

Sports Update: The Shoulder

Much of the research performed in sports medicine focuses on two major regions: the shoulder and the knee. This month and next, we will focus on new research findings regarding the shoulder. The following two months, we will focus on the knee.

This month, we will answer the following questions:

- Is the empty can test sensitive to full-thickness tears of the supraspinatus? Is the thumb-down or thumb-up position the best?
- Are there other forms of labrum tears other than the traumatic anterior-inferior tears (from dislocations) and SLAP tears (from falls or overcontraction of the biceps)? How difficult are they to detect on physical examination?
- What is the natural history for volleyball players who have infraspinatus atrophy?

Itoi E, Kido T, Sano A, et al. Which is more useful, the "full can test" or the "empty can test" in detecting the torn supraspinatus tendon? *Am J Sports Med* 199;27:65-68.

Since Jobe and Moynes¹ reported that the supraspinatus was best tested with the empty can position of 90 degrees abduction in the scapular plane (scaption) coupled with internal rotation, there have been several challenges to their findings. The interpretation of whether pain was necessary for a positive finding or whether weakness alone was sufficient has been debated. Also, if pain is not necessary, Kelly et al.² suggested the same position but with the shoulder in external rotation (thumb up). They felt that it was sensitive, however, less painful for the patient.

This current study evaluated these issues by testing 143 shoulders in 136 patients. Of these patients, 35 had full-thickness tears (as demonstrated on high-resolution MRI). The accuracy of the test was highest when weakness was used as the positive indicator. The full can test (thumb up) was 75% accurate; the empty can test (thumb down) was 70% accurate with no statistical difference between the two tests. The sensitivity for both the full can and empty can tests were 86% and 89% when the results were interpreted using either pain, muscle weakness or a combination of both. The specificity was highest when using weakness as the only indicator (full can test = 74%; empty can test = 68%). What this seems to suggest is that although pain increased the sensitivity of the tests, it was not specific for supraspinatus tears. Remember that accuracy factors in positive and negative predictive values which take into account the number of actual rotator cuff tears in the tested group.

Mair S, Zarzour R, Speer K. Posterior labral injury in contact athletes. *Am J Sports Med*

1998;26:753-758.

Although there are clear historical and physical examination indicators for labrum damage in patients who dislocate or fall on an outstretched arm, there are no clear indicators for posterior tears that do not have associated shoulder instability. Posterior labrum tears have been identified in throwing athletes who have tensile failure due to capsular stretching and posterior impingement.

This study evaluated a small group of patients who had no indication of instability when tested. Patients reported pain with bench pressing, but did not attribute the onset of pain to bench pressing. All nine patients did have posterior joint line tenderness. Less than half had posterior clicking on load-and-shift testing. They all had full range of motion and no indicators of instability. Impingement test results were variable.

Imagine this type of patient in your office. Chances are, based on the level of professional play, you would either run special imaging or treat conservatively for a period of time. In this study, all patients were examined with special imaging (CT arthrography or MRI). Six of the patients had positive "suggestions" of posterior labral tearing. All patients were put through six weeks of physical therapy prior to surgery. The rationale is that some may improve; those that do not will have better postoperative muscle tone and theoretically improve their recovery time. All patients did not improve and were surgically treated with labral reattachment procedures. At 30-month followup, none of the athletes had recurrence of symptoms.

What is interesting about this study is that all the athletes had a potentially common mechanism. Seven were offensive linemen; one was a defensive lineman; and one was a lacrosse player. All had been exposed to a posteriorly directed force with their arms abducted and held in front of the body, although not all could remember a single inciting incident. What is important about this mechanism is that all were prepared for the oncoming posteriorly directed force (from the opposing player). The proposed mechanism is one of compression from the outside causing a shear at the posterior glenoid and labrum. It is believed by the authors that the capsule is not involved in this mechanism (protected by position and pretensed muscles) which would explain why there were no clear indicators of instability on the physical examination.

The take-home message is that athletes who repeatedly sustain posterior directed forces to the shoulder and pain with bench pressing should be evaluated for posterior labrum tear. The evaluation will probably include positives of posterior joint line tenderness and clicking on posterior translation with load-and shift maneuvers. However, range-of-motion and stability testing will be normal. Impingement testing will be equivocal or positive. The authors suggest that these athletes be further evaluated for posterior labrum tears. They caution that special imaging (they recommend CT arthrograms for labrum tears, as does most of the literature) may still miss the lesion and that arthroscopic evaluation is necessary. A limited period of conservative rehabilitation may be attempted. Those that fail to respond should be referred for surgical consult.

Ferretti A, DeCarli A, Fontana M. Injury of the suprascapular nerve at the spinoglenoid notch: the natural history of infraspinatus atrophy in volleyball players. *Am J Sports Med* 1998;26:759-763.

It may be shocking the first time a sports chiropractor attends a high-level volleyball competition such as the Association of Volleyball Professionals (AVP) series. Many of the top-level layers have

infraspinatus atrophy, yet are Olympic-level players. The estimation is that 20% of high-level volleyball players have infraspinatus atrophy.³ If unaware of this common presentation, overinvestigation or over-referral is likely. The irony of the ability of the athlete to function at such a high level without pain is confusing, however, it is the norm as evidenced by this study.

Over a period of 11 years, 38 cases of isolated atrophy of the infraspinatus were followed. Thirty-five of the athletes had no pain and were simply treated with exercises emphasizing external rotation. The three patients who did have pain were surgically treated. Only one of the surgically treated athletes had notable reduction of atrophy. All other patients had no improvement of atrophy. Out of 16 patients who were treated conservatively and followed for an average of 5.5 years, 13 were still involved in volleyball and the remaining three retired symptom-free.

The proposed mechanism that is specific to volleyball is the floating serve. The idea is to produce a perceived "floating" trajectory that is harder to "read" by the opponents. Unlike other serves or throwing, the floating serve requires sharply striking the ball and then suddenly retracting the arm. EMG evidence suggests that the eccentric activity of the infraspinatus is much more intense than other similar activities.⁴ Theoretically, this increases the distance between the origin and termination of the nerve, stretching the nerve over the lateral edge of the spine of the scapula.

References

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