

## Rotator Cuff Pathophysiology

Shoulder injuries occur to most people at least once in their life. This highly mobile and versatile joint is one of the most common reasons people visit their health care practitioner. The challenge faced by all health care providers is to not only identify the exact cause of the shoulder dysfunction but come up with a treatment program that will effectively treat it. The tricky part about the shoulder is that it is a ball and socket joint that receives its stability from soft tissue structures like capsules, ligaments, tendons and muscles. Proper treatment will depend upon identifying which of the soft tissue structures are damaged. One of the most common injuries to the shoulder is with the rotator cuff.

The rotator cuff is a collection of muscles that act to stabilize the shoulder joint as well as provide internal and external rotation motions. The four muscles of the rotator cuff include the supraspinatus, infraspinatus, teres minor and subscapularis. Also known as the SITS muscles. Of these muscles the most commonly ruptured is the supraspinatus. Mosby's Medical Allied Health Dictionary defines the shoulder joint as the ball and socket articulation of the humerus with the scapula. The joint includes eight bursar and five ligaments, including the glenoidal labium that deepens the articular cavity and protects the edges of articulating bones. A rotator cuff injury consists of a strain or tear in the group of tendons and muscles that hold the shoulder joint together. Injury occurs in a number of different ways. Poor head and shoulder posture, especially in older people, using your arm to break a fall, motor vehicle accidents, lifting a heavy object as well as abnormal wear and tear. Rotator cuff injuries are also seen in sports with repetitive overhead movements such as baseball, swimming, football, and tennis. These repetitive motion sports often lead to a muscle imbalance in the shoulder, which places great strain on the tendons. The repetitive strain causes microtrama to the tendons, leading to a rotator cuff injury. Shoulder pain can also indicate a viscerosomatic referral from organs such as the gall bladder on the right and spleen and heart on the left, so these must be considered.

The symptoms of a torn rotator cuff are arm and shoulder pain, shoulder weakness, shoulder tenderness, and loss of shoulder movement, especially overhead. Diagnosis is performed by following basic physical examination procedures. First and foremost a complete and detailed history should be taken. In this history you must ask questions like how the injury took place, did the onset of the pain happen

suddenly or over time, where is the location of the pain, and are there any movements that exacerbate the symptoms. Also, determine if the patient has received any other treatment before coming to your office.

History is followed by inspection of the shoulder. Check for signs such as swelling, redness, black and blue, and deformity. Palpate the bony structures such as the humeral head, acromion process, clavicle, and scapula. Also palpate soft tissue structures such as the subacromial and subdeltoid bursae, deltoid muscle group, bicipital tendon, and of course, the four rotator cuff muscles and tendons. Palpation of the rotator cuff muscles is most easily performed by first finding the bony landmark of the spine of the scapula. The infraspinatus muscle is located in the fossa directly below the spine of the scapula. The teres minor is located inferior and lateral to the infraspinatus. The supraspinatus is located immediately above the spine of the scapula with its tendonous insertion into the humeral head. The subscapularis muscle is located on the underside of the scapula making digital palpation somewhat restricted.

Range of motion examination of the shoulder involves the motions of abduction, adduction, internal and external rotation, flexion and extension, as well as scapular elevation and retraction. Correct range of motion examination requires both passive and active range of motion to be checked. Investigating rotator cuff pathology focuses on the abduction, and rotation movements of the shoulder. Limited abduction, especially actively, indicates possible supraspinatus involvement. Limited passive internal rotation points more towards infraspinatus and teres minor involvement, while restricted active internal rotation points more towards subscapularis. Conversely, limited passive external rotation indicates subscapularis pathology, and restricted active external rotation points towards the infraspinatus and teres minor.

Orthopedic testing should be performed to further pinpoint the origin of the pathology. These orthopedic tests include Codman's arm drop. Supraspinatus press test, Dugas' test, and Shoulder apprehension. Each test will help the clinician differentiate exactly which structures are involved. Neurologic testing should also be performed since the shoulder is a common region for referred pain from nerve compression in the neck. This should include deep tendon reflex examination of the biceps, triceps, and brachioradialis. Skin sensation testing of the upper extremities, and manual muscle testing of the shoulder and upper extremity muscles.

Radiographic examination is recommended in shoulder pathology to rule out fractures and bone spurs. If the exact diagnosis is still unclear, advanced diagnostic radiographic procedures can be ordered including

an arthrogram, magnetic resonance imaging (MRI) and computerized tomography (CT). Surgical arthroscopy can also be performed as a diagnostic procedure.

Once a diagnosis has been achieved a treatment plan must be prescribed. Conservative treatments should always be explored before surgical intervention. Partial tears and strains of the rotator cuff respond very well with conservative treatments. Conventional conservative treatments include Chiropractic, Physical Therapy, Massage or a combination of each. Treatment programs should focus on restoration of joint range of motion through massage, joint manipulation and stretching techniques. Once a proper range of motion has been achieved, it is important to strengthen and balance the surrounding shoulder girdle musculature through therapeutic exercise techniques. The patient should also be educated on proper posture and lifting techniques to enhance the healing process. Normal recovery of a rotator cuff tear with therapy usually lasts about 3 months, however each case is different. Conventional Allopathic treatment begins with the prescription of medications such as anti-inflammatories, painkillers, and muscle relaxants. It should be remembered that these medications only control the symptoms of rotator cuff pathology and do not provide any tissue healing. If the tear is severe enough, surgical intervention is usually recommended through arthroscopy. In this case the tear is stitched back together. Physical therapy is prescribed following the surgery to strengthen the shoulder as it heals. Strengthening and balancing the shoulder joint musculature and making sure there is a full range of motion is the best way to ensure that this rotator cuff problem does not become a chronic one.

A different approach to treating a rotator cuff tear other than conventional medicine would be through acupuncture. Acupuncture is an excellent way of treating the pain accompanied by a rotator cuff injury. Acupuncture diagnoses shoulder pain as Qi and blood stagnation within the channel. The channels effected with a rotator cuff tear injury are the large intestine, small intestine and San Jiao. Whether your tear is a major or minor one acupuncture can be very effective for treating the pain. Our first line of defense would be to develop a treatment principle. In this case it would be to move the qi and the blood. Next the practitioner will pick a series of points to treat the problem. Most points will probably be A shi point with some channel points mixed in. The most effective channel points posterior are SI 9, 10, 11, 12, and SJ 14, 15. Anterior points would consist of LI 15, and 16. Because acupuncture works very well with pain, the

patient will be able to tolerate physical therapy and chiropractic treatments making Acupuncture the perfect compliment to those treatment techniques.

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