

CASE REPORT

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Anterosuperior Glenoid Impingement Syndrome

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Abstract: Anterosuperior glenoid impingement is a well documented cause of shoulder pain. It occurs when there is deep tearing of the subscapularis, with fibers becoming embedded between the anterosuperior glenoid and humeral head. To our knowledge, this has not been described in radiologic literature and we present MRI findings depicting this entity

Keywords: subscapularis, glenoid, impingement, MRI, rotator cuff

Clinical Medicine Insights: Arthritis and Musculoskeletal Disorders 2012:5 15–18

doi: [10.4137/CMAMD.S7880](https://doi.org/10.4137/CMAMD.S7880)

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Introduction

Anterosuperior glenoid impingement is a well known and well documented cause of shoulder pain, which occurs after deep surface tears of the subscapularis retract and subsequently become trapped between the anterosuperior glenoid and humeral head. Pain is typically elicited when the shoulder is flexed with internal rotation. We demonstrate MRI images depicting anterosuperior glenoid impingement in a 52 year old male.

Case Report

A 52 year old male carpenter presented with chronic shoulder pain to his dominant side. He had hurt his shoulder nearly two years prior to MRI, when a bungee cord he was pulling up on suddenly snapped, causing his shoulder to jerk. The patient stated that since the acute injury, he has had trouble working as a carpenter. His pain was to the point of debilitating when reaching out in front and rotating inwards, localizing over the anterior aspect of the shoulder in the region of the subscapularis. He also had difficulty sleeping, sometimes awakening with extreme pain, noting that he often slept with his arm over his head. His primary care physician started him on a nonsteroidal antiinflammatory drug, which he said had relieved some of the pain.

MR imaging of the shoulder was acquired using multiplanar multisequential imaging. This clearly depicted partial thickness tear of the subscapularis, with portions of the deep fibers trapped between the anterosuperior glenoid and humeral head. This was best visualized on axial imaging, displaying deep fibers of the subscapularis embedded between the glenoid and humeral head (Fig. 1A, B and C). This was triangulated and confirmed on sagittal and coronal images (Fig. 2A and B). Intact superficial fibers of the subscapularis or scar tissue remained attached to the lesser tuberosity. The long head of the biceps was located in its proper anatomical position within the bicipital groove, with overlying transverse ligament intact. Ancillary findings included a complete tear of the supraspinatus with significant myotendinous retraction (Fig. 3). There was also a moderate sized joint effusion giving an arthrogram appearance, aiding in the diagnosis. A radiograph done prior to MRI only demonstrated mild degenerative changes of the acromioclavicular joint.

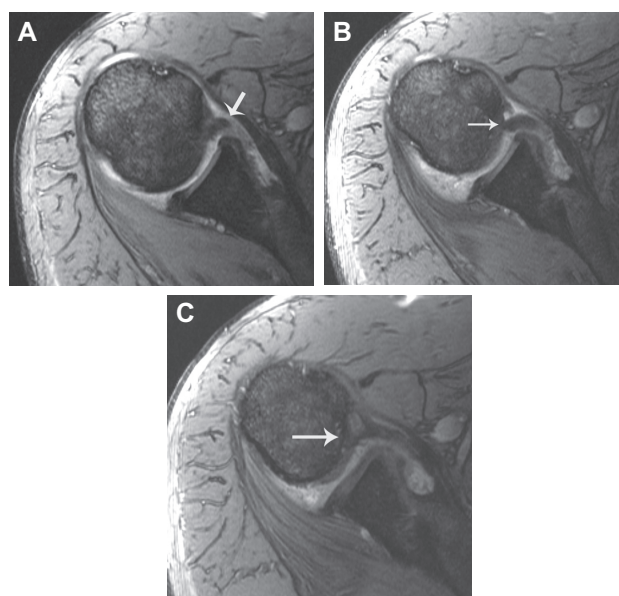


Figure 1. Axial T2 WI from superior to inferior demonstrate partial undersurface tearing of the subscapularis. The arrow points to the deep fibers of the subscapularis, which is retracted and has become entrapped between the anterior glenoid and humeral head.

Discussion

The subscapularis muscle arises from the anterior surface of the scapula, inserting at the lesser tuberosity.¹ It is the sole anterior component of the rotator cuff and functions mainly as an internal rotator. Furthermore, the subscapularis acts as an important anterior dynamic stabilizer of the glenohumeral joint and also contributes to the static stability of the joint.^{2,3}

Anterosuperior impingement involving the deep surface of the subscapularis has been detailed by Gerber arthroscopically. He first presented a study using arthroscopy revealing impingement of the undersurface of the subscapularis tendon against the anterosuperior glenoid rim in a position of flexion and

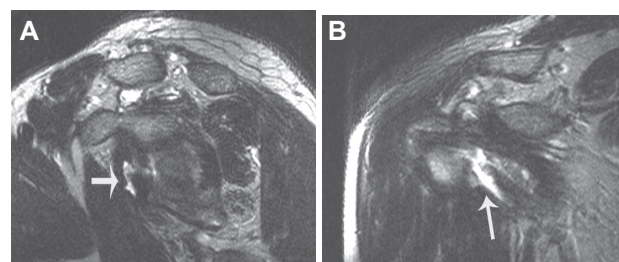


Figure 2. Sagittal (A) and Coronal (B) T2 WI redemonstrate partial tear of the subscapularis, proximal to its insertion on the lesser tuberosity. The coronal images (B) clearly depict the tear, with fluid seen where subscapularis muscle fibers normally run (arrow). Just above the fluid, several intact fibers are seen.



Figure 3. Coronal PD images demonstrate complete tear of the supraspinatus with myotendonous retraction (arrow).

internal rotation as a cause of intra-articular impingement responsible for painful structural disease.⁴

Cadaveric studies have also confirmed articular subscapularis tears to be quite frequent and can be associated with lesions of the common attachment of superior glenohumeral and coracohumeral ligament.⁴⁻⁹ The cause of undersurface subscapularis tear is unknown, however several theories have been postulated. This includes degenerative changes by higher tension in poorly vascularized region.^{4,10} Another possibility includes tensile loading from indenting of the superficial surface, by the coracoid process.¹¹ Bergin et al also detailed a significant relationship between chronicity of full thickness supraspinatus tendon tears and severity of subscapularis tendon abnormalities, suggesting that secondary anterior instability predisposes to subsequent subscapularis tendon abnormality.¹ This may have been the underlying cause in the case presented, where there was a complete supraspinatus tear. Subscapularis tendon injuries usually occur in older patients, with most studies reporting a mean age of more than 51 years.¹²⁻¹⁶ The presented case was consistent with this mean, a 52 year old male.

This process of the subscapularis tendon fibers getting stuck between the glenoid and humeral head causing pain is similar to the process seen with posterolateral impingement. Posterolateral impingement, which occurs when either the supraspinatus

and infraspinatus or both tendons become entrapped between the humeral head and posterior glenoid, has been widely recognized in orthopedic and radiology literature. Posterior impingement usually occurs with abduction and external rotation.¹⁷

The subscapularis should be carefully examined on all patients and is best evaluated on axial imaging. It is also important to view the long head of the biceps in this plane, as the tendon may sublux with subscapularis tears or dissect back into the subscapularis tendon. Findings may be confirmed in the sagittal and coronal planes. We also propose that special attention is made involving deep articular surface tears of the subscapularis, predisposing to anterosuperior impingement between the humeral head and glenoid. Symptoms are often exaggerated during flexion and internal rotation and overhead movements, such as tennis or repetitive movements and often seen in the dominant arm.⁴ MRI is especially an important tool in evaluating the subscapularis, as lesions may be missed at arthroscopy or surgery when they are not specifically sought for.^{8,13,16}

In conclusion, it is important for the radiologist to become familiar with pathology related to the subscapularis and in particular deep surface tears, as this may lead to impingement between the glenoid and humeral head. Anterosuperior impingement syndrome is a well known entity and MRI is a key diagnostic tool in evaluating the subscapularis and may aid the orthopedic surgeon prior to arthroscopy.

Disclosures

Author(s) have provided signed confirmations to the publisher of their compliance with all applicable legal and ethical obligations in respect to declaration of conflicts of interest, funding, authorship and contributorship, and compliance with ethical requirements in respect to treatment of human and animal test subjects. If this article contains identifiable human subject(s) author(s) were required to supply signed patient consent prior to publication. Author(s) have confirmed that the published article is unique and not under consideration nor published by any other publication and that they have consent to reproduce any copyrighted material. The peer reviewers declared no conflicts of interest.



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