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Editorial comment

Associative learning mechanisms may trigger increased burden of chronic pain; unlearning and extinguishing learned maladaptive responses should help chronic pain patients

Harald Breivik[a,b,c,*]

[a] University of Oslo, Oslo, Norway
[b] Oslo University Hospital, Department of Pain Management and Research, Oslo, Norway
[c] Oslo University Hospital, Department of Anaesthesiology, Oslo, Norway

In this issue of the *Scandinavian Journal of Pain* Daniel S. Harvie and co-workers with G. Lorimer Moseley as senior author, publish interesting and potentially clinically important results from a study on volunteers [1]. Visual and auditory cues are known to enhance pain perception both in laboratory and in clinical scenarios, effects that are due to expectation of impending harm. In this study, Harvie and co-workers were able to show that somatosensory cues (vibrotactile stimuli) also can modulate pain perception. The brief (milliseconds) conditioning stimulus close to the nociceptive stimulus could not allow any conscious expectation of effect. They therefore consider their findings due to an associative learning mechanism, learning that can occur without conscious evaluation of the conditioning stimulus [1]. They propose that this has implications for development of chronic pain conditions and for treatment of pain.

1. Associative learning and perception of pain from nociceptive stimuli

Associative learning mechanisms are different from those mechanisms that link increased pain perception to pain-related fear and avoidance [1,2]. They studied, in healthy volunteers, pain-modifying effects by vibrotactile stimuli near the location on the forearm where they induced pain by electrical stimuli to create pain-intensity between 2/10 and 8/10 on a NRS-11 scale. They found significantly higher perceived pain-intensity of an electrically induced pain when this was paired with the vibrotactile cues. Thus, in this classical conditioning study they were able to document that a non-nociceptive somatosensory input can increase the perceived pain-intensity of a painful stimulus, in the pain-laboratory [1].

2. Clinical implication of associative learning that increase the experience of pain of a nociceptive stimulus

For a clinician, the changes in perceived pain due to the vibrotactile conditioning stimulus were tiny: from 48.6 to 51.2 mm on a 150 mm visual analogue scale for pain intensity (VAS). The mean difference was 3 mm (CI 95% 0.4–4.8 mm). The authors admit that this may not be considered a dramatic effect, but the fact that they can document such an effect in the artificial context of a pain laboratory, may indicate that in a therapeutic context these effects could be larger and should be studied, and hopefully they can be exploited in the clinic [1].

They emphasize that based on their findings; it must be worthwhile in clinical research to explore associative learning mechanisms during development of a chronic pain condition. With more knowledge of such associative learning mechanisms, unlearning techniques aiming to extinguish these associations could be a new principle for treating chronic pain conditions. This is very welcome because we are not always treating successfully chronic pain, such as complex regional pain syndrome (CRPS) [3].

3. Unlearning complex and poorly understood maladaptive mechanisms in complex regional pain syndrome – CRPS

Data indicating that a neuroinflammation may be behind the early phases of a developing CRPS [4–6]. In fact, we do not fully understand the mechanisms, in the “black box”, our CNS, that can lead to such a horrendous pain experiences with subsequent pathophysiological, mental, and socioeconomic changes [3]. Because we do not understand fully the mechanisms operating in the “black box”, we are not always able to stop and reverse this decline into an existence with very low quality of life [3].

Psychological factors do not start a CRPS-condition, but once established the healing process of a CRPS can be delayed by psychological “complications” [7]. We clearly need expert pain-psychologists in the team trying to help patients with such complex pain conditions as a CRPS. The positive effects of graded motor imagery and mirror therapy [8–10], exposure therapy [11], and

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* Corresponding author at: Oslo University Hospital, Department of Pain Management and Research, Pbox 4950 Nydalen, 0424 Oslo, Norway. Tel.: +47 23073691.
E-mail address: harald.breivik@medsin.uio.no

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patient education [12], all come from distinguished experimental and clinical psychologists [1].

Being aware of the fact that associative learning can contribute to the complexities of chronic pain conditions, and taking this into our understanding and treatment of our unfortunate chronic pain patients, will be of value as we strive to help our patients [1].

Conflict of interest

None declared.

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