

Magnetic Resonance Imaging Findings in Asymptomatic Elite Volleyball Players

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Summary:

Pathologic MRI findings in elite overhead athletes can be present; however, they are often asymptomatic. Treatment of shoulder pathology in an elite volleyball player should almost always begin with conservative treatment measures.

Abstract:

Purpose: To evaluate the shoulder of asymptomatic elite-level volleyball players. **Methods:** Before the initiation of this investigation, we obtained approval from the Institutional Review Board (QR File#: 27208/1). A total of 26 elite volleyball players from the United States Men's and Women's National Indoor Volleyball Teams consented to participate in this study. Each athlete completed a comprehensive survey regarding prior injury and treatment. Physical examination was performed to record range of motion, strength and response to provocative testing. Visual analog pain scores, UCLA shoulder scores and American Shoulder and Elbow Society (ASES) outcome scores were recorded. Each athlete underwent a non-arthrogram MRI (Esoate S-Scan 0.27 Tesla) of his or her dominant, asymptomatic shoulder. MRI studies were reviewed by two radiologists with fellowship training in musculoskeletal radiology. Both radiologists were blinded. **Results:** The mean self-reported ASES score was 88.5 (range: 42.5 – 100), and the mean UCLA score was 32.1 (range: 20 – 35). Mean flexion, abduction, extension, and external rotation at 0 degrees of the subjects' dominant shoulders (164.4 degrees, 158.5 degrees, 61.6 degrees, and 68.0 degrees respectively) were relatively similar to those of their non-dominant shoulders (164.8 degrees, 162.3 degrees, 62.2 degrees, and 66.0 degrees respectively). Mean dominant isolated glenohumeral external rotation was 92.1 degrees (range: 66 – 140 degrees) compared to 82.3 degrees (range: 5 – 120 degrees) in the non-dominant shoulder. Mean dominant shoulder isolated glenohumeral internal rotation at 90 degrees was 48.5 degrees (range: 22 – 60 degrees) compared to 56.0 degrees (range: 33 – 90 degrees) in the non-dominant shoulder. One athlete (3.8%) had positive apprehension and relocation tests, eight (30.7%) had positive Sulcus signs, two had decreased (4/5 on manual muscle testing) rotator cuff strength (one infraspinatus, one subscapularis), four (15.4%) had positive Neer's tests, four (15.4%) had positive Hawkins's tests, and four (15.4%) had positive Jobe's tests of their dominant shoulders. Seven (26.9%) athletes had visible muscle atrophy and scapular dyskinesis upon physical examination. 23 of 26 athletes had rotator cuff tendinosis (88.5%) on MRI. Among the 23 athletes with tendinosis, 17 had evidence of partial rotator cuff tears (65.4%): 13 supraspinatus, two infraspinatus, and two subscapularis. Six athletes had labral tears (23.1% - four SLAP (15.4%), two anterior-inferior Bankart (7.7%)), and six athletes had evidence of labral fraying (23.1%). 13 athletes had degeneration of the capsule (50% - 12 anterior and/or inferior (46.2%), one posterior (3.8%)), 18 had arthritis of the AC joint (69.2%), and 13 had chondromalacia (50%). There were no MRIs with no pathology detected. **Conclusion:** The dominant shoulder of an elite overhead athlete, such as a volleyball player, is placed under significant repetitive stress and is at risk for damage to the structures of the joint. However, this damage can remain asymptomatic even under the repetitive stress incurred throughout an athlete's career. Our current study is the first that we know to evaluate the dominant shoulders of asymptomatic, elite volleyball players. We found that MRI findings in elite overhead athletes are highly likely to include abnormalities that could be considered surgical;

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however, these findings are often asymptomatic. It is important to recognize that there is a high rate of asymptomatic, yet abnormal MRI findings in this patient population. Therefore, we recommend that operative management on overhead athletes only be utilized following significant non-operative treatment as patient symptoms may not correlate with MRI findings.