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by Orthopedic & Sports Physical Therapy Associates, Inc.,
OSPTA@Home and Valley Outpatient Rehabilitation

Rotator Cuff Injuries

The shoulder girdle is a rather complicated joint complex. The primary joint is the glenohumeral joint, a “ball and socket” where the head of the humerus, the bony prominence closest to the shoulder blade, interacts with the glenoid fossa of the scapula, the socket in the shoulder blade. The rotator cuff, NOT “cup”, is a team of four muscles—*infraspinatus*, *subscapularis*, *supraspinatus*, and *teres minor*. All of the aforementioned muscles originate on the scapula and have tendinous insertions on the humerus. When properly acting together, the muscles stabilize the ball within the socket and allow the arm to be elevated and rotated without pain or symptoms.

Since the majority of rotator cuff tears occur in the *supraspinatus*, this newsletter will focus on the etiology, symptoms, surgical options, and rehabilitation of *supraspinatus* tears. Throughout the newsletter, the phrase rotator cuff tear should be considered synonymous with a *supraspinatus* tear.

ETIOLOGY

Rotator cuff tears can be partial or full-thickness. Partial tears are those that present with at least a portion of the muscle or tendon connected at the site of the tear. Partial tears have a greater chance of responding non-surgically, though surgery can be considered an option if conservative treatment fails. Full-thickness tears do not have any portion of the muscle or tendon connected at the site of the tear. Full-thickness tears usually require surgical repair.

Rotator cuff tears result from gradual “wear and tear” or from an acute injury. The majority of tears occur gradually, commonly in people over the age

of 40. Causes of gradual tears include abnormal wear from bone spurs, muscle weakness, or postural abnormalities. Acute tears are seen in both older and younger populations. These can result from falls, repetitive overhead activities, or trauma, such as a dislocation or a fracture.

Listed below are causes and risk factors for a rotator cuff tear. Most of the causes or factors serve to diminish the sub-acromial space between the aforementioned glenohumeral joint and the acromion, a bony “bridge” that lies above the joint. The *supraspinatus* tendon travels within this sub-acromial space making it a prime target for potential tears.

Causes and Risk Factors for a Rotator Cuff Tear

- Bony abnormalities from genetic anatomical design or from degenerative aging changes.
- Postural abnormalities, such as a slouched posture.
- Reduction in blood flow to the rotator cuff tendon due to degenerative aging.
- Falls onto the shoulder girdle or other unspecified trauma to the shoulder girdle.
- Lifting heavy objects.
- Repetitive overhead activities, such as painting, pitching baseball, playing tennis, and swimming.

SYMPTOMS

Symptoms of a rotator cuff tear may develop gradually or suddenly depending upon the cause. Non-traumatic tears typically present with

gradual, but progressive, pain. Pain can eventually radiate down the involved arm towards the elbow. Traumatic tears normally present with acute, sharp pain, a sensation of popping or snapping, and an immediate weakness of the entire upper extremity. Regardless of whether trauma was present or not, people normally have difficulty lying on the involved side, therefore disrupting sleep. In addition to pain, symptoms may include range of motion loss and weakness, leading to difficulty reaching behind the back, reaching overhead, and lifting objects at or above shoulder level. Common activities that are troublesome are combing hair, driving, and fastening a bra.

SURGERY

The symptoms of a rotator cuff tear are usually first treated with conservative measures, such as rest, physical therapy, and anti-inflammatory medicine(s). If the potential tear is unresponsive to the aforementioned treatments, a consultation with an orthopedist is typically suggested. Upon initial orthopedic consultation, many surgeons will perform plain-film radiographs, more commonly known as x-rays, and perhaps attempt a focal corticosteroid injection. The corticosteroid injection is placed under the acromion, the bony “bridge” mentioned above. If patients’ pain is significantly caused by inflammation, then the injection should reduce the pain and thereby improve range of motion and strength. When an injection is coupled with physical therapy and anti-inflammatory medicine, patients suffering from partial tears, or less severe pathologies such as bursitis and tendonitis, can be greatly helped.

If the conservative measures coupled with an injection do not reduce patients’ symptoms, the orthopedist will usually then order magnetic resonance imaging (MRI) or an arthrogram (MRI, with contrast). If imaging confirms a large (>three centimeters) or full-thickness (>five centimeters) tear, the surgical repair is indicated. Recent advances in technology allow orthopedic surgeons to repair even the largest of tears arthroscopically. Arthroscopic surgery requires only three to five tiny incisions approximately one-half of an inch long around the involved shoulder. Benefits of arthroscopic procedure are as follows:

- Better evaluation of the tear during the surgery.

- Better mobilization of the involved, retracted tendons.
- Shorter recovery time and less pain post-operatively.

Arthroscopic rotator cuff repairs usually involve a sub-acromial decompression (SAD). An SAD is performed to alleviate pressure on the involved rotator cuff tendon due to bony changes or spurs of the acromion. To guide the understanding of why an SAD is performed, think of tooth floss tearing off the hook in its container. The rotator cuff tendon is the tooth floss and the hook in its container is the acromion. If the hook does not allow enough space for the tooth floss, the tooth floss will tear.

The rotator cuff tendon is then repaired by mending the tissues of the tendon back together. The orthopedic surgeon will assess the mobility of the “good” tissue and determine which surgical option is best for the patient. The sutured tendon will then be re-attached to the bone with screws at the natural insertion site. If there is not enough “good” tissue, the surgeon may use a mesh degradable material to reinforce the repair.

Other considerations that may arise during a rotator cuff repair involve the long head of the biceps brachii tendon and the acromioclavicular (AC) joint. A bicipital tenodesis can be performed to further relieve pressure on the involved shoulder. The AC joint, where the collarbone meets the bony bridge”, is inspected for osteoarthritic changes. If the surgeon feels that the AC joint is contributing to the pain, he/she may remove a finite amount of bone to create additional space for the shoulder girdle to move.

REHABILITATION

As stated above, conservative management of rotator cuff pathology usually includes rest from any stimuli that cause symptoms, physical therapy, injection(s), and anti-inflammatory medicine(s). Physical therapists offer a comprehensive evaluation followed by a treatment plan that is aimed at reducing the compression and friction between the rotator cuff tendon and the acromion. Treatment may include corrective strengthening exercises, manual therapy, massage, modalities (electric stimulation, ice, moist heat, and ultrasound), patient education, postural training, and range of motion exercises. It is vital to remember that treatment based upon specific evaluation of each patient is preferred for

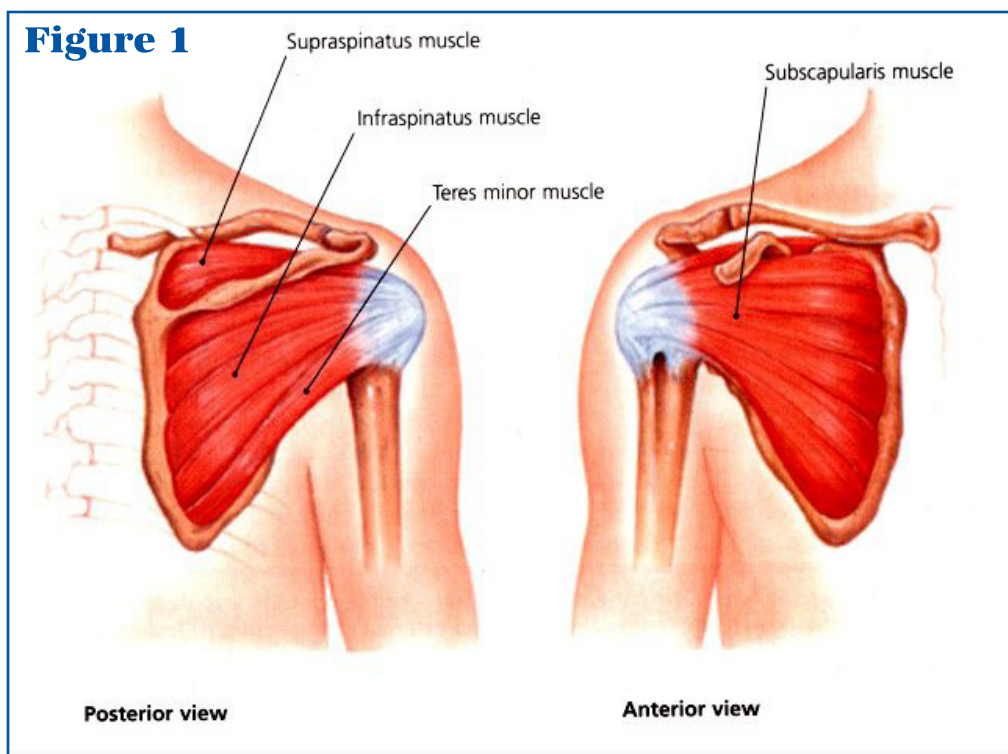
optimal outcomes, as not just one approach exists for every person.

Post-operative rehabilitation protocols vary depending upon orthopedic surgeons' preferences, the size of the tear, and the type of surgery performed, but the desired result remains a healthy rotator cuff complex, devoid of compression and friction via the acromion. Generally, post-operative protocols are divided into four or five phases, with movement between each phase determined via time, or upon approval from the surgeon. The first phase of post-operative rehabilitation lasts one to ten days. Typically, the patient is instructed to don a slight abduction brace to prevent undue stress on the healing tendon. Pain medicine, varying in potency, can be prescribed via the surgeon for a finite amount of time. Physical therapy, if initiated, focuses on passive and active-assisted range of motion in order to prevent adhesive capsulitis, or a "frozen shoulder", and pain-relieving modalities.

Phase two begins roughly 11 days post-surgery and lasts until approximately six weeks post-surgery. The slight abduction brace, if utilized, is discontinued in this phase. Early focuses of physical therapy are passive and active-assisted range of motion, initiation of isometric exercises (strengthening exercises in which the involved extremity does not move), and pain-relieving modalities. As this phase progresses, active range of motion exercises and strengthening exercises below the level of the involved shoulder are initiated.

Phase three begins roughly at six weeks post-surgery and continues to about 12 weeks post-surgery. Physical therapy focuses on restoration of full active range of motion and progression of stability and strength at varying angles throughout the range of motion. When this phase is completed, many patients who do not need to return to strenuous activities or occupations will be discharged via the surgeon from physical therapy. These patients should continue to perform an independent home exercise program, as instructed from their physical therapist.

Phases four and five differ only slightly from one another and are often considered only one phase of a protocol, rather than two. They are usually reserved for patients that require a higher level of performance due to their occupations or recreational activities. These phases typically begin at approximately 12-14 weeks post-surgery and last until the patient has returned fully to their respective activities. Focuses in these phases are on continued progression of stability and strength, and activity-specific training.





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NEWS briefs

OSPTA would like to thank Mr. Jon Jiancristoforo, PT, Mr. Nick Sivrich, PT and Mr. Matt Bair, DPT for their contribution for the newsletter.

At select offices, OSPTA offers specialty programs in Pilates, Vestibular Rehabilitation, Pediatrics, Lymphedema, Women's Health, Certified Hand Therapy and a Sportsmetrics program to prevent ACL injuries.

To find an office close to you, check our website: www.osptainc.com or call 1-800-337-6452.

In addition, OSPTA Home Healthcare offers homecare services. The toll free number 1-866-483-4859.

OSPTA would like to remind everyone that home health visits can be performed through



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