for him/her). The survey was developed in Spanish. The data of the open-ended questions will be codified into agreed categories by several researchers. Moreover, descriptive analyses and comparisons using Chi-square and Student's t tests will be performed comparing the variables among regions. A total of two hundred and forty-three participants responded to the survey from Latin America (N=124), and Spain (N=117). Data collection is ongoing. The possible differences among regions will be discussed taken into account the limitations of the study in the sampling and sample size. Process evaluation: Possible limitations are the sampling and the sample size.

The interaction between chronic spinal pain and sleep quality in people with chronic spinal pain and comorbid insomnia: a systematic review

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The interaction between chronic spinal pain and sleep quality in people with chronic spinal pain and comorbid insomnia: a systematic review

Introduction Chronic spinal pain (CSP, i.e. chronic low back and neck pain) is a highly prevalent and debilitating disorder with tremendous personal and socioeconomic consequences. Chronic spinal pain adversely impacts many quality of life elements, including sleep quality and quantity. Comorbid insomnia is a common health problem among people suffering from CSP. In literature, a bidirectional interaction between sleep and pain is suggested in these patients (1). The current study aims to systematically review the existing literature reporting the association between sleep quality and pain in people with CSP and comorbid insomnia.

Methods A systematic search of existing literature will be conducted via the electronic databases Pubmed, Web of Science and Embase. Keywords for CSP and sleep will be used for this search. First, all articles will be screened for eligibility on title and abstract. An article must meet following inclusion criteria: participants are (1) human adults (>18 years) suffering from chronic spinal pain and comorbid insomnia; (2) articles should report outcomes related to sleep and pain; and (3) full text articles should contain original research. Then, potential relevant articles will be screened on full text. Screening and scoring risk of bias will take place by two independent reviewers. Evidence, dependent on the quality of the articles, will be scored using the Grades of Recommendation, Assessment, Development and Evaluation (GRADE) approach. Extraction of data from included articles will be executed in order to interpret these data and draw conclusions. If possible, a meta-analysis will be conducted. Results Review is ongoing, results will be

ready to present at the congress. Discussion Various dimensions of sleep are reported to be negatively affected by pain. In people with CSP, it is not clear which aspects of sleep are most disturbed. If there is an interaction between CSP and the quality and quantity of sleep, and it is clear which dimensions of sleep are disturbed in this population, then physical therapy for CSP in people with comorbid insomnia could be optimized. Process Evaluation A previous review investigated the interaction between chronic low back pain and sleep (2). Literature between January 197 and 29 was discussed, so an update is not redundant. Additionally, the present study specifically added chronic neck pain, enabling us to draw conclusions for the complete CSP population. (1) Pigeon WR, Moynihan J, Matteson-Rusby S, Jungquist CR, Yinglin X, Xin T, et al. Comparative effectiveness of CBT interventions for co-morbid chronic pain & insomnia: A pilot study. *Behaviour Research and Therapy*. 212; 5(11):685-689. (2) Kelly GA, Blake C, Power CK, O'Keeffe D, Fullen MB. The association between chronic low back pain and sleep: a systematic review. *The clinical journal of pain*. 211; 27(2):169-181.

Pain education for patients with low back pain in Nepal: Results from PEN-LBP feasibility clinical trial

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Pain education (PE) is a recommended treatment for low back pain (LBP) and commonly used in western countries, but cultural and language barriers limit its use in the Eastern cultures. Before educational interventions such as PE can be used in a new culture, such as Nepal, the contents need to be adapted to the new cultural context (1), and tested in a randomized clinical trial (RCT). However, no RCTs in LBP, or of PE, have been conducted before in Nepal, the feasibility of such research is not known. The aims of the study were to cross-culturally adapt an evidence-based PE package to Nepali, and assess the feasibility of conducting a RCT to evaluate its effectiveness. We registered the protocol in ClinicalTrials.gov and published the full protocol of the study (2). We first developed a curriculum to deliver PE for LBP in Nepal as recommended by Moseley and Butler (3). We then used Nepalese patients' pain stories and metaphors to deliver key pain concepts, but based it on "Explain Pain" principles (3). This was pretested on six patients with LBP, and proofread by three Nepalese. We then conducted a two-arm, assessor-blinded, feasibility RCT in 4 individuals with non-specific LBP of any duration from Nepal. We randomized participants to either one hour each of PE or a guideline-based physiotherapy control group. The primary feasibility outcome measures were related to recruitment, assessor blinding, contamination, and treatment. We also used eight secondary, clinical outcome measures to assess pain intensity, pain interference, pain catastrophizing, depression, sleep disturbance, resilience, global rating of change, and quality of life. Post-treatment assessments were performed after one week. The Nepalese PE package was comprehensible. Forty out of 7 participants approached met inclusion criteria and all consented to participate. This exceeded our minimum recruitment target of four participant every week. Assessor blinding was feasible, as the assessor did not receive any information about participants' group allocation. There were no contamination between groups. PE was acceptable as a treatment for back pain to all the study participants. Secondary analyses suggested significant reduction in pain intensity and pain catastrophizing compared with guideline-based care. Results related to secondary outcomes should be cautiously interpreted, as the study was not powered to perform these analyses. Future definitive trial is required to have a definitive conclusion. We conclude that PE is an acceptable intervention for LBP in Nepal, and that conducting a RCT to evaluate effectiveness of PE is feasible in Nepal. Process evaluation Intervention providers in both the groups adhered to the duration of the treatment. However, intervention fidelity was not assessed in this feasibility trial, which we recommend in the full trial. 1. Sharma S, Abbott JH, Jensen MP. Why clinicians should consider the role of culture in chronic pain. *Braz J Phys Ther.* 218;22(5):345-6. 2. Sharma S, Jensen MP, Moseley GL, Abbott JH. Pain education for patients with non-specific low back pain in Nepal: protocol of a feasibility randomised clinical trial (PEN-LBP Trial). *BMJ Open.* 218;8(8):e22423. 3. Moseley G, Butler D. *Explain pain supercharged.* Adelaide, Australia: Noigroup publications. 217.

Parallel versus Sequential Conditioned Pain Modulation testing using various parameters; does it make a difference?

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Conditioned Pain Modulation (CPM) is a paradigm that tests the central pain inhibiting mechanism in case of a secondary nociceptive stimulus(1). There are various protocols and types of conditioned stimuli available to test the CPM paradigm, making it difficult to compare the results from research. Even though Yarnitsky's recommendations for CPM testing suggest an application of the test stimuli sequential to the conditioning stimulus, most studies use of a parallel application (2,3). It is unclear whether a parallel or a sequential application of the test stimuli influences the magnitude of the CPM effect. The primary aim of this study is to assess the differences between a parallel and sequential application on the magnitude of the CPM effect. Secondary, we assessed whether the intensity of the conditioning stimulus and a possible interaction with a second test stimulus influenced the CPM effect. Healthy participants (n=89) were tested in a mixed method, cross sectional study design consisting of three different study parts. Using Pressure Pain Thresholds (PPT) and Heat Test Stimuli (HTS), parallel and sequential to a cold pressor test, the CPM effect was measured on three locations. All participants were blinded for the study aim and had a randomised order of either the sequential or parallel protocol. Both protocols were used on all participants. Testers were blinded for the protocol used. In the first part (n=29), intensity of the cold pressor test was set at VAS 4/1. In the second part (n=31), the intensity was set at VAS 6/1. In the third part (n=29), the intensity remained at VAS 6/1, but no heat was used as additional test stimulus. The CPM magnitude was compared using a mixed method general linear model, with parallel versus sequential as within variable and three different study parts as between variable (2x3 model for PPT and 2x2 for HTS). Preliminary Results There were no differences found in the magnitude of the CPM effect between the parallel and sequential protocols, nor between the three study parts, for either PPT or HTS on all three locations. No interaction between protocol x study part was found either. Process evaluation Measurements were performed in a fully controlled situation with complete blinding for participants and testers. Using a mixed method design improves power to detect differences, while keeping the total testing time for the participants low. 1. Pud D, Granovsky Y, Yarnitsky D. The methodology of experimentally induced diffuse noxious inhibitory control (DNIC)-like effect in humans. *Pain* [Internet]. International Association for the Study of Pain; 29;144(1–2):16–9. Available from: <http://dx.doi.org/10.1016/j.pain.2004.05.001> 2. Yarnitsky D, Bouhassira D, Drewes AM, Fillingim RB, Granot M, Hansson P, et al. Recommendations on practice of conditioned pain modulation (CPM) testing. *Eur J Pain* (United Kingdom). 2015;19(6):85–6. 3. Kennedy DL, Kemp HI, Ridout D, Yarnitsky D, Rice ASC. Reliability of conditioned pain modulation: a systematic review. *Pain*. 2016;157:241–9.

Comparison of Acceptance & Commitment Therapy (ACT) to a multi-modal Physical Therapist intervention (PT) and ACT/PT combination for chronic pain

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Pain-related fear and pain catastrophizing lead to avoidance behaviors, which have been shown to predict pain severity, chronicity and disability. Treatment strategies aimed at decreasing avoidance, especially related to physical activity (PA) and exercise, vary. Physical Therapist (PT) interventions like graded exercise or cognition-targeted exercise therapy apply progression of exercise or activity that is contingent upon dose rather than pain. Pain Neuroscience Education (PNE) aimed at reconceptualizing pain may be used to enable this. Another treatment strategy designed to reduce avoidance behaviors involves cultivating Psychological Flexibility (PF), or the ability to act effectively in accordance with personal values and goals in the presence of potentially interfering thoughts and feelings. Acceptance & Commitment Therapy (ACT) is an intervention delivered by psychologists in which PF leads to willingness to experience pain in the pursuit of values. ACT does not include PNE or exercise components, and individuals are instructed to approach activity with a spirit of PF instead of forcing oneself to achieve a target. The purpose of the proposed study is to present an ACT-compatible multi-modal PT intervention that cultivates PF and to compare the effectiveness of ACT, multi-modal PT, and a combination of ACT & PT for chronic pain. Methods: Participants will be Veterans diagnosed with a chronic pain condition and will be recruited from the Madison Veterans Affairs (VA) Hospital system. This is a randomized controlled trial with 3 intervention arms (ACT, PT, and ACT/PT combination) and a waitlist control. Interventions for ACT and PT were designed and implemented as part of the Empower Veterans Program originating at the Atlanta VA Healthcare system. Both ACT and PT demonstrate feasibility and acceptability to Veterans and clinicians. Each intervention involves 1 hour per week for 1 weeks duration and are delivered in a group format. Measures include self-reports of function, quality of life, pain-related interference, pain catastrophizing, pain acceptance, and PF. Physical performance measures include physical activity (accelerometry) and functional mobility. A biological measure of stress reactivity is under consideration. At the time of this abstract submission, researchers are finalizing methodological design and plan to begin enrolling subjects in 219. Malfliet A, Kregel J, Meeus M, Cagnie B, Roussel N, Dolphens M, Danneels L, & Nijs J. Applying contemporary neuroscience in exercise interventions for chronic spinal pain: Treatment protocol. *Brazilian Journal of Physical Therapy*. 217, 21(5):378-387. George SZ, Wittmer VT, Fillingim RB, & Robinson ME. Comparison of graded exercise and graded exposure clinical outcomes for patients with chronic low back pain. *JOSPT*. , McCracken LM & Gutierrez-Martinez O. Processes of change in psychological flexibility in an interdisciplinary group-based treatment for chronic pain based on Acceptance and Commitment Therapy. *Behav Res Ther*. 211, 49(4):267-274.

Cognitive behavioral therapy for insomnia within a comprehensive treatment approach for chronic spinal pain: a randomized controlled trial

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Introduction The major share of people suffering from chronic spinal pain (CSP) report comorbid insomnia. In current treatment for CSP, this highly prevalent comorbidity is usually not addressed. Considering the bidirectional interaction between pain and sleep and the great impact of poor sleep on pain, untreated insomnia may be a risk factor for adverse physical and psychological health outcomes (1). Therefore, the aim of this study is to examine if cognitive behavioral therapy for insomnia (CBT-I) combined with the modern neuroscience approach (i.e. pain neuroscience education and cognition-targeted exercise therapy) is effective in improving pain, sleep, physical activity and function in people with CSP and comorbid insomnia. One hundred twenty participants with CSP and comorbid insomnia will be included in this multi-center randomized controlled trial. Participant will undergo a total of 18 therapy sessions in both the experimental and control group. Both groups will receive three sessions of pain neuroscience education, followed by alternating six sessions of CBT-I and nine session of cognition-targeted exercise therapy in the experimental group and 15 sessions of cognition-targeted exercise therapy in the control group. Pain-related outcomes will be evaluated using the Brief Pain Inventory, Central Sensitization Inventory and pressure pain thresholds. Sleep-related outcomes will be investigated using different questionnaires (Pittsburg Sleep Quality Index, Insomnia Severity Index, Dysfunctional Beliefs and Attitudes about Sleep Scale, Epworth Sleepiness Scale and the Brugmann Fatigue Scale) and home-based polysomnography. Physical activity will

be measured by actigraphy and function will be questioned by the 36 Item - Short Form Health Survey. Questionnaires will be completed online at baseline, directly after finishing treatment and at three, six and twelve months follow-up. Polysomnography, pressure pain thresholds and actigraphy will be performed at baseline, post-treatment and at twelve months follow up. Results Data will be collected until May 2021.

Discussion Possible findings could allow the development of new guidelines for professionals treating CSP patients with comorbid insomnia, so that a new therapeutic approach could improve physical outcomes.

Process evaluation There are no specific guidelines to integrate the pain aspect within CBT-I. Adjustments related to pain are needed to optimize the treatment of people with CSP and comorbid insomnia. (1)

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Advancing the clinical assessment of sensitivity to physical activity

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Introduction: Sensitivity to physical activity (i.e. increased pain during physical activity) affects the performance of activities required in daily life(1, 2) and is major barrier to rehabilitation(3). Recently developed measures for sensitivity to physical activity (SPA) use brief physical tasks and monitor evoked pain-related responses (1, 2). However, these measures have not yet been studied prospectively. The purpose of this study is to estimate the extent to which SPA is associated with pain and disability among people with recent onset low back pain (less than 6 months), both cross-sectionally (initial visit) and prospectively (3-month follow-up). **Methods:** SPA is assessed using a physical task consisting of repeated lifting tailored to personal pain responses. Using standardized weight-position combinations, the easiest weight-position combination for which a single lift evoked a pain intensity rated at least 2 out of 10 (numerical rating scale) was selected for doing 1 repeated lifts. In relation to this lifting task, participants (1) reported their evoked pain intensity, (2) completed pre-post pressure pain threshold readings at the lower back and hands, and (3) answered questions (task-specific catastrophizing, fear, pain self-efficacy). The Brief Pain Inventory and the Pain Disability Index were used to measure pain and disability both at initial visit and at 3-month telephone follow-up. Pearson's correlation was conducted with statistical significance set at $p < .05$. When the assumption of normality or linearity did not appear respected, Spearman's correlation was run. : Preliminary analysis completed on 76 participants (target sample size is 100). The SPA task's measures of evoked pain intensity and task-specific catastrophizing showed significant correlations (r =between .2 and .5) with pain and disability at initial visit and 3-month follow-up. Pressure pain threshold at the lower back correlated ($r = -.271$, $p = .21$) with disability at 3-month follow-up. **Discussion:** Consistent with past studies, SPA is correlated pain and disability. However, this is the first study to demonstrate this association prospectively. This is also the first study to consider the task-specific evoked psychological responses as part of a physical task-based SPA measure. **Process evaluation:** It was challenging to decide how best to capture patient responses to the physical task as an indicator of SPA, therefore several approaches were included. **Characters count:** 2478 1. Wideman TH, Finan PH, Edwards RR, Quartana PJ, Buenaver LF, Haythornthwaite JA, et al. Increased sensitivity to physical activity among individuals with knee osteoarthritis: relation to pain outcomes, psychological factors, and responses to quantitative sensory testing. *Pain*. 214;155(4):73-11. 2. Sullivan MJ, Lariviere C, Simmonds M. Activity-related summation of pain and functional disability in patients with whiplash injuries. *Pain*. 21;151(2):44-6. 3. Jack K, McLean SM, Moffett JK, Gardiner E. Barriers to treatment adherence in physiotherapy outpatient clinics: a systematic review. *Manual Ther*. 21;15(3):22-8.

The use of Symptomatic Medication is Associated with the Degree of Sensitization in Patients with Tension Type Headache

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Tension-type headache (TTH) is a common headache disorder, presenting 42% of global prevalence in an adult population, and it is considered one of the most important disorders in terms of socioeconomic impact. It's pathophysiology is not fully understood, but it seems that central sensitization (CS) play an important role. There is no specific medication for TTH, and patients tends to manage the acute episodes with symptomatic medications. Our aim was to investigate the differences in clinical features and widespread pressure pain sensitivity according to the use of symptomatic medication in TTH. Individuals with TTH diagnosed according to the International Classification of Headache Disorders (ICHD-III) criteria participated. Exclusion criteria included other primary headaches, medication overuse headache, whiplash, fibromyalgia or any neurological disorder. A 1-month headache diary was used to collect clinical data and use of symptomatic medication. Pressure pain thresholds (PPTs) were assessed over the temporalis muscle, C5-C6 zygapophyseal joint, second metacarpal, and tibialis anterior muscle. One hundred and sixty eight patients (72% women, age: 45±14 years; headache frequency: 14±8 days/month; headache intensity: 5.7±1.3; headache duration: 6.1±3.2 hours) participated. One hundred and thirty-six (8%) reported use of symptomatic medication for headache (73% NSAIDs); 58 (43%) took the medication at the beginning of headache whereas 78 (57%) took the medication when the headache intensity was intense. No differences in clinical features and widespread pressure pain sensitivity was observed depending on taking or not the medication (all, P>.157). However, patients taking the symptomatic medication when the headache was intense exhibited widespread lower PPTs than those taking the medication at the beginning of the attack (all, P<.5). Discussion Consuming the symptomatic medication at the beginning of the headache could turn down the afferent input to the central nervous system, preventing the sensitization and causing lower widespread pressure pain sensitivity. Process evaluation Although our sample of patients were mainly chronic TTH, it included also some episodic TTH patients: next study should divide them in two sub-groups, to study if the same findings may be generalizable to both populations. Stovner L, Hagen K, Jensen R, et al. The global burden of headache: a documentation of headache prevalence and disability worldwide. 27;27:193–21. De Tommaso M, Cesar Fernández-de-las-Peñas. Tension type headache. Curr Rheumatol Rev 216;12:127–139. Fernández-de-las-Peñas C, Benito-González E, Palacios-Ceña M, Wang K, Castaldo M, Arendt-Nielsen L. Identification of subgroups of patients with tension type headache with higher widespread pressure pain hyperalgesia. The Journal of Headache and Pain. 217; 18(1), 43.

The effectiveness of Robot- Erigo to reduce the pain in patients with advanced MS (EDSS ≥ 7)

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Background, Aim Rehabilitation therapy adapts to the different phases of Multiple sclerosis (MS), however, patients with advanced MS[Expanded Disability Status Scale(EDSS) ≥ 7] become inactive and few studies show adequate pain control (i.e. due to painful tonic spasms and spasticity pain or musculoskeletal pain). Erigo is a robot with an integrated leg movement system and body weight loading, which allows progressive verticalization of the patient. The aim of this study is to verify the effectiveness of Erigo in patients with advanced MS, in order to reduce pain, frequency of spasms and spasticity, improve sphincter function and fatigue resistance. Inclusion criteria: MS patients with EDSS ≥ 7 ; exclusion criteria: weight >135 kg, cardiovascular impairment, uncontrolled hypertension, severe cognitive disorders, bone instability, skin lesions in areas of the body being treated. Outcome measures were: Numerical Rating Scale for pain(NRS), Ashworth Modified (MAS), Barthel Index(BI), Motricity Index(MI), Spasm frequency(SFS), Wexner test, Trunk Control Test(TCT) and the Range Of Motion(ROM). Patients conduct clinical assessments at the beginning(T1), at the end(T2) and after 3 months(T3) of follow up. They received a 1h treatment, twice a week, for 2 individual sessions. In each session, the vital parameters were monitored in three steps. Seven patients entered this study, age $M=57.7\pm 9.6$. Erigo treatment resulted in a significant improvements of NRS score from 5.67 ± 2.94 to 2.83 ± 2.32 ($P=.5$), SFS from 2.33 ± 1 to $1.33\pm .51$ episodes/day ($P=.41$). MI increased the score by 8 points for both limbs, although at not significant level, BI improved from 19 ± 12.45 to 23 ± 12.4 ($P=.99$); similar results have been demonstrated in the Wexner showing a better sensitivity to stimulus and occasional reduction of faecal incontinence. MAS demonstrated a reduction in spasticity in the hip and Knee at both limbs, although not at significant level (MAS: $P=.178$, MAS: $P=.324$, MAS: $P=.374$, MAS: $P=.374$);no statistical differences between the TCT= 26.67 and TCT= 26.67 were observed. Preliminary results of this study indicate that Erigo may have some effect on secondary pain. This study is still ongoing and further results will be provided at the end of the study. Our findings suggest association between Erigo treatment and a reduced frequency of spasms and pain. Then, progressive verticalization of the patient might be useful to treat secondary pain.

Morphological differences in the upper trapezius muscle between female office workers with and without trapezius myalgia: facts or fiction?

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Office workers frequently report work-related neck pain, which is often associated with myofascial dysfunction of the upper trapezius muscle, called trapezius myalgia. It is hypothesized that prolonged low-level muscle activity during office work may lead to morphological changes in the muscle tissue, causing muscle pain and fatigue. The aim of the present study was to investigate morphological differences in a muscle sample of the upper trapezius, between female office workers with and without trapezius myalgia (1). Muscle biopsy samples were obtained from the upper trapezius muscle of female office workers with trapezius myalgia (n=17) and healthy controls (n=15). Myosin heavy chain immunohistochemistry stainings were performed to identify differences in fiber type proportion and fiber size. Histochemical stainings were executed to investigate differences in internal nuclear proportion and fibers lacking oxidative enzyme activity. Differences in mitochondrial and lipid droplet morphology were investigated by means of electron microscopic imaging at the subsarcolemmal and intermyofibrillar level. The trapezius myalgia group showed significantly more type IIA and IIX fibers, and less type I and IIX fibers, compared to the control group ($P < .01 - P = .5$). No significant differences were found for fiber size and internal nuclear proportion ($P > .5$). A significantly higher number of fibers lacking oxidative enzyme activity was found in the patient group ($P = .3$). A significantly higher mitochondrial area ($P = .23 - P = .29$) and lower lipid droplet area ($P = .15$) were found in the patient group. It may be hypothesized that, due to muscular overload during office work, the local blood and oxygen supply is restricted, leading to an impaired oxidative energy metabolism. This may cause an increased reliance on the anaerobic energy metabolism associated with a shift in fiber type proportion and compensatory changes in mitochondrial and lipid droplet morphology (2, 3). Process evaluation This cross-sectional study does not allow to draw conclusions about causality. Future studies with a longitudinal design should be executed to identify whether these differences are a cause or a consequence of the pain condition.

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Theological and philosophical concepts of hope and their clinical application in a holistic treatment of chronic pain.

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Living with chronic pain is considered an experience that effects multiple dimensions of life and is therefore difficult to comprehend. Initially evolved within palliative care, the concept of 'total pain' by Cicely Saunders (1983) tries to capture this complexity by categorising the effects of pain into a physical, mental, social and spiritual dimension. This concept reflects the definition of health as 'a state of complete physical, mental and social well-being' in the constitution of the WHO (1948) and extends the 'biopsychosocial model' of illness by Engel (1977). The adding of the spiritual dimension considering worldviews and meaning-making schemes has been subject of continuing efforts in scholarship and clinical practice. Yet, metaphysical ideas as one category of human thought do not exist on their own but are established in the human brain, affecting the body and social relations. On this backdrop, I see spirituality and religion not as a distinct dimension of human being but as an overarching theme. Consequently, I argue that hope as a concept with deep theological and philosophical roots does not belong to the spiritual dimension of the pain experience. It is rather an idea that is inherently relational: Hope is established between individuals and embodied by them. By embodiment I refer to the unity of the body and the brain. Methodologically, this PhD projects incorporates theology and philosophy in a clinical qualitative study of pain. First, I will analyse theological and philosophical concepts of hope drawing mainly on Moltmann, Kierkegaard and Bloch. In dialogue with coping and pain management theory, I will then conduct narrative interviews to explore individuals' experience with chronic pain and their ideas on hope. Further, I am considering interviews with chaplains and health care professionals for a more comprehensive picture of how hope is addressed in the medical treatment of chronic pain. One idea at this point is also a comparison of the approaches in pain clinics as opposed to hospices which focus on the coming years of life (with pain) and the end of life (without pain) respectively. The implementation and interpretation of the interviews will prove the appropriateness of this theologically and philosophically grounded approach. Yet, the rise of spiritual care and the general popularity of alternative medicine and Eastern spirituality indicates the need for a return to a faith-based medicine.

Which factors influences the Central Sensitisation Inventory in patients the Total Hip Replacement waiting list? Preliminary results

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Introduction: In severe cases of hip osteoarthritis (OA) replacement procedure usually is indicated for this patient, but financial problems in public health led to the increase of the hip replacement waiting list (HRW). This long period of waitlist could bring some negative effects as persistence of the pain symptoms and decreased of functionality. The persistent pain can evolve to central sensitisation (CS) symptoms. **Aim:** Evaluate which factors are associated with central sensitisation in patients in the first Hip Replacement waiting list. **Methods:** This is a cross-sectional study that evaluate patients of public hospital in São Paulo, Brazil. This patients usually attend the medical outpatient. Our evaluation was done after medical consultation and the patient filled a form with demographic characteristics, personal history of the disease, pain intensity (Visual Analogic Scale - VAS), catastrophizing (Pain Catastrophizing Scale - PCS), function (Harris Hip Score - HHS) and CS (CS Inventory - CSI). We performed descriptive analysis and a logistic regression (LR) which was categorised the patients in Group 1: CSI $\leq$ 36 and group 2: CSI $>$ 36 and used this variable as dependent in the LR analysis. **Results:** The evaluation was done since July/218 and in 4 months we evaluate 7 patients in HRW. The mean of age was 53 (13.7) years old, the time of waitlist was 6 (63.2) months, 8% of patients do not practice physical activity, 88.6% are using some medication, 72.5% presents others MSK complaints and 65.3% has co-morbidities. The mean of VAS was 7.2 (2.2), PCS was 27 (14.5) which represents a moderate score. The function was evaluated by HHS was showed poor score. In the CSI categorisation, 54.3% (38) of patients presented a score of CSI less than 36 and 44.3% (31) show a CSI greater than 36. In the univariate LR 9 of 16 variables (physical activity, work disability, other MSK complaints, number of Other MSK complaints, time of waiting list, VAS, PCS and HHS) showed $p < .05$. The results of multivariate LR the Number of MSK complaints (OR: 4.3 CI 95%: 1.2 to 14.6) and the work disability (OR: 12.8; CI 95% 2.1 to 78.2) show statistically significant. **Discussion:** The mainly results of our paper are the Number of MKS complaints and work disability are associated with CSI score greater than 36. The characteristics of this patients shows a troubling situation, the mean of HRW time is greater than 5 years the score of HHS show a low function. This data corroborate to the CS symptoms which is very common in the patients presents various complaints, high disability making it difficult the process of return of daily activities. As preliminary results we know that our results is possible to change with the final of the study. **Conclusion:** In conclusion Other MSK Complaints and work disability was associated with high CSI score.

Multidimensional evaluation of patients with Low Back Pain in public hospital - Preliminary results of a cross-sectional study

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Introduction: Low Back Pain (LBP) is one of the most relevant conditions of public health, approximately 54 million people will presents this complaint in some moment of the life. The data show a low resolution of this problem and expressive increasing over the years, regarding incapacity and economic impact, the improvement of the understanding of the profile of these patients. The literature have been showed the influence of biopsychosocial factors in this patients. **Objective:** Characterise in a multidimensional aspects the patients with LBP in a physiotherapy service of a public hospital. **Methods:** This is a cross-sectional study in which all patients that sought the physiotherapy service of a public hospital of São Paulo, Brazil with LBP as the main complaint were evaluated. We realize a multidimensional evaluation based on demographic characteristics, questionnaires and physical examination. The questionnaires applied were Brief Pain Inventory (BPI), Hospital Anxiety and Depression Scale (HADS), Central Sensitisation Inventory (CSI), Roland-Morris Disability (RMD) Questionnaire, StarT Back Screening Tool (STST), Tampa Scale for Kinesiophobia (TKS), Pain Catastrophizing Scale (PCS) and physical evaluation and Time Up and Go (TUG) Test. It was realised a descriptive analyses. **Results:** Data from 1 patients were analysed during 5 months period. 73% were female, with a mean age of 55 years old and 93% with LBP more than 3 months. We found in the BPI a mean of 7.4 (SD: 2.4) in the assessment of the worst pain which shows a high level of pain in the patients, taking into account a scale of to 1. In the HADS a mean of 18.45 (SD: 7.) in both sub-scales, scores above 8 indicate depressive and anxious behaviour, the CSI presented a mean of 47.2 (SD: 17.1) and 65% of the patients with a score higher than 4 points. A mean of disability score on the RMD Questionnaire was 14.1 (SD: 5.39) on a scale ranging from to 24 points where the higher the score the higher the level of disability. In the SBST 47% of the patients presents a high risk, 37% medium risk and 16% a lower risk related to prognosis. A mean of TKS was 48.5 (SD: 7.8), in the PCS mean 34. (SD: 12.3) on a scale ranging from to 52 points where the higher the score the higher the catastrophic behaviour, and in the TUG test we found a mean of 15.8 seconds. **Discussion:** The population evaluated with low back pain was mostly chronic and female, showing high psychological (depressive, kinesiophobic and catastrophic) behaviour in relation to pain, which demonstrates the presence of multidimensional factors presented in patients to low back pain, not only physical dysfunction. The SBST show us that almost half of the population presents a high risk of a poor prognosis, factor that shows the need to better understand and classify these patients with LBP. **Conclusion:** Patients with LBP presented high level of psychosocial characteristics and moderate to high level of function disability.