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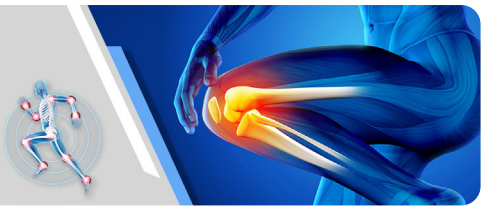

Tender Point Examination in Low Back Pain Patients may improve the Understanding of Pain and the Management. Degenerative Disc Disease or Pain Syndrome, or Both?

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Introduction

In the management of non-specific low back pain (LBP) patients, reassuring information to the patient is essential as highlighted in LBP guidelines. However, it is not easy to inform about non-specific LBP that has no known pathoanatomic cause [1]. In acute LBP with no imaging of the lumbar spine, the patient may accept the explanation 'non-specific LBP' supplied by information on the favorable prognosis and guidance of the management. However, in more chronic cases with disability, where the results of magnetic resonance imaging (MRI) are available, explanation of pain is more difficult [2,3]. In a patient with high-intensity long-lasting back pain and no or little degenerative changes of the lumbar spine, it is a challenge to inform about back pain. And it is also difficult to understand and explain the role of degenerative changes in back pain in the absence of radicular pain, since degenerative changes are frequent in people without back pain. Disc degeneration is primarily due to age and heredity [4] and occurs in over 50% over the age 50 in people without back pain. At 80 years, more than 80% have degenerative changes [5]. However, in people aged 50 or younger, disc protrusion, disc extrusion, disc degeneration, disc bulge, spondylolysis and type 1 Modic changes occur more often in people with back pain than in people without back pain [6], so these changes may contribute to back pain. Still, these changes are also prevalent in pain-free individuals, with the exception of disc extrusion only occurring in about 2-7% of people without back pain and spondylolysis in about 2%.

Nociplastic Pain

Recently, a third concept of pain, i.e. nociplastic pain, has been introduced by IASP (International Association for the Study of Pain) explaining the pain mechanism responsible for fibromyalgia, which are not explained by nociceptive or neuropathic pain mechanisms [7]. This third type of pain mechanism is caused by functional changes of the central nervous system, so-called neuroplastic changes. The definition of nociplastic pain is "Pain that arises from altered nociception despite no clear evidence of actual or threatened tissue damage causing activation of peripheral nociceptors or evidence for disease or lesion of the somatosensory system causing the pain" [7]. The mechanism of nociplastic pain is amplified processing of pain and/or decreased inhibition of pain stimuli at multiple levels in the nervous system. There may be overlap in relation to nociceptive or neuropathic pain mechanisms [7,8].

Apart from fibromyalgia, it has become clear, that some chronic, regional pain conditions also may be explained by nociplastic pain mechanisms [8]. The most prevalent of these is chronic non-specific low back pain (CN-LBP), a condition causing disability in up to 10% of the general population [9].

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According to a recent systematic review, nociplastic pain may be present in 43.2% (13%-78%) of patients with CN-LBP [10].

If we had a reliable clinical test showing whether nociplastic pain was present in CN-LBP, then the cause of pain would be more understandable in cases with no serious findings on MRI. And it would be easier to explain to the patient that the pain, although severe, is not a dangerous spinal pain. This type of information has improved care for fibromyalgia patients [11].

However, there is no consensus on assessing nociplastic pain. In the absence of a golden standard, the authors of a systematic review [10] suggested using quantitative sensory tests (QST) like 'pressure-pain thresholds to assess hypersensitivity', 'temporal summation (wind-up-ratio)', 'reduced pain inhibition (conditioned pain modulation)', or a standard questionnaire ('Central Sensitisation Inventory (CSI))' [8]. Unfortunately, these methods may not be suitable for use in daily clinical practice, perhaps with the exception of CSI, and these measures have not been related to the impact on pain from possibly present degenerative changes of the lumbar spine. Furthermore, the value of these measures as prognostic factors for chronicity has not been confirmed [12,13]. Two more measures have been used in LBP research, but were not recommended by the authors of the review, i.e. tender point examination [14-22] and a fibromyalgia survey in two studies [23,24].

Tender Point Examination

Digital tender point (TP) testing was one of the first QSTs introduced to clinical practice [25]. Originally, TP examination was used in research primarily to distinguish fibromyalgia patients from patients with inflammatory rheumatologic disorders. The test was performed by using a standardized pressure by the thumb gradually increased by 1 kg/sec. up to 4 kg on 18 symmetrically distributed locations on the body. These points were selected after a careful statistical process, and the technique was trained by using a dolorimeter [26]. A point was counted as positive, if the pressure resulted in pain. In 1990, after analyzing data from 558 rheumatologic patients, fibromyalgia was defined as widespread pain for more than 3 months in combination with more than 10 of 18 TPs [26].

Thus, the result of TP examination is the number of painful points induced by a pressure of ≤4 kg. Although the results of testing every single point are dichotomous, the TP count reflects the degree of diffuse pressure tenderness in the whole body, i.e. is a measure of global mechanical hyperalgesia in the range 0-18.

TP examination has been used in population studies and fibromyalgia studies [27-32]. In general, TPs are associated with pain intensity, psychological distress and disability. It has also been shown that widespread pain patients with >10 TPs have more pain and disability than widespread pain patients with ≤10 TPs [33]. In the original cohort of 558 rheumatologic patients, 89% were women, and therefore the cut point 10/11 fits less well in men than in women, as population studies and clinical studies indicate 3-4 fewer TPs in men compared to women [18,21,27].

Tender Point Examination in LBP Patients

Apart from our studies [18-22], TP examination has only been used in a few LBP studies [14-17]. We have studied TP associations in LBP patients more rigorously. We have shown that the TP count was positively associated with back pain intensity in both men and women [18,21], and this was still so after adjustment for degenerative changes on MRI of the lumbar spine [22]. In addition, the TP count was strongly positively associated with bodily distress [21]. Furthermore, the TP count was strongly negatively associated with disc degeneration on sagittal X-rays [21] as well as negatively associated with most degenerative changes on MRI of the lumbar spine [18]. The TP count was also strongly negatively associated with radiculopathy [18,21].

Men with more than 7 TPs and women with more than 10 TPs reported higher low back pain intensity than patients with few TPs in spite of having statistically less degenerative changes on MRI of the lumbar spine [18]. These findings were interpreted as a sign of central sensitization, e.g. nociplastic pain, as the degenerative changes could not explain the pain intensity. The patients with these high levels of TPs included 44% of the patients with non-specific LBP [18]. Finally, the TP count had prognostic value, as it was included in the final models explaining low back pain intensity and disability after one year [19].

The reproducibility of TP examination in chronic LBP patients was shown to be fair as reflected by 70% agreement within ±3 TPs and reliability between 0.72 and 0.84. Cronbach's α was 0.92-0.94 indicating that every single TP contributed almost equally to the TP count [20].

Fibromyalgia Survey

TP examination may be unreliable in patients with widespread pain, because the pain response may be influenced by expectations or distress [34]. Thus, bias is likely in a patient being aware of the need for a high number of tender points in order to fulfill requirements for a respected diagnosis as fibromyalgia. This aspect hardly matters for the LBP patient, who focuses on the back and the results of MRI of the lumbar spine.

Due to the questionable reliability and validity of TP examination in patients with widespread pain, assessment of fibromyalgia by TP examination to a large extent has

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been replaced by filling in a questionnaire by the patient (fibromyalgia survey 2011 [35] revised 2016 [36] combined with a clinical assessment. The fibromyalgia survey is completed in the range 0-31 and includes both questions about widespread pain and a symptom severity scale (specific bodily distress symptoms). This way of diagnosing fibromyalgia has increased the prevalence of fibromyalgia a little, but has also reduced the large sex- difference in diagnosing fibromyalgia by the original criteria [37]. Nonetheless, the original criteria of diagnosing fibromyalgia by TP examination are still accepted by pain researchers and clinicians [36].

The fibromyalgia survey (2011) has been used in a cross-sectional study of CN-LBP patients with pain in the lower back as their primary complaint. By using the fibromyalgia cut-points, the patients were divided into LBP patients with nociplastic pain and patients without [23]. CN-LBP patients with nociplastic pain included 48% of the whole group, and these patients had lower pressure-pain threshold at the L5-S1 interspace and on the thumbnail compared to CN-LBP patients without nociplastic pain. The pain-pressure thresholds were also lower than in pain free controls. Conditioned pain modulation was affected similarly in the CN-LBP patients with nociplastic pain.

A Pragmatic Approach – Future Perspectives

The TP associations in LBP patients described above should be replicated. Meanwhile, clinicians could start learning and using TP examination in LBP patients, since it would have the potential to improve their understanding of pain and the communication with the patients.

The examination technique is moderately reliable [20], but not as reliable as pressure-pain thresholds [38]. However, it is quick to perform (less than 5 minutes) and only requires a dolorimeter intermittently in order to calibrate the pressure applied by the thumb [20]. It may provide the clinician with relevant clinical information that can be used immediately in contact with the patient. Low TP counts may indicate higher probability for degenerative changes being responsible for the pain. High levels of TPs (>7 in men and >10 in women) indicate high probability for bodily distress and low probability for the presence of degenerative changes of the spine or radiculopathy. Thus, it may help explain high pain intensity in spite of no or few degenerative changes. These findings may be used in the communication with the patient, who should be informed about disturbed pain regulation as an explanation of the pain, i.e. decreased pain inhibition and/or facilitation of pain processing. In case of no improvement over time, it may be relevant to let the patient fill in the fibromyalgia survey [36]. If the fibromyalgia criteria are met, the health care professional needs to consider further examinations to exclude other conditions causing widespread pain and hyperalgesia as recommended for fibromyalgia [37]. Furthermore, the awareness of nociplastic pain may qualify the decision on treatment choices: Aerobic exercises may work better than strength training as shown for fibromyalgia [39,40], and medicines supporting the descending inhibitory pathways may be preferable, when pharmacologic treatment is needed [41]. As an example, duloxetine, which is recommended as treatment choice in fibromyalgia patients [40], also might work in the nociplastic subgroup of LBP patients in spite of a hardly relevant clinical effect in the total group of chronic LBP patients [42].

Conclusion

Nociplastic pain seems to be prevalent among CN-LBP patients, and identifying the subgroup with nociplastic pain may have great potential for improving LBP care. Accordingly, it is of crucial importance to reach agreement on which test or questionnaire should be used to identify the subgroup with nociplastic pain in daily clinical practice. At present we do not know, which test or questionnaire is the best. However, TP examination in LBP patients is the only QST that has been analyzed in relation to degenerative changes of the lumbar spine, and the only QST with documented prognostic value in LBP patients. Nevertheless, if the vision described in the pragmatic approach is to be realized, there is still much work to be done. Digital TP examination should be taught, exercised and evaluated in LBP patients and also compared to the other types of QST. Furthermore, SNRI medications should be tested in the subgroup of CN-LBP patients with nociplastic pain. Still there is another question to be answered: Would it be more feasible in daily practice to use a questionnaire than using TP examination in the first place. And if so, what is to be preferred, the fibromyalgia survey or CSI?

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