

A CLINICIAN'S PERSPECTIVE

The Athlete and Asymptomatic Shoulder Changes Seen on MRI

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In the past decade, with improvements in imaging to investigate soft tissue, there has been growing evidence of significant changes in the bone, ligament, tendon and muscle that do not have pain associated with these changes. The prevalence of musculoskeletal pain in the general population is 18.6–31% for one-month prevalence and 6.7–66.7% for lifetime prevalence (Luime JJ et al., 2004). However, there are relatively few studies that have investigated this prevalence. There are even fewer studies available that have specifically looked into the prevalence of shoulder pain in the elite athlete. One study found involved 257 Brazilian swimmers who were participating in the 2014 swimming championship. 20% of the swimmers reported current musculoskeletal pain. Of these swimmers, 60% reported at least one injury in the previous year. The shoulder was the most commonly affected region in this population. Of this joint, the most common diagnosis was tendonopathy (IJSPT 2015).

There is a growing body of evidence that in the asymptomatic population of both the elite athlete and non-athlete there is a high frequency of significant pathology found on MRI. Fredericson et al., 2009, found in asymptomatic elite volleyball players, 50% had shown moderate changes to the labrum and 8% with severe changes. In these same athletes there were changes demonstrated in the rotator cuff with 25% moderate changes and 17% with severe changes. Fredericson et al., (2009) also investigated swimmers and found more changes noted in the labrum with 83% having moderate changes. There were 67% with moderate ligament changes. At the three to four-year follow-up, only one swimmer and one volleyball player reported shoulder problems during the study period (p. 107). These authors concluded, "Asymptomatic elite athletes demonstrate MRI changes of the shoulder (swimmers and volleyball players) and wrist (gymnasts) similar to those associated with abnormalities for which medical treatment and sometimes surgery are advised" (p. 108).

Similar changes were found in elite baseball players. Conner et al., 2003, reported on asymptomatic shoulders of overhead athletes with a five-year follow-up study. Dominant and non-dominant shoulders were compared. These authors found 40% of the dominant shoulders with partial or full thickness tears of the rotator cuff with but 0% in the non-dominant arm. There was also evidence of Bennett lesions in 25% of the dominant arms. The authors concluded that "MRI alone should not be a basis for operative intervention in this patient population" (p. 724).

Miniaci et al., 2002, assessed elite asymptomatic baseball pitchers as well comparing the throwing arm to the non-throwing arm. They found Grade 1 changes in the rotator cuff to be 79% in the throwing arm and 86% in the non-throwing arm. When comparing the infraspinatus between the two shoulders, there was evidence of Grade 1 changes at 86% and Grade 2 changes at 14% in the throwing arm. The non-throwing arm had 79% Grade 1 changes only. The labrum in the throwing arm had abnormal changes seen in 79%, with 55% having signal changes, and 45% having tears. The non-throwing arm demonstrated similar changes with 79% abnormalities seen and 64% with signals changes and 36% with tears. These authors concluded that "Due to the presence of signal changes and abnormalities in pain free shoulders, MRI may have little role in the assessment of the symptomatic shoulder of professional pitchers" (p. 72).

Although this paper was focused on asymptomatic elite athletes and positive changes on MRI, there are significant pathologic changes also seen in the non-athletic population typically demonstrating greater and more common incidence of changes with age (Reilly P et al. and Gill T et al.). Advances in imaging have led to improved detection of these changes as well as the extent of the tear (Shaffer and Huttman, 2014). Over the years, this has also led to advances in surgical techniques. However, Shaffer and Huttman report "Despite improved recognition and surgical treatment, successful management of the thrower with a torn cuff remains elusive" (p. 101). Therefore, the authors conclude that non-operative management of overhead athletes should be first choice because of the fact there is a high asymptomatic prevalence of cuff changes. These authors go on to report that there is a frequent positive response to conservative management and, unfortunately, there is the current reality that surgery does not assure successful return to sport or even full resolution (p. 104). They suggest a reasonable period of conservative management to be around three months, but could also take longer especially with a more extensive tear (p 104).

There are relatively few studies that have assessed the return to sport from a post-operative intervention. If the source of pain is in the rotator cuff, there are two options for surgical intervention: debridement and

cuff repair (Shaffer & Huttman, 2014). Payne et al, (1997) reported on 40 athletes with partial tears who underwent subacromial decompression and debridement of partial tears. The group with a traumatic onset of pain reported 86% satisfied with the outcome and 64% return to sport at pre-injury level. However, the group with insidious onset of shoulder pain reported 66% satisfied and a 45% return to pre-injury athletic activity (Shaffer and Huttman, 2014).

These same authors reviewed return to sport after cuff repair and found that overhead athletes have not shown uniformly good results (p 105). Unfortunately, there is little data available that has investigated outcomes after cuff repair in overhead athletes. Mazoue et al., 2006, studied this group of athletes and found a 12% chance of return to baseball. Therefore, operative management involving cuff repair should be carefully considered, and only considered if conservative management has failed (p. 108).

There are also studies on diagnostic accuracy of orthopedic special tests, which have consistently demonstrated lack of specificity and sensitivity. A systematic review of these individual tests by Hegedus et al., 2015, found that "The diagnostic accuracy of the Neer test for impingement, the Hawkins-Kennedy test for impingement and the Speed test for labral pathology is limited" (p. 80).

There is growing evidence that shoulder pain with ROM, strength and functional deficits can have a pure cervical or even thoracic origin, in which all dysfunction of the shoulder is fully resolved with cervical and/or thoracic movement. The IMC Database in Tallahassee, FL (2016) rates this prevalence at 30%. This diagnosis is found with proper use of Mechanical Diagnosis and Therapy's (MDT) response based assessment. This assessment process also reveals the diagnosis of shoulder derangement that is characterized by rapid changes in shoulder deficits. The IMC Database (2016) reports a 67% prevalence of shoulder derangement. These diagnoses and rapid changes are determined without the use of imaging.

Based on the review of imaging on asymptomatic shoulders of elite athletes, imaging could, then, create an unintentional increase in unnecessary interventions if decisions are made based on what a picture reveals. This could cause a direct increase in cost due to unnecessary interventions including unnecessary imaging. In fact, Donelson et al, 2016, found a 51.5% cost savings when patients who sought 'Mechanical Care,' which utilized McKenzie's MDT response based assessment, as opposed to community care. Perhaps with issues in imaging and special tests, the MDT response based assessment offers a reasonable and sensible solution to resolving musculoskeletal problems that are capable of change without imaging.

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