

Differentiating Between Cervical Radiculopathy and Rotator Cuff Tear

By: Kern Singh, MD

Cervical spine and rotator cuff pathology may present in very similar clinical patterns. Thorough knowledge of the neuromuscular anatomy of the shoulder and the cervical spine can make the differential diagnosis easier. Meticulous physical examination along with simple diagnostic imaging may aid the treating physician in determining the source of the patient's shoulder pain.

■ Rotator Cuff Anatomy and Pathology

The rotator cuff is made up of four muscles and their corresponding tendons. The four muscles - supraspinatus, infraspinatus, subscapularis, and teres minor - originate from the scapula, and together form a single tendon unit over the head of the humerus named the "rotator cuff". The rotator cuff helps to lift and rotate the arm and to stabilize the ball of the shoulder within the joint.

Rotator cuff pathology is most commonly caused by extrinsic (outside) causes. Extrinsic examples include a traumatic tear in the tendon(s) from a fall or accident. Overuse injuries from repetitive lifting, pushing, pulling, or throwing are also extrinsic in nature.

Rotator cuff dysfunction is typically a continuum of pathology ranging from tendonitis and bursitis, partial tearing, to a complete tear. These tears most commonly occur in the supraspinatus at the tenoperiosteal (tendon to bone) junction. Several factors including poor blood supply, the constant resting tension in the muscle-tendon unit, and joint fluid from within the shoulder may prevent tendon healing.

■ Cervical Spine Anatomy and Pathology

Cervical nerve roots (C4-6) innervate the shoulder girdle and rotator cuff muscles. Radiculopathy arising from C4, C5 and C6 is very difficult to differentiate from shoulder pathology because the sensory distribution runs from the base of the neck to the outer edge of the shoulder. Any of these cervical nerves can produce pain in the scapula, shoulder, upper/lower arm, and hand. Weakness of shoulder without pain suggests cervical pathology; however, this rule is not absolute.

■ Physical Examination and Special Tests

Since the pathologies of both the rotator cuff and cervical nerve root impingement often replicate each other, special tests are used to differentiate them.

The physical exam should be systematic and may involve using special maneuvers to differentiate between cervical and shoulder pathologies. These tests include the Neer's, Hawkins', and Jobe's tests for rotator cuff pathology and the Spurling's sign for cervical radiculopathy.

Rotator Cuff
<ul style="list-style-type: none">• Atrophy/thinning of the shoulder muscles• Pain with abduction (lifting) of the arm• Pain with lowering a fully raised arm• Weakness with arm rotation
Cervical Radiculopathy
<ul style="list-style-type: none">• Reduction in pain with arm abduction (decreases nerve root tension)• Sensory changes along a nerve root dermatome• Small percentage of patients will have weakness without significant pain

■ Shoulder Pathology

The Neer's Test

This test is used for impingement of the rotator cuff tendon. The patient is asked to forward flex a fully pronated arm. The examiner prevents the



scapula from moving and provides resistance against further forward flexion. This test will cause pain in patients with cuff pathology at all stages. For further differentiation, the examiner can place a 1% lidocaine injection into the subacromial space and retest. If the pain is still present, then another diagnosis must be considered.

The Hawkins' Test

The Hawkins' test was first described in 1980 as an alternative to the Neer's test. The test adds to the certainty of a diagnosis. In this test, the patient forward-flexes the arm to 90° and flexes the elbow to 90°. The examiner then internally rotates the humerus with force in order to impinge the greater tuberosity against the acromion.



The Jobe's Test

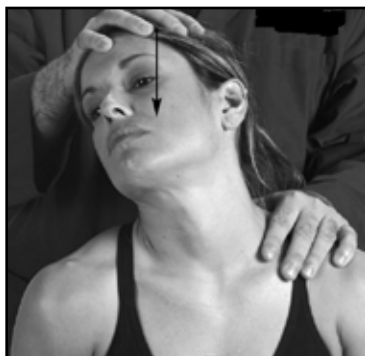
This test isolates the supraspinatus tendon that is the most often injured tendon. The patient abducts the arm to 90°, and from there the arm is angled forward 30°. The thumb is then turned towards the floor, internally rotating the humerus and isolating the tendon. The examiner places his hand on top of the arm to provide resistance while the patient tries to lift against the resistance. A positive test is made when there is pain referred along the superior lateral deltoid muscle with muscle weakness.



■ Cervical Pathology

Spurling's Sign

To test for the Spurling's sign, the patient should extend the neck and laterally tilt the head to the affected side. The examiner should apply downward force to the top of the head. If the test is positive, the re-creation of the radicular pain or paresthesia will be evident. This occurs due to the narrowing of the foramina against the inflamed nerve root from a ruptured disk. While this test will recreate the pain of the affected shoulder, it differs from rotator cuff pathology in that standard rotator cuff tests will not cause dermatomal pain.



■ Additional Diagnostic Studies

Once the pathology has been localized an MRI may then be obtained. Obtaining an MRI prior to physical examination will lead to an erroneous diagnosis and expensive workup for asymptomatic findings. Oftentimes, patients are treated for shoulder or cervical pathology before an examination is done. The simple provocative maneuvers mentioned previously can help differentiate the source of pain and provide a more focused treatment algorithm.

Electromyogram is a study of the nerves and their conduction disturbances. This test differentiates the shoulder pain and muscle weakness due to an impinged nerve. Nerve conduction studies are usually done at the same time as an EMG. Precise locations of a nerve disorder can be located and the test is fairly inexpensive as well as readily accessible. This test may provide value when the patient has findings on both the shoulder and cervical MRI.

These various tests demonstrate how a patient with diffuse complaints of shoulder pain may actually have either shoulder or cervical pathology. By performing a complete history and physical exam and using these provocative physical maneuvers, the examiner can discover the underlying cause of the symptoms. A systematic history and physical examination will help the treating physician to order specific diagnostic studies providing a focused treatment algorithm allowing patients to recover quicker and return to work and activity sooner.

A graduate of Jefferson Medical College (magna cum laude), Dr. Singh completed his orthopaedic residency at Rush Presbyterian-St. Luke's Medical Center. Dr. Singh's practice specializes in the treatment of complex degenerative disorders of the cervical, thoracic, and lumbar spine. Dr. Singh also specializes in spine tumors and adult spinal deformities. A particular research interest to Dr. Singh is minimally invasive, motion sparing spinal technology.



*For more information:
Kern Singh, MD
RUSH University Medical Center
1725 W. Harrison St., Ste. 1063
Chicago, Illinois 60612
Toll free: 877-MD-BONES*