Pain neuroscience education & behavioral treatment for chronic pain patients

Lynn Leemans[1-4], Wouter Van Bogaert [1,3-4] & Laurence Leysen[1-4]

[1] Pain in Motion International Research Group, www.paininmotion.be

[2]RERE Rehabilitation Research Group, https://rere.research.vub.be

[3] Department of Physiotherapy, Human Physiology and Anatomy, Faculty of Physical Education & Physiotherapy, Vrije Universiteit Brussel, Belgium

[4] Department of Physical Medicine and Physiotherapy, University Hospital Brussels, Belgium

twitter: @PaininMotion; facebook: www.facebook.com/PainInMotion

Learning objectives:

At the completion of this course, learners will be able to:

1. Apply evidence-based guidelines for chronic pain management to physical therapy practice;
2. Classify pain patients as having nociceptive, neuropathic or central sensitization pain;
3. Implement a thorough biopsychosocial assessment of a patient with chronic pain;
4. Provide pain neuroscience education to patients with chronic pain;
5. Devise an effective physical therapy program to remediate pain that engages the patient and considers cognitive/affective/emotive aspects of the pain experience.

Content:

Increasing evidence supports a cardinal role for physiotherapists in the treatment of chronic pain. Physiotherapists combine the unique skills for targeting the chronic pain patient's mind, body and brain concomitantly[1-5]. Yet physical therapists are often unaware of their ability to treat complex patients with chronic pain. Therefore, the course aims at learning physical therapists to apply evidence-based guidelines for chronic pain management.

Chronic pain represents a biopsychosocial problem, with maladaptive changes in the mind, body and brain. Education[6], exercise therapy[7] and physical activity interventions are effective treatments for various chronic pain disorders, including fibromyalgia, chronic neck pain[8], osteoarthritis[1,9], rheumatoid arthritis and chronic low back pain[2]. Although the clinical benefits of physiotherapy in these populations are well established (i.e. evidence based), clinicians struggle applying science in daily practice.

One of the reasons why clinicians experience difficulties in applying evidence in practice, is that they are unaware of their capacity to differentiate between various pain types. Indeed, a prerequisite for providing appropriate treatment is classifying pain patients as having either predominant nociceptive, neuropathic or central sensitization pain. Course participants will learn how physical therapists can classify their pain patients without relying on expensive or complex examinations. They will learn using a clinical algorithm for differentiating nociceptive from neuropathic and central sensitization pain in daily practice[10,11]. Furthermore, course participants will learn how to perform a thorough biopsychosocial assessment of patients with chronic pain so that they can assess the provoking and

contributing factors of the pain problem. This will allow them to provide individually-tailored physical therapy, targeting mind, body and brain.

At the mind level, reductions in maladaptive pain cognitions, especially pain catastrophizing and fear-avoidance beliefs, as well as increased pain self-efficacy beliefs, have been established as key contributors to positive outcome in exercise therapy programs for chronic pain. Such maladaptive cognitive factors are typically addressed in comprehensive exercise therapy programs that include not only exercise but also pain neuroscience education and activity self-management.

At the brain level, it is crucial to consider the concept of pain mechanisms, including aspects like central sensitization and dysfunctional endogenous analgesia in response to exercise as seen in some chronic pain populations. Hence, in patients with chronic pain and central sensitization it seems rational to target therapies at the brain rather than muscles, joints or cardiovascular system. More precisely, modern pain neuroscience calls for treatment strategies aiming at decreasing the sensitivity of the central nervous system (i.e. desensitizing therapies). An increasing number of studies support the use of physical therapy interventions like graded activity and graded exercise therapy, as desensitizing therapies for patients with chronic pain.

Besides maladaptive changes at the level of the mind and the brain, many patients with chronic pain show bodily dysfunctions like impaired neuromuscular control or articular damage. Course participants will learn how to address such dysfunctions within a broader biopsychosocial approach for the management of chronic pain.

Physiotherapists combine the unique skills for targeting the chronic pain patient's mind, body and brain concomitantly. A prerequisite for providing appropriate treatment is classifying pain patients as having either nociceptive, neuropathic or central sensitization pain. Once the chronic pain patients are correctly classified and the biopsychosocial aspects involved in the contribution of the problem are known, physiotherapy can include interventions like counselling, activity self-management, and graded exercise therapy tailored to the patient's preferences, needs, pain cognitions, musculoskeletal and central nervous system dysfunctions. A broad biopsychosocial view is required for applying effective physiotherapy for patients with chronic pain, and can be provided in primary, secondary or tertiary care. This accounts for physiotherapists working in the field of musculoskeletal pain, neurology, pediatrics, internal medicine and geriatrics.

Content of program:

- Short introduction
- Chronic pain: a matter of maladaptive changes in the mind, body & brain
- Classification of nociceptive, neuropathic and central sensitization pain in physiotherapy practice.
- Skills training biopsychosocial assessment and classification of chronic pain patients in physiotherapy practice
- Pain neuroscience education in clinical practice: theory, demonstration and skills training
- Behavioural therapy for chronic pain within a physiotherapy: graded activity

Educational modes:

The course content will be delivered through a mixture of methods, including:
- interactive lectures
- demonstrations (e.g. demonstrating pain neuroscience education)
- practical skills training:

- learning differential diagnosis between predominant neuropathic, nociceptive & central sensitization pain
- learning to perform a biopsychosocial physical therapy assessment
- pain neuroscience education in clinical practice
- exercise therapy & the patient-therapist communication to facilitate exercise interventions in chronic pain patients

- illustrations
- case studies

Key references

1. Lluch Girbes E, Nijs J, Torres-Cueco R, Lopez Cubas C. Pain treatment for patients with osteoarthritis and central sensitization. *Physical therapy.* 2013;93(6):842-851.
2. Nijs J, Meeus M, Cagnie B, et al. A modern neuroscience approach to chronic spinal pain: combining pain neuroscience education with cognition-targeted motor control training. *Physical therapy.* 2014;94(5):730-738.
3. Zusman M. Forebrain-mediated sensitization of central pain pathways: 'non-specific' pain and a new image for MT. *Manual therapy.* 2002;7(2):80-88.
4. Zusman M. Mechanisms of musculoskeletal physiotherapy. *Physical Therapy Reviews.* 2004;9:39-49.
5. Zusman M. Associative memory for movement-evoked chronic back pain and its extinction with musculoskeletal physiotherapy. *Physical Therapy Reviews.* 2008;13(1):57-68.
6. Nijs J, Paul van Wilgen C, Van Oosterwijck J, van Ittersum M, Meeus M. How to explain central sensitization to patients with 'unexplained' chronic musculoskeletal pain: practice guidelines. *Manual therapy.* 2011;16(5):413-418.
7. Nijs J, Lluch Girbes E, Lundberg M, Malfliet A, Sterling M. Exercise therapy for chronic musculoskeletal pain: Innovation by altering pain memories. *Manual therapy.* 2015;20(1):216-220.
8. Nijs J, Ickmans K. Chronic whiplash-associated disorders: to exercise or not? *Lancet.* 2014;384(9938):109-111.
9. Baert IA, Lluch E, Mulder T, Nijs J, Noten S, Meeus M. Does pre-surgical central modulation of pain influence outcome after total knee replacement? A systematic review. *Osteoarthritis and cartilage / OARS, Osteoarthritis Research Society.* 2015.
10. Nijs J, Apeldoorn A, Hallegraeff H, et al. Low back pain: guidelines for the clinical classification of predominant neuropathic, nociceptive, or central sensitization pain. *Pain physician.* 2015;18(3):E333-346.
11. Nijs J, Torres-Cueco R, van Wilgen CP, et al. Applying modern pain neuroscience in clinical practice: criteria for the classification of central sensitization pain. *Pain physician.* 2014;17(5):447-457.

Short bio Lynn Leemans

Lynn Leemans obtained her master's degree in Rehabilitation Sciences and Physiotherapy with a specialization in manual therapy in 2015 at the Vrije Universiteit Brussel, Belgium. In 2016, she successfully completed an advanced master's degree in Manual Therapy. After 3 years of combining working as a manual therapist with a teaching assignment at the Vrije Universiteit Brussel, she started her PhD in 2018. Now, Lynn is a fulltime PhD-researcher at the Vrije Universiteit Brussel, Belgium and a member of both the Pain in Motion international research group and the RERE Rehabilitation Research group. Her main domain of interest is the role of central pain mechanisms in chronic musculoskeletal pain patients, and more specific related to pain during movement.

Short bio Wouter Van Bogaert

Wouter Van Bogaert holds both a Master of Science degree in Physical Education and Kinesiology and a Master of Science degree in Rehabilitation Sciences and Physiotherapy. Since 2018, he is a pre-doctoral researcher at the Vrije Universiteit Brussel and a member of the Pain in Motion international research group. At the VUB, he is appointed as a researcher in the B²aSic-project, which focusses on the pain neuroscience education in patients with lumbar radiculopathy scheduled for surgery. His primary research interests include perioperative pain neuroscience education, as well as persistent pain and quality of life following surgery.

Short bio Laurence Leysen

Laurence Leysen holds a PhD in Rehabilitation Sciences and Physical Therapy, a master's degree in Rehabilitation Sciences and Physical Therapy and an advanced master in Manual Therapy. She is a fulltime researcher and lecturer at the Vrije Universiteit Brussel (Brussels, Belgium) and a member of both the Pain in Motion international research group and the RERE Rehabilitation Research group. She is interested in the role of central pain mechanisms in patients with chronic pain, particularly cancer survivors. She is (co-)author of 13 articles in international peer-reviewed journals from which 3 as first author. Since 2015 she teaches practice and science classes at the Vrije Universiteit Brussel (Belgium). Besides that, she gives numerous courses and lectures about chronic pain rehabilitation in Belgium and abroad (Netherlands, France, Spain).