

Case Study: September 2008—Evaluation of the Shoulder Aimee Mulkern, NP



“Doctor, I tore my rotator cuff”: Diagnosing shoulder problems in the office

Introduction:

The shoulder is a complex multidirectional joint that is mobilized and stabilized by many different structures. The rotator cuff is the largest stabilizing structure of the glenohumeral joint. It is a structure comprised of four muscles that converge at the humeral head. When patients come into the office complaining of shoulder pain, the most frequent assumption is that it is coming from their rotator cuff.

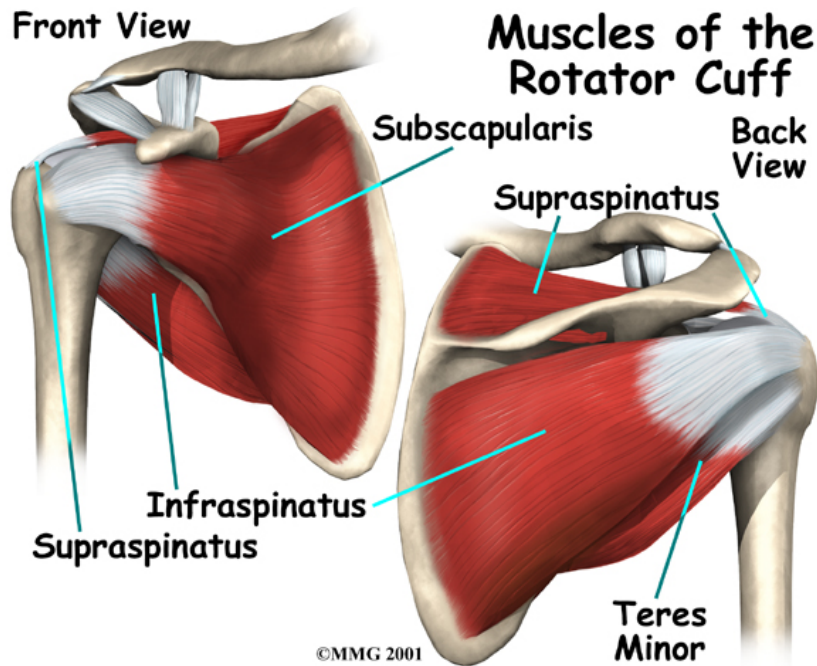
It is so commonly discussed that while many people may have heard of the rotator cuff, they aren't quite sure of what it is. They may have a friend with a “similar” shoulder problem and it happened to be a rotator cuff injury thereby solidifying the association of shoulder pain and the rotator cuff.

While a rotator cuff tear is certainly one of the more common diagnoses in the shoulder, there are many other diagnoses that should be considered in the differential diagnosis. To formulate the appropriate diagnosis and treatment plan, a thorough history and physical examination are critical.

What is the rotator cuff anyways? (Anatomy review)

The rotator cuff is actually made up of four muscles and tendons-- the supraspinatus (top of the shoulder), the infraspinatus (just posterior to the supraspinatus), the subscapularis (anterior to the supraspinatus), and the teres minor (just inferior to the infraspinatus). The four rotator cuff muscle tendons

combine to form a broad, conjoined tendon called the rotator cuff tendon and insert into the humeral head.



Tendons, in general, serve as the connection between muscle and bone. When a muscle contracts it pulls on the tendon, which in turn pulls on the bone that it is attached to. If any one or more of these tendons is/are torn, the muscle-bone connection is broken and the muscle is unable to do its job. With respect to the rotator cuff, in addition to help mobilize the arm, the rotator cuff has two other important functions.

One of these functions is to statically stabilize the humerus so that it remains well-centered in the glenoid. In the absence of one or more of the rotator cuff tendons, there is translation of the humerus on the glenoid surface either anteriorly, superiorly, or posteriorly, depending on which tendon is injured or torn. Increased movement often results in shearing forces across the joint (in particular to the labrum) and may result in humeral head migration and impingement

The second critical function the rotator cuff function is to rotate the shoulder. Because the rotator cuff is made up of four tendons, it has the ability to rotate the humerus on the glenoid surface. The supraspinatus is the principle supporting and kinetic muscle of the shoulder and assists with shoulder abduction. The primary function of the rotator cuff, however, is to stabilize the glenohumeral joint so that the larger shoulder muscles (deltoid, latissimus dorsi)

can carry out their function without significant motion of the humeral head on the glenoid.

Why is it not as common as people think?

Age plays a big factor when formulating a differential diagnosis for a patient who presents with shoulder pain. Most rotator cuff tears occur in patients due to chronic overuse and degeneration. If a younger patient (under the age of 50 years) presents to your office with a history of atraumatic shoulder pain, rotator cuff tear should be quite low on your list of differentials. If on the other hand the same patient describes a specific, traumatic event that occurred just prior to the onset of the shoulder pain, you would want to pay closer attention to the signs of a rotator cuff tear as you gather the rest of the history and conduct the physical exam. Younger patients with a rotator cuff tear often present after an acute injury such as a fall or lifting a heavy object. When the tear occurs, there may be sudden acute pain, a snapping sensation, and an immediate weakness of the arm.

History

As with most diagnoses in healthcare, much of the information that is needed is obtained by taking a detailed history. The rotator cuff is a perfect example of this. First, it is important to determine the patient's chief symptom (pain, weakness, instability, limited ROM). Determine how and when the problem began and if the symptoms are related to a specific injury or traumatic event. Determine which activities and arm positions increase or decrease symptoms. Ask if previous treatments or therapies have been tried, including ice, heat, or medications (NSAIDs, Acetaminophin), physical therapy, previous injections or surgeries. A social history should be obtained including the patient's occupation and level of athletic participation.

Case Study #1

Mr. G is a 28 year-old male who presents to your office with a 6-week history of right shoulder pain. He states that he doesn't remember any real trauma to the shoulder. The only thing he can remember is that he was in the gym doing pushups one day and subsequently noticed shoulder pain the next day. He has since stopped going to the gym and has noticed that his pain is better. He is fearful of returning to his gym activities because he doesn't want to "damage it anymore" so he is here in your office for an evaluation.

Case Study #2

Your next patient is Mr. S. He is a 60 year-old male who presents to your office with a 2-month history of left shoulder pain. He states that he doesn't remember hurting his shoulder. He states that he began noticing some mild to moderate pain in his shoulder that has since progressed to what he would now consider to be severe. His chief complaint today is that he is unable to sleep. He describes the pain as being localized to the side of his shoulder and he uses his right hand to rub the side of his left arm as he describes the pain.

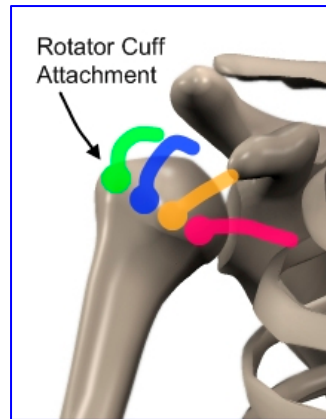
To better help focus your history in after listening to the above presentations it is helpful to ask patients about the location of their pain.

The location of the pain is often critical making the correct diagnosis. Asking the following question is often very helpful in helping to focus your examination.

"If you had to say where in your shoulder the pain is **PRIMARILY** you would say:

- A. The top of your shoulder
- B. The front of your shoulder
- C. The back of your shoulder
- D. The side of your shoulder
- E. Inside your shoulder joint

Mr. G answers C and Mr. S answers D.



- Classic rotator cuff pain is referred to the side of the shoulder. Most patients will use their unaffected hand to rub the side of their affected shoulder from the lateral aspect of the shoulder downward to the region of the mid-humerus and then back up to the lateral aspect of their shoulder.
- Another classic complaint in patients with rotator cuff problems is night pain. Patients will often say that their pain is primarily at night when they lay on the affected shoulder. In fact many patients will be sleep deprived as a result of the pain waking them up at night.

Mr. S's history is consistent with classic rotator cuff symptoms whereas Mr. G's symptoms are not.

Physical Exam:

1. Inspection/Palpation

First inspect the shoulder for atrophy of the musculature surrounding the shoulder or any obvious deformities. Carefully inspect the shoulder from the anterior, lateral, and posterior positions. Note any swelling, atrophy, asymmetry, or old scars. Providers should also palpate around the glenohumeral joint for localized tenderness or abnormalities.

2. Range of Motion

Providers should evaluate the total active and passive range of motion. Ask the patient to move their shoulder into forward flexion, abduction, external rotation, and internal rotation. If the patient is unable to do this on his or her own, it can be as a result of stiffness, pain, weakness, or any combination of these (i.e. pain and weakness).

The patient should then be put through these same motions passively. It is then the job of the examiner to determine if the shoulder is in fact stiff, or if pain is limiting them in moving their shoulder. Decreased active elevation with normal passive ROM is usually observed in rotator cuff tears secondary to pain and weakness. When both active and passive ROM are decreased similarly, this usually suggests onset of adhesive capsulitis (frozen shoulder)

Hawkin's and Neer impingement signs are two specialty tests that detect inflammation of the rotator cuff-- specifically the supraspinatus tendon.

Classic Neer Impingement sign – Passively bring the patient's arm into the extreme of forward flexion and internal rotation. Pain at the extreme of this motion (180 degrees of forward flexion) is considered to be a positive sign and may indicate an injury to the rotator cuff or possibly the biceps tendon

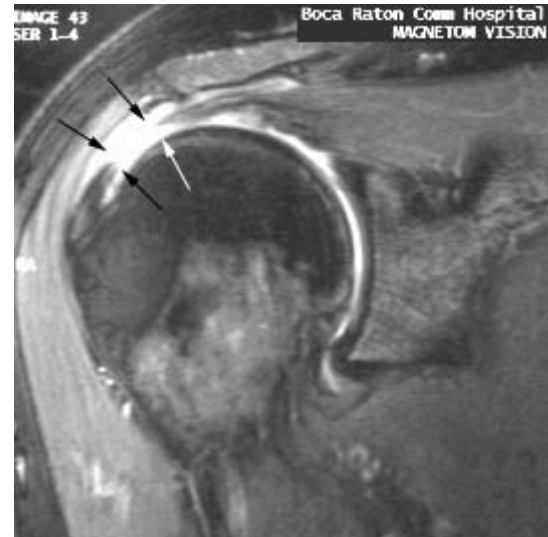
Hawkin's impingement sign – Passively bring the patient's arm into 90 degrees of abduction and angled to about 45 degrees into the frontal plane, gently rotate the forearm into internal rotation. Pain in the superior, lateral aspect of the shoulder indicates a positive sign. A positive Hawkins impingement test often indicates a rotator cuff tear.

Strength Testing

Weakness can occur as a result of actual structural deficiencies or from guarding due to pain. Weakness secondary to pain can often be mistaken for an actual structural deficiency. Patients with a chronic tear or injury to the rotator cuff may present with visible atrophy of the shoulder muscles.

4.) Radiographic Studies/Imaging:

The correct use of diagnostic tests is an important component of effective medical practice. X-rays cannot directly reveal tears of the rotator cuff, however, they can show indirect evidence of rotator cuff pathology. Large tears of the rotator cuff may allow the humeral head to migrate upwards (high riding humeral head) and this can be seen on x-ray. If, based on the history and the physical exam you are concerned about a possible rotator cuff injury, the study of choice would be magnetic resonance imaging (MRI). The MRI can reliably detect most full and partial thickness rotator cuff tears. Small rotator cuff tears and labral tears of the glenoid are seen better when the MRI is done with intra-articular contrast (arthrogram).



MRI scan showing full thickness tear of supraspinatus tendon

Conclusion/Discussion

Utilizing the history, physical examination and imaging you can make the diagnosis and formulate a treatment plan. Providers should be advised to use clinical judgement and not rely on MRI images or x-rays to determine the cause of shoulder pain. Don't be misled when a patient walks into your office and says that they had a rotator cuff injury. Listen to what they have to say about how their pain began and ask them that multiple choice question as to where they feel as though their pain is localized to. If they are younger than 45 years old without any history of trauma, put the diagnosis of rotator cuff problems on the very bottom of your list of differentials.

