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Reply to Musculoskeletal Science and Practice Feedback

Thank you for your comments regarding the recent publication 'Clinical Assessment of Subacromial Shoulder Impingement – Which Factors Differ from the Asymptomatic Population?' Not surprisingly, impingement is a term which does not reflect the underlying cause of all shoulder pain. Hence there is healthy debate, especially amongst physical therapists, regarding alternate terminology (Braman, Zhao, Lawrence, Harrison, & Ludewig, 2013; J. S. Lewis, 2011; McFarland et al., 2013). However, it continues to be a term used throughout the medical literature and in an attempt to embrace this wider audience, until there is agreement about terminology, it was chosen for use in this paper.

The paper did not represent itself as investigating the acromial irritation theory (J. S. Lewis, 2011), as you have suggested, but investigated factors purported in the literature which potentially alter the size of the subacromial space in those with shoulder pain (Land & Gordon, 2017). With current research suggesting rotator cuff tendinopathy is a major factor in the source of pain in this subacromial area (Jeremy Lewis, 2016; Jeremy. Lewis & Ginn, 2015; J. S. Lewis, 2010) and tendinopathy related research suggesting this may be related to a compressive load (Cook & Purdam, 2012) we felt it relevant to explore this relationship. No comment was able to be made about whether compressive loading or irritation of the tendon or both was the cause of the pain in these participants as this was not the aim of the paper.

In preparation for this study, previous literature on clinical tests used to assess external factors in those with subacromial shoulder impingement (SSI) was reviewed (Land & Gordon, 2017). The few included studies that compared symptomatic and asymptomatic subjects did not definitely show which clinical assessments are able to detect a difference in each of these factors with many having methodological limitations with respect to recruitment of subjects, matching of subjects for dominance and comparison of values calculated from both shoulders within each group prior to comparison between groups (Land & Gordon, 2017).

The systematic review 'Is thoracic spine posture associated with shoulder pain, range of motion and function?' cited in the letter included research about non-specific shoulder pain and thoracic spine posture (Barrett, O'Keeffe, O'Sullivan, Lewis, & McCreesh, 2016). It reported that thoracic kyphosis did not appear to be a major contributor to non-specific shoulder pain, based on studies across various populations with the majority of included studies having moderate to high levels of bias (Barrett et al., 2016). The authors concluded as with other systematic reviews that 'higher quality research is warranted' (Barrett et al., 2016; Haik, Alburquerque-Sendin, Moreira, Pires, & Carmargo, 2016; Trampas & Kitsios, 2006). Other references cited in the letter relate specifically to the athletic throwing population (Bach & Goldberg, 2006; Dashottar & Borstad, 2012; Gates, Gupta, McGarry, Tibone, & Lee, 2012; Manske & Ellenbecker, 2013) and cadaver studies ((Bach & Goldberg, 2006; Dashottar & Borstad, 2012; Gates et al., 2012) neither of which should be directly compared to the current study.

People who were regularly participating in strength training were excluded from our study, as it is common to include 'strength training' within a prescribed exercise program for this condition and we wanted to understand the presentation prior to intervention (Carmargo et al., 2015; Holmgren, Bjornsson Hallgren, Oberg, Adolfsson, & Johansson, 2012; Tate, McClure, Young, Salvatori, & Michener, 2010).

Accepted outcome measures used in shoulder intervention studies are predominantly changes in pain scores (VAS, NRS) (Jensen, Karoly, & Braver, 1986) and changes in a functional score (SPADI, DASH) (Hudak, Amadio, & Bombardier, 1996; Roach, Budiman-Mak, Songsiridej, & Lertratanakul,

1991). Changes in these measures could be attributed to a biopsychosocial effect of the intervention experience (Woolf, 2010). The measures provided in this recent publication have provided objective comparison of symptomatic and asymptomatic groups which provides new information to inform clinical management.

It was timely and relevant therefore to study a clearly defined homogenous patient group, which commonly presents to general clinical practice, using well-designed research methodology. We look forward to sharing the outcome of intervention studies in this defined shoulder pain population in the future.

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