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Anxiety and stress are associated with widespread hyperalgesia and altered pain modulation in shoulder pain

MELINA NEVOEIRO HAIK (Melina N. Haik) - UFSCAR - melhaik@gmail.com, Kerrie Evans (Kerrie Evans) - Griffith University, Paula Rezende Camargo (Paula R. Camargo) - Universidade Federal de São Carlos, Leanne Bisset (Leanne Bisset) - Griffith University

Introduction: Shoulder pain is the third most common musculoskeletal reason for seeking treatment in primary care with 50% of patients reporting persistent pain at 6 months, and 40% still experiencing pain 1 year after the first episode. Psychosocial factors, such as depression, anxiety and stress, appear to correlate with shoulder symptoms and clinical prognosis, however there is currently little understanding of the relationship between psychosocial factors and neurosensory characteristics in shoulder pain.

Objectives: To verify whether neurosensory characteristics, measured using static and dynamic quantitative sensory tests, are associated with psychosocial factors in people with and without shoulder pain.

Methods: Twenty-three participants with shoulder impingement symptoms (aged 35.6 ± 11.8 years, 9 women, duration of pain 3.2 ± 4.3 years) and 23 sex- and age-matched healthy participants (33.7 ± 10.7 years, 9 women) were assessed for pressure (PPT), cold (CPT) and heat (HPT) pain thresholds and temporal summation of pinprick pain at the middle deltoid (local) and at a remote site (tibialis anterior). Conditioned pain modulation was assessed using the cold pressor test (conditioned stimulus) and PPT (test stimulus). Shoulder disability (Shoulder Pain and Disability Index; SPADI), depression, anxiety and stress (Depression, Anxiety Stress Scale-21), and health related quality of life (EuroQuol-5D) were also measured. Pearson and Spearman correlations were performed in each group between physical measures and psychosocial measures. The study was approved by the ethics committee of Griffith University, Queensland Australia (AHS/65/14/HREC).

Results: In the shoulder pain group, higher shoulder pain and disability (SPADI) were associated with lower local PPT ($p=0.04$, $r=-0.49$). Higher levels of anxiety were associated with lower remote PPT ($p=0.03$, $r=-0.53$), higher local CPT ($p=0.03$, $r=0.52$), lower remote HPT ($p=0.03$, $r=-0.52$) and lower conditioned pain modulation ($p<0.01$, $r=-0.63$). Higher levels of stress were associated with lower remote PPT ($p=0.03$, $r=-0.53$) and lower remote HPT ($p<0.01$, $r=-0.60$); and lower health related quality of life was associated with lower local CPT ($p=0.04$, $r=-0.50$). Among healthy participants, the

only significant associations were found between higher levels of anxiety and lower remote PPT ($p=0.03$, $r=-0.50$) and higher local CPT ($p=0.04$, $r=0.46$).

Conclusion: Widespread sensory hyperalgesia and loss of descending noxious inhibitory response appear to be related to increased levels of anxiety and stress and poorer quality of life in people with shoulder pain. As such, central sensitization might negatively impact the psychosocial health of this population, however a causal link cannot be assumed.

Key-words: Central sensitization; shoulder pain; psychosocial health.

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