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## ROTATOR CUFF INJURIES

The tendons of four muscles in the upper arm form the rotator cuff, blending together to help stabilize the shoulder. Tendons attach muscles to bone and are the mechanisms that enable muscles to move bones. It is because of the rotator cuff tendons, which connect the long bone of the arm (the *humerus*) to the *scapula* (the shoulder blade) that we can raise and rotate our arms. The rotator cuff also keeps the humerus tightly in the socket (*glenoid*) when the arm is raised. The tough fibers of the rotator cuff bend as the shoulder changes position.

For normal shoulder function, each muscle must be healthy, securely attached, coordinated, and conditioned. When there are full or partial tears to the rotator cuff tendons, movement of the arm up or away from the body is impaired, making it difficult or impossible to rotate the arm in its ball-and-socket joint.

### Causes of Rotator Cuff Injuries

Most often associated with baseball players, injuries to the rotator cuff tendons of the shoulder can happen to anyone over time. Rotator cuff tendons can be injured or torn by excessive force, such as lifting a very heavy object with the arm extended or trying to catch a heavy object as it falls. Occasionally these accidents happen to young people, but typically a rotator cuff tear occurs to a person who is middle-aged or older who has experienced problems with the shoulder for some time before the injuring event. That person may try to lift something or to participate in an activity that exceeds the strength of the tendons, and the rotator cuff tears acutely, resulting in an inability to raise the arm. The triggering event may or may not be particularly painful.

The flexible, elegant design of the shoulder gives it great range of motion but limited stability. It is prone to injury as we age. As long as the parts of this, the most mobile joint in the body, are in good working order the shoulder moves painlessly and easily. When injury or conditions such as arthritis, tendinitis, or bursitis affect the shoulder joint, pain and the loss of mobility result.

As we age, rotator cuff tendons can be subject to a great deal of wear and tear, resulting in the gradual degeneration of the tissue. Activities requiring overhead reaching put particular pressure on the rotator cuff tendons, and any form of repetitive movement, chronic misuse, or recurring stress may result in a condition known as impingement. Impingement syndrome is the improper alignment of tissue or bone that results in rubbing or chafing.

One reason rotator cuff tendons tend to weaken over time is that they contain areas where there is a very poor blood supply. Parts of the human body that have good blood supply are better able to repair and maintain themselves. The areas of poor blood supply in the rotator cuff tendons make them especially vulnerable to degeneration with aging. This may help explain why the rotator cuff tear is such a common injury in later life. The part of the rotator cuff that tears is usually one that has been weakened by degeneration and impingement.

### Symptoms of Rotator Cuff Injuries

If you have torn a tendon in the rotator cuff, there will probably be tenderness and soreness in the shoulder, especially after any strenuous movement. A fully ruptured tendon may make it impossible to raise the arm or even move it away from the side of the body. You may have the sensation of a chronic vague discomfort or a more intense acute pain. Many people with rotator cuff injuries complain of not being able to sleep on the injured side, as there is pain with any pressure on the shoulder.

Rupture of the rotator cuff tendons does not usually occur in a shoulder that is perfectly healthy. Most shoulders with rotator cuff tears have a history of other problems. Diagnosis and treatment involves addressing these related conditions (such as bursitis, tendinitis, and *acromioclavicular [AC] joint arthrosis*) as well. The conditions may overlap and share common symptoms, such as a "catching" sensation when you try to move the arm, stiffness or chronic soreness, and the presence of bone spurs. On some occasions cuff tears are gradual and progressive, producing no apparent symptoms but an increasing weakness in the shoulder joint. There may be tears affecting both shoulders.

## Treatment of Rotator Cuff Injuries

Rotator cuff tears can usually be identified fairly easily in a physical examination. Signs of a complete tear are often quite obvious. If your doctor can assist you in moving the arm through a range of motion, yet you are unable to complete the same movements using your own strength, a tear in the tendons is very likely.

A special test called an arthrogram is often used to affirm a rotator cuff tear. For this test, dye is injected into the shoulder joint before x-rays are taken. If there is indication that dye has leaked out of the place where it was injected into the joint, there is likely to be a rotator cuff tear at that location.

The MRI scan is a radiographic test that is frequently used to examine the rotator cuff tendons and determine whether or not they are torn. With an MRI scan, magnetic waves are used to create pictures that look like slices of the shoulder. Unlike x-rays, which show only the bones of the shoulder, the MRI scan shows tendons and any damage to them. Both the MRI scan and the arthrogram are widely used to confirm a diagnosis of rotator cuff tear. Sometimes ultrasound is used as well.

If the rotator cuff tear is not complete, your doctor will probably recommend conservative treatment methods to control pain and promote healing in the shoulder. The treatment regimen known as R.I.C.E. can be very effective in some cases. Rest, ice, compression, and elevation are components of this treatment. It is important to rest the injury, as well as to initiate physical therapy as soon as any acute pain has subsided. Anti-inflammatory medication such as non-steroid anti-inflammatory drugs (NSAIDs) are often prescribed for pain relief. If the recommendations of a physical therapist are followed on an ongoing and continuous basis, many partial tears will become very manageable with this treatment.

Sometimes cortisone injections are given to patients who are still experiencing pain after several weeks of conservative care. While cortisone can be very effective in offering temporary symptomatic relief, there is some risk of cortisone (a steroid) causing further rupture of the tendons. For this reason, and because steroids are associated with other side effects over time, they do not represent the best long-term solution to rotator cuff tears or other persistent shoulder injuries.

Surgery is normally recommended if a rotator cuff tear makes it impossible for you to raise your arm on your own. The timing of surgery also depends on the extent of the damage to the rotator cuff, as evidence suggests that repairing complete tears of the tendons within three months of injury results in a better outcome.

Typical surgery for rotator cuff injuries involves making a 4-5 inch incision in the side of the shoulder. The surgeon first removes any tissue that has degenerated or does not appear healthy. Then a section of the humerus (the upper arm bone) from which the tendon tore away is prepared for tendon reattachment. The soft tissue on a portion of the humerus is removed to create a raw bony area for positioning of the torn tendon. Holes are drilled in the humerus for sutures to be used in the reattachment process. The tendon tear is then sewn together, and sutures looped through the drill holes to attach the repaired tendon to the bone. As time passes, the tendon heals to the humerus, reattaching itself in a more permanent fashion.

*Arthroscopy*, another surgical method, is also used to diagnose and repair rotator cuff injuries. Arthroscopy involves using a fiberoptic endoscope to repair the joint. This procedure can often be done on an outpatient basis and is used in cases that are not as severe as complete tendon tears. Candidates for arthroscopy include patients who suffer from impingement syndrome (the improper alignment of tissue and bone that result in chronic chafing), partial rotator cuff tears, partial tears along the long head of the biceps, and chronic dislocations of the shoulder, detached socket structures, or damage to the lining membranes.

There have been great strides in shoulder arthroscopy in recent years, making it an increasingly popular method for the diagnosis and repair of shoulder damage.

After surgery, your shoulder is usually protected by a sling and swathe for at least one month, and physical therapy is begun almost immediately – first using passive exercises, and then moving the arm through a more active range of motion. You will be given an individualized program of rehabilitation, designed to address the particular condition of your injury.

The doctor and physical therapist will explain the necessity of limiting sudden and stressful movements to the arm for several weeks or longer. Activities that involve pushing, pulling, and lifting will not be possible, as even the best surgical repair can be damaged if subjected to undue strain. During the first six weeks or so after surgery, the shoulder may require support from the other arm or from a pulley during movement.

In many cases, the tendons and muscles of the shoulder have been weakened from prolonged misuse or degeneration, and strengthening them will require a gentle, steady process of changing habitual ways of moving your arm. It may be many months before maximal results are achieved.

If initial surgical attempts to treat rotator cuff injuries fail to give you a useable shoulder, there are other more complex procedures that include tendon grafts and muscle transfers. These are rare cases, but will be discussed with you by your surgeon if they appear to be necessary. Under certain circumstances a complete shoulder replacement may be advised. Remember that all surgical procedures are tailored to meet individual needs, and that recovery depends not on surgery alone but also on your general state of health and commitment to the rehabilitation process.

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