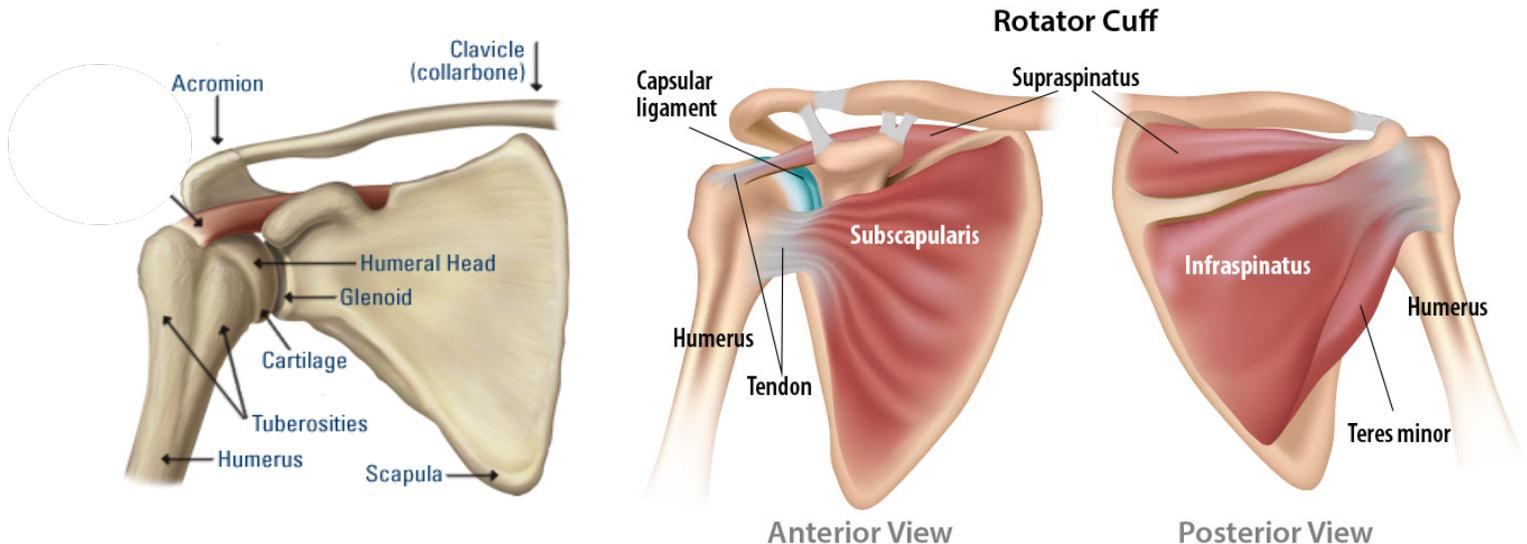


ROTATOR CUFF INJURIES / IMPINGEMENT SYNDROME

Shoulder injuries are common in patients across all ages, from young, athletic people to the aging population. Two of the most common problems occur in the narrow space above the rotator cuff. Irritation in this area can occur from inflammation of the bursa, or ‘bursitis’, or sometimes caused by a bone spur. This condition is commonly caused **impingement syndrome**. In more severe cases, actual damage to the tendons in this area can occur and is called a **rotator cuff tear**. These two problems can exist separately or together. Rotator cuff tears can also be caused by trauma, ‘wear-and-tear’ over time and as we get older, from repetitive trauma from sports or work, smoking, and genetic factors.

The shoulder is the most mobile joint in the human body, with a complex arrangement of structures working together to provide the movement necessary for daily life. Unfortunately, this great mobility comes at the expense of stability. Several bones and a network of **soft tissue structures** (ligaments, tendons, muscles, and the joint capsule), work together to produce shoulder movement. They interact to keep the joint in place while it moves through extreme ranges of motion. Each of these structures makes an important contribution to shoulder movement and stability.

The rotator cuff is made up of muscles and tendons that attach your upper arm to your shoulder. The tendons attach your muscles to the bone. The rotator cuff is made up of 4 tendons: supraspinatus, infraspinatus, subscapularis, and teres minor.



What is a Rotator Cuff Tear?

Continual irritation to the bursa and rotator cuff tendons can lead to deterioration and tearing of the rotator cuff tendons. The supraspinatus tendon is the most commonly involved tendon among the rotator cuff muscles. The muscle forms the top of the cuff and lies in the narrow space beneath the acromion.

It is subject to the most pinching of all the rotator cuff muscles. Rotator cuff tears can be the result of a traumatic injury or deterioration over time. Symptoms may be present, but in many cases, the patient experiences no symptoms at all. In young active people, full thickness rotator cuff tears are common. When they do occur, they are usually the result of a high-energy injury to the rotator cuff that is associated with throwing or overhead sporting activities. In older people, rotator cuff tears tend to be the result of wear and tear over time. Several scientific studies have shown that up to 2/3 of the population at age 70 have rotator cuff tears; many of these people had no pain or motion loss, but felt weak when using the arm.

What is impingement syndrome?

Shoulder impingement syndrome occurs when the **tendons of the rotator cuff and the subacromial bursa are pinched in the narrow space beneath the acromion**. This causes the tendons and bursa to become inflamed and swollen. This pinching is worse when the arm is raised away from the side of the body or when reaching behind the back. Impingement may develop over time as a result of a minor injury, or as a result of repetitive motions that lead to inflammation in the bursa.

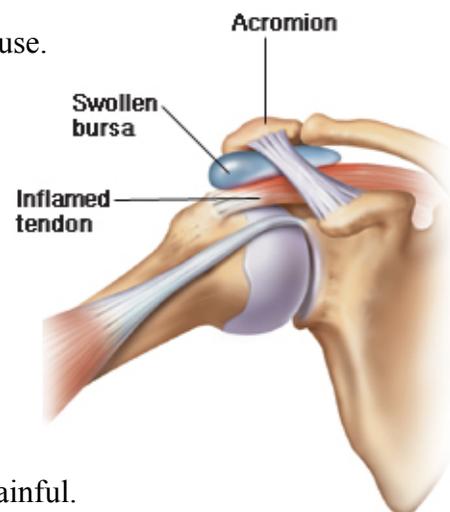
The shape and angle of the acromion may make certain individuals more susceptible to impingement problems between the acromion and the bursa. With age and the onset of arthritis, the acromion may develop bone spurs that further narrow this space. Impingement caused by bone spurs on the acromion is common in older patients who participate in sports or work activities that require overhead positions. Spurs may also result if one of the ligaments in the coracoacromial arch becomes calcified.

What are the signs and symptoms of impingement syndrome?

Most often the onset of symptoms is related to an episode of overuse. In many patients, the episode occurred sometime in the past and the shoulder has failed to return to normal.

Impingement symptoms are marked by pain:

- The pain is sharp and intermittent in its early stages
- As impingement progresses, the pain becomes more of a constant ache.
- Although pain is usually present after impingement sets in, the original event that led to the problems is often relatively minor and not remembered as painful.
- Once inflammation starts, simple movements may become painful.
- Overhead motions and reaching behind the back tend to increase the pain.
- There is less space for the bursa when the arm is in this position, causing more compression on the bursa.



- Arm movements at waist level are not painful. In this position, there is more space for the bursa, and therefore it is less compressed.
- Pain usually increases at night for two reasons. First, inflammation and swelling tend to get worse as the shoulder is used during the day, and this can lead to more pain in the evening. Second, the mind is usually less occupied in the evening, allowing pain to become a major focus of attention.

What are the signs and symptoms of a rotator cuff tear?

The symptoms of a rotator cuff tear are very similar to those of impingement syndrome with the added complaint of **weakness**. This weakness will vary depending on which rotator cuff tendon has been torn. For example, if the supraspinatus muscle is involved (the most common case) the weakness will be present with forward arm elevation and overhead activity. Many patients are at first unaware of how much strength they have lost when they tear the rotator cuff. Pain at night while sleeping is common and the pain will frequently travel down the arm from the shoulder to the elbow.

How are impingement and rotator cuff tears diagnosed?

With careful history and physical examination, impingement and rotator cuff tears can be easily diagnosed in the doctor's office. Further testing may be necessary to determine the exact nature of a rotator cuff tear.

After the evaluation of symptoms, the doctor will perform certain muscle tests to determine whether there are tears in the rotator cuff tendons and to rule out other conditions. The doctor may place the arm in positions that reproduce the described pain to confirm the diagnosis.

There are many tests that can isolate specific areas of pain and weakness to help make the diagnosis. Further evaluation may include:

- A **diagnostic injection** can help the doctor distinguish between impingement syndrome and a full-thickness rotator cuff tear. A local anesthetic is injected into the inflamed bursa to eliminate the pain. If strength in the shoulder returns once the pain is blocked, it is likely that the weakness was due to pain and the rotator cuff tendons are not torn. **A rotator cuff tear is suspected if strength does not return while the pain is blocked.**
- **X-rays** can reveal signs of arthritis, fractures, and bone spurs on the acromion. They can also reveal changes in position of the humerus and scapula that may suggest a rotator cuff tear. These images are frequently negative in the early stages of injury since x-rays show bone structure but not soft tissue.
- An **MRI (Magnetic Resonance Image)** allows the physician to see muscle and other soft tissue not visible with X-ray. It also allows the physician to determine the likelihood of success with surgical treatment.

- An **arthrogram** is another method used to help diagnose a rotator cuff tear. A dye is injected into the shoulder and X-rays are then performed. If a tear in the rotator cuff tendons exists, the dye will run through the tear and be visible on X-ray. This study is infrequent today

How are impingement and rotator cuff tears treated?

Impingement and rotator cuff tears can be treated non-operatively or with surgery. Treatment for both injuries usually begins with a non-operative treatment plan. **More than 2/3 of impingement patients can expect significant improvement in their symptoms with a physical therapy program alone.** Older patients and in those with large bone spurs often need surgery.

When trauma causes a full thickness tear of the rotator cuff or if patients are especially active, surgery is often the first choice of treatment. Patients with this type of injury recover best if surgery is generally performed within 2-3 months of injury.

Non-Operative Treatment

Non-operative treatment is similar for both impingement and rotator cuff tears. A clear majority of patients improve with this as the only treatment.

The goals of a physical therapy program include:

- Strengthening the rotator cuff tendons.
- Stretching and regaining lost motion caused by pain and inflammation.
- Allowing the humerus to be better positioned under the acromion, thus reducing compression of the bursa.

Anti-Inflammatory medication may be prescribed to help reduce pain and inflammation. Many patients with rotator cuff tears can function quite well if pain and inflammation are controlled with medication and therapy. This is especially true for the elderly and those with low demands on the shoulder.

If symptoms have not improved with this program, the doctor may recommend a **steroid injection** into the bursa. Depo-Medrol, or a similar steroid, is often combined with a local anesthetic to help control the pain and inflammation of the bursa. Steroid injections are used with caution. Damage to the rotator cuff tendons may occur with more than two or three injections over several months. Patients with diabetes can expect a temporary increase in their glucose levels following steroid injection.

Operative Treatment

Impingement

A non-operative treatment plan is often all that is necessary for most patients with impingement syndrome. However, the small parentage of patients whose symptoms have not improved after a dedicated course of physical therapy may be candidates for surgery. The shoulder should be reevaluated to make sure no other problems exist.

Subacromial Decompression

This minimally invasive arthroscopic procedure expands the space between the acromion and rotator cuff tendons. During an arthroscopy, a tiny fiberoptic instrument is inserted into the joint. In most cases, the doctor can assess and repair the damage entirely through this scope without making large incisions. Scar tissue, inflammation, and bone spurs can successfully be removed using this technique. If a rotator cuff tear is found at the time of surgery, it can also be repaired if necessary.

Rotator cuff tear

Not all rotator cuff tears require surgery. Many patients are content with their progress following a non-operative treatment plan. Patients who have been unable to regain lost motion and strengthen the surrounding muscles sufficiently may need a rotator cuff repair. This is often the case for the younger, more active patients who want to address continued weakness following physical therapy.

Rotator cuff repairs can be performed with either arthroscopically or with open incisions. Today, arthroscopic techniques are suitable to repair virtually *all* rotator cuff tears. An open repair may be recommended in select cases and will be discussed prior to surgery. Some rotator cuff tears may not be repairable due to poor quality tissue or delay in treatment. Frequently, this can be determined prior to surgery using MRI or CT scans. Rarely, this is determined at the time of surgery. If a rotator cuff tear is not repairable, there are other options available which can be discussed with Dr. Costouros based on your activity demands, age, and expectations following surgery.

What types of complications may occur?

Complication rates after surgery are generally low. Pre-operative antibiotics are given to reduce the slight risk of infection after surgery. Infection tends to rarely occur when arthroscopic techniques are used. Risks of major bleeding or nerve damage are extremely small. Postoperative stiffness is the major complication of both impingement and rotator cuff repair surgery.

Post-surgical care for impingement and rotator cuff tears are similar. General care recommendations will be discussed with Dr. Costouros.

Rehabilitation programs for impingement and rotator cuff repair surgery are different:

Impingement surgery rehabilitation begins almost immediately:

- Exercises to regain shoulder motion usually begin with a therapist in the first week after surgery and continue for about **8 weeks**.
- At **8 weeks**, most patients have regained full motion and will continue to regain strength with a home exercise program.
- Full recovery time after surgery varies; most patients have greatly improved at 2 months and are close to normal by 4 months.

Rotator cuff surgery recovery is generally slower and requires more supervision. It is also important to protect the repair, especially during the first 4-6 weeks after surgery. Activity restrictions and use of the sling is extremely important, including during sleep. For some severe tears or revision cases, physical therapy may be delayed for up to 6 weeks following surgery. Although use of the elbow, wrist, and hand are encouraged immediately, any active use of the shoulder or lifting is not allowed for the first 4-6 weeks after surgery. **This is extremely important to protect the repair, prevent re-tear, and promote healing.**

Therapy is carefully controlled for the first 6-12 weeks while the tendons heal back to the bone.

The first goal is to regain full motion within 3 months after surgery. A therapist will assist in the early stages with gradual recovery of motion. Sometimes, Dr. Costouros may recommend an injection after surgery to reduce inflammation and pain and facilitate recovery.

During the first 4-6 weeks, there is no active use of the shoulder to protect the surgical repair.

Once initial healing is achieved a progressive stretching and strengthening program should begin. The sling should be used at night for the first 4-6 weeks during sleep to protect the repair. Full recovery can take more than 6 months. Some patients may require more time to regain muscle strength and complete the healing process.

Other Painful Shoulder Conditions:

Overuse Tendinitis

Shoulder motions used during activities like golfing, pitching, carrying luggage, swimming, and exercise may cause repetition stress within the rotator cuff. This can lead to irritation, inflammation or fraying. Any of these can cause shoulder pain and weakness in the joint. Severe tendinitis can cause partial or complete tearing of the rotator cuff. This can result in shoulder pain, weakness and a loss of normal movement.

Impingement Tendinitis

The acromion can pinch (impinge) and irritate the rotator cuff when the space between them narrows. This can happen when the cuff is weak, the bursa is swollen or the acromion angles down too far.



John G. Costouros MD, FACS
Assistant Professor, Orthopedic Surgery
Shoulder Disorders, Sports Medicine
www.californiashoulder.com

Impingement tendinitis can occur with repetitive shoulder activities. These include sports or jobs involving overhead reaching.

Calcific Tendinitis

Inflammation can lead to calcium deposits within the rotator cuff. This can cause severe pain and a loss of shoulder strength and movement. Most of these calcium deposits eventually disappear over time but in some cases, surgical removal is needed.