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TACTILE THRESHOLDS ARE PRESERVED YET COMPLEX SENSORY FUNCTION IS IMPAIRED OVER THE LUMBAR SPINE OF CHRONIC NON-SPECIFIC LOW BACK PAIN PATIENTS: A PRELIMINARY INVESTIGATION

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Background and Aims: Evidence indicates that chronic non-specific low back pain (CNSLBP) is associated with alteration in the brain's cortical representation of the back, resulting in body perception disturbance and contributing to the condition [1,2]. This study investigated perception via 'cortical' sensory tests, in this case two-point discrimination and graphaesthesia—whose results partly depend on the integrity of cortical representation [2]. The hypothesis was dysfunction in these higher-order tasks, with simple tactile thresholds remaining unchanged. Furthermore a relationship between cortical sensation and severity of the condition was predicted.

Method: Volunteers with a six-month history of CNSLBP were recruited. Nerve root pain or specific spinal pathology (eg. malignancy, fracture, infection or inflammatory disease) were excluded. Healthy volunteers reported no low back pain episodes in the last 5 years.

CNSLBP patients reported pain duration, completed numerical rating scores for pain, The Hospital Anxiety and Depression Scale (HADS), and Item 3 of the Medical Outcomes Study Short Form Health Survey (SF-36) indicating physical function.

Monofilaments were used for tactile threshold testing at the left and right transverse processes of L1, L3 and L5. Mechanical callipers were kept parallel to the spine, centred at L3, for two-point discrimination testing on each side. 20 letters of the alphabet were drawn at three sites on each side of the spine, centred on the transverse processes of L1, L3 and L5, obtaining a total graphaesthesia error rate over 60.

Data from the painful side were analysed for patients with unilateral CNSLBP; for all other participants data from both sides were utilised. Tactile threshold data were analysed with a Mann-Whitney *U*-Test. A one-way between-groups multivariate analysis of covariance was performed to test the hypothesis that cortical sensory function would differ between groups.

Results: 19 participants were in the CNSLBP group (11 females; mean age 41 ± 12 years) and in the control group (14 females; mean age 34 ± 12). There was no significant difference between groups in tactile threshold detection (median difference 0.0mg, 95% C.I.—0.4 to 0.4). With a Bonferroni-adjusted $\alpha=0.025$, there was a significant difference between groups in two-point discrimination [$F(1,34)= 8.727, P=0.006$] and letter error-rate [$F(1,34)= 6.389, P=0.016$]. In patients no significant correlation was found between cortical sensory function and pain duration, intensity, physical function or mood.

Conclusion: In line with previous findings of specific deficits in sensory function in CNSLBP [3], this study found two-point discrimination threshold was larger and graphaesthesia error rate was higher over the lumbar spine in patients compared with controls. Such perceptual abnormalities may provide a target for therapeutic intervention via cortical sensory training.

[1] Lloyd, D, et al. 2008. Spine.33: 1372-7.

[2] Lotze M, et al. 2007. Curr Rheumatol Rep. 9: 488-496.

[3] Moseley, GL. 2008. Pain. 140: 239-43.