



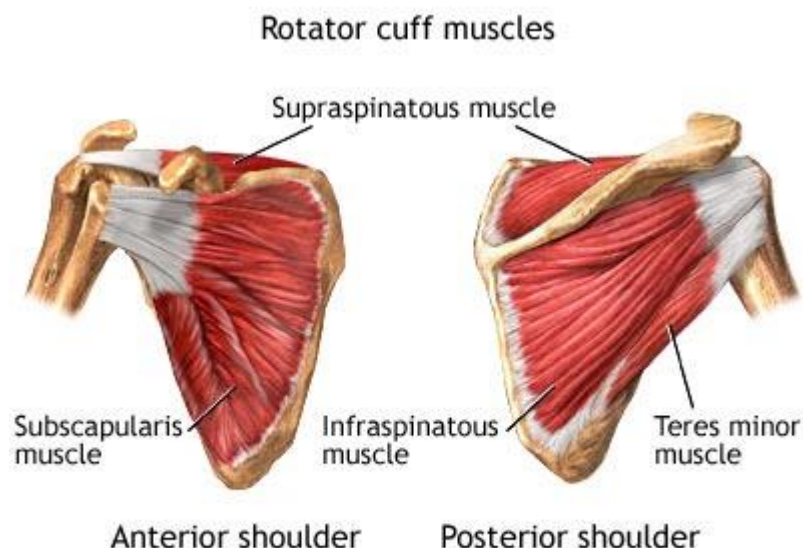
Shoulder injuries – Rotator Cuff

Many muscles are attached to different parts of the shoulder, and they are used to move the arm in all different directions.

The rotator cuff is a group of four muscles that form a strong cuff around the shoulder joint and are the muscles that help to control the rotation and position of the arm and hold the humeral head (ball) in the glenoid (socket).

Each of these muscles has a tendon at the end that attaches to the humerus by growing directly into the bone. These four muscles are:

- **The subscapularis**
- **The supraspinatus**
- **The infraspinatus**
- **The teres minor**



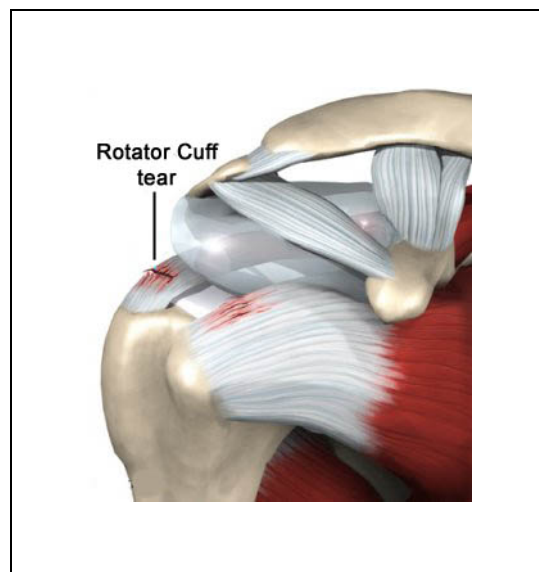
The **subscapularis** muscle is attached to the deep surface of the scapula and then travels in front of the humeral head. It fits into a bump of bone on the humerus called the lesser tuberosity. This muscle is used to internally rotate the arm and to bring the arm down to the side of the body (a motion that is called "adduction"). The subscapularis also plays a very important role in preventing the shoulder from slipping out of the front of the joint.

The three other muscles of the rotator cuff are all attached to the back of the scapula and travel behind the humeral head. The **supraspinatus**, **infraspinatus**, and **teres minor** all insert on a bump of bone called the greater tuberosity. These three muscles together are called the posterior rotator cuff. They externally rotate the arm and also help to bring the arm down to the side of the body (adduction). The supraspinatus muscle and tendon can be considered the weak link in the shoulder, since the supraspinatus muscle is the most commonly injured part of the rotator cuff. This muscle begins on the top and back of the shoulder blade and travels along the top of the head of the humerus. The ceiling of the space that this muscle travels in is formed by the acromion, and it is in this space that the muscle is very vulnerable to wear and tear and injury.

“the supraspinatus muscle is the most commonly injured part of the rotator cuff”

People are often told that they have injured one particular member of the rotator cuff, with the most common diagnosis being supraspinatus tendonitis. However, it is unlikely that the problem is with just one of the muscles in isolation. Most good clinicians will refer to the injury as ‘rotator cuff injury’ and treat the problem as a bigger picture.

Although the rotator cuff can be injured by a single traumatic incident, this is not common. Injury to the rotator cuff will usually begin as inflammation (tendonitis) caused by some form of microtrauma (a small but continuous source of irritation). If the cause of the inflammation is not addressed, and continues over a long period of time, partial tears may develop in the cuff that could eventually become complete tears (a tear all the way through one or more of the rotator cuff muscles).



There are three main causes of microtrauma to the rotator cuff:

1. Primary Impingement.

The coracoacromial arch forms a bridge over the rotator cuff. It is made up of bones and ligaments and is lined by a sac of fluid called the subacromial bursa. The space under the bridge that is available for the rotator cuff is called the subacromial space. Many people will have a

naturally small subacromial space, which is just bad luck, but the space can also be reduced by conditions such as osteoarthritis. Whatever the cause of this small subacromial space, repetitive overhead activities (such as throwing a basketball or dusting high shelves) can cause the rotator cuff to become continuously squashed against the coracoacromial arch, causing inflammation of the cuff.

2. **Secondary Impingement.**

Many people will have what is called shoulder instability (a lax shoulder joint). This laxity may have been present since birth or may be due to an injury. Often it will have occurred over time due to repetitive overhead activity, poor posture or inactivity. Due to this instability, the rotator cuff has to overwork to stabilise the shoulder, causing it to become inflamed. Eventually, the rotator cuff will become weak and tired, and will not be able to prevent the humeral head from squashing up against the coracromial arch. Because this type of impingement is not due to a small subacromial space, it is called secondary impingement.

3. **Overstraining.**

During forceful throwing actions (e.g. javelin throwing), the rotator cuff has to work very hard. With repetitive throwing, the cuff is prone to being overloaded, resulting in inflammation.

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Signs & Symptoms

Symptoms of rotator cuff injury include weakness, loss of full movement and shoulder pain. The amount of pain will depend on the extent of the injury. Patients with early-stage inflammation may only have pain with overhead activities, while those with a complete cuff tear may not be able to sleep because of the pain. Physiotherapists have a number of physical tests designed to diagnose the presence and severity of rotator cuff injury. Ultrasounds and MRIs are effective methods for identifying signs of shoulder instability.

Rotator Cuff Problems

Rotator Cuff Tendonitis. This is also known as *Impingement Syndrome* or *Shoulder Bursitis*. Usually this occurs in people 30-80 years of age, and usually the weakness in the shoulder is only mild to moderate.

Rotator Cuff Tear. This occurs usually in people who have had tendonitis for a while and are starting to experience more weakness. The tendonitis gets so bad it wears a hole in the rotator cuff. It can also happen in someone who tries to lift something too heavy and feels a pop in the shoulder.

Instability Impingement. This occurs in younger patients, typically 15-30 years old. The rotator cuff is irritated because the shoulder is loose in the socket. This often happens in *baseball pitchers, swimmers, and other throwing athletes.*

Shoulder instability can be classified into two different types, **dislocations** and **subluxations**.

1. **Dislocations.** This happens when the head of the humerus completely pops out of the socket. The first few times this happens, it is usually with significant trauma (although some people can have these without any injury at all). After that, it can get easier and easier for the joint to dislocate. Most shoulder dislocations are anterior - this means that the ball pops out the front of the socket.
2. **Subluxations.** This is the feeling that the shoulder slips slightly out of socket, then immediately comes back in place. This often happens without any major trauma. Sometimes it happens in people who are very "loose-jointed". Sometimes these happen in just one direction (like out the front - "anterior"), and other times they happen out multiple directions - (eg. front - anterior and back - posterior) - this is called "multidirectional instability".

Next Issue: Rehabilitation of the shoulder

