InfoSheet – Rotator Cuff Problems

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The shoulder is a very elegant and complex piece of machinery. The design of the shoulder gives us the ability to do useful things by helping us to reach and use our hands in many different positions. This design gives the shoulder joint a great range of motion but not much stability.

As long as the parts of this elegant machine are in good working order, the shoulder can move freely and painlessly. The rotator cuff tendons are one of the essential reasons that the shoulder is so useful. The tendons can be subject to a considerable amount of wear and tear as we use our arms in overhead activities. This wear and tear can lead to weakening of the rotator cuff tendons, through a condition know as impingement. The rotator cuff tendons are also subject to degeneration as we age. Additionally, some people's anatomy sets them up for shoulder problems, and both sides are often involved.

An injury to these tendons can result in a weak painful, shoulder. Let's look at how this can occur.

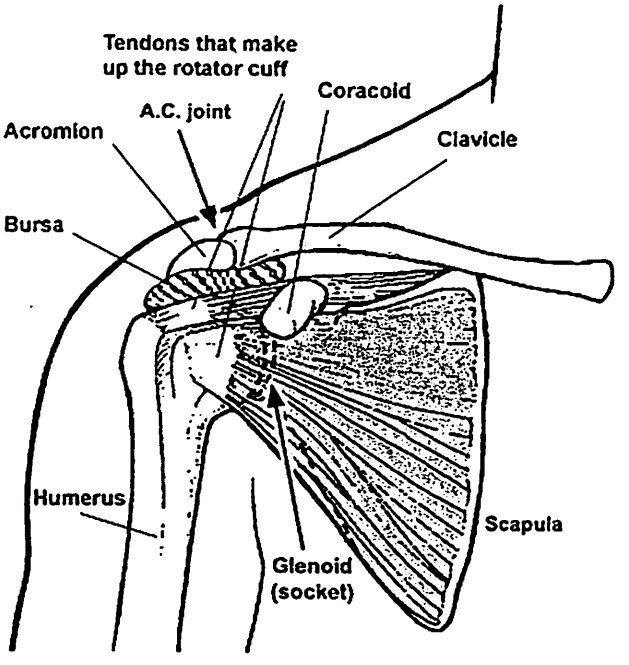
WHAT DO YOU FEEL WITH CUFF PROBLEMS?

Early symptoms of rotator cuff problems include generalized aching of the shoulder and pain when raising the arm out from the body. Most patients complain of difficulty sleeping due to pain, especially when they roll over on the affected shoulder. A reliable sign of *impingement* is a sharp pain when trying to reach into your back pocket.

As the process continues, discomfort increases and the joint may become stiffer. Sometimes a "catching" sensation is felt when the arm is lowered. Weakness and inability to raise the arm, as well as severe night pain, may indicate that the rotator cuff tendons are actually torn.

WHAT IS THE ROTATOR CUFF?

The shoulder is made of three bones: the scapula (shoulder blade), the *humerus* (upper arm bone) and the *clavicle* (collarbone). The shoulder is a ball and socket joint similar to the hip, although in the shoulder, the socket is *very shallow* and has an appearance similar to that of a golf ball on a golf tee. In order to gain stability, the shoulder has specific muscles that keep the ball centered in the socket.



The tendons of these muscles (called the *supraspinatus*, *infraspinatus*, *teres minor*, and *subscapularis*) form the rotator cuff. Tendons attach muscles to bones, allowing the muscles to pull and produce motion. The rotator cuff complex connects the humerus with the scapula (shoulder blade) and helps

stabilize and rotate as the arm is raised by the deltoid (the outer layer of muscle). The rotator cuff holds the ball of the humerus tightly in the socket (glenoid) of the scapula.

The part of the scapula that makes up the roof of the shoulder, and serves as the origin for the deltoid, is called the acromion. Between the acromion and the rotator cuff, there is a bursa. A bursa is a lubricated sac of tissue that protects the muscles and tendons as they move against one another. The bursa simply allows the moving parts to slide against one another without too much friction. Treating an inflamed bursa alone will not fix the underlying problem.

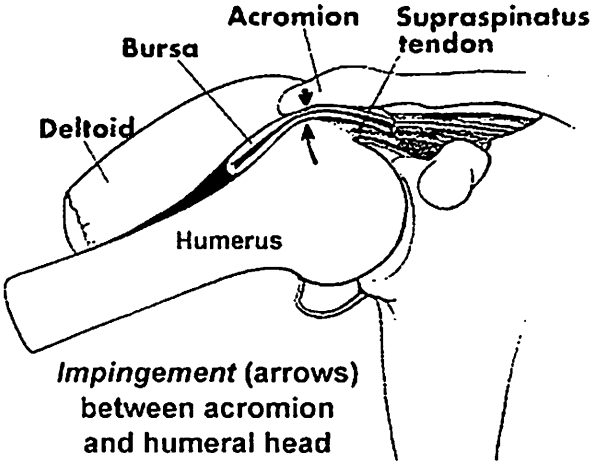
Without function of the rotator cuff, the deltoid will pull the humeral head upwards to rub against the acromion, irritating the bursa, and even eventually tearing the tendons of the cuff itself.

WHAT IS A *ROTATOR CUFF TENDINITIS* OR *SHOULDER IMPINGEMENT*?

Shoulder impingement is the pinching of a tendon or bursa between the acromion and the humeral head. This can be caused by:

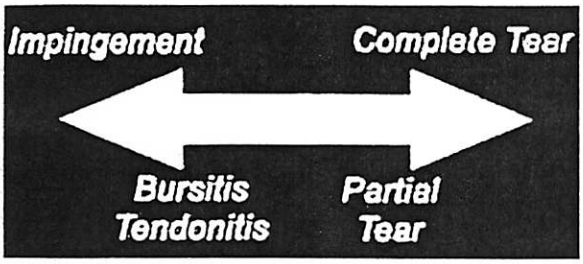
- Anatomy - The actual shape of the bones in your shoulder or the presence of a bone spur in the shoulder may cause an impingement
- Weak muscles - The muscles in your shoulder (the rotator cuff) and in your mid-back (called the scapular stabilizers) can cause improper movement of the shoulder, producing pinching of the tendons and bursa.
- Shoulder instability - Instability at the shoulder joint may also cause shoulder impingement symptoms.

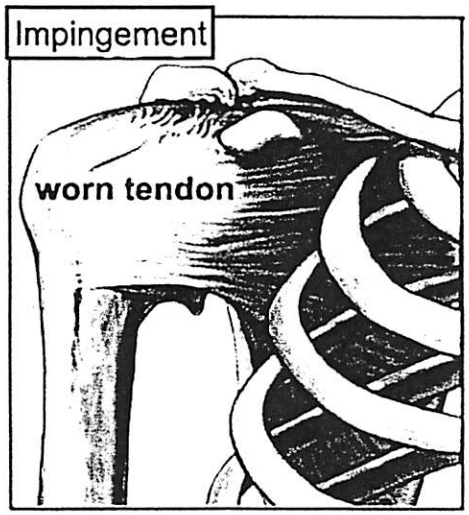
Usually, there is enough room between the acromion and the rotator cuff so that the tendons slide easily underneath the acromion as the arm is raised. But each time the arm is raised, rubbing does occur. This rubbing, or pinching action, is called **impingement**. Impingement occurs to some degree in everyone's shoulder, caused by day to day activities that we do with the arm above shoulder level.

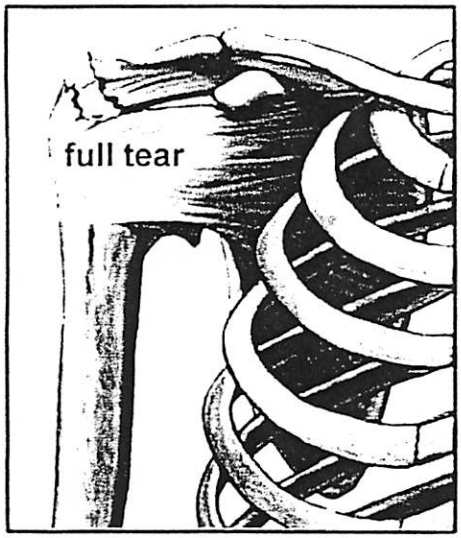


But continuously working with the arms raised overhead, repeated throwing activities, or other repetitive actions of the arm can cause impingement to become a problem.

Irritation of the bursa and rotator cuff tendons comes in a wide spectrum and has many names. All of these names refer to different degrees of the disease process, but are not necessarily separate items. For example, the terms ***rotator cuff syndrome***, ***shoulder bursitis***, ***rotator cuff tendinitis***, and ***impingement syndrome*** all refer to the same thing. The next step in the disease process would be a ***partial thickness rotator cuff tear***. The final step in the disease process would be a ***full thickness rotator cuff tear***. (see the figures on the next page)







Spectrum of Rotator Cuff Problems

HOW CAN I PREVENT THIS INJURY FROM RECURRING?

The best way is through daily shoulder exercises. Do not work through sharp pain when performing exercise or activities of daily living. If you are experiencing sharp pain with an exercise or activity, you should stop and inform your doctor or physical therapist. They will both help educate you to prevent this injury from recurring.

WHO GETS ROTATOR CUFF *TENDINITIS* AND *TEARS*?

Rotator cuff tendinitis can be either a wear and tear process that starts gradually without any evidence of an injury, or it can follow an acute event such as a fall or when lifting and twisting in an unusual position. While it is most common between the ages of 40 and 60, it may start as early as one's 20s or present as late as one's 80s. It happens in both men and women.

CAN YOU DIFFERENTIATE *TENDINITIS* VERSUS A *PARTIAL TEAR* VERSUS A *FULL-THICKNESS CUFF TEAR* BY HISTORY AND PHYSICAL EXAM ALONE?

No. A torn rotator cuff commonly causes weakness and pain in the shoulder, although many patients with known tears of the rotator cuff have surprisingly few symptoms. Unless there is clearly no strength with lifting the arm or with rotating it outward, it is often impossible to tell the difference between tendinitis and a cuff tear.

WHAT IMAGING STUDIES ARE USED TO SEE THE CUFF?

X-rays do not show evidence of rotator cuff tears, unless the tear is so old and so large that bony changes have occurred. If such changes *are* seen, it generally predicts a poor outcome.

An MRI scan or arthrogram is the next step if there is a suspected tear of the rotator cuff tendons. An MRI scan is a special radiological test where magnetic

waves are used to create pictures that look like slices of the shoulder. The MRI scan shows soft tissues like tendons and ligaments better than it does bones. The MRI scan is painless, and requires no needles or dye to be injected.

The arthrogram is an older test, done by injecting dye into the shoulder joint and taking several X-rays. If the dye leaks out of the shoulder joint, it suggests that there is a tear in the rotator cuff tendons.

Both tests are still widely used. Many physicians consider them to be 'pre-operative' studies, only ordered if surgical treatment is being considered.

WHAT CAUSES ACTUAL TEARS OF THE ROTATOR CUFF?

Many studies have shown that the rotator cuff tendons have areas where there is a very poor blood supply. In the human body, the better the blood supply a tissue has, the better and faster that tissue can repair and maintain itself from day to day wear and tear. These areas of poor blood supply in the tendon make the rotator cuff tendons especially vulnerable to degeneration with aging. This simple condition of aging may help explain why the rotator cuff tear is fairly common in later life. Rotator cuff tears usually occur through areas of the tendon that were not normal to begin with and have been weakened by degeneration and impingement.

Rotator cuff tears can be either of gradual onset or can occur because of an injury. The most common type of rotator cuff tear, a chronic tear, is an attritional process. Over time, the rotator cuff rubs back and forth against the underside of the acromion, which gradually tears fibers of the rotator cuff. Eventually a full thickness tear is present and may cause pain not only with activity, but also at rest. The other type of rotator cuff tear is a traumatic tear that may occur following a fall, a dislocation, or other high energy injury to the arm.

Typically, a rotator cuff tear occurs in a late middle-aged person who has been having problems with the shoulder for some time before the acute event. That person starts a lifting activity that exceeds the strength of the tendons, and the tendon tears, leaving an inability to raise the arm. There may be, or may not be, pain associated with the event.

Not all rotator cuff tears are repairable. Sometimes, the tendon has been torn for too long. This can lead to the tendon and muscle **contracting**. The muscle and tendon cannot be stretched enough to be attached back to where it was torn from. In other cases, the tendon tissue has simply worn away, and what tendon remains is not strong enough to hold the stitches necessary to attach the tendon to bone. In these circumstances, simply removing all the torn tissue and fixing any other problems in the shoulder (such as acromioclavicular (AC) joint arthrosis and impingement syndrome) may reduce pain. It will probably **not** increase the strength or motion of the shoulder, and may actually *decrease* the motion.

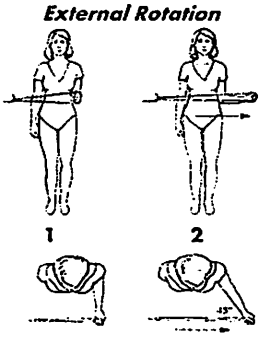
If all of these attempts to improve your shoulder fail to give you a useable shoulder, there are other more complex and involved procedures that include tendon grafts and muscle transfers. *These are rarely necessary* but will be discussed with you by your doctor if necessary.

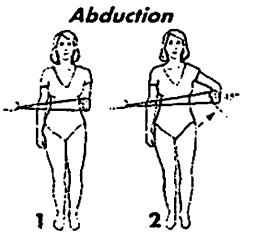
CAN ROTATOR CUFF TEARS HEAL THEMSELVES? -- DOES EVERYONE NEED SURGERY?

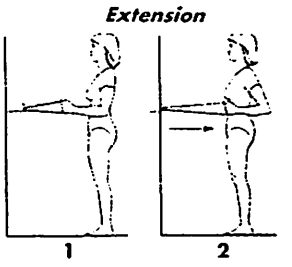
Full thickness rotator cuff tears generally *do not heal* or repair themselves. Many people, however, have pain that goes away following a rotator cuff tear. This is not because of healing, but because of compensation by the remainder of the rotator cuff muscles that are not torn, taking over the function of the muscle that is torn. For this reason, not all people need to have rotator cuff tears fixed.

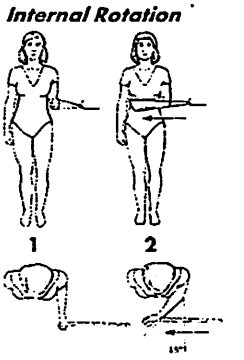
HOW IS *TENDINITIS* OR "*ROTATOR CUFF SYNDROME*" TREATED?

Rotator cuff syndrome (tendon or bursal pain *without* a full-thickness tear) is extremely common and often responds to conservative measures. Alternatives for treatment include *anti-inflammatory medications by mouth* or *injected cortisone* into the space above the rotator cuff. Of extreme importance, however, in treating rotator cuff syndrome is **physical therapy and home exercise programs designed to strengthen the rotator cuff muscles**.



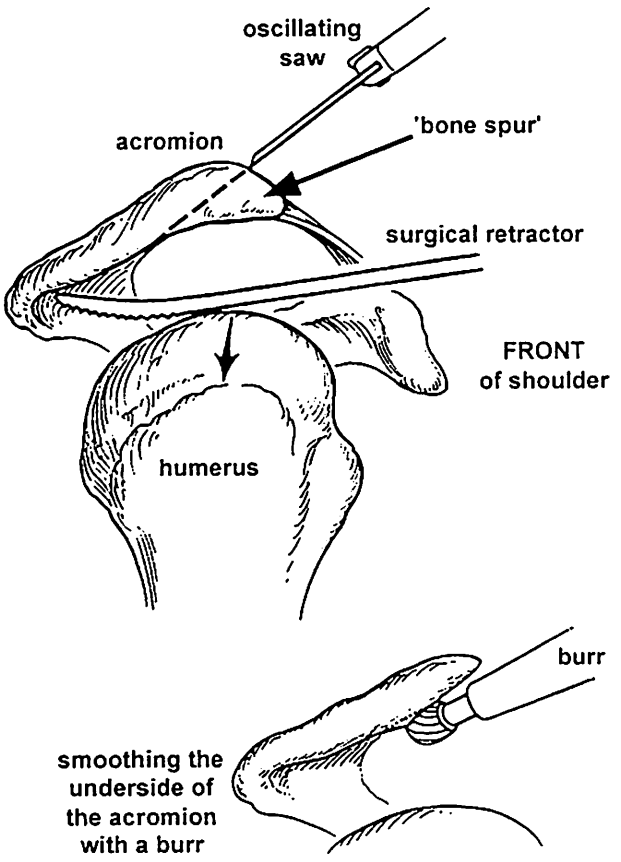






These exercises are not the type of exercises one ordinarily does at a gym or with regular weight equipment. The reason that these exercises are important is because strengthening of the rotator cuff will enable it to function correctly, keeping the humeral head centered against the socket of the shoulder joint. This will limit the rubbing that occurs between the rotator cuff and the acromion above to prevent further irritation. Other things that are often helpful in treating rotator cuff tendinitis involve the use of *hot or cold packs* to decrease pain. Additionally, if motion is limited, then *stretching exercises* are also important.

If rotator cuff tendinitis pain does not improve with these conservative measures, surgical treatment may be indicated. The surgical treatment for a tendinitis is known as **acromioplasty** or **subacromial decompression** (see diagrams on next page). This can be done either as an open procedure or as an arthroscopic procedure. During the surgery, the bone spur that forms on the underside of the acromion is removed and the acromion is smoothed, giving more space for the rotator cuff when the shoulder is elevated.



Cutaway Side View Showing Acromioplasty Types

(The *upper diagram* shows an open acromioplasty, with an oscillating saw, and with a large retractor holding down the humeral head. Arthroscopic acromioplasty accomplishes the same goals, but only uses a rotary burr, as shown in the *lower diagram.*

Impingement may not be the only problem in a shoulder that has begun to show wear and tear due to aging and overuse. It is very common to see degenerative (wear and tear) arthritis in the acromioclavicular (AC) joint in addition to impingement. If there is reason to believe that an arthritic acromioclavicular (AC) joint is contributing to the pain (most do not), then the end of the clavicle may be removed as well. After removal of about one half inch of the clavicle (not shown in this handout), scar tissue fills the space left between the clavicle and the acromion to form a *false joint*. The scar tissue that forms creates a stable, flexible connection between the clavicle and the scapula stopping the arthritic pain that was caused by bone rubbing against bone.

In most cases these procedures can be using the arthroscope. The arthroscope is a TV camera that is inserted into a joint through a small incision. Through other small incisions around the joint, the surgeon can insert special instruments to cut and burr away bone while he watches what he is doing on a TV screen.

In a few cases, a larger open incision is made to allow removal of the bone. Usually an incision about 3 or 4 inches is made over the top of the shoulder. Bone spurs are removed and a part of the acromion is removed and smoothed by the surgeon. If necessary, the end of the clavicle is removed to perform the resection arthroplasty of the acromioclavicular (AC) joint.

Recovery from shoulder surgery can be a slow process. Physical therapy will probably be needed for several weeks after your surgery. Getting the shoulder moving as fast as possible is important, but this must be balanced with the need to protect the healing muscles and tissues. You can expect the process of recovery to take several months.

HOW ARE ROTATOR CUFF TEARS TREATED ?

Rotator cuff tears are either acute, secondary to a trauma, or they are chronic. Traumatic tears generally do better when surgically repaired rather than with a trial of therapy first. Chronic tears generally are best treated with a

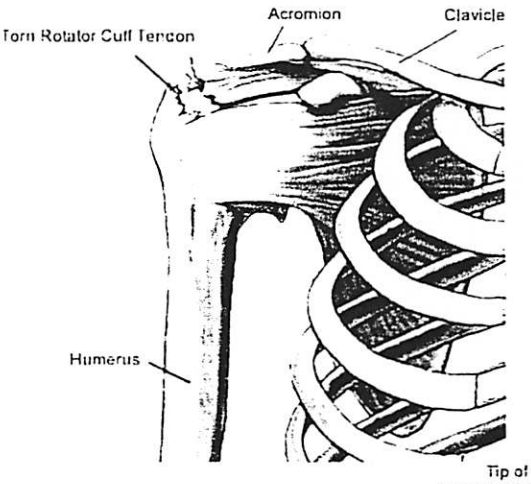
trial of therapy to see if the pain will resolve. If not, they too are often candidates for operative repair.

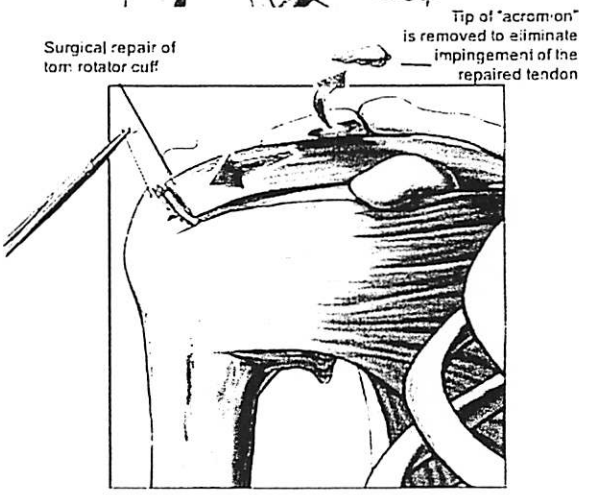
Some patients with chronic tears are not good candidates for repair because the tear is too large or the rotator cuff muscles have already wasted away, (atrophied).

For those who do not get better with physical therapy, medications, or injections for rotator cuff tears, repair of the rotator cuff may be carried out either using an arthroscope or using an open procedure. Surgery will usually be recommended the patient is young and very active or if the tear causes continued weakness or pain. A subacromial decompression (as described above) is also performed with rotator cuff repair. The rotator cuff itself may be repaired back to the humeral head using either sutures placed through bone or by using suture anchors.

Some cuff tears can be fixed arthroscopically. Other tears are fixed by making an incision (approximately 2-3 inches) over the outside of the shoulder. (Your surgeon will determine which approach is best for the particular tear)

The tears in the cuff are identified, and the torn edges are sutured together and/or reattached to bone. This may require the placement of drill holes, small screws or other anchors into the bone. These anchors may be made of metal or a type of material that will dissolve over time.





Sometimes the tear is so large or the tissue so damaged that it is impossible to completely fix. Bone from the acromion, the humeral head, and the underside of the clavicle (collarbone) is often shaved and removed to help reduce the pain after surgery.

Either approach towards surgery can often be done as an outpatient procedure.

The incision from the surgery will be closed with stitches and covered by a sterile bandage. A 'pain pump' catheter may temporarily be left in the shoulder to inject numbing medicine. You may have some swelling and small bruises on your shoulder, but this should disappear within a few days. For several

weeks after your surgery, your arm will be placed into a sling or harness that will immobilize the affected arm against the body. Sometimes it is necessary to place a pillow or brace under the arm for added support.

It will take about 12 weeks for the tendon to heal completely. The early recovery phase lasts approximately 6 weeks. During the first 4 - 6 weeks you can and should use your hand, wrist, and elbow, but you should not lift the shoulder with its own muscle until instructed to do so by your doctor or therapist. Using the rotator cuff muscles too soon may cause the repair to fail.

Using the shoulder muscles for activities such as elevating the arm usually starts at about 4 - 6 weeks after surgery. Your doctor may have you begin an assisted physical therapy program to help you regain your strength and range of motion. Full recovery from your surgery will take 9 - 12 months.

WILL A ROTATOR CUFF REPAIR *RELIEVE PAIN* AND *RESTORE FUNCTION*?

Pain relief is fairly reliable after a cuff repair. Increased strength and motion is *not*, and only occurs in about half of patients. Motion itself may even worsen following surgery, even if pain is gone.

HOW IS PAIN CONTROLLED FOLLOWING SURGERY FOR THE ROTATOR CUFF?

For both subacromial decompressions as well as repairs of the rotator cuff there may be several different elements to anesthesia and pain control. One of these is an injection in the nerves that go to the shoulder. This injection is known as an *intrascalene block* and produces numbness of the arm and the shoulder that may last several hours. This may be done immediately prior to or during the time of surgery and will result in a "numb arm" following the surgery, during which the patient feels no pain.

Another way to help the pain following rotator cuff surgery is through the placement of a "pain pump". A pain pump is a large syringe containing a numbing medicine such as Marcaine that is then injected slowly and continuously into the shoulder. The pain pump will provide numbing medicine that will help, but not eliminate the pain from the surgery. It is extremely important that the catheter for the pain pump be removed when the medication is exhausted.

A third way to help with pain following rotator cuff surgery is via medications by mouth. Most of these are narcotics such as codeine or a synthetic variant of codeine like Percocet. There is also the possibility to use anti-inflammatory medicines to help control the pain or to use long lasting medications such as OxyContin or MSContin. These three approaches help control the pain following rotator cuff surgery.

WHAT TYPE OF THERAPY FOLLOWS ROTATOR CUFF SURGERY?

For patients that have subacromial decompressions without repair to the rotator cuff, the main reason for therapy is to restore the motion of the shoulder and strengthen the muscles of the shoulder. People who have had this operation usually have no restrictions placed upon them as motion of the shoulder cannot damage anything that was done during the operation. As soon as their pain gets better, they find themselves more able to perform

regular daily activities and have better motion of their shoulder.

For most people that have subacromial decompressions, the pain from surgery is almost gone by week four and thereafter the patient will generally have less pain then they had before surgery.

For the patients that have rotator cuff repairs, the physical therapy regimen is more restrictive. Because there is a repair of the rotator cuff to protect until the tendon actually heals to bone, the patient is not allowed to move his or her own shoulder using their own muscles for the first several weeks. A rehab protocol is outlined to the patient following surgery. The patient needs to be in a sling when not doing therapy for the first 6 weeks and no driving is permitted for the first 6 weeks. Starting at 6 weeks the patient can gradually start to raise their arm using his or her own muscles. Before this time, they need to be assisted by somebody else or with the aid of devices such as an overhead pulley or a cane.

Strengthening of the rotator cuff muscles following a rotator cuff repair does not start until at least 12 weeks after surgery. Full recovery from a rotator cuff repair may be anywhere from 6-12 months following the surgery, although pain relief is often accomplished within a few weeks after the surgery.

CAN ALL ROTATOR CUFF SURGERY BE DONE ARTHROSCOPICALLY?

Arthroscopic surgery has improved rotator cuff treatment by providing a less painful form of surgery for the patient. Many rotator cuff repairs can be repaired arthroscopically. Other rotator cuff repairs are better performed via a more traditional open surgery. The restrictions in use of the shoulder after surgery are generally **not** different with an arthroscopic or an open approach (unlike in general surgery where people can do more sooner after laporoscopic surgery than after open laporotomies). The reason for the restrictions is to **protect the repair**, which heals at the same speed whether the skin incisions are large or small.

WHAT CAN GO WRONG WITH THE SURGERY?

For the vast majority of people, rotator cuff repair surgery has a good outcome, relieving pre-op pain. Complications occur in some, however. These complications can include and are not limited to problems with anesthesia, infections, re-tears, loss of motion, numbness in the arm, weakness, and arthritis.

DO ROTATOR CUFF TEARS RECUR?

While most people get good relief from repair of a rotator cuff tear, studies show that approximately one out of three large tears will reoccur. Fortunately, most of these people that have recurrent tears do not have pain associated with the recurrent tear. Because of this, repeat surgery is not usually needed. In some cases, however, a re-tear becomes very painful and may benefit from further surgical repair. Following a re-repair, the therapy protocol will be even more restricted and take a longer period of time.