***Strands: Expertise in musculoskeletal and manual physical therapy***

**1. Title of suggested symposium**

Disentangling the complexities of persistent pain through a mechanistic approach

**2. Key words**

Persistent pain, Nociplastic pain, central sensitization, pain mechanisms, pain modulation, pain hypersensitivity, systemic inflammation

**3. Names of convenor and all presenters**

Presenters: Morten Hoegh, Ashley Smith, Sean Gibbons, Susanne Becker

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**5. Relevance to IFOMPT and expected audience**

**100-150 words**

Persistent pain can involve multiple mechanisms presenting concurrently. These mechanisms interact with each other creating complexity for the clinician. Nociplastic pain has been proposed as a mechanistic descriptor associated with many persistent musculoskeletal pain disorders. At the same time nociplastic pain and “central sensitization pain” have been described as measurable and treatable mechanisms. Immune dysregulation is a relatively new mechanism in persistent pain. It is associated with endocrine and autonomic dysregulation. Behavioural appraisal has many dimensions. A key aspect is reward processing and fear learning. Persistent pain may also be related to local tissue loading. Disagreement may exist due to multiple types of tissue loading mechanisms. This session will explain what the mechanistic descriptors are, how they can be assessed and what relationship they have to persistent pain. Testing paradigms associated with these processes are believed to depict the clinical pain experience and provide an understanding of specific underlying mechanisms that can possibly be modulated to effectively treat patients. Subsequently, their clinical relevance and application is discussed.

**6. Summary of the session format that will be followed**

5 minutes: Convenor Morten Hoegh gives an overview of the contents and learning objectives of the workshop.

15 minutes: Morten Hoegh will explain the mechanistic descriptors and their relationship to central sensitization

15 minutes: Ashley Smith will demonstrate testing paradigms and explore evidence associated with evaluation and modulation of central sensitization

15 minutes: Sean Gibbons will discuss persistent pain as a disease with multiple contributing mechanisms and causes. He will focus on tissue loading and immune dysregulation.

15 minutes: Susanne Becker will focus on endogenous pain modulation induced by pain-reward interactions and how alterations in such interactions contribute to persistent pain.

15 minutes: Panel discussion

10 minutes: questions

**7. Information concerning any presentations or publications of the work made prior to the IFOMPT 2024**

The contributors will present their own research publications, draw on their ongoing research and clinical experience as well as previously published papers by other groups.

**8. A biography for the convenor and each contributor.**

Prof Morten Hoegh (PhD) is a specialist physiotherapist in sports physiotherapy and associate professor at Aalborg University. His MSc in Pain was obtained from King's College London (UK) and a PhD in Medicine/pain from Center for Neuroplasticity and Pain (CNAP) at Aalborg University. He has published over 30 papers, including the #PainScienceInPractice series in JOSPT, covering basic neuroscience principles that underlie the concept of “pain neuroscience”, as well as 10+ book chapters and authored two books on pain. Dr Hoegh is a prolific pain educator, hosts the MOWP Podcast, EFIC TV (conference interviews), and SmerteVejleder Podcast (advice for patients with chronic musculoskeletal pain). He chairs the European Pain Federation (EFIC) Academy and online education platform and sits in the exam and curricula committee for the European Diploma in Pain Physiotherapy. He has attracted more than € 300.000 in funding for research to increase knowledge about musculoskeletal pain.

Dr. Ashley Smith is a clinical specialist in musculoskeletal physiotherapy with a special interest in the clinical features of whiplash-associated disorders (WAD) and orthobiologic medicine. In particular, Ashley’s research focusses on pain modulation, with an emphasis on the role of nociception and its influence on various clinical manifestations of chronic WAD. His PhD focussed on modulation of central sensitization and he continues to pursue research investigating mechanisms underlying endogenous analgesia. Ashley has published over 40 papers on chronic pain disorders and attracted over US$300,000 in funding to pursue clinical research. His research collaborations involve an international network of multidisciplinary specialists spanning the globe from Australia, Europe, the United States and Canada.

Sean Gibbons graduated from Manchester University in 1995. He a clinician who does part time research. He has been using sub-classification strategies for the rehabilitation of movement patterns, motor control, pain and behavioral conditions his whole career. The overall theme of his research has involved understanding how the traditional disease pathogenesis framework applies to musculoskeletal pain including the key functional mechanisms, their causes and barriers. His PhD was on the development of a screening tool to predict motor skill learning ability for motor control exercises in low back pain. His current research is on understanding the role of systemic inflammation as a mechanism in the disease pathogenesis framework for low back pain and its influence on motor control and pain. Part of this is the validation of a questionnaire to screen for low grade systemic inflammation and outcome prediction. He has presented his research at national and international conferences, has several journal publications and book chapters on related topics and teaches internationally. He is an Assistant Clinical Professor (Adjunct) at McMaster's Advanced Orthopaedic Musculoskeletal / Manipulative Physiotherapy specialization program and is a guest lecturer on other advanced physiotherapy programs.

Prof Susanne Becker (PhD) is Professor for Clinical Psychology at the Heinrich Heine University Düsseldorf, German, with a focus on psychobiological mechanisms of human pain perception. In 2009, Susanne earned her PhD at the University of Mannheim, Germany, after which she was a postdoctoral research fellow at the Alan Edwards Centre for Research on Pain, McGill University, Montreal, Canada. In 2013 she continued her post-doctoral work in at the Central Institute of Mental Health in Mannheim, Germany, where she soon after become a research group leader. In 2019 she moved to the Department of Chiropractic Medicine at the Balgrist University Hospital, University of Zurich, Switzerland, where she was promote to Assistant Professor. The overarching goal of her work is to characterize neuroanatomical and neurochemical mechanisms of the interaction of pain and reward processing in humans and to identify pathogenetic relevant alterations of these processes in chronic pain. The main methodological approaches of her research groups are human behavioral testing combined with pharmacological interventions to challenge biopsychological mechanisms and neuroimaging techniques as well as computational modelling for data analyses.

**9. Abstract body /content**

**Learning Objectives:**

The purpose of this session for attendees is:

1. To consider multiple mechanisms and their interactions in persistent pain
2. To critically understand the difference between mechanistic descriptors and neurophysiological mechanisms (e.g., nociplastic pain vs sensitization)
3. To critically understand the background rationale, causation and prognosis regarding the association between different mechanisms and how this influences treatment options

**Description**

At the beginning of the session, Morten Hoegh will present the three mechanistic pain descriptors (nociceptive, neuropathic and nociplastic) and continue with a presentation of the neurophysiological mechanisms related to the central sensitization-phenomena (wind-up, classical central sensitization and long-term potentiation). Afterwards, he will discuss the overlap between mechanisms and descriptors.

Sean Gibbons will present persistent pain within the disease pathogenesis framework. He will discuss low grade systemic inflammation mechanisms, his research on how to identify immune dysregulation and strategies for subgrouping. He will also discuss the importance of addressing functional mechanisms in the clinical reasoning of intervention strategies. Following this he will highlight tissue mechanisms and how they may be influenced by immune dysregulation.

Susanne Becker will present results on factors that can induce endogenous pain modulation in humans, focusing specifically on the perception of reward, and related motivation and learning. In particular, she will present recent evidence highlighting the importance of these factors in the modulation of pain, including persistent pain. Recent research convincingly shows the relevance of reward processing as a pathogenetic factor in chronic pain. This presentation will discuss this evidence and link it to potential novel intervention strategies in patients with chronic pain.

In the following discussion, the presenters together answer questions from the audience in a panel discussion format.

**Implications/conclusions**

Persistent pain involves multiple mechanisms. By understanding the mechanisms contributing to the persistent pain, physiotherapist could optimise treatment (e.g., lifestyle, manual therapy, therapeutic exercise, behavioral, education) and prognosis in various pain conditions. Effective recognition of the factors associated with this clinical presentation and the options available to modulate such allows physiotherapists to assist patients’ recovery trajectories.

**10. Funding acknowledgments**

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