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Title: Scapular dyskinesia increases the risk of future shoulder pain by 43% in asymptomatic athletes: a systematic review and meta-analysis

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Scapular dyskinesia increases the risk of future shoulder pain by 43% in asymptomatic athletes: a systematic review and meta-analysis

The systematic review by Hickey et al. evaluated whether the presence of scapular dyskinesia in asymptomatic athletes increased risk of developing future shoulder pain [1]. This review was conducted on the backdrop of conflicting evidence [1] and concluded that athletes with scapular dyskinesia have 43% greater risk of developing shoulder pain than those without scapular dyskinesia. This headline is an interesting finding that appears to add some clarity to the many unknowns in relation to assessment and management of shoulder pain. However, as is always the case with research, the devil is in the detail, which warrants further consideration.

The review reports 65% (104/160) of those with scapular dyskinesia did not go on to develop shoulder pain, whereas 25% (65/259) of those without scapular dyskinesia did. As the authors reflect, an increased risk informs us only that there is an increased chance of developing shoulder pain, but is not a guarantee that it will, i.e. the presence of scapular dyskinesia does not guarantee that an athlete will develop shoulder pain nor does its' absence guarantee that shoulder pain will not develop. This is important to recognise because increasingly we are appreciating the multi-dimensional nature of shoulder pain presentations across the biopsychosocial spectrum [3] and therefore it is potentially only appropriate to consider such findings as one part of the shoulder 'puzzle' [4].

But, to be considered a useful part of the 'puzzle', where a factor is associated with increased risk, the risk factor needs to be modifiable; if not then perhaps the value of being aware of the risk is open to debate because in some situations this awareness can lead to harm, i.e. awareness of dyskinesia creates a self-fulfilling prophecy and an onset of shoulder pain that would not otherwise have arisen. Two recent systematic reviews have evaluated the effectiveness of scapular-focused approaches while at the same time collecting data to help understand why such approaches do or don't work [5,6]. While these reviews reported improvements in patient reports of pain and function, questions were raised in relation to whether scapula kinematics changed in a concordant way or even changed at all. These findings provide the platform on which to suggest that changes in scapular kinematics do not adequately explain such improvements in pain and function and indeed question whether scapular dyskinesia is a modifiable risk factor.

Although in symptomatic populations and with relatively short-term follow-up, the findings from these reviews raise relevant questions in relation to some current assumptions. Other questions remain also; one such question being is scapular 'dyskinesia' an individual's adaptation to optimise function? If such a hypothesis were true then it would support observations that the scapula does not adopt a common and consistent posture in painful shoulder conditions [7] and perhaps is another example of where we have 'pathologised' a normal human response to our surrounding environment. A second of many possible questions is whether focus on

dyskinesia, i.e. the product of scapular muscle recruitment, and other modifiable and non-modifiable factors, is the most appropriate focus? Perhaps a focus on muscle recruitment is more relevant to help explain parts of the shoulder 'puzzle'? [8].

Returning to the review by Hickey et al., the relative risk statistic, reported as 1.43 (95% CI 1.05 to 1.93); the headline figure of a 43% increased risk is appealing but where a statistic is derived from a sample and aiming to infer findings to a population, there will always be uncertainty. In this case, the 95% confidence interval, i.e. the range of values within which the true population value lies, reflects this uncertainty. So, the true population risk ranges from 1.05, i.e. almost no increased risk (where 1 = no increased risk) to 1.93, i.e. almost twice the risk. This range of uncertainty highlights the problem of quoting one headline figure.

Finally, reliability of the assessment of scapular dyskinesia is widely recognised to be poor [9]. This has direct implications, as identified by the authors of the review who conducted a sensitivity analysis to determine the effects of a different assessment of scapular dyskinesia. An alternative approach to assessment demonstrated that the presence of scapular dyskinesia at baseline was indicative of a 28% increased risk (RR=1.28, 95% CI 0.93 to 1.76). Hence, a different method of assessment results in a more cautious estimate of risk and again, with reference to the 95% confidence interval it can be seen that there is wide variability around this point estimate with a relative risk of less than one indicating a protective effect of scapular dyskinesia on developing a future episode of shoulder pain.

To conclude, Hickey et al. have produced a rigorous systematic review in a topical area of interest. As, the authors reflect through the review, there remain limitations in the data we have and much uncertainty in relation to our current understanding. So, we suggest the headline figure might best be taken with a 'pinch of salt' at this time.

STATEMENTS

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