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Editorial comment

Increased deep pain sensitivity in persistent musculoskeletal pain but not in other musculoskeletal pain states

Lars Arendt-Nielsen*

Center for Sensory-Motor Interaction (SMI), School of Medicine, Aalborg University, Aalborg E, Denmark

In this issue of the *Scandinavian Journal of Pain*, Gunnarsson and co-workers report on the use of pressure pain thresholds (PPTs) for assessing deep somatic pain sensitivity in patients with acute, recurrent, and persistent musculoskeletal pain [1]. In this study, the particular approach is that the assessments are conducted at a location extra-segmental to the painful area (tibialis anterior muscle). The study showed that the persistent pain group had significantly lower PPTs (a general increase in pain sensitivity as a result of centralized sensitisation) as compared with a matched control group. No significant differences were found between the acute, recurrent, and healthy control groups.

1. Manifestations and assessment of widespread sensitisation

Currently, no definitive method or guideline exists for diagnosing centralised sensitisation but sensitisation-specific questionnaires have been developed [2]. Assessing sensitisation in healthy volunteers and in pain patients can also be conducted using Quantitative Sensory Testing (QST) whereby it is possible to estimate gain or loss of pain sensitivity under different conditions to get an impression of the peripheral and/or the central gain.

If a painful stimulus (e.g. pressure) is applied to a pain patient, it is difficult to determine if the reaction is a result of a localised (peripheral) pain sensitisation/desensitisation or caused by a generalised central attenuation of the pain sensitivity.

In Gunnarsson et al. [1], the PPT was determined from one muscular location (tibialis anterior) not involved in the primary cause of the pain in any of the different pain patients studied. Therefore, the study predominantly evaluated the centralised pain sensitisation and showed that mainly the patients with persistent pain had lowered PPTs. Centralised sensitisation is observed across many different chronic pain conditions and is not only a phenomenon seen in persistent musculoskeletal pain patients [2]. This is in accordance with the current notion that patients need to have pain for a long time (most likely chronic) to develop the central consequences [3]. A continued bombardment from the periphery due to lowered thresholds or spontaneous firing may initiate and maintain the segmental and extra-segmental sensitisation [4] and in parallel the descending pathways start to enhance the excitability along the entire neuroaxis [5,6].

It should be mentioned that patients with non-painful psychiatric and psychological disorders may also develop signs of centralised sensitisation without any obvious peripheral drivers [7]. This is obviously an area requiring further investigations.

Gunnarsson et al. [1] investigated pain patients with, e.g. knee osteoarthritis, fibromyalgia, and low back pain; all conditions with well-described manifestations of centralised sensitisation.

In knee osteoarthritis (OA) patients the origin/location of pain is known whereas fibromyalgia patients have a more diffuse and widespread presentation of pain. In a knee OA patient, the PPT can be assessed from the site of pain and from an extra-segmental site with no persistent pain whereas this is not possible in a fibromyalgia patient. When comparing with a control population, it is possible to evaluate if the PPTs from both the knee and the extrasegmental site are different in a OA population. If only the knee PPT is lower and the extrasegmental PPT is not lower as compared with controls, it is mainly a localised sensitisation. In case of centralised sensitisation both the knee and the extrasegmental PPTs will be affected. In this situation it is more difficult to determine the relative contribution of the localised sensitisation.

To overcome this problem, recently a topographical pressure pain sensitivity mapping technique has been developed with which it is possible to evaluate which particular regions of, e.g. a knee joint structure is particularly sensitised, and thereby this technique can be used for subgrouping patients [8].

In knee OA studies low pressure pain thresholds are shown to be associated with reduced function, increased disability, and poor quality of life [9].

Many studies have shown a higher degree of centralised sensitisation in OA (lower PPT) [10,11] and high pain sensitivity questionnaire score [12,13].

Furthermore, it has recently been shown that preoperative centralised sensitisation is related to a high level of pain and poor outcome after total joint replacement surgery [14–16]. This

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* Corresponding author. Center for Sensory-Motor Interaction (SMI), School of Medicine, Aalborg University, Fredrik Bajers Vej 7, Bld. D3, DK-9220 Aalborg E, Denmark. Tel.: +45 9940 8828; fax: +45 9815 4008.
E-mail address: LAN@HST.AAU.DK

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highlights the importance that widespread sensitisation can be an important feature for the clinical outcome.

When assessing PPTs from fibromyalgia patients, the PPTs will be low in all regions and hence it is not possible to get an impression of the relative contribution of peripheral versus centralised sensitisation. To determine if an individual chronic pain patient seen in the clinic has signs of centralised sensitisation, statistical approaches are needed such as *Z*-scores which can judge if an individual patient is outside the normative range [17].

The PPT assessment from patients with lumbar pain in Gunnarson et al. [1] seems in accordance with a recent study concluding that PPT measurements have acceptable reliability in these patients [18] and that the most sensitive QST parameter to assess centralised sensitisation in this population is PPT [19]. Generalised pressure hyperalgesia in chronic low back pain has been found in many other studies, e.g. [20].

Gunnarsson et al. [1] found a weak significant correlation between pain intensity and PPTs (the higher pain intensity, the lower PPT). Although the study demonstrated a weak correlation, the data are in accordance with a number of other studies in the area of musculoskeletal pain [21,22].

2. Conclusion and implications

Widespread sensitisation seems to be a consequence of the pain chronification process and is present across many painful conditions including musculoskeletal pain.

Assessing the widespread sensitisation is challenging and more recently clinical applicable questionnaires have been developed. For additional assessments, QST techniques have been developed; the most widely used is the pressure pain threshold which is useful for assessing deep somatic tissue pain sensitivity.

The presentation of widespread sensitisation has clinical implication for the therapeutic approach and may further help to develop targeting of pain management regimes.

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