

IRRITATED BY IMPINGEMENT SYNDROME?

By Peggy Lamb, MA, LMT, NCTMB

Shoulder impingement syndrome is one of an array of conditions that indicate a dysfunction in shoulder mechanics. It's frequently present with rotator cuff injuries and causes pain in the upper arm, decreased and painful range of movement, and interrupted sleep. Mine came on suddenly, or so it seemed, and so many movements hurt: fastening my seat belt, putting on my coat and reaching to the side to turn off a lamp are just a few. After a frustrating month, I gave up trying to self-diagnose, (is anybody else guilty of that?), and went to my chiropractor. He immediately did the test for impingement syndrome (see below) and of course, it was positive.

In this article we'll explore the scapulohumeral rhythm as a possible culprit for impingement syndrome and I'll offer strategies and protocols for the two muscles that are prime time players in the scapulohumeral rhythm: serratus anterior and trapezius.

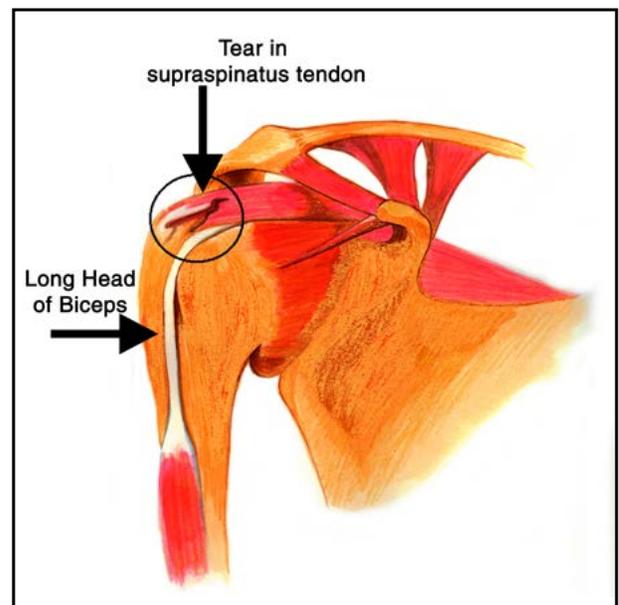
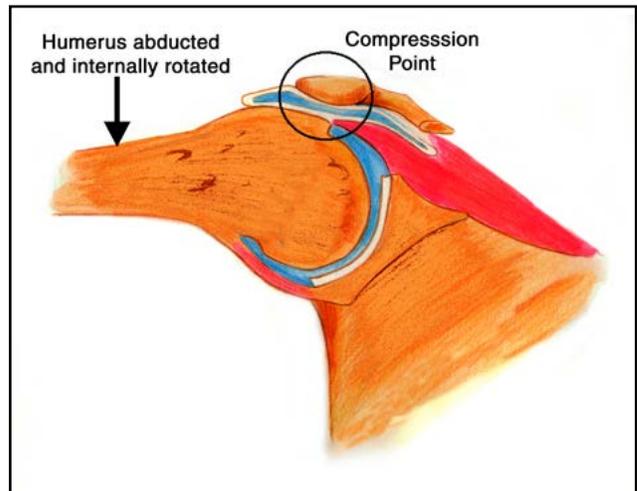
First let's review the anatomy.

The superior aspect of the shoulder joint is called the impingement area. The primary structures affected in Shoulder Impingement Syndrome are the supraspinatus tendon, the sub-acromial bursa and the long head of the biceps.

When the humerus is internally rotated, the greater tubercle rolls forward, taking the supraspinatus tendon along for the ride. Since the supraspinatus attaches to the top of the greater tubercle, it will collide with the acromion process if the humerus is abducted in the internally rotated position as shown in **Figure A**. Try internally rotating and abducting your humerus and you'll feel the restriction of the greater tubercle colliding with the acromion process.

Just imagine how many times people do this on any given day! You can see why this muscle/tendon unit is so frequently torn and/or impinged as shown in **Figure B**. The subacromial bursa lies above the supraspinatus and underneath the acromion process and, of course, it too suffers from irritation and inflammation when impinged.

Let's turn our attention to the long head of the biceps (the short head of the biceps has been cut out of Figure B). Habitual internal rotation will cause that tendon to rub against either the lesser or greater tubercles causing micro-tearing, impingement, and inflammation.



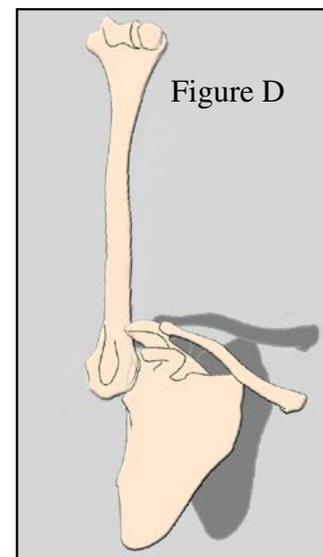
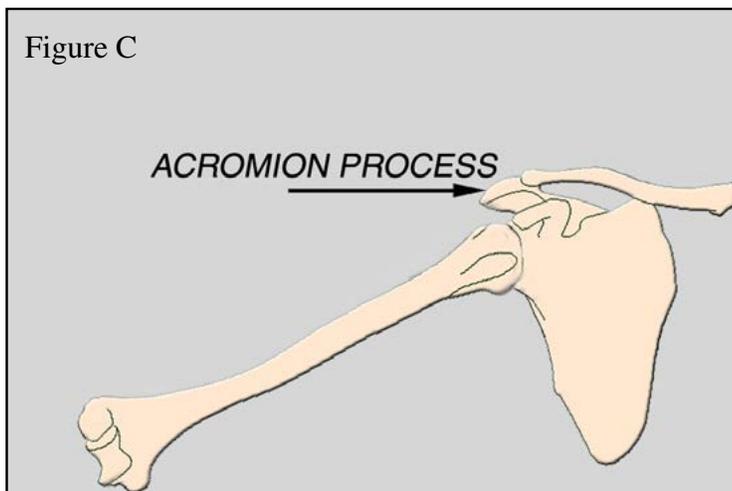


If you suspect impingement syndrome, you can test for it easily. Flex the client's shoulder to 90 degrees and from that position, internally rotate and horizontally adduct, (bring the arm across the chest), the humerus as far as it will go. This brings the greater tuberosity of the humerus up under the coracoacromial arch and it will press on the soft tissue structures under the arch (supraspinatus tendon, long head of biceps and subacromial bursa.) If impingement syndrome is present, this test will reproduce the pain/discomfort

Hawkins-Kennedy Impingement Test

SCAPULOHUMERAL RHYTHM

The shoulder girdle and shoulder joint dance a lovely duet called the scapulohumeral rhythm. In order for the humerus to move past 30 degrees of abduction and 45 to 60 degrees of flexion, the scapula must move in order to accommodate the humerus. Upward and downward rotation of the scapula happens when the humerus is abducted higher than 30 degrees or flexed higher than 60 degrees. We'll use abduction as our model. Figure C shows the humerus abducted to 30 degrees and the scapula in neutral. As the humerus rises toward 90 degrees, the head of the humerus approaches the acromion process. In order to abduct the humerus higher than 90 degrees, the scapula must get out of the way, or else the head of the humerus would collide with the acromion process. Figure D shows the scapula upwardly rotated, leaving a clear pathway for the head of the humerus. The dark gray scapula in Figure D shows the scapula in neutral. Upward rotation refers to the acromion process, clavicle, and glenoid fossa rotating upward. Feel it on yourself by placing your fingers in the middle of your clavicle and walking your fingers laterally till it meets with the acromion process. Now, abduct your arm above 90 degrees and you will feel the acromion process and clavicle upwardly rotating. The trapezius and serratus anterior are the prime movers for upward rotation of the scapula. Since these two muscles tend to be locked short (held in a concentric contraction), and fascially bound, they are likely candidates for impeding healthy rotator cuff function and causing shoulder impingement syndrome.

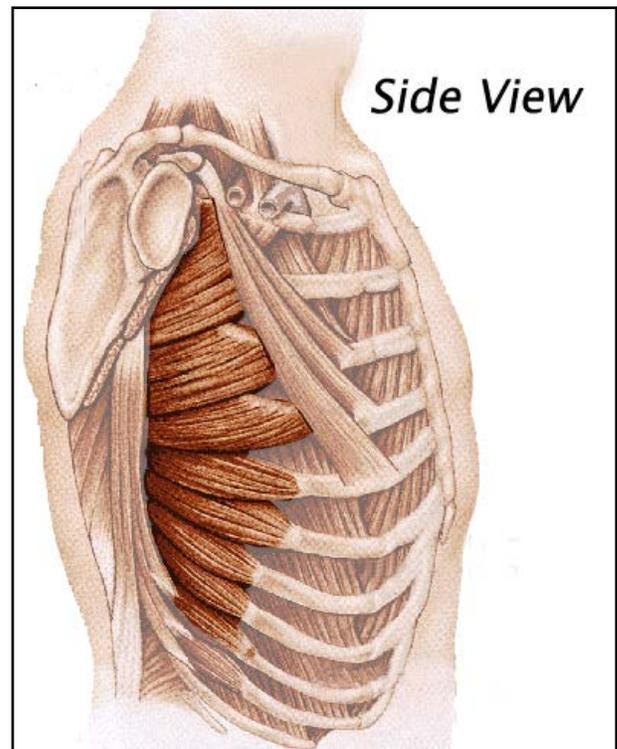


A Scapulohumeral Rhythm Test:

An easy test to do with a client is to stand behind her and place one hand on her scapula. Ask her to slowly raise (abduct) her arm above her shoulder. You will feel the upward rotation of the scapula. Now do the same thing on her other arm. The final step is to place your hands on both of her scapulae and ask her to raise (abduct) both arms above her shoulder. Both scapulae should upwardly rotate at the same time. On someone who is having impingement symptoms, the affected scapula will lag behind the healthy shoulder. In other words, the upward rotation is not happening soon enough and some irritation of those structures in the impingement area (supraspinatus tendon, subacromial bursa, long head of biceps) is occurring. Over a long period of time significant damage can happen. Now let's take a look at strategies to release the serratus anterior and trapezius.

Serratus anterior: protracts and upwardly rotates the scapula and prevents “winging” of the scapula. Attachments: anterior - superior lateral surfaces of upper eight or nine ribs; posterior - anterior surface of the medial border of scapula.

The serratus anterior is an important muscle for shoulder girdle stabilization (holding the scapula on the torso preventing “winging”) and torso alignment. When it's locked short it pulls the scapula, shoulder, head, and neck forward and restricts the lateral movement of the ribs in respiration. Since the serratus and the trapezius upwardly rotate the scapula, a tight and fascially bound serratus can limit painless and fluid abduction or flexion of the humerus above 45/60 degrees. As we've seen, the humerus needs the scapula to upwardly rotate to avoid the collision of the acromion process and the head of the humerus.



TECHNIQUES FOR WORKING THE SERRATUS ANTERIOR

1. Client can be supine, side-lying, or prone, but I find the side-lying position offers the most advantages for access. Have the client position her arm out of your way by propping it on a pillow. Start by skin rolling without lubricant which helps to release the connective tissue (fascia).

2. To release the stubborn superior fibers of the serratus, place your fingers as if you were accessing subscapularis. Instead of pressing towards the scapula, press your fingers on the upper ribs. Your client's arm can rest comfortably on your shoulder. You'll find lots of trigger points and hot spots to release. Static compression and deep stroking are good choices here. The serratus lies on top of the ribs, not in between, so you want your pressure to be directly on the ribs. Include the following active movements to help your fingers "swim" into the tissue and gain depth:



A. Have your client reach her arm across her body and back, (protracting and retracting the scapula), as you release trigger points and hot spots.

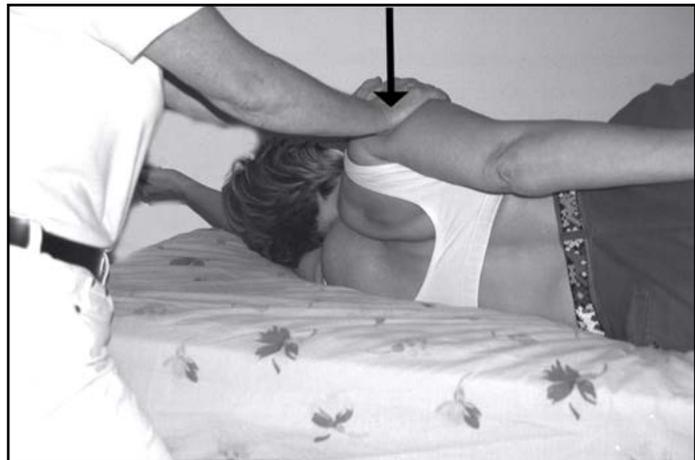
B. Ask your client to abduct her arm above 90 degrees to engage the fibers of serratus that perform upward rotation.

3. Latitudinal stroking, anterior to posterior along the ribs, while taking the shoulder through both passive and active range of motion as described above. Locate tender spots and trigger points and release with static compression and deep stroking. In the photo below, the therapist is working over the client's sports bra, but it's easy to drape the client to just expose the ribs. Most tender areas and trigger points are found on the lateral ribs along the line of the nipple. Work the muscle from the ribs toward the shoulder blade, which promotes proper scapula placement. Encourage your client to breathe into the lateral ribs to expand them while you work.



Locating tender spots and trigger points in the side-lying position.

4. Serratus Anterior Stretch: Client is side-lying on the side opposite of the one to be stretched. Press the shoulder blade into full retraction (adduction). This is a subtle stretch but clients with a tight serratus will find it quite pleasant.



Trapezius: (upper fibers) elevation and upward rotation of the scapula; lateral flexion of the neck; extreme contralateral rotation of the neck; (middle fibers) retraction and upward rotation of the scapula; (lower fibers) depression and upward rotation of the scapula
Attachments: (upper fibers) : superior - occiput; inferior- nuchal ligament of cervical spine; lateral - outer third of the clavicle; (middle fibers): medially - spinous processes of C6 to T4; laterally - acromion and superior lip of the spine of the scapula; (lower fibers) : medially - spinous processes of T5 to T12; laterally - root of the spine of the scapula.

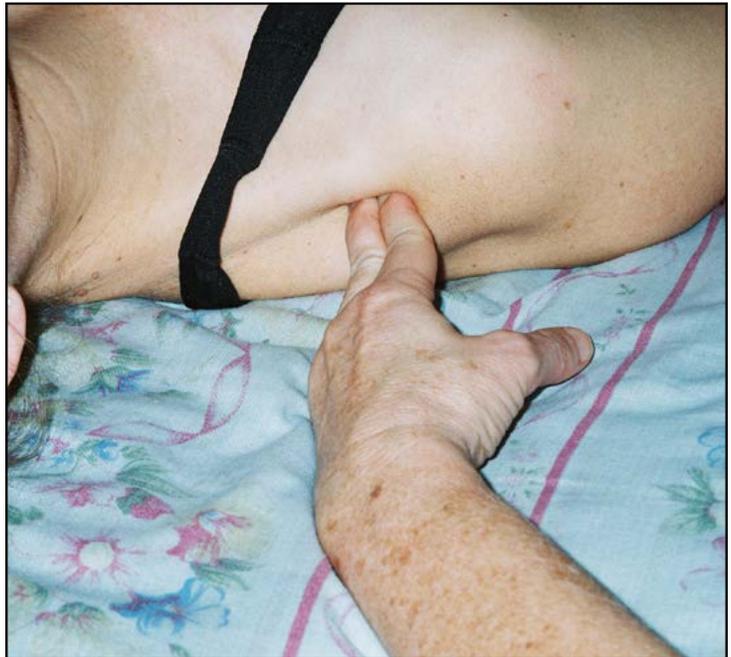
Since the trapezius upwardly rotates the scapula, tight traps can limit abduction of the humerus above 60-90 degrees. And who doesn't have tight traps?! This muscle is often the overlooked component in restoring full range of movement to the shoulder joint. Typically the upper traps are more developed than the lower traps, which means that the lower traps (which depress the scapula) cannot balance the upward pull of the upper traps on the scapula and clavicle. The middle traps are often weak and overstretched due to a slumped shoulder posture. Both the middle and lower traps usually benefit from strengthening exercises, which help stabilize the shoulder girdle and therefore release the load on the rotator cuff. The upper trapezius often gets enmeshed with the posterior scalene, which it sits on top of, in a dysfunctional relationship which inhibits healthy functioning of either muscle.



TECHNIQUES FOR WORKING THE ACROMIAL/CLAVICULAR ATTACHMENTS OF THE TRAPEZIUS

1. Since most massage therapists are quite capable in releasing the trapezius, the following protocol focuses on working the acromial/clavicular attachments. Work the entire muscle but concentrate on this usually overlooked area of glued tissue. Client can be supine, side-lying, or prone, but I find the supine position offers the best access. Concentrate your work in the small area around the attachments at the acromion process and the clavicle.

1. Skin roll the area, working to free this fascially bound tissue.
2. Perform deep parallel stripping, cross-fiber friction, and static pressure to free the attachments. Have the client do the following active movements to help your fingers “swim” into the tissue and gain depth while you work.:
 - A. Ask your client to abduct her arm above 90 degrees to engage the fibers of trapezius that perform upward rotation.
 - B. Laterally flex the neck to the opposite side and return it to center.



2. Trapezius stretch: Client is supine. Therapist laterally flexes the neck (ear to shoulder). Ask the client

to rotate her head away from the side of the neck being stretched. In the photo left, the therapist's right hand is gently pushing the client's right shoulder down while the left hand is gently pressing the head and neck towards the left shoulder. Traction the neck before and during the stretch.



If you have a client that is not responding to treatment, they may have a Type II or Type III acromion process. In Type II, the acromion process is curved and dips downward; Type III acromion processes are beaked. Both types obstruct the outlet for the supraspinatus tendon. This can easily be seen with an X-Ray. Surgery may be the best option, especially for Type III's. That being said, my impingement syndrome took a good year to resolve and I have a normal acromion process. Regularity and continuity of treatment is essential and the healing may come in baby steps. Combining the massage work with other modalities such as ultrasound and acupuncture can produce a powerful therapeutic effect. Sleep position, posture and body mechanics must be addressed for any treatment to be lasting.

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