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ROTATOR CUFF PROBLEMS

This informational handout has been prepared to help patients and their families better understand the diagnosis and treatment options of rotator cuff disease and injury. Before discussing specific problems of the rotator cuff, it will help to review some of the basic anatomy of the shoulder and the rotator cuff. Some of the illustrations which accompany this handout will help you to get a general idea of the anatomy and to visualize it better.

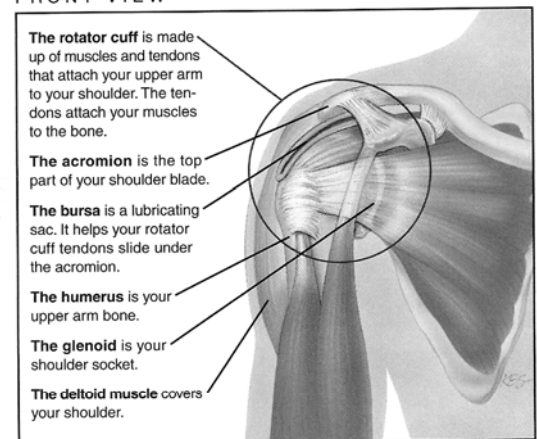
ANATOMY

The shoulder is not a true ball and socket joint like the hip. One side is round, and the other side is flat. The round side is called the humeral head, and the flat side is called the glenoid. This relationship resembles more like a golf ball sitting on a tee, rather than a classic ball and socket. The bones that form the shoulder joint, therefore, do not provide much, if any, built-in stability because of their shape. The structures that do provide stability are the ligaments. These ligaments surround the joint; they are attached to the humeral head on one side and the glenoid on the other. These ligaments are in the front of the shoulder, the underneath-side of the shoulder (deep in the arm-pit), and the back of the shoulder; together they form a “hammock” to support the ball within the glenoid socket. On top of the shoulder joint and overlaying the ligaments in the front and the back of the shoulder are a group of tendons. These tendons originate from four muscles which together, as a group, are called the rotator cuff.

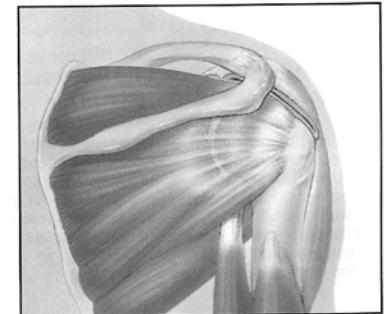
For those of you who are more interested in anatomic details, the names of the muscles and tendons that comprise the rotator cuff are: the subscapularis, in the front or anterior aspect of the shoulder; the biceps tendon, also in the front of the shoulder; the supraspinatus, which covers most of the top; and the infraspinatus and teres minor muscles, which comprises the posterior or back. The ligaments described above which provide stability to the joint are actually underneath or deep to the rotator cuff tendons, primarily the subscapularis and the infraspinatus / teres minor tendons. These rotator cuff muscles (and tendons) do also act to support and stabilize the shoulder, but their main function is to move the arm and shoulder. The ligaments are called the glenohumeral ligaments and are named according to their position; the superior and middle glenohumeral ligaments are in the front of the shoulder; the inferior glenohumeral ligament lies at the bottom or in the arm-pit; and the posterior glenohumeral ligament which is found in the back, all of which contribute to give the joint stability.

As mentioned above, the ligaments provide stability to the shoulder. The muscles and tendons provide some degree of support and stability to the shoulder, but their main function is to move the arm and shoulder. The combination of different muscle groups that surround the shoulder [i.e. the rotator cuff muscles, the large deltoid muscle (which covers the outside of the shoulder), as well as some other muscles, like the pectoralis major (chest muscle)], work together in a rather complex fashion to allow you to move the shoulder through a remarkable range of motion.

FRONT VIEW



BACK VIEW



Other important structures related to the shoulder and influence rotator cuff disease and injury are the acromion (which is the bone on top of the shoulder) and the collarbone or clavicle which joins to the acromion. This joint is called the acromioclavicular joint or the AC joint. The acromion and the AC joint can develop spurs, particularly in the older age groups, which can irritate and abrade the rotator cuff and cause abnormal wear and tear of the rotator cuff.

DIAGNOSIS

To arrive at a specific diagnosis, I will have taken a history (your story about your symptoms, their onset, and your injury, if any), examined you, and reviewed your x-rays. All the above are helpful in establishing a diagnosis. Some of these diagnoses are as follows:

ROTATOR CUFF TENDINITIS

This term means the same thing as bursitis or tendonitis of the shoulder. There are several causes of this problem. In some people, the most common cause is overuse, such as repetitive throwing, weightlifting, overhead racquet sports, swimming, and so forth; it can also occur in people not performing athletic activities, but daily repetitive activities, such as using a computer mouse, carrying/lifting objects or typical household cleaning. In some people, these activities lead to inflammation or tendonitis. As mentioned above, the rotator cuff is composed of four muscle-tendon units, and any or all of these can be involved. The supraspinatus and the biceps are the most commonly involved. What overuse does to the tendons is not known absolutely. It is felt that with overuse small, microscopic tearing of the tendon fibers occurs. Most tendons have an area of poor blood supply within the tendon itself. This makes the body's attempt at healing these microtears not totally successful. We think this leads to an irritative process in the tendon which is called tendonitis with ultimately results in chronic thickening of the tendon, known as rotator cuff tendinosis.

Symptoms are generally those of pain, usually after activity at first, and then during activity. The pain can usually be relieved by rest, but in some cases, the pain may be rather severe and require more specific treatment. The general treatment for this group of patients is nonsurgical, including prolonged rest, sometimes often six weeks or more, and appropriate exercises to strengthen and stretch the rotator cuff muscles and tendons. In throwing athletes and some swimmers, the anterior or front muscles of the rotator cuff (the subscapularis, the biceps, and the supraspinatus) are too strong, and the back muscles (the infraspinatus, teres minor and occasionally the supraspinatus) are weak. Rest and exercises along with the use of nonsteroidal anti-inflammatory drugs and an occasional injection of cortisone will almost always result in improvement. The use of heat for 10-15 minutes before exercise and workouts, as well as the use of ice afterwards is also important.

If an individual wishes to return to athletics during this time, then it can be done with some indicated modifications of the activity, strengthening exercises, symptomatic treatments with heat before and ice after, as well as the occasional use of NSAIDS (nonsteroidal anti-inflammatory drugs). An individual who follows these prescribed recommendation will usually be able to continue participation in their sport at the desired frequency and level.

Some throwing athletes and others involved in overhead athletic activities will develop rotator cuff tendonitis secondary to instability or subluxation of the shoulder. If the above-described conservative, non-surgical treatment fails in the group of patients, then surgery to reconstruct or stabilize the shoulder may be indicated. This subject is covered in another handout covering shoulder instability and dislocations.

IMPINGEMENT SYNDROME

Most patients 35 or over normally develop some wear and tear changes in the tendons of the rotator cuff and are more susceptible to rotator cuff tendonitis with overuse. The presence of spurs on the undersurface of the acromion and the AC joint is more prevalent in even older age groups. One of the diagnoses that we use to describe the group of patients who have rotator cuff tendonitis secondary to spurs under the acromion or AC joint is “Impingement Syndrome.” These patients have symptoms the same as or similar to those described above, but the most prominent complaint is pain with overhead use and athletic activities. The initial treatment as outlined above is appropriate for patients in this category also. Some patients in this group will also have calcium deposits in the rotator cuff secondary to more chronic degeneration and overuse.

An occasional young patient will have an abnormally formed acromion or spur which leads to rotator cuff tendonitis with overuse. If this is the case, and it fails to respond to treatment as outlined, arthroscopic surgery may be indicated to remove the spur.

FROZEN SHOULDER/ADHESIVE CAPSULITIS

This diagnosis is one that I see in some patients who have had a painful shoulder for a long time, and that have either had no treatment or the treatment prescribed has not been effective enough. These patients have pain most of the time which is made worse by use. Due to the inability to move the joint without to pain, these individuals eventually have lost motion of the shoulder and lost full use of the arm. Simple activities like getting dressed or bathing are difficult and painful to perform. The lay term for this condition is called “frozen shoulder”; the medical term is called “adhesive capsulitis.”

The treatment for this condition can be prolonged and difficult. It generally consists of the same treatment methods described above. It is paramount that the patient is engaged in an aggressive, supervised physical therapy program to restore motion, as well as a vigorous home therapy program. Use of NSAIDS and even an occasional corticosteroid injection can be also helpful. All of the treatments are aimed at regaining motion and reducing pain. Occasionally, it is necessary to arthroscopically release the stiff, scarred tissue and then move the shoulder through a complete range of motion to break up adhesions and to stretch the muscles. This has not been necessary very often in my experience.

ROTATOR CUFF TEAR OR RUPTURE

There are two primary causes of tears or ruptures in rotator cuff tendons. One is acute trauma. An individual may have an accident or fall on an outstretched arm which may result in a rotator cuff tear. Likewise, in some people who fall and dislocate their shoulders, they may sustain a tear of the rotator cuff. Rotator cuff ruptures are rare in patients under 40, and substantial trauma is required to tear the rotator cuff tendons from the bone in a young patient.

In older patients, less trauma is required. In some, the rotator cuff simply wears and frays until it gradually pulls apart secondary to use of the shoulder. This sometimes is aggravated by spurring. Patients who experience a fall or other injury to the shoulder will, of course, have pain at the time of injury. As the pain subsides, they will sometimes notice at least some difficulty or inability to raise the arm overhead. This movement will usually be associated with pain. In patients with rotator cuff tears secondary to wear and to degenerative changes, pain with use of the arm in the overhead position is usually the typical primary symptom. Sometimes, there will be associated cracks, pops, and noises in the shoulder that are painful. Often they will experience pain at night and difficulty sleeping.

DIAGNOSTIC STUDIES

A specific diagnosis of rotator cuff tendinitis or tear can usually be made from your history, examination, and x-rays. An MRI (Magnetic Resonance Imaging) is a test which is often quite helpful in establishing a diagnosis and differentiating between a tear and tendonitis of the rotator cuff. This test is done in a radiology department as an outpatient. An MRI uses a magnetic field and does not use x-rays radiation to give fairly accurate information about the status of the rotator cuff and other structures in and around the shoulder. Other diagnostic tests may be necessary to diagnosis shoulder conditions, and I will discuss any special test with you. Occasionally, I will recommend a MRI arthrograms in which fluid is injected into the shoulder prior to the MRI to highlight certain structures.

TREATMENT OPTIONS

Some patients with small rotator cuff tears function fairly well with only aggravating or annoying pain. In patients with satisfactory function and tolerable pain, surgery is probably not indicated and use of some conservative treatment methods described above will suffice. For those with increased pain and difficulty with normal daily activities and/or work activities, surgery is probably the best option.

SURGICAL TREATMENT

Failure to respond to nonsurgical, conservative treatment is often an indication for arthroscopic surgery. Surgical treatment of rotator cuff tendinitis and rotator cuff tears or ruptures involves examining the shoulder with an arthroscope into two different areas of the shoulder.

First is examining the joint, or the glenohumeral articulation itself. This helps to determine if there is any instability (subluxation), or rotator cuff tears and to identify other possible problems (i.e. labral tears or SLAP lesions) inside the shoulder joint itself. The undersurface of the rotator cuff can be inspected and any tears can be seen and identified from this view.

The second area to be examined is called the subacromial space. This is a space between the acromion (the bone on the top of the shoulder) and the top of the rotator cuff tendons. The space is normally occupied by a bursa which is the protective, lubricating sac between the acromion and the rotator cuff. In cases of rotator cuffitis, it is often thick and inflamed. During the procedure, it is usually partially or completely removed. Tears of the rotator cuff can now be identified from this view. Spurring of the acromioclavicular joint and the acromion can be seen.

If no tear of the rotator cuff is present, this subacromial space can be “decompressed” or made larger by removing the bursa and spurs. An “acromioplasty” is when arthroscopically the undersurface of the acromion is burred or shaved away to enlarge the space where the rotator cuff moves.

If a small to moderate-sized rotator cuff tear is identified, then in addition to the above, the rotator cuff will be repaired. This amounts to sewing it back to the bone where it was originally attached. Often, all this can be performed completely arthroscopically; on rare occasions, a small, one inch open incision will be made to repair the cuff to bone. When repair is done for small to moderate-sized tears, a sling is used for 2-3 weeks after the surgery.

Patients that have tears that are old or chronic, and large present difficult treatment problems. In rotator cuff tears, the tendon pulls off the bone. Since the tendon is attached to the muscle, the muscle contracts and causes the tendon to shorten or retract. This results in a gap between its original attachment site and its eventual resting place. When the gap is sometimes very large and the muscle-tendon unit is shortened in that position for some time, it resists being stretched out to its original position and makes repair difficult.

In very rare cases, it is necessary to cut through the acromion to expose the retracted tendon muscle so as to lengthen it and to allow repair. In routine tears, it is not necessary to lengthen the muscle and tendon. In some cases in which the rotator cuff has been retracted, the repair is made under some tension. Because of this tension, it is necessary to splint the arm away from the side using a foam pillow to relieve some of this tension. This splint will have to remain in place for about one month after surgery.

In some older patients with very large, old tears which cannot be repaired, simple spur removal with an arthroscope will give satisfactory pain relief, but function (motion) of the shoulder and arm will probably not be improved. This approach does avoid the somewhat prolonged and difficult rehabilitation after repair of a large tear and may be desirable in some patients. This will be discussed with those of you that I feel may need or would want to consider this approach.

TIME IN HOSPITAL

After arthroscopic decompression (removal of spurs without rotator cuff repair), the patients are discharged on the day of surgery. A sling is used for a few days, and range of motion exercises are begun as symptoms will permit. Since no repairs of tendons have been carried out, then no damage will occur from a vigorous range of motion exercise program. Although this is an arthroscopic procedure, considerable surgery has been done. It will take 2-3 months to regain full motion and strength, and sometimes longer for the soreness to subside. You will be given a physical therapy prescription and instructed by the physical therapy staff in appropriate exercises both before and after the surgery.

After rotator cuff repair, patients are also discharged on the same day of surgery. Exercises after rotator cuff repair are different from those done after simple spur removal. Due to the repair requiring the tendon being sown back to bone, this repair has to be protected to allow healing. This protection lasts typically for six weeks. An exercise technique called passive range of motion is used in patients who have had this done. This means that you do not use your muscles to move the arm and shoulder. It is done for you either by the physical therapist, a family member, or by you doing it using your other arm. This is carried out for, again, usually six weeks after surgery. After one month has passed, another technique called active assisted range of motion is begun, which means that you begin to use your own muscles but are helped by either the physical therapist, a family member, or you doing it using your other arm. This is done for the next two weeks. At six weeks, you can begin to exercise on your own using your own muscles. A varying degree of help from the physical therapist from this point on is necessary. A vigorous home program is necessary in all cases.

Recovery from surgery to repair rotator cuff tears takes usually 3 months or more. Recovery from surgery for larger, massive tears, can sometimes take 4-6 months. Return to normal daily activities which involves use of the operated shoulder can be judged from the above. Non-lifting activities below waist level can begin at 4-6 weeks. Return to athletic activities, overhead work, and heavy lifting will require at least 3 months or more.

WHAT YOU CAN EXPECT

What you can expect from arthroscopic surgery for impingement problems (spur removal) is at least improvement in your pain with activities. After any shoulder procedure, there is a chance that you may have some occasional soreness. More often than not, there is some wear and degenerative changes in the tendon, and it is not unusual to have some occasional, residual soreness in the shoulder. If you have a repair of a torn rotator cuff, then you can expect significant improvement in your pain and improved function and motion of the shoulder. Again, after any shoulder procedure, you may have occasional soreness episodically due to scarring following surgery.

COMPLICATIONS

Inadequate pain relief can occur but is not common or usual. Large rotator cuff tears repaired under tension can pull apart and fail. If this happens, you should still get improvement in your pain, but function or motion would probably not be improved.

Loss of range of motion can also occur secondary to inadequate relief of pain and/or inadequate rehabilitation.

Other complications such as infection and blood clots can occur but are extremely rare in my experience. If infection occurs, it is a serious problem and could possibly cause the surgery to fail and probably make the shoulder feel worse.

Anesthetic complications can occur. These complications and the type of anesthetic will be discussed with you by an anesthesiologist on the day of surgery. You will either go to sleep (general anesthesia) or have some local anesthetic injected at the base of the neck to numb the shoulder and entire arm (interscalene block). You would remain awake but sedated during the procedure. This latter method is my preferred and recommended method of anesthesia for shoulder surgery as it also gives excellent post operative pain relief.



The information contained in this patient education packet is intended to help you and your families/caretakers better understand a particular diagnosis and/or the treatment options available. If you have any questions after reading this, please don't hesitate to contact Dr. Longobardi's office at 201.343.1717 for a further explanation or you can also go to www.universityorthopaedic.com and click on Patient Education to gather more information. Thank you.