

# Indices of Central Sensitisation can Predict Effective Self-management in Individuals with Chronic Low Back Pain

V Georgopoulos<sup>1,3,4</sup>, K Akin-Akinyosoye<sup>1,3,4</sup>, D McWilliams<sup>1,3,4</sup>, P Hendrick<sup>1,2,3</sup>, DA Walsh<sup>1,3,4</sup>

<sup>1</sup>Academic Rheumatology, University of Nottingham; <sup>2</sup>Physiotherapy School of Health Sciences; <sup>3</sup>Pain Centre Versus Arthritis; <sup>4</sup>NIHR Nottingham BRC

vasileios.georgopoulos@nottingham.ac.uk

## BACKGROUND

- Chronic low back pain (CLBP) is one of the most prevalent reasons people seek healthcare assistance worldwide. Guidelines for managing CLBP prioritise the development of self-management strategies.
- Levels of central sensitisation (CS) might be associated with increasing psychological distress, pain, fatigue and catastrophisation and may contribute to the relatively poor efficacy of treatments aiming to facilitate self-management.
- Widespread pain distribution (reported by shading a pain manikin) or a self-report Central Mechanisms Trait score, comprising items addressing depression, anxiety, neuropathic-like symptoms, pain distribution, catastrophising, sleep, fatigue and cognitive difficulties
- Quantitative sensory testing (QST) may provide reliable and valid indices of CS and is shown to longitudinally predict musculoskeletal pain and disability.

## METHODS

- Healthy participants (n=25) and individuals with CLBP (n=25) were recruited to establish the reliability of Pressure Pain Detection Threshold (PPT), Temporal Summation (TS) and Conditioned Pain Modulation (CPM) conducted at a site distant from the low back (**Fig. 1**).
- Receiver operating characteristics (ROC) analysis established the cut-off point for the optimal number of painful sites on a body manikin needed to classify low PPT (1st quartile) (**Fig. 2**).
- Confirmatory factor analysis (CFA) was used to assess model fit and produce a single Central Mechanisms Trait score (**Fig. 3**).
- Individuals with CLBP participating in a cognitive behavioural therapy (CBT)-based group physiotherapy intervention, which aimed to facilitate self-management were recruited to allow longitudinal analyses.
- The ability of baseline indices of CS (PPT, TS, CPM, number of painful sites on a manikin, and Central Mechanisms Trait score) to predict self-management outcomes at 3-months follow-up was assessed in bivariate and multivariate analyses.
- Self-management was measured in 8 discrete domains; health-directed behaviour (HDB), positive engagement in life (PEL), self-monitoring and insight (SMI), constructive attitudes and approaches (CAA), skill and technique acquisition (STA), social integration and support (SIS), health services navigation (HSN) and emotional distress (ED).



Fig. 1 Quantitative Sensory Testing

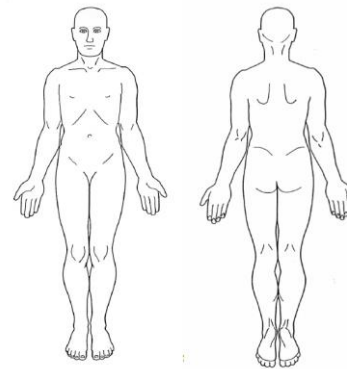


Fig. 2 Body Manikin Chart

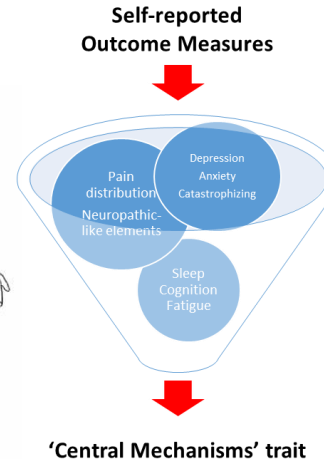


Fig. 3 Single 'Central Mechanisms' Factor

## RESULTS

- Test-retest and inter-rater reliability were high for PPT and TS in both normal and CLBP populations (**ICC=0.76-0.92**) but low for CPM (**ICC=0.43-0.46**).
- ROC analysis determined that **>9/24** painful sites optimally predicted low PPT at the forearm (**AUC=0.67, 95%CI: 0.55-0.80**).
- The single-factor Central Mechanisms Trait model showed a good fit to the data (**CFI=0.92, TLI=0.88; RMSEA=0.09; SRMR=0.07; x2(df)=34.19(20)**).
- **Ninety-seven** people with CLBP provided baseline data and **87** of those (**67% female, mean age 65y**) completed follow-up questionnaires.
- Low PPT and inefficient CPM measures at baseline predicted worse SIS (**r=0.28, p<0.01**) and PEL (**r=-0.31, p<0.01**) at 3 months. More than 9/24 painful sites shaded on the pain manikin at baseline also predicted less PEL (**r=-0.32, p<0.01**) at 3 months. Baseline Central Mechanisms Trait score also predicted worse PEL, CAA and ED (**r=0.51-0.54, p<0.01**) at 3-months.
- Low PPT and inefficient CPM at baseline, remained significant (**p<0.05**) predictors of worse SIS and less PEL in multivariate regression models adjusted for baseline depression, catastrophization, pain and fatigue.

## CONCLUSIONS

- Baseline indices of high CS can predict reduced ability of individuals with CLBP to self-manage their condition 3 months after commencing a CBT-based group physiotherapy intervention.
- Prediction of self-management by CS was not entirely explained by pain severity, catastrophizing, depression or fatigue.
- Treatments which directly target CS might help remove barriers to self-management in people with CLBP.