



The **Belgian Pain Society** is proud to present
the 2nd Young Researchers Day



THE NEXT GENERATION IN PAIN RESEARCH

22nd of April 2023



PROGRAM BOOK





WELCOME FROM THE BELGIAN PAIN SOCIETY

It is my pleasure to welcome you to the second edition of the “Belgian Pain Society - Young Researchers Day”, a multidisciplinary scientific meeting that aims to bring together the many researchers and clinicians in Belgium who are interested in basic or clinical research on pain.

Our primary motivation for organising this event is to provide early-stage researchers and clinicians with a unique opportunity to meet, learn about each other’s research, exchange ideas and interact. Our second motivation is to promote “bench-to-bedside” collaborations between basic researchers and clinicians.

As with the first edition, the Belgian Pain Society has entrusted the scientific organisation of the event to a group of 10 highly-motivated junior (PhD or postdoctoral) researchers and clinicians affiliated to Belgian institutes including Ghent University, Hasselt University, University of Antwerp, University of Liège, Université catholique de Louvain, KULeuven, Vrije Universiteit Brussel, AZ Sint-Lucas, UZ Leuven, UZ Gent and Ziekenhuis Oost-Limburg. This scientific committee designed the meeting format, organised the call for abstracts, and prepared the scientific program, with the aim of fostering interdisciplinary interactions.

The Young Researchers Day will conclude with a multidisciplinary debate on the place of quantitative sensory testing in research and clinical practice. We hope and expect that the diverse perspectives on this topic will spark lively discussions.

On behalf of the Belgian Pain Society, I would like to express my sincere gratitude to the organising committee for their hard work and dedication, as well as to Prof. Jessica Van Oosterwijck for hosting us today at Ghent University.

I wish all attendees a stimulating and enriching day.

Prof. dr. André Mouraux

President of the Belgian Pain Society





WELCOME TO GHENT UNIVERSITY

Ghent University is delighted to host the Young Researchers Day of the Belgian Pain Society. Our vision on learning and education refers to the credo Dare to Think. After all, Ghent University wants to educate those who stand with both feet in reality and dare to venture outside the box. Ghent University encourages this through multiperspectivism, the ability to perceive oneself through someone else's eyes. Research is the driving force of Ghent University. Boundaries are pushed. Researchers make discoveries that have an impact on society at large. Moreover, the research breathes new life into education and establishes the basis for a forward-looking knowledge society.

Being a pain researcher myself, I am proud to host this inspiring meeting at Ghent University. I want to express my gratitude to the Doctoral Schools of Life Sciences and Medicine from Ghent University who with the support of the Flemish Government provided the beautiful and historical facilities in which this researchers day is held. In name of the organising committee I would also like to thank the FNRS doctoral school of neuroscience for their support, and Grunenthal for sponsoring the awards.

Whether you are attending this day as a participant to present and discuss your own research or as a delegate to discover novelties in pain research, my challenge to you is Dare to Think!

Prof. dr. Jessica Van Oosterwijck

Host from Ghent University

DOCTORAL SCHOOLS



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THE BELGIAN PAIN SOCIETY

Mission

The Belgian Pain Society, Belgian chapter of the International Association for the Study of Pain (IASP, <http://www.iasp-pain.org>), is a multidisciplinary scientific association which assembles the medical profession and non-medical professionals involved in chronic and acute pain. The goals of our association is to support the education for the treatment of pain, stimulate the pain research, encourage the treatment of a patient by creating a network that is adapted for the correct treatment and participate in the application of public health care.

Membership

The BPS is a multidisciplinary association which includes doctors, nurses, psychologists, occupational therapists, physiotherapists, dentists, social workers ... As a scientific association, the missions of the BPS are to support training in assessment and pain treatment, stimulate research in this area, encourage patient treatment and participate in the implementation of health care policy. Your contribution will help support the implementation of these objectives.

Membership benefits:

- Reduced rate for the BPS Annual Scientific Congress on Saturday 3rd June 2023.
- FREE access to the 'online' European Journal of Pain (European Pain Federation).
- The possibility of being part of the European Pain Federation EFIC, of which BPS is the Belgian chapter, and of applying for support to participate in a Pain School.
- The possibility of creating, or being a member of, a Special Interest Group (SIG) or a Professional Interest Group (PIG) in accordance with the statutes.
- Access to the part of our website reserved exclusively for members + forum for SIG/PIG.
- Regular transmission, electronically, of all information in the area of pain that reaches us. Interesting ideas and articles can be sent to info@belgianpainsociety.org

Membership fee 2023:

- You pay EUR 45 membership fee per year as psychologist, nurse, physiotherapist, medical doctor in training, PhD student.
- You pay EUR 90 membership fee per year as a medical doctor, medical specialist.
- You pay EUR 35 membership fee per year as a retired medical doctor.

To renew your membership status for **2023**, you must pay the amount corresponding to your income, to the **IBAN BE89 3101 6231 0085** account of the Belgian Pain Society, mentioning your name, address, e-mail address and "**2023-membership**".





BPS Congress 2023

Translating pain knowledge into integrative pain care

Bluepoint Conference Centre Brussels, 03-06-2023, 09:00-16:00

Plenary presentations (with simultaneous translations Dutch ↔ French)(*)

- ICD-11 as a communication tool for improved integrated pain management, O. Van Haute (Brussels)*
- Nutrition, the gut-brain axis and pain, I. Coppieters and L. Van Oudenhove (Leuven)*
- Pain and sleep: how to negotiate?, H. Bastuji (France)*
- Not a passive experience. The role of cognition in pain perception, D. Torta (Leuven)
English
- Updates and trends in non invasive neuromodulation for pain relief: when evidence meets the person in pain, D. Ciampi de Andrade (Denmark)*

Workshops (when registering online, you can select 1 or 2 workshops)

Each workshop lasts 1 hour and will be presented in Dutch/French.

- Workshop 1: Mindfulness and hypnosis in chronic pain, A. Bicego (Liège)
- Workshop 2: "Fear and anxiety: it's all in the mind"; How to use new technology for calming children?, N. Bogaerts (Roselare), R. Verbrugge and C. Verpoort (Brugge)

Accreditation has been requested for medical doctors and physiotherapists.





ORGANISING COMMITTEE

André Mouraux (representative from the **Belgian Pain Society**)

Conny Goethals (representative from the **Belgian Pain Society**)

Jessica Van Oosterwiick (host from **Ghent University**)

Associate Professor at Ghent University - Department of Rehabilitation Sciences. Representative from the host institution Ghent University.

Research interests: central nervous system mechanisms of pain and fatigue, exercise pathophysiology, pain-motor interactions, pain-stress interactions and rehabilitation in healthy people and in chronic pain populations.



Junior researchers and clinicians from the organising committee

Elise Cnockaert

Physiotherapist at the Pain Center AZ Sint-Lucas Gent, and PhD researcher at Ghent University – Department of Rehabilitation Sciences and Physiotherapy.

Research Interest: Chronic pain, multimodal interdisciplinary pain treatment, nociplastic pain, central sensitization.



Thomas Matheve

Visiting Professor at Spine, Head and Pain Research Unit, Ghent University; Postdoc at Faculty of Rehabilitation Sciences, Hasselt University.

Research interests: low back pain, sensorimotor control, influence of pain-related psychological factors on movement behaviour



Emma Rheel

Postdoctoral researcher from the Pain in Motion (PAIN) research group at the Department of Physiotherapy, Human Physiology and Anatomy, Vrije Universiteit Brussel.

Research interest: pain science education, parental responses, pain memories, pain in children, childhood cancer.





Thibault Vanneste

Anesthesiologist/Pain physician at Ziekenhuis Oost-Limburg Genk and MUMC+ Maastricht, and PhD researcher at Maastricht University.

Research interests: pain in knee osteoarthritis, persistent post-surgical pain after total knee arthroplasty, radiofrequency treatment for chronic pain.



Anthe Foubert

PhD researcher at the University of Antwerp - Department of Rehabilitation Sciences and Physiotherapy and UCLouvain - Faculty of Motor Skills Sciences.

Research interest: the biopsychosocial assessment of joint pain in people with haemophilia.



Aminata Bicego

Neuropsychologist and postdoctoral researcher at the Sensation and Perception Research Group - GIGA Consciousness - University of Liège.

Research interest: consciousness, non-ordinary states of consciousness self-induced (e.g. hypnosis, trance) and pharmacologically induced (i.e., psychedelics), and pain.



Lore Dams

Postdoctoral researcher at the Department of Rehabilitation Sciences and Physiotherapy, University of Antwerp and Physiotherapist oncological rehabilitation UZ Leuven, campus Gasthuisberg.

Research interest: cancer-treatment) induced pain and neuropathies, pain science education, physical activity during and after oncological treatment.



Delia Della Porta

PhD researcher at the Institute of Neuroscience of the UCLouvain.

Research interest: Central sensitization, secondary hyperalgesia, top-down and bottom-up attentional modulation.



Marlies Colman

PhD researcher and medical doctor at the Center for Medical Genetics at the Ghent University Hospital (department of biomolecular medicine).

Research interest: heritable connective tissue disorders, role of the extracellular matrix in chronic pain, rheumatology





SCIENTIFIC PROGRAM

- 9.30 - 10.00 Registration with welcome coffee and tea
Peristilium
- 10.00 - 10.30 Welcome by the Host institution (Prof. dr. Jessica Van Oosterwijck),
The President of the Belgian Pain Society (Prof. dr. André Mouraux),
the Organising Committee (Dra. Elise Cnockaert)
Ceremoniezaal
- 10.30 - 12.30 Oral presentations
Parallel Oral Session I - *Ceremoniezaal*
Parallel Oral Session II - *Academieraadzaal*
- 12.30 - 13.15 Lunch and Coffee + Poster viewing (optional)
Peristilium
- 13.15 - 14.00 Networking event
Peristilium
- 14.00 - 14.50 Poster presentations (parallel poster walks)
- 14.55 - 16.05 Multidisciplinary hot topic debate: Quantitative sensory testing, what's in a name? (Moderator: Dra. Elise Cnockaert)
Ceremoniezaal
- 14.55-15.05 Introduction + Voting explanation
- 15.05-15.20 Keynote presentation 1: Quantitative sensory testing from a research perspective. Dr. Evy Dhondt (Ghent University)
- 15.20-15.35 Keynote presentation 2: Alternative pain measurements for QST in clinical practice: do's and don'ts.
Drs. Vincent Haenen (KULeuven - University of Antwerp)
- 15.35-16.05 Debate with the keynote speakers
- 16.05 - 16.30 Closing and awards ceremony (Dra. Elise Cnockaert and Dr. Lore Dams)
Ceremoniezaal



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SCIENTIFIC PROGRAM

	Parallel Oral Session I - Ceremoniezaal Moderator: Dr. Emma Rheel	Parallel Oral Session II - Academieraadzaal Moderator: Dr. Lore Dams
10.30	O1: Interhemispheric asymmetry of visual evoked potentials underlies crossmodal interaction between nociception and vision (<i>Monika Halicka</i>)	O8: Conventional compared to cooled radiofrequency ablation of the genicular nerves for chronic knee pain: the 12-month results of the COCOGEN trial (<i>Amy Belba</i>)
10.47	O2: Virtual Reality Hypnosis reduces neural and subjective pain perceptions (<i>Panda Rajanikant</i>)	O9: Low load and high load exercise improve paraspinal muscle morphology, disability and pain in people with low back pain: a systematic review with meta-analysis (<i>Sofie Dierckx</i>)
11.04	O3: Cytokine expression in cancer survivors suffering from chronic pain: A systematic review (<i>Amber De Groot</i>)	O10: The effect of perceived injustice targeted pain neuroscience education among breast cancer survivors: a protocol for a randomized controlled trial (<i>Eva Roose</i>)
11.21	O4: [Preliminary results] Early prognostic factors in complex regional pain syndrome: a 1-year Belgian prospective longitudinal observational study (NCT05337501) (<i>Marc-Henri Louis</i>)	O11: Employees and healthcare professionals' experiences and perspectives on the secondary back pain prevention program in Belgium (<i>Lisa Bernaers</i>)
11.38	O5: Sleep characteristics in people with chronic spinal pain and comorbid insomnia: a cross-sectional study (<i>Thomas Bilterys</i>)	O12: Multimodal patient-centered teleprehabilitation for women with breast cancer: a protocol for a feasibility study (<i>Kenza Mostaqim</i>)
11.55	O6: Pain cognitions, Sex, Pain Pressure Thresholds, and Pain Intensity as Mediators of Disability and Quality of Life in People with Chronic Musculoskeletal Spinal Pain (<i>Wouter Van Bogaert</i>)	O13: The effectiveness of paramedical interventions or rehabilitation programmes to improve work participation in patients with chronic spinal pain after spinal surgery: a systematic review (<i>Jonas Callens</i>)
12.12	O7: Footwear and Exercise for Knee Osteoarthritis (FiREwORK Trial) (<i>Paolo Dainese</i>)	O14: An interdisciplinary multimodal integrative healthcare program for somatic symptom disorder with predominant (spinal) pain (<i>Jaap Wijnen</i>)





SCIENTIFIC PROGRAM

	Poster Walk A		Poster Walk B		Poster Walk C		Poster Walk D	
	Moderator: Drs. Thibaut Vanneste		Moderator: Dr. Aminata Bicego		Moderator: Dra. Anthe Foubert		Moderator: Dra. Delia Dela Porta	
14.00	P1	Continuum of somatosensory profiles in breast cancer survivors with and without pain, compared to healthy controls and patients with fibromyalgia (Vincent Haenen)	P7	Clinical Examination of Lumbopelvic Sensorimotor Control in Low Back Pain: Is It Actually Valid? A Systematic Review (Michiel Brandt)	P13	Hypnosis, mindful self-compassion meditation, and self-induced cognitive trance to improve pain in post-treatment patients with cancer (Charlotte Grégoire)	P19	The exploration-exploitation dilemma in pain (Maryna Alves)
14.06	P2	Autonomic nervous system dysfunctions in patients with stress-related and functional syndromes vs. healthy controls (Indra Ramakers)	P8	The effects of exercise therapy on lumbar muscle structure in low back pain: a systematic review and meta-analysis (Hannes Meirezonne)	P14	The effects of motivational interviewing among cancer patients and cancer survivors: a protocol for a systematic review (Alexander Hendrickx)	P20	Multisensory interactions between nociception and vision through the looking glass (Avgustina Kuzminova)
14.12	P3	A Systematic Review on Proprioception in Patients with Fibromyalgia and Chronic Fatigue Syndrome (Stef Feijen)	P9	Are pain-related psychological variables associated with postural control in individuals with low back pain? A systematic review and meta-analysis (Sofie Van Wesemael)	P15	The Biology of Stress Intolerance in Patients with Chronic Pain – State of the Art and Future Directions (Arne Wyns)	P21	The influence of cognitive processes on the efficacy of conditioned pain modulation: an experimental study (Emilyn Dierickx)
14.18	P4	Brain functional connectivity and turbulent dynamics increases by hypnosis induction in healthy individual and patients with fibromyalgia (Felipe Paiva)	P10	Bio-psycho-social rehabilitation in chronic low back pain, what does that imply? A concept analysis (Dries Ceulemans)	P16	Ultrasound assessment of structural and mechanical properties of soft tissues at the upper limb region in women after breast cancer treatment: reliability and validity study (Kaat Verbeelen)	P22	TRPA1 and CGRP: another species difference? (Dorien Bamps)
14.24	P5	Investigating the effect of negative expectations on pain and secondary hyperalgesia (Solenn Gousset)	P11	Exploration of somatosensory function of patients with acute non-specific neck pain, through Quantitative Sensory Testing and self-reported symptoms (Jente Bontinck)	P17	The effect of psychologically informed practice with behavioural graded activity in cancer survivors: systematic review and meta-analysis (Astrid Lahousse)	P23	Investigating the relationship between the modulation of pain-related ongoing oscillations and changes in pain perception induced by an arithmetic task (Chiara Leu)
14.30	P6	Effects of test modality and testing site on exercise-induced hypoalgesia in healthy human males: A protocol (Vladimir Aron)	P12	The prevalence of perceived injustice and factors associated with perceived injustice in people with pain: a systematic review with meta-analysis (Eva Roose)	P18	Identifying prognostic variables for persistent upper limb dysfunctions after breast cancer treatment: protocol of a longitudinal cohort study (Nieke Vets)	P24	Self-induced cognitive trance reduces subjective pain perception in healthy volunteers (Nolwenn Marie)





INTERHEMISPHERIC ASYMMETRY OF VISUAL EVOKED POTENTIALS UNDERLIES CROSSMODAL INTERACTION BETWEEN NOCICEPTION AND VISION

Halicka Monika^{1*}, Kuzminova Avgustina¹, Legrain Valéry²

1. Université catholique de Louvain, Institute of Neuroscience
2. Université catholique de Louvain, Institute of Neuroscience & Psychological Sciences Research Institute

Background and Aims: Behavioural studies repeatedly evidenced that nociceptive stimuli affect the perception of external visual information near the stimulated body part. We investigated neurophysiological mechanisms of such crossmodal interaction between nociception and vision. We hypothesised that nociceptive stimuli could influence cortical visual pathways, and more specifically the interhemispheric asymmetry of brain responses to lateralised visual stimuli.

Methods: 28 healthy participants made temporal order judgements (TOJs) on pairs of light flashes presented one in either side of space with different onset asynchronies. They were shortly preceded by an electrical nociceptive stimulus randomly delivered to the left or right hand. We compared the amplitude of event-related potentials (ERPs) to simultaneous bilateral visual stimuli between the two hemispheres.

Results: TOJs were significantly biased towards perceiving the light on the side of the nociceptive stimulus as having flashed earlier than the light on the opposite side. Mean amplitude of the visual ERPs was significantly larger over the hemisphere contralateral to the side of the nociceptive stimulus, relative to the ipsilateral hemisphere, mostly over parietal-occipital area at 120-200 msec after bilateral lights' onset. Greater behavioural TOJ bias correlated with greater interhemispheric asymmetry of the visual ERPs.

Conclusions: This data shows that nociceptive stimuli can boost cortical processing of visual stimuli at a relatively early latency in extra-striate areas, possibly acting on the visual dorsal stream. This effect is thought to index cortical mechanisms by which one's attention is automatically drawn towards the portion of visual space surrounding the body part that receives nociceptive input.

Funding bodies which supported the submitted research: MH, AK, and VL are supported by the Fund for Scientific Research of the French-speaking Community of Belgium (F.R.S.-FNRS).





VIRTUAL REALITY HYPNOSIS REDUCES NEURAL AND SUBJECTIVE PAIN PERCEPTIONS

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2. Oncomfort SA, Wavre, Belgium
3. CERVO Brain Research Center, University of Laval, Québec, Canada
4. Coma Science Group, GIGA Consciousness, University of Liège, Liège
5. Algology Interdisciplinary Center, University Hospital of Liège, Liège, Belgium

Background and Aims: Virtual Reality Hypnosis (VRH) has aroused the curiosity of researchers and clinicians as it is a new promising tool to modulate pain perception. The aim of this study is to assess the effects of VRH on pain-modulation, anxiety, and phenomenological variables.

Methods: Forty-two healthy participants (26.5 ± 4.31 yo; 25 women) received 60 electrical-painful stimulations to the foot ($n=20$) or shoulder ($n=22$), during ordinary consciousness (OC, eyes open) and VRH conditions (Aqua©, Oncomfort, following a whale in an underwater world). Visual Analogue Scales (VAS) on pain intensity and unpleasantness, dissociation, absorption and an open-ended question on time perception were asked after each condition. The level of anxiety was assessed before and after each condition (VAS). High-density EEG (256-electrodes, EGI-Geodesics) was also recorded. Repeated measures ANOVAs were performed for behavioral data. Event related potentials (ERPs) following painful stimulations were measured at the individual and group (shoulder and foot) levels for both conditions using cluster based non-parametric test ($p < 0.05$).

Results: Pain intensity and unpleasantness, anxiety (post condition) and time perception were reduced in VRH compared to OC. Dissociation and absorption were higher in VRH compared to OC. No significant group effect (foot vs. shoulder) was found. Regarding pain-related ERPs, lower amplitudes at frontal (P100, N200), central and posterior (N100, P200) electrodes were observed during VRH compared to OC in both groups.

Conclusions: VRH decreases pain perception both behaviorally and electrophysiologically. These results suggest that VRH is an effective approach to reduce experimental pain and pave the way for clinical applications of VRH.

Funding bodies which supported the submitted research: University and University Hospital of Liege, the Benoit Foundation (Brussels, Belgium), the Non-Fria Grant (Liege, Belgium), the Belgian National Funds for Scientific Research (FRS-FNRS), the European Union's Horizon 2020 Framework Programme for Research and Innovation under the Specific Grant Agreement No. 945539 (Human Brain Project SGA3), the BIAL Foundation, the fund Generet of the King Baudouin Foundation and AstraZeneca Foundation. OG is a research associate and SL is a research director at FRS-FNRS.





CYTOKINE EXPRESSION IN CANCER SURVIVORS SUFFERING FROM CHRONIC PAIN: A SYSTEMATIC REVIEW

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6. Lab Protein Chemistry, Proteomics & Epigenetic Signaling (PPES), Department of Biomedical Sciences, University of Antwerp, Wilrijk, Belgium
7. Molecular Pathology Group, laboratory of Cell Biology & Histology, Faculty of Medicine and Health Sciences, University of Antwerp, Wilrijk, Belgium
8. Translational Neurosciences, Faculty of Medicine and Health Sciences, University of Antwerp, Wilrijk, Belgium
9. Research Group Rehabilitation in Internal Disorders (GRID), Department of Rehabilitation Sciences, KU Leuven, University of Leuven, Leuven, Belgium
10. Department of Rehabilitation Sciences, Faculty of Medicine and Health Sciences, Ghent University, Ghent, Belgium

Background and Aims: Chronic cancer-related pain remains underdiagnosed and undertreated although it affects 40% of cancer survivors. Recent insights suggest that cytokine signaling between immune, neuro, and glial cells contributes to chronic pain. Therefore, this study systematically reviewed cytokine levels and their relation to chronic cancer-related pain and investigated differences in cytokine levels between cancer survivors with and without chronic pain.

Methods: The study conducted a systematic literature search in the databases PubMed, Web Of Science, and Embase for articles examining cytokine levels and pain experience at a time point of minimum three months post-cancer diagnosis. Pain experience was categorized into a total pain score, pain intensity, and pain interference.

Results: Eight articles were included, investigating six cancer types and 30 cytokines. Moderate evidence was found for pro-inflammatory cytokine IL-6 to be correlated with pain intensity of which higher levels are observed in cancer survivors experiencing chronic pain compared to pain-free survivors. Moderate evidence was found for TNF- α to be not correlated with any pain experience and for anti-inflammatory cytokines IL-8 and IL-10 with pain intensity. For the remaining 26 cytokines and pain outcomes, only limited evidence was found for an association.

Conclusions: More standardized post-cancer treatment studies are warranted to confirm these results and explore associations with other cytokines. Nonetheless, moderate evidence suggests that elevated levels of IL-6, in contrast with TNF- α levels, are correlated with pain intensity in cancer survivors experiencing chronic pain compared to pain-free survivors.

Funding bodies which supported the submitted research: This work was supported by The Research Foundation – Flanders (FWO), Grant Number: G042221N





[PRELIMINARY RESULTS] EARLY PROGNOSTIC FACTORS IN COMPLEX REGIONAL PAIN SYNDROME: A 1-YEAR BELGIAN PROSPECTIVE LONGITUDINAL OBSERVATIONAL STUDY (NCT05337501)

Louis Marc-Henri¹, Legrain Valéry¹, Filbrich Lieve¹, Halicka Monika¹, Berquin Anne²

1. Institute of Neuroscience, UCLouvain
2. Department of physical medicine and rehabilitation, Cliniques Universitaires Saint-Luc

Background and Aims: Complex regional pain syndrome (CRPS) is a still poorly understood condition. Some risk factors have been associated with its incidence but little is known about its (early) prognostic factors and how they influence the long-term outcomes. The aim of this study is to examine the role of biopsychosocial factors in the development of persistent CRPS.

Methods: Early CRPS patients (< 6 months from the onset of the condition) are included in a prospective longitudinal observational study and assessed at 4 time points during 1 year (as soon as possible, 4.5, 6 and 12months). Each session includes anamnesis, clinical examination, quantitative sensory testing, visuospatial attentional abilities and questionnaires covering the entire biopsychosocial model. The primary endpoint is the disability.

Results: recruitment is ongoing (53 patients included); the following results are the inclusion characteristics of the cohort. The cohort is predominantly female (72.9%) with a mean age of 54 years. 67% worked before the condition onset, only ¼ of them have returned to work. The mean CRPS duration is 83 days while mean CRPS severity score is 12. Function and quality of life are impaired. Mean pain severity is rated at 4.7/10, pain interference is 5.4/10. Participants present pain-related fear. On average, they do not report anxiety or depressive disorders (mean HADS<11). Visuospatial biases are observed mostly in patients with lower limb.

Conclusions: The results of this study will investigate which of these biopsychosocial factors predict long-term outcomes in CRPS. Ultimately, it will allow patients to be stratified according to their risk of chronification.

Funding bodies which supported the submitted research: Marc-Henri Louis is funded by Fondation Saint-Luc (grant number : 326E).





SLEEP CHARACTERISTICS IN PEOPLE WITH CHRONIC SPINAL PAIN AND COMORBID INSOMNIA: A CROSS-SECTIONAL STUDY

Bilteyrs Thomas¹, Van Looveren Eveline², Malfliet Anneleen¹, Nijs Jo¹, Meeus Mira², Danneels Lieven², Ickmans Kelly¹, Cagnie Barbara², Goubert Dorien², Moens Maarten², De Baets Liesbeth¹, Munneke Wouter¹, Mairesse Olivier¹

1. Vrije Universiteit Brussel, Department of Physiotherapy, Human Physiology and Anatomy
2. Ghent University, Department of Rehabilitation Sciences

Background and Aims: Sleep problems are very prevalent in people with chronic spinal pain (CSP) and often lead to higher health care cost, increased disability and lower quality of life. Furthermore, they present an additional challenge in the management of chronic pain. A better understanding of sleep disturbances in chronic pain patients could potentially improve chronic pain management. This study aimed to obtain insight in the sleep characteristics of people with CSP by examining objective and subjective sleep parameters.

Methods: The sleep outcomes were assessed through self-report, actigraphy and polysomnography. Pearson correlations, t-tests, and Bland-Altman plots were used to investigate the association, differences, and agreement between objective and subjective sleep outcomes.

Results: In general, participants (n=123) overestimated sleep onset latency (SOL) (MD=13.76 [8.33, 19.20], $p < 0.001$) and underestimated their total sleep time (TST) (Mean Difference [MD]=-52.37 [-67.94, -36.81], $p < 0.001$). No clear agreement between subjective and objective sleep measures was identified.

Conclusions: Our results (on group level) suggest that there is a discrepancy between subjective and objective sleep outcomes in people with CSP and comorbid insomnia. Overall, CSP patients seem to underestimate TST and overestimate SOL. Despite the significant discrepancy on group level, caution is warranted given the large inter-individual variations.

Funding bodies which supported the submitted research: This study was funded by the Research Foundation Flanders - the Applied Biomedical Research (FWO-TBM).





PAIN COGNITIONS, SEX, PAIN PRESSURE THRESHOLDS, AND PAIN INTENSITY AS MEDIATORS OF DISABILITY AND QUALITY OF LIFE IN PEOPLE WITH CHRONIC MUSCULOSKELETAL SPINAL PAIN

Van Bogaert Wouter¹, Liew Bernard X.W.², Fernández-de-las-Peñas César³, Valera-Calero Juan A.⁴, Varol Umut⁴, Coppieters Iris¹, Kregel Jeroen⁵, Nijs Jo¹, Meeus Mira⁶, Cagnie Barbara⁵, Danneels Lieven⁵, Malfliet Anneleen¹

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4. Department of Physiotherapy, Camilo Jose Cela University
5. Department of Rehabilitation Sciences and Physiotherapy, Ghent University
6. Department of Rehabilitation Sciences and Physiotherapy (MOVANT), University of Antwerp

Background and Aims: Nonspecific chronic spinal pain (CSP) is a prevalent worldwide condition with a substantial individual and socio-economic burden. In people with CSP, disability and quality of life are associated with clinical, cognitive, psychophysical, and demographic variables. However, the interactions between these variables have yet to be investigated in this population. Therefore, this study aims to explore path models explaining the multivariate contributions of such variables to disability and quality of life in people with CSP.

Methods: This secondary analysis uses baseline data from a randomized controlled trial including 120 participants with CSP. Structural equation modelling was used to explore path models for the Pain Disability Index (PDI), the physical (SF-36 PC), and the mental (SF-36 MC) component scores of the Short Form 36-item health survey. All models included sex, pain cognitions (i.e., pain catastrophizing, kinesiophobia, hypervigilance), and pain intensity. Additionally, the PDI and SF-36 PC models included pressure pain thresholds at the dominant pain site (i.e., neck or low back).

Results: Though analyses are ongoing, the final results are expected to be available during the congress.

Conclusions: We hypothesize that (1) pain cognitions explain the differential effect of sex on pressure pain thresholds; (2) pressure pain thresholds explain the differential effect of sex and pain cognitions on pain intensity; and (3) pain intensity explains the effect of pain cognitions on the PDI, SF-36 PC, and SF-36 MC. Findings will provide novel insight into the interactions between these factors associated with disability and quality of life in people with CSP.

Funding bodies which supported the submitted research: This work was supported by the Agency for Innovation by Science and Technology (IWT)–Applied Biomedical Research Program (TBM), Belgium (grantNo. 130246).





FOOTWEAR AND EXERCISE FOR KNEE OSTEOARTHRITIS (FIREWORK TRIAL)

Dainese Paolo¹, Stautemas Jan¹, De Mits Sophie^{2,3}, Wittoek Ruth^{2,4}, Van Ginckel Ans¹, Huysse Wouter⁵, De Meyer Helee^{1,6,7}, Mahieu Hanne¹, Calders Patrick¹

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Background and Aims: Guidelines recommend exercise and "appropriate" footwear for knee osteoarthritis (OA) self-management. Uncertainty exists on the ideal footwear. This randomized controlled trial (RCT) aimed to assess whether adding daily use of flat flexible shoes (FFF) to an exercise programme improved short- and long-term outcomes compared to stable supportive shoes (SSS) in patients with medial knee OA.

Methods: Participants (n=97) with medial knee OA were randomly assigned to FFF (n = 50) or SSS (n = 47) group. Both groups received the same intervention (shoes & exercise) for 9 months. The primary outcome was change (baseline to 3 months) in knee pain on walking measured using a 11-point numeric rating scale (NRS). Secondary outcomes included change from baseline to 3- and 9-months in severity of knee pain overall, physical function, habitual physical activity level, quality of life (QoL) and inflammatory parameters.

Results: Both groups experienced a reduction in knee pain during walking after 3 months. There were no significant differences between the groups in the change in pain on walking (between-group difference, -0.67 [95% CI, -1.62 to 0.29]). Severity of knee pain overall significantly decreased in both groups at 3-months and at 9-months. Physical function and QoL improved in both groups at 3-months and at 9-months. We found no between-group differences in change in any secondary outcome at any time.

Conclusions: Flat flexible footwear did not provide additional benefit compared to conventional stable supportive shoes.

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CONVENTIONAL COMPARED TO COOLED RADIOFREQUENCY ABLATION OF THE GENICULAR NERVES FOR CHRONIC KNEE PAIN: THE 12-MONTH RESULTS OF THE COCOGEN TRIAL

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Background and Aims: Knee osteoarthritis (OA) and persistent pain after total knee arthroplasty (PPSP) are two important causes of chronic knee pain. Radiofrequency ablation (RF) of the genicular nerves is an effective treatment thereof, however it is unknown which RF modality is most effective. In this abstract we present the 12 months results of the COCOGEN trial.

Methods: COCOGEN is a double-blind pilot randomized control trial. Patients were 1:1 randomized to cooled and conventional RF after stratification into OA and PPSP. The primary outcome was the proportion of patients with $\geq 50\%$ pain reduction in Numeric Rating scale (NRS) at 3 months. Secondary outcomes were NRS, functionality, emotional health, cost-effectiveness and adverse events up to 12 months.

Results: Forty of the 49 included patients were analyzed at 12 months after treatment. Pain reduction of $\geq 50\%$ was achieved in 4/18 patients (22,2%) after conventional RF and 5/22 patients (22,7%) after cooled RF. The mean NRS score at 12 months was 5.6 (± 3.1) and 4.7 (± 2.2), the mean pain reduction was -0.78 (± 3.0) and -1.38 (± 2.5) after conventional and cooled RF respectively. This value was statistically significant ($p = 0.018$) only in the cooled RF group. The mean pain reduction was not significantly different between cooled and conventional RF.

Conclusions: Conventional and cooled RF resulted in lower pain scores at 12 months after intervention. Due to low statistical power, this pilot trial could not identify statistically different reductions in pain between cooled and conventional RF. Larger powered trials are required.

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LOW LOAD AND HIGH LOAD EXERCISE IMPROVE PARASPINAL MUSCLE MORPHOLOGY, DISABILITY AND PAIN IN PEOPLE WITH LOW BACK PAIN: A SYSTEMATIC REVIEW WITH META-ANALYSIS

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Background and Aims: Low back pain (LBP) is highly prevalent and the largest cause for years lived with disability worldwide. Mostly, exercise therapy is advised as non-invasive treatment, however, it remains unclear which type of exercise therapy is most beneficial. Therefore, this study investigated the effect of low- and high load exercise on paraspinal muscle morphology, pain and disability in people with LBP.

Methods: Seven online databases were searched from inception to August 2022. Randomized controlled trials, including people with non-specific, chronic LBP (> 3 months) and exercise interventions (> 4 weeks) were included. Random effects meta-analyses, with standardized mean differences and 95% confidence intervals of pre-post outcomes were performed.

Results: A total of 23 studies out of 3981 articles were retained for analysis, showing that both low- and high load exercise can improve multifidus thickness with small to medium effect size (0.44 [0.32 to 0.56]; 0.38 [0.10 to 0.66]). Similarly, low and high load exercise show large improvements for pain (-3.07 [-3.97, -2.16]; -3.06 [-4.20, -1.91]) and disability (-2.41 [-3.44, -1.39]; -3.53 [-5.14, -1.91]). Subgroup analysis revealed a quantitative interaction, where longer duration of high load training could potentially improve disability more in people with LBP.

Conclusions: Both low- and high load exercise can improve muscle morphology, pain and disability in people with LBP. However, longer duration high load exercise might be more effective to reduce disability. Perhaps therapists should focus on providing functional, patient-tailored exercises to increase adherence to exercise programs.

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THE EFFECT OF PERCEIVED INJUSTICE TARGETED PAIN NEUROSCIENCE EDUCATION AMONG BREAST CANCER SURVIVORS: A PROTOCOL FOR A RANDOMIZED CONTROLLED TRIAL

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Background and Aims: Twenty-two percent of breast cancer survivors with pain are experiencing perceived injustice. Perceived injustice predicts adverse pain outcomes and opioid prescription due to increased pain behaviour. Educational interventions including reassurance and encouragement towards activity re-engagement are suggested to target perceived injustice. Current treatments for pain in survivors are rather biomedically focused instead of biopsychosocial driven. This trial aims thus to reduce pain in breast cancer survivors by focusing on injustice.

Methods: Female breast cancer survivors (n=156) experiencing pain and perceived injustice (≥ 3 months post-oncological treatment) are recruited. Perceived injustice-targeted pain neuroscience education including motivational interviewing is compared with biomedical education. The randomization is done separately for each of the 4 treatment locations. Both interventions include an online session, an information leaflet, and three one-to-one sessions. Online questionnaires assess pain, quality of life, perceived injustice, healthcare costs, sleep, fatigue, and cognitive-emotional factors at baseline and 0-, 6-, 12-, and 24-months post-intervention. A linear mixed model for repeated measures will evaluate whether the groups differ in terms of pain, perceived injustice, opioid use, and quality of life after 12 months.

Results: We expect that perceived injustice-targeted pain neuroscience education is superior to biomedical education at reducing pain, perceived injustice, and opioid use, and improving the quality of life in breast cancer survivors.

Conclusions: This study is the first randomized controlled trial investigating the effectiveness of perceived injustice-targeted pain neuroscience education as a non-pharmacological strategy in a pain population with perceived injustice. This study pioneers interventional research for perceived injustice.

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EMPLOYEES AND HEALTHCARE PROFESSIONALS' EXPERIENCES AND PERSPECTIVES ON THE SECONDARY BACK PAIN AND PREVENTION PROGRAM IN BELGIUM

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Background and Aims: Low back pain (LBP) causes significant work absenteeism and disability. To prevent chronicity and stimulate return to work (RTW), early implementation of a multidisciplinary-based rehabilitation (MBR) program may be beneficial. In Belgium, the Federal Agency for Occupational Risks (FEDRIS) reimburses such MBR program for secondary prevention of LBP for specific categories of employees incapacitated from work due to LBP. This qualitative study explores the experiences and perspectives of employees and healthcare professionals (HCPs) during and after the MBR program to identify potential areas for improvement.

Methods: A multicenter qualitative study using semi-structured focus group interviews was conducted. Data were collected during five focus groups (employees n = 15; HCPs n = 20) and analyzed by two independent researchers using coding reliability and reflexive thematic analysis.

Results: After open, axial, and selective coding, three major themes emerged: (1) outcome, (2) content-related influencing factors, and (3) duration and continuation. Results suggest that the program is generally well-received. It improved ability to RTW, but sustainable RTW is influenced by factors such as employer support and personal factors. The multidisciplinary approach addressing both physical and psychosocial aspects of LBP was seen as valuable. Additionally, the group setting during exercises was consistently considered motivating. Finally, HCPs as well as employees suggested extending the program (currently 36 sessions) to include more follow-up or annual booster sessions.

Conclusions: This study provides insights into the experiences of employees and HCPs in an MBR program and highlights the positive aspects as well as potential points for improvement.

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MULTIDIMODAL PATIENT-CENTERED TELEPREHABILITATION FOR WOMEN WITH BREAST CANCER: A PROTOCOL FOR A FEASIBILITY STUDY

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Background and Aims: Surgery, the cornerstone of most cancer treatments, is associated with considerable postoperative complications. Adjusting patients' health behavior before surgery may have beneficial effects on postoperative outcomes. The objective of this trial is to investigate the feasibility and safety of, and patient satisfaction and adherence with, patient-centered teleprehabilitation in patients undergoing breast cancer (BC) surgery.

Methods: Women (n=50) who will undergo breast surgery because of stage I-III BC are eligible. All participants will receive multimodal patient-centered teleprehabilitation comprising education, exercise therapy, and stress management with the integration of motivational interviewing. Feasibility, participation rate, patient satisfaction, intervention safety, and treatment adherence will be monitored as primary outcomes. Fatigue, pain, quality of life (QoL), physical activity level, perceived injustice, self-efficacy, and healthcare utilization will be assessed by self-reported questionnaires at baseline, 0-, 2-, and 6-months post-intervention.

Results: Proof of concept for using telecommunication and exercise therapy in prehabilitation before BC surgery is available. We expect the proposed intervention to be feasible and effective at reducing fatigue, pain, perceived injustice, and healthcare use, and at improving treatment adherence, QoL, physical activity levels, and self-efficacy. Preliminary results will be available by the time of the presentation.

Conclusions: Research on the effectiveness of BC prehabilitation represents an important knowledge gap. Effective prehabilitation interventions can reduce the long-term symptoms that arise/persist beyond treatment completion, improving patients' QoL. By using telecommunication technologies, socio-economic barriers can be reduced, making care accessible to all.

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THE EFFECTIVENESS OF PARAMEDICAL INTERVENTIONS OR REHABILITATION PROGRAMMES TO IMPROVE WORK PARTICIPATION IN PATIENTS WITH CHRONIC SPINAL PAIN AFTER SPINAL SURGERY: A SYSTEMATIC REVIEW

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Background: Patients with therapy-refractory persistent spinal pain syndrome type II (PSPS-T2) endure increased disability, resulting in substantial loss of employment and consequently lower quality of life and independency. Despite the findings that nonsurgical, nonpharmacological interventions improve socio-economic outcomes in chronic pain conditions, evidence for PSPS-T2 patients is limited. The objective of this systematic review is to investigate paramedical interventions or rehabilitation programmes and their effectiveness to improve work participation for PSPS-T2 patients.

Materials and Methods: A systematic literature review with forward and backward reference searching was performed in four reference databases (PubMed, Scopus, EMBASE & Web of Science) according to the Preferred Reporting Items for Systematic Review and Meta-Analysis guidelines. The review protocol was prospectively registered on PROSPERO (CRD42022346091). Quality and risk-of-bias was assessed using the modified Downs & Black checklist.

Results: The search yielded a total of 984 publications after removing duplicates. Full-text screening of 39 articles resulted in the inclusion of four publications. All included interventions comprised multiple components and included a personalised approach. All four studies reported a positive effect on work participation after back school, self-care and functional restoration programmes. Methodologically, the quality of the included studies was scored as poor.

Conclusions: The use of a personalised rehabilitation approach shows promise to improve work participation within the population of PSPS-T2 patients. However, based on available literature, there is a lack of comprehensive evidence concerning the effectiveness of paramedical interventions or rehabilitation programmes to improve work participation for PSPS-T2 patients.

Funding bodies which supported the submitted research: /



AN INTERDISCIPLINARY MULTIMODAL INTEGRATIVE HEALTHCARE PROGRAM FOR SOMATIC SYMPTOM DISORDER WITH PREDOMINANT (SPINAL) PAIN

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Background and Aims: Although multimodal interventions are generally recommended in patients with long-term somatic symptom disorders (SSD), available evidence is limited. This study evaluated the effectiveness of an outpatient secondary care interdisciplinary multimodal integrative healthcare program for patients suffering from SSD and persistent spinal pain.

Methods: In this observational study, 4453 patients with SDD were prospectively followed during a 20-week integrative healthcare program and subsequent 12-month relapse prevention program. Primary outcome was health-related quality of life (HRQoL), assessed using the RAND-36 (i.e. mental/physical component summary). Secondary outcomes included: 1) symptoms of psychopathology, assessed using the Brief Symptom Inventory (BSI), and 2) subcomponents of HRQoL (i.e. subscales of RAND-36). Mixed linear models were used to examine changes in RAND-36 and BSI scores over four time points: before 20-week intervention (T0), halfway 20-week intervention (T1), end 20-week intervention (T2) and at completion of 12-month relapse prevention program (T3).

Results: Significant improvements were observed from T0 to T2 for the primary variable HRQoL (i.e. mental/physical component summary) and for secondary variables (i.e. scores on BSI/RAND-36 subscales). All improvements were maintained until the end of the relapse prevention program (T3).

Conclusions: This study provides tentative evidence for the effectiveness of an interdisciplinary multimodal integrative intervention in improving HRQoL and reducing symptoms of psychopathology for patients with SDD and persistent spinal pain. Results are to be interpreted with caution, since the study has an observational design without comparator group. Nevertheless, results could be value for clinical practice because of the large group of patients included.

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CONTINUUM OF SOMATOSENSORY PROFILES IN BREAST CANCER SURVIVORS WITH AND WITHOUT PAIN, COMPARED TO HEALTHY CONTROLS AND PATIENTS WITH FIBROMYALGIA

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Background and Aims: The prevalence of persistent pain among breast cancer survivors (BCS) is high and it is unclear what distinguishes those with persistent pain from those without. Research suggests that differences in somatosensory function, evaluated by quantitative sensory testing (QST) may be responsible. This study first aimed to describe the somatosensory profiles in terms of loss and gain in function of BCS with and without persistent pain using reference data from healthy controls. Second, QST parameters of BCS with and without pain were compared with those of healthy controls (i.e., a negative control group) and patients suffering from fibromyalgia (i.e., a positive control group).

Methods: In this study, 128 participants were divided into four equal groups: healthy controls, BCS with persistent pain, BCS without persistent pain, and patients with fibromyalgia. Nine QST parameters were evaluated at the trunk and at a remote location. Somatosensory profiles were determined using z-score transformation of the QST data by using normative data of healthy controls.

Conclusions: Alterations in the peripheral, but not in the central somatosensory nervous system are present in BCS with and without persistent pain when compared to healthy controls and participants with fibromyalgia.

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AUTONOMIC NERVOUS SYSTEM DYSFUNCTIONS IN PATIENTS WITH STRESS-RELATED AND FUNCTIONAL SYNDROMES VS. HEALTHY CONTROLS

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Background and Aims: It is hypothesized that a dysregulated autonomic nervous system (ANS) is an important mechanism underlying stress-related disorders (SRD) and functional syndromes. The aim of our study was to examine the physiology of the ANS by measuring heart rate (HR), skin conductance (SC), and skin temperature (ST) in response to stressors in patients with SRD, fibromyalgia (FM)/chronic fatigue syndrome (CFS), and healthy controls (HC).

Methods: Patients with SRD (n=59), FM/CFS (n=26) and HC (n=30) went through a stress test consisting of a resting phase (120s), the STROOP color word task (120s), a recovery (120s), a mental arithmetic task (120s), a recovery (120s), a stress talk (120s) and a recovery (120s). HR, SC, and ST were monitored continuously during all phases.

Results: Our main findings were that the average HR and SC during rest in patients with FM/CFS and SRD are higher compared to HC, and average HR is higher in FM/CFS compared to SRD. A more blunted stress response and recovery regarding HR was found in all patients compared to HC, while a more exaggerated stress response is found in patients with FM/CFS compared to HC regarding SC. ST could not differentiate between the different groups.

Conclusions: Our results showed indications of a dominance of the sympathetic nervous system in patients compared to HC which was most pronounced in FM/CFS. This suggests the possibility of ANS dysfunctionalities as underlying working mechanisms for SRD and functional syndromes.

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A SYSTEMATIC REVIEW ON PROPRIOCEPTION IN PATIENTS WITH FIBROMYALGIA AND CHRONIC FATIGUE SYNDROME

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Background and aims: Several researchers have evaluated proprioception in fibromyalgia (FM) and chronic fatigue syndrome (CFS) and analysed the differences with healthy controls. However, the level of evidence these studies have yielded has yet to be critically assessed. The purpose of our systematic review was to investigate the published evidence for impairments in proprioception in people with FM and CFS and analyse differences with healthy controls.

Methods: Relevant studies were searched within PubMed, MEDLINE and Web of Science. Eligible trials included case-control studies that compared a defined construct of proprioception between objectively diagnosed patients with FM or CFS and healthy controls. The risk of bias of the included studies was checked using the JBI Critical Appraisal Checklist for Case Control Studies. Certainty of the evidence was assessed using the GRADE approach.

Results: Eight studies (N =798 participants) met the criteria. Proprioception was evaluated based on the participant's performance in estimating static position in space using lower body (n = 3), upper body- (n = 2) or trunk- and cervical related (n = 3) repositioning tasks. Studies consistently reported greater trunk and cervical repositioning errors in women with FM compared to healthy controls (P = < .005).

Conclusions: FM patients showed impairments in trunk- and cervical related proprioception, but not in lower- or upper limb reposition sense. Although the certainty of the evidence was low, evidence suggests trunk-related impairments may be relevant to the frequently reported postural imbalances in this population.

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BRAIN FUNCTIONAL CONNECTIVITY AND TURBULENT DYNAMICS INCREASES BY HYPNOSIS INDUCTION IN HEALTHY INDIVIDUAL AND PATIENTS WITH FIBROMYALGIA

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Background and Aims: Hypnosis is a non-ordinary state of consciousness characterized by a decreased awareness of the environment and modulation of self-awareness. Hypnosis has been shown to be of clinical utility in disorders of chronic pain such as fibromyalgia; however, its underlying neural mechanisms remain unclear.

Method: We studied resting-state functional MRI in ten healthy subjects and 14 patients with fibromyalgia during the eyes-closed ordinary state of consciousness and the hypnotic state. Hypnosis was induced by muscle relaxation and eye fixation, accompanied by suggestions to experience a pleasant auto-biographical memory. To assess brain spatiotemporal complex dynamics, we used data-driven voxel-to-voxel intrinsic connectivity, dynamic functional connectivity, and turbulence approaches. Brain turbulence is based on fluid dynamics; it indicates how well brain networks display nonlinearity and spatiotemporal complexity in the neural dynamics of the information flow cascade.

Results: Our results showed that hypnosis increased intrinsic brain connectivity in occipital regions in both healthy participants and patients with fibromyalgia. However, decreased connectivity in inferior frontal areas was only found in healthy participants. Further assessing the underlying neural structure, we found that mean dynamic functional connectivity and brain turbulence increased during the hypnosis ($p < 0.05$) state in healthy participants and patients with fibromyalgia.

Conclusions: Hypnosis increased brain connectivity and complex spatiotemporal dynamics in healthy individuals, in line with other non-ordinary states of consciousness such as meditation. Our findings suggest that hypnosis strengthens brain network flexibility and could rewire the altered network dynamics in the clinical population, specifically in patients having pain-related and emotion-related deficits such as depression.

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INVESTIGATING THE EFFECT OF NEGATIVE EXPECTATIONS ON PAIN AND SECONDARY HYPERALGESIA

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Background and Aims: The aim was to investigate whether negative expectations of pain could increase experimentally induced secondary hyperalgesia.

Methods: Fifty healthy volunteers were randomly allocated into either a control group or a nocebo group. Participants in the nocebo group were given negative expectations of pain by being told that the patch they were given contained ethanol and capsaicin, which would sensitize their skin to high-frequency stimulation (HFS), while participants in the control group were told that the patch contained only water. Primary outcomes were the length of the area and the magnitude of secondary hyperalgesia.

Results: We found no significant differences in the length or magnitude of the increased pinprick sensitivity induced by HFS in the two groups. Similarly, there were no significant differences in the level of fear, expected pain for HFS and the level of trust regarding the experiment. However, an exploratory analysis revealed that the rating elicited by the first single electrical stimulus delivered after the application of the patch was significantly higher in the nocebo group compared to the control group. Furthermore, a significant correlation was found between the expected pain for HFS and the mean perceived pain intensity across the five trains across all participants.

Conclusions: Negative expectations were successfully induced, but the suggestion was probably not strong enough to affect secondary hyperalgesia. Expected pain for HFS was significantly correlated with the mean perceived pain intensity across the five trains, suggesting that psychological factors may play a role in pain perception, but further research is needed to explore this possibility.

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EFFECTS OF TEST MODALITY AND TESTING SITE ON EXERCISE-INDUCED HYPOALGESIA IN HEALTHY HUMAN MALES: A PROTOCOL

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Background and Aims: A single session of physical exercise can acutely reduce experimental pain—a phenomenon known as exercise-induced hypoalgesia (EIH). There is inconsistency in the literature as to (1) whether EIH differentially impact the perception of different types of nociceptive stimuli (e.g., pressure versus thermal stimuli) and (2) whether exercise selectively modulates pain at exercising body parts, or also involves non-exercising body parts.

We aim to characterize the effects of a single session of aerobic exercise on the sensitivity to stimuli activating skin versus muscle nociceptors, within or outside exercising body parts.

Methods: We will recruit 40 healthy male participants aged 18-30 years. First, we will familiarize them with the sensory assessments and conduct a maximal cycling test. Then, we will assess, in two sessions, the sensitivity to blunt pressure, mechanical pinprick, contact heat and cold, and auditory stimuli before and after a cycling exercise versus a control session. Sensory testing will be performed over the rectus femoris muscle of the dominant leg (local site) and over the flexor muscles of the non-dominant forearm (remote site). EIH will be quantified as the absolute and relative changes in sensitivity to the sensory stimuli before and after exercise.

Conclusions: We hypothesize that EIH will be greater (1) in the exercise than in the control session, (2) at the local site compared with the remote site if local changes in nociceptive sensitivity contribute to EIH, and (3) when blunt pressure stimuli are used if EIH involves specific changes in sensitivity of muscle nociceptors.

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CLINICAL EXAMINATION OF LUMBOPELVIC SENSORIMOTOR CONTROL IN LOW BACK PAIN: IS IT ACTUALLY VALID? A SYSTEMATIC REVIEW

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Background and Aims: Lumbopelvic sensorimotor control (SMC) is often assessed in patients with low back pain (LBP). Our aim was to systematically review the convergent and known-groups validity of clinically assessed lumbopelvic SMC tests in patients with LBP.

Methods: This review was conducted according to the COSMIN guidelines. Electronic databases were searched until March 2023. Studies were included when they evaluated: (1) the relationships between clinically assessed lumbopelvic SMC (i.e., via inspection or palpation) and objectively measured lumbopelvic SMC parameters during either the same test or a different functional task in patients with LBP (i.e., convergent validity); (2) known-groups validity of clinically assessed lumbopelvic SMC tests between patients with LBP and pain-free persons. A modified GRADE quality of evidence (QoE) assessment was performed.

Results: Twelve studies (946 participants) were included. Regarding convergent validity, one test assessing multifidus activation showed sufficient validity, while two tests evaluating transversus abdominis muscle activation showed insufficient validity (low to very low QoE). No study examined the relationships between clinically assessed lumbopelvic SMC tests and objectively measured lumbopelvic SMC parameters during other functional tasks. Regarding known-groups validity, sufficient validity was shown for four out of seven single tests and in three out of four studies examining two different test-clusters. Single tests or test-clusters with sufficient known groups validity all had (very) low QoE, whereas those with insufficient known-groups validity had moderate QoE.

Conclusions: Current evidence for convergent and known-groups validity of clinically assessed lumbopelvic SMC tests in patients with LBP is limited.

Funding bodies which supported the submitted research: /





THE EFFECTS OF EXERCISE THERAPY ON LUMBAR MUSCLE STRUCTURE IN LOW BACK PAIN: A SYSTEMATIC REVIEW AND META-ANALYSIS

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Background and Aims To answer the following questions: (1) What are the effects of exercise therapy on lumbar muscle structure in low back pain (LBP) patients and (2) which type of exercise intervention has the largest effects?

Methods: Six electronic databases were systematically searched. Only randomized controlled trials (RCTs) investigating the effect of exercise therapy on muscle structure in adults with non-specific LBP were included. The RoB 2 tool was used to blindly assess the Risk of bias (RoB), and the RevMan 5 tool was used for the meta-analysis.

Results: In total, 852 articles were retrieved of which 25 RCTs were included. The various exercise interventions applied were classified into 6 groups. When considering the overall effect size per muscle structure outcome, exercise therapy showed significant positive effects on Multifidus (MF) muscle thickness (MT), MF cross-sectional area (CSA), Erector Spinae (ES) CSA and Quadratus Lumborum (QL) CSA. Considering the different intervention groups, significant positive effects were observed for: 1) "Stabilization without cognitive aspect" with moderate effect on MF MT and large effects on MF CSA, ES CSA, and QL CSA, 2) "Core strengthening" with large effects on ES CSA and QL CSA and 3) "Stabilization with cognitive aspect" with small effect on MF MT. There were no significant effects observed for: 4) "Peripheral and/or whole body strengthening", 5) "Mixed therapy" and 6) "Other specific exercises".

Conclusions: Exercise therapy has a positive effect on muscle structure in people with LBP, stabilization exercises without a cognitive aspect take the upper hand in this matter.

Funding bodies which supported the submitted research: /





ARE PAIN-RELATED PSYCHOLOGICAL VARIABLES ASSOCIATED WITH POSTURAL CONTROL IN INDIVIDUALS WITH LOW BACK PAIN? A SYSTEMATIC REVIEW AND META-ANALYSIS

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Background and Aims: Altered postural control can contribute to low back pain (LBP), particularly during challenging postural tasks. Moreover, higher levels of pain-related fear and pain catastrophizing are (weakly) associated with protective spinal movement behaviour in individuals with LBP. However, it remains unknown whether pain-related psychological variables are associated with postural control, measured by center of pressure (CoP) variables, in individuals with LBP.

Methods: A systematic review and meta-analysis was conducted (PROSPERO CRD42021241739). Pubmed, Web of Science and PsycInfo were searched until November 2022. Studies were eligible for inclusion if they measured CoP variables during static bipedal standing and if they reported at least one pain-related psychological variable. Random-effect models were used to calculate pooled correlation coefficients between pain-related psychological variables and CoP variables during different postural tasks with increasing difficulty. An adapted version of the GRADE was used to determine the certainty of evidence.

Results: Sixteen studies (n= 723 participants) were included. Pain-related fear and pain catastrophizing were the only reported pain-related psychological variables. Results indicated that both pain-related fear ($-0.04 < \text{pooled } r < 0.15$) and pain catastrophizing ($0.28 < \text{pooled } r < 0.29$) were weakly associated with CoP variables. For all associations, the certainty of evidence was rated as very low.

Conclusion: In the majority of the findings, higher levels of pain-related psychological variables are weakly associated with an increase in CoP motion and velocity in individuals with LBP, regardless of the postural task difficulty. The certainty of evidence is very low.

Funding bodies which supported the submitted research: /





BIO-PSYCHO-SOCIAL REHABILITATION IN CHRONIC LOW BACK PAIN, WHAT DOES THAT IMPLY? A CONCEPT ANALYSIS

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Background and Aims: Global prevalence of low-back pain is significant and causes increasing disability and health-care costs. Many risk factors have been identified in the past, also in case of chronicity. The role of psychosocial factors may not be underestimated. Biopsychosocial rehabilitation (BPS-R) has proven to be effective in decreasing pain, disability and fostering return-to-work, but there are a lot differences in the way the BPS-R is conceptualized. Therefore a concept analysis was performed aiming to clarify what features should be attributed to BPS-R and to fill this gap through identifying the essential components of BPS-R in the working population suffering from chronic low back pain (CLBP).

Method: The method of Walker and Avant is used. Eight steps were completed: 1) selecting a concept, 2) determining the aims and purposes, 3) identifying the concept definitions and selecting the literature, 4) determining the attributes, 5) identifying a model case, 6) identifying an additional case, 7) identifying the antecedents and consequences and 8) defining the empirical referents.

Results: The main outcome are the 11 attributes found in 45 unique references. Physical activity, psychological support, education, personalization, self-management, functional training, follow-up, golden standard measures, goal-setting, social support and dietary advice are arranged from most to least occurring. Antecedents like motivation, preparedness and a multidisciplinary team are formulated. Consequences include among others less pain, lower sick leave and increased function, work status and increased personalization.

Conclusions: The essential attributes are summarized giving future researchers a solid base to build BPS-R interventions personalized to the patient.

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EXPLORATION OF SOMATOSENSORY FUNCTION OF PATIENTS WITH ACUTE NON-SPECIFIC NECK PAIN, THROUGH QUANTITATIVE SENSORY TESTING AND SELF-REPORTED SYMPTOMS

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Background and aims: Adaptations in somatosensory function characterize several chronic pain conditions, including non-specific neck pain (NNP). Early signs of central sensitization (CS) contribute to pain chronification and poor treatment responses after e.g. whiplash injury and low back pain. Despite this well-established association, the prevalence of CS in patients with acute NNP, and accordingly the potential impact of this association, is still unclear. Therefore, this study aims to investigate whether changes in somatosensory function occur during the acute phase of NNP.

Methods: This cross-sectional study compared 35 patients with acute NNP, with 27 pain-free individuals. All participants completed standardized questionnaires and an extensive multimodal Quantitative Sensory Testing protocol. A secondary comparison was made with 60 patients with chronic WAD, a population wherein CS is well-established.

Results: Compared to pain-free individuals, pressure pain thresholds (PPTs) at remote areas and thermal detection and pain thresholds were unaltered. However, patients with acute NNP showed lower cervical PPTs and conditioned pain modulation, and higher temporal summation, Central Sensitization Index (CSI) scores, and pain intensity. Compared to the group with chronic WAD, PPTs did not differ at any location, yet CSI scores were lower.

Conclusion: Changes in somatosensory function occur already in acute NNP. Local mechanical hyperalgesia demonstrated peripheral sensitization, while enhanced pain facilitation, impaired conditioned pain modulation, and self-reported symptoms of CS suggest adaptations in pain processing already early in the stage of NNP.

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THE PREVALENCE OF PERCEIVED INJUSTICE AND FACTORS ASSOCIATED WITH PERCEIVED INJUSTICE IN PEOPLE WITH PAIN: A SYSTEMATIC REVIEW WITH META-ANALYSIS

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Background and Aims: Perceived injustice (PI) gained interest in pain research since it potentially contributes to the experience and burden of (chronic) pain. This systematic review aimed to determine the prevalence of PI and factors associated with PI in people with pain.

Methods: Three databases were screened for studies with people with pain reporting prevalence rates for PI and/or associations between a factor and PI. Two independent reviewers screened and evaluated the literature and extracted the data. Meta-analyses were carried out, and subgroup analyses were undertaken based on the methodological quality, the type of pain population, and whether the outcome measure was valid or not in case of heterogeneity ($p < 0.05$).

Results: Fifty-four studies were eligible. The prevalence of PI ranged between 23%-77% (I²=99%). Significant associations were found with pain catastrophizing ($rp=0.66$ [0.64]), posttraumatic stress ($rp=0.63$ [0.59,0.67]), anger ($rp=0.59$ [0.49,0.67]), anxiety ($rp=0.59$ [0.52,0.64]), pain acceptance ($rp=-0.59$ [-0.66,-0.49]), depressive symptoms ($rp=0.57$ [0.52,0.60]), kinesiphobia ($rp=0.57$ [0.50,0.64]), academic functioning ($rp=-0.54$ [-0.65,-0.41]), disability ($rp=0.53$ [0.47,0.59]), emotional functioning ($rp=-0.52$ [-0.64,-0.39]), pain interference ($rp=0.49$ [0.35,0.60]), state anger ($rp=0.48$ [0.41,0.54]), mental functioning ($rp=-0.48$ [-0.57,-0.38]), symptoms of central sensitization ($rp=0.47$ [0.39,0.55]), social functioning ($rp=-0.47$ [-0.60,-0.31]), and physical functioning ($rp=-0.43$ [-0.53,-0.33]), pain perceptions ($rp=0.40$ [0.40,0.64]), trait anger ($rp=0.40$ [0.29,0.49]), pain intensity ($rp=0.37$ [0.33,0.42]), and anger inhibition ($rp=0.35$ [0.26,0.43]).

Conclusions: The prevalence of PI was $\geq 33\%$ in 75% of the studies indicating that PI is important to consider in people with pain. There is evidence for the association of PI with psychological-, pain-, and quality of life characteristics in people with pain. The associations of PI with personal, injury, and recovery characteristics were overall not significant or negligible.

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HYPNOSIS, MINDFUL SELF-COMPASSION MEDITATION, AND SELF-INDUCED COGNITIVE TRANCE TO IMPROVE PAIN IN POST-TREATMENT PATIENTS WITH CANCER

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Background and aims: After a cancer, patients can endure several symptoms, such as fatigue, sleep difficulties, emotional distress, and pain. These symptoms reinforce each other. Several interventions have been tested to decrease cancer pain. Among them, mind-body approaches seem to represent a promising option. They also answer the need for non-pharmacological interventions expressed by patients with cancer. In this context, hypnosis has showed its efficacy to decrease pain. Hypnosis is a non-ordinary state of consciousness characterized by an increase of absorption, dissociation, suggestibility, and automaticity. The works done on this technique in the past decades open the way to the study of other non-ordinary states of consciousness such as mindful self-compassion meditation and self-induced cognitive trance. Mindful self-compassion meditation involves specific attentional sets, processes and practices that self-regulate the body and mind. First studies in oncology suggest that this approach can improve quality of life and decrease pain. Self-induced cognitive trance is inherited from traditional Mongolian shamanic practice and is induced through vocalizations and movements. Its potential benefits on quality of life have not been investigated yet.

Methods: Our longitudinal controlled study aims to assess the short- and long-term (up to one year follow-up) impact of three group interventions based on these three non-ordinary states of consciousness on different symptoms presented by patients with cancer, including pain.

Results: Preliminary results will be presented at the conference.

Hypotheses: We expect that pain will decrease and that quality of life will improve after the intervention in the three groups.

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THE EFFECTS OF MOTIVATIONAL INTERVIEWING AMONG CANCER PATIENTS AND CANCER SURVIVORS: A PROTOCOL FOR A SYSTEMATIC REVIEW

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Background and Aims: Cancer remains a significant public health concern and affects more than 18 million individuals worldwide. Modifying health behaviour is a crucial strategy in combating related symptoms. Motivational Interviewing appears to be a promising candidate for achieving this. This systematic review aims to evaluate the effectiveness and utility of Motivational Interviewing techniques in promoting positive health behaviour outcomes among cancer patients and survivors.

Methods: This study will systematically review literature from five medical databases. Inclusion criteria will be applied to screen the articles, and subsequently, selected articles shall be categorized based on specific behavioural outcomes observed. To evaluate the efficacy of the interventions, effect sizes will be computed for each outcome, both pre- and post-intervention, as well as within each group. These effect sizes will then be compared to visualize the effectiveness of the interventions.

Hypotheses and possible implications: It is hypothesised that Motivational Interviewing can effectively target both lifestyle behaviours and psychosocial needs among cancer patients and survivors. However, intervention design must take into consideration the specific cancer type, the phase of care, and the complexity of the targeted behaviour. Furthermore, robust empirical evidence is necessary to evaluate the efficacy of MI for self-management of cancer-related symptoms.

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THE BIOLOGY OF STRESS INTOLERANCE IN PATIENTS WITH CHRONIC PAIN – STATE OF THE ART AND FUTURE DIRECTIONS

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Background: Stress has been consistently linked to negative impacts on physical and mental health. More specifically, patients with chronic pain experience stress intolerance, which is an exacerbation or occurrence of symptoms in response to any type of stress. The pathophysiological mechanisms underlying this phenomenon remain unsolved.

State-of-the-art: In this state-of-the-art paper, we summarised the role of the autonomic nervous system (ANS) and hypothalamus-pituitary-adrenal (HPA) axis, the two major stress response systems, in stress intolerance. We provided insights into such mechanisms based on evidence from clinical studies in both patients with chronic pain, showing dysregulated stress systems, and healthy controls supported by preclinical studies, highlighting the link between these systems and symptoms of stress intolerance. Furthermore, we explored the possible regulating role for (epi)genetic mechanisms influencing the ANS and HPA axis.

Relevance: The link between stress and chronic pain has become an important area of research as it has the potential to inform the development of interventions to improve the quality of life for individuals living with chronic pain. As stress has become a prevalent concern in modern society, understanding the connection between stress, HPA axis, ANS, and chronic health conditions such as chronic pain is crucial to improve public health and well-being.

Funding bodies which supported the submitted research: /





ULTRASOUND ASSESSMENT OF STRUCTURAL AND MECHANICAL PROPERTIES OF SOFT TISSUES AT THE UPPER LIMB REGION IN WOMEN AFTER BREAST CANCER TREATMENT: RELIABILITY AND VALIDITY STUDY

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Background and aims: Breast cancer is the most common cancer among women. Current treatments for breast cancer, such as surgery, radiotherapy, chemotherapy, immunotherapy, and hormone therapy, can lead to upper limb (UL) dysfunction. UL dysfunction is a multifactorial issue with various potential contributing factors including treatment-related risk factors that alter the structural (tissue composition and volume) and mechanical properties (tissue stiffness) of the soft tissue.

Previous assessment methods for these properties were limited in validity, especially for deeper tissues. Ultrasound (US) with shear-wave elastography (SWE) is a promising, objective, safe, and non-invasive tool for assessing soft tissue properties on multiple levels. **AIM 1:** To test the reliability and validity of 2D US (with SWE) for quantification (i.e. severity) of soft tissue properties (including tissue composition, tissue thickness and stiffness) at the UL region in breast cancer survivors. **AIM 2:** To investigate the contribution of soft tissue properties (assessed with US methods) to self-reported UL dysfunctions after breast cancer treatment.

Methods: This study will include three patient groups (n=30 each): breast cancer patients with self-reported UL dysfunction, breast cancer patients without self-reported UL dysfunction, and healthy age-matched women. Soft tissue properties, including tissue composition and tissue thickness, will be assessed with B-mode of 2D US and soft tissue stiffness with SWE. Measurements will be performed on the affected and non-affected sides on predefined locations and will be compared with non-US methods (MyotonPRO, SkinFibrometer, RTOG and MAP-BC) that are measured in the same positions for known validity testing.

Funding bodies which supported the submitted research: University of Antwerp.





THE EFFECT OF PSYCHOLOGICALLY INFORMED PRACTICE WITH BEHAVIOURAL GRADED ACTIVITY IN CANCER SURVIVORS: SYSTEMATIC REVIEW AND META-ANALYSIS

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Background and Aims: In past years, behavioural graded activity (BGA) has demonstrated positive effects on debilitating symptoms, physical functioning, and pain in chronic pain populations and has gained acceptance in the oncological field. BGA appears foremost in psychological informed practices (PIP). However, no review has been published about the effect of PIP with BGA in cancer. Therefore, this systematic review with meta-analyses determines the effectiveness of PIP with BGA compared to (1)waitlists (WLC), (2)other interventions (OI), (3)PIP-, or (4)BGA alone in cancer patients and survivors (CPaS).

Methods: Three databases were screened for randomized controlled trials encompassing PIP with BGA in CPaS. Effect sizes of physical activity (PA), quality of life (QoL) and debilitating symptoms (ex. pain) were inventoried. Subgroup analyses were undertaken to reduce heterogeneity($I^2>50\%$).

Results: Thirty-three studies were included, comprising 4,330 participants. Significant effects of PIP+BGA comparing to WLC were found for anxiety(SMD:-1.29[-1.71;-0.86], $I^2=0\%$),fatigue(SMD:-0.86[-1.18;-0.54], $I^2=61\%$), depression(SMD:-0.79[-1.10;-0.48], $I^2=0\%$), functional impairment(SMD:-0.72[-0.95;-0.50], $I^2=0\%$), psychological distress(SMD:-0.58[-0.82;-0.34], $I^2=51\%$), PA(SMD:-0.58[-0.84;-0.32], $I^2=47\%$ and SMD:-0.51[-0.90;-0.13], $I^2=0\%$), QoL(SMD:-0.38[-0.68;-0.09], $I^2=51\%$), social impairment(SMD:-0.33[-0.58;-0.08], $I^2=0\%$) and only the psychological distress(SMD:-0.89[-1.76;-0.02], $I^2=82\%$) remained significantly after 1-to 3-months. When comparing PIP+BGA to OI, significant effects were found for anxiety(SMD:-0.47[-0.88;-0.06], $I^2=83\%$), depression (SMD:-0.46[-0.84;-0.09], $I^2=82\%$), fatigue(SMD:-0.35[-0.51;-0.20], $I^2=48\%$), and PA(SMD:-0.26[-0.41;-0.11], $I^2=44\%$). After 1-to 3-months, anxiety (SMD:-1.54[-2.88;-0.21], $I^2=87\%$), depression (SMD:-0.46[-0.84;-0.09], $I^2=82\%$) and fatigue (SMD:-0.34[-0.58;-0.10], $I^2=47\%$) remained significantly. These significant effects were not observed in the meta-analyses of studies comparing PIP+BGA to BGA or PIP alone.

Conclusions: PIP with BGA was superior to non-behavioural interventions in improving biopsychosocial outcomes in CPaS. For pain, nonsignificant effects and high heterogeneity were demonstrated. However, no subgroup analysis could be performed due to the small number of studies.

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IDENTIFYING PROGNOSTIC VARIABLES FOR PERSISTENT UPPER LIMB DYSFUNCTIONS AFTER BREAST CANCER TREATMENT: PROTOCOL OF A LONGITUDINAL COHORT STUDY

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Background and Aims: Breast cancer is the most frequent occurring cancer in women luckily with high surviving rates. However many breast cancer survivors (BCS) suffer of persistent upper limb (UL) dysfunctions at 6 months post-radiotherapy. Therefore the objective of this study is to identify the contributing factors to chronic UL dysfunctions in terms of identifying targets for prospective evaluation and specific treatment approaches at specific time points during breast cancer treatment.

Methods: A cohort study will be performed in 250 unilateral primary BCS, assessing different aspects of the International Classification of Function, Disease and Health (ICF). The BCS will be assessed before their surgery, one and six months after their surgery and if applicable one and six months after radiotherapy treatment.

Results: A contribution of sensory functions and specific pain characteristics, soft tissue stiffness, relative arm volume, breast cancer treatment modalities, personal factors such as, pain catastrophizing, self-efficacy, depression, anxiety, stress and fear of movement, a contribution of the received physical therapy care and movement alterations of the upper limb are expected.

Conclusions: A prediction model will be formed for persistent UL dysfunction in BCS covering all aspects of the ICF. Prevalence rates of UL dysfunctions up to 50% at 6 months post-radiotherapy have been reported, with known impact on BCS social, physical and daily life activities. Therefore, this project aims to develop a prediction model, which is the first important step toward a prospective care pathway for prevention and treatment of persistent UL dysfunctions in BCS.

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THE EXPLORATION-EXPLOITATION DILEMMA IN PAIN

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Background and Aims: Have you ever hesitated between eating at your favourite restaurant or trying a new one? Keeping your current job or trying to find a new position? This type of dilemma is called the exploration-exploitation dilemma (EED). The EED emerges when having to choose between exploiting a familiar option and exploring a new option with the risks it may include. Facing the EED while in pain can be difficult, for example, deciding whether to do a physical activity that could reduce pain but also carries risks of complications (i.e., exploration) or staying at home to rest (i.e., exploitation). Nevertheless, how individuals solve the EED when there is a risk of pain is essential. According to the fear-avoidance model, prioritizing pain control over other valuable life goals can create a cycle of pain-related avoidance and maintain pain over time.

Our work aims to understand how individuals solve the EED in the context of pain.

Methods: To achieve our objective, we used a 4-armed bandit task with each bandit/option associated with a probability of appetitive (e.g., reward) and aversive (e.g., pain-related picture) outcomes.

Results: Our computational model analysis revealed that participants tended to exploit in most trials. Furthermore, the learning rate (i.e., how fast individuals learn) for the pain-related stimuli was higher than the reward. Finally, participants were more sensitive to rewards than to pain-related stimuli.

Conclusions: Our findings provide insight into the underlying mechanisms of the EED in a pain-related context and highlight the role of individual differences in this trade-off.

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MULTISENSORY INTERACTIONS BETWEEN NOCICEPTION AND VISION THROUGH THE LOOKING GLASS

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Background and Aims: It has been demonstrated that nociceptive stimuli influence the perception of visual stimuli especially when those visual stimuli occurred near the body, i.e. in the peripersonal space, a multisensory representation of the body integrating the external space immediately surrounding it. In the present study, we examined whether nociceptive stimuli influence the perception of visual stimuli when those are indirectly seen as occurring near the stimulated body parts.

Methods: To this aim, we used a visual temporal order judgment task (TOJ) in which pairs of visual stimuli were presented, one to each side of space. Those visual stimuli were preceded by a nociceptive stimulus applied only on one of the hands to attract attention in one side of visual space. Visual stimuli were presented either at a far distance from the participants' hands or at a similar distance but indirectly seen near the hands through a mirror.

Results: It was expected that visual judgments would be biased to the advantage of the visual stimulus presented in the same side of space as the stimulated hand. Moreover, it was hypothesized that the visual bias induced by the nociceptive stimulus will be stronger in the mirror condition than in far condition, i.e. the condition without the mirror, even though stimuli are projected at a similar retinal distance in both conditions. Results showed that indeed, nociceptive stimuli facilitated more significantly the perception of visual stimuli in the mirror condition.

Conclusions: Multisensory interaction between nociception and vision seems driven by a mental representation of the peripersonal space.

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THE INFLUENCE OF COGNITIVE PROCESSES ON THE EFFICACY OF CONDITIONED PAIN MODULATION: AN EXPERIMENTAL STUDY

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Background and Aims: Despite the extensive amount of research performed on conditioned pain modulation (CPM), there are still uncertainties concerning the influence of cognitive mechanisms on CPM efficacy. This study aimed to assess the influence of attention and intrinsic expectations on the CPM effect in healthy adults.

Methods: In this cross-sectional study, seventy-two healthy pain-free adults underwent CPM evaluation (i.e. pain pressure threshold (PPT) assessment (= test stimulus (TS)) in response to hot water immersion (=conditioning stimulus (CS))) during three experimental protocols in random order, i.e. 1) a sequential 'neutral' protocol during which attention was not manipulated, 2) a 'focus' protocol during which attention was focused on the CS, and 3) a 'distraction' protocol during which attention was directed away from the CS using a distraction task. Prior to each protocol, participants their pain expectations were registered.

Results: A smaller CPM effect was found during the focus protocol compared to the other protocols ($p < .001$). No influence of distraction on CPM efficacy was observed compared to the neutral protocol, however the distraction protocol resulted in lower NRS ratings for the CS ($p < .001$). A priori expectations did not significantly influence the CPM effect.

Conclusions: CPM efficacy seems to be influenced by attentional focus to the CS, whereas distraction does not seem to influence CPM magnitude. However, attentional distraction during CS administration reduces the experienced CS pain intensity. Hence, it is recommended to rate CS-related pain intensity after CS completion rather than during to prevent a reduction in inhibitory effects elicited by the CPM paradigm.

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TRPA1 AND CGRP: ANOTHER SPECIES DIFFERENCE?

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Background and Aims: Transient Receptor Potential Ankyrin 1 (TRPA1) is an emerging analgesic target for which drug development efforts are hampered by species differences. The vasodilation upon topical application of the TRPA1 agonist cinnamaldehyde provides a translational tool to characterise TRPA1 in vivo. This tool was used to evaluate whether Calcitonin Gene-Related Peptide (CGRP) is released downstream TRPA1 activation in rats and humans.

Methods: Male Wistar rats (n=8) were dosed with the CGRP-receptor antagonist olcegepant (60 mg/kg, s.c.) 60 minutes prior to cinnamaldehyde (10% v/v, 8 μ L) application on the abdomen. Healthy male subjects (n=20) were administered ubrogepant (100 mg, p.o.) 90 minutes prior to cinnamaldehyde (10% v/v, 20 μ L) application on the volar surface of the forearm. The dermal blood flow was quantified using laser Doppler (rats) or laser speckle contrast imaging (humans) at 20 minutes post application. Statistical significance was assessed using an independent (rats) or paired-samples (humans) t-test.

Results: In rats, olcegepant fully blocked (mean \pm SEM) the vasodilation typically observed following cinnamaldehyde application ($101 \pm 5\%$ inhibition, $p=0.0002$). In humans, ubrogepant failed to inhibit the vasodilation at the site of cinnamaldehyde application ($3 \pm 7\%$ inhibition, $p=0.3942$).

Conclusions: The present study demonstrates that in rats, but not in humans, CGRP is crucial to the cinnamaldehyde-induced vasodilation, indicating an additional TRPA1 species difference.

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INVESTIGATING THE RELATIONSHIP BETWEEN THE MODULATION OF PAIN-RELATED ONGOING OSCILLATIONS AND CHANGES IN PAIN PERCEPTION INDUCED BY AN ARITHMETIC TASK

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The functional role of ongoing EEG oscillations in pain perception remains uncertain, despite evidence that theta, alpha, and beta band OOs are modulated by sustained periodic nociceptive stimuli at the frequency of stimulation (FoS). Meanwhile, cognitive processes such as distraction have been shown to decrease pain perception. This study aimed to investigate whether distraction/cognitive load can modulate ongoing oscillations and provide insight into their functional significance in pain perception. 25 healthy volunteers received sustained periodic thermonociceptive and vibrotactile stimuli at a frequency of 0.2 Hz in two conditions: baseline and an arithmetic task. Subjects provided a VAS rating of stimulus intensity after each of the 40 trials, and EEG was recorded using a 64-channel cap throughout the experiment. Linear mixed models were used to analyze the effects of condition and modality on the intensity ratings, phase-locked EEG, and modulation of OOs at the FoS.

Results showed that the arithmetic task significantly decreased perceived intensity for both modalities. Both stimuli induced a phase-locked response at the FoS, with thermonociceptive stimuli leading to significantly larger modulations of ongoing oscillations than vibrotactile stimuli across all frequency bands. However, no significant differences were found between the two conditions.

These findings suggest that ongoing oscillations may play a role in the neural processing of painful stimuli, but their modulation does not necessarily reflect the experience of pain. Distraction/cognitive load did not appear to modulate ongoing oscillations in this study, making it difficult to draw conclusions about their functional relevance in pain perception.

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SELF-INDUCED COGNITIVE TRANCE REDUCES SUBJECTIVE PAIN PERCEPTION IN HEALTHY VOLUNTEERS

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Background and Aims: People who practice self-induced cognitive trance (SICT) anecdotally report a modification of pain perception. SICT is defined as a state of voluntary non ordinary state of consciousness, characterized by a different awareness of the environment, combined with a flow, and increased internal imagery, alteration in somato-sensory processes, self, and time-space cues.

To rigorously investigate these anecdotal reports of modified pain perception during SICT in healthy volunteers all experts in SICT.

Methods: We compared pain perception (i.e., intensity and unpleasantness) in 19 SICT experts (age: $42,6 \pm 13,4$ yrs.; 14 women, regular practice) in three conditions: ordinary consciousness (OC), SICT, post-SICT. Each condition was performed with eyes closed, and started with 5 minutes of rest without stimulation, followed by 10 minutes of electrical nociceptive stimulation during which 60 stimuli were manually administered with random inter-stimulus intervals (8-12 sec.). The order of the sessions (i.e., OC and SICT/post-SICT) was counterbalanced between participants with a 1-hour washout period in between, allowing the participants to fully exit the SICT state. At the end of each session, participants were asked to assess, on a scale 0-10, their pain intensity and pain unpleasantness.

Results: Results indicated that both pain intensity and unpleasantness were significantly lower in SICT compared to OC and post-SICT. Pain unpleasantness was also lower in post-SICT compared to OC.

Conclusions: These results suggest that SICT might be an effective approach to reduce pain, paving the way for clinical application in chronic conditions such as chronic pain.

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