

## **Frozen Shoulder**

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Writing about frozen shoulder seemed so apropos considering the deep frozen state we have reached here in the great state of NH this year. Just like the three stages of frozen shoulder; freezing... frozen ....thawing, we have experienced all three stages in just the last 90 days of winter.

### **The Anatomy**

Let's take a moment to take a look at the shoulder structure and its mechanics.

The shoulder (glenohumeral) joint does not act alone to move the humerus. The shoulder complex is comprised of three bones; clavicle, scapula and humerus, and the joint most affected by the frozen shoulder is the glenohumeral joint.



Illustration from Primal Software

The glenohumeral joint is a ball and socket joint. The head of the humerus fits into the glenoid fossa, a shallow depression (fossa) on the upper lateral boarder of the scapula. The joint is supported by a fibrous joint capsule and various ligaments. Also keep in mind, the Rotator cuff group (supraspinatus, infraspinatus, teres minor and subscapularis) also support, stabilize and move the glenohumeral joint.

There are two more synovial joints within the shoulder complex, acromial-clavicular (AC) and the sterno-clavicular (SC). The AC joint is the articulation between the clavicle and scapula, and the SC joint is aptly named because is comprised of simply the clavicle and sternum. These two joints, AC and SC, will have coupled action with movements of the scapula.

Next is a joint that doesn't fit into any other classification, for it's not a synovial, fibrous or cartilaginous joint. This mysterious joint is the scapulo-costal joint (ScC), and it is considered a "pseudo joint", for there is no articulation of bones, fiber or cartilage with the ScC.

If the arm wants to achieve full range of motion, the scapula is coupled with most every movement of the humerus. The scapula via muscle contraction has the ability to rotate upward and downward, elevate and depress, protract and retract. Imagine you wanted to reach for that vase on the top shelf of your cabinet, but your scapula was bolted to your rib cage like most of our classroom skeletons. You wouldn't be able to achieve 170-180 degrees of shoulder flexion without the scapula protracting and upwardly rotating. Those last 50-60 degrees of movement are achieved because of the coupled action between the scapula and humerus.

### **Kinesiology**

The movement of the shoulder is somewhat intricate because of all the coupled actions that are occurring simultaneously. At this time, I would like to use the KIS (keep it simple) rule.

As far as movements of the shoulder complex are concerned, the ScC, AC and SC joints will enhance the overall movement of the humerus by approximately 1/3. For instance, when abducting the humerus, the GH allows for 120 degrees of ROM, but in order to get maximum ROM of the shoulder complex, the scapula adds another 60 degrees of ROM. This scapula-humeral rhythm allows for the maximum ROM of 180 degrees of movement of the shoulder complex.

Average ROMs of the shoulder in degrees:

- Flexion 180
- Extension 70
- Abduction 180
- Adduction 0\*
- Lateral rotation 90
- Medial rotation 90

\*The adduction of 0 degrees ROM (range of motion) is a pure adduction movement. Yes you can move your arm across your chest, but that is a coupled action of flexion and adduction.

### Pathology

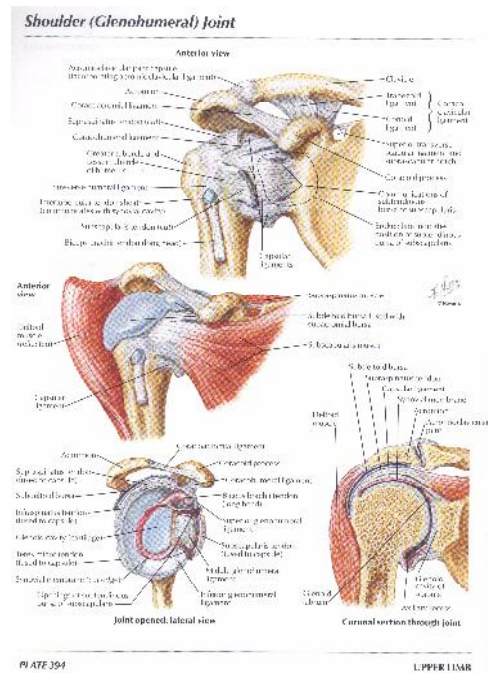


Illustration From Atlas of Human, Frank Netter

Frozen shoulder is also known as adhesive capsulitis, and is named due to the lack of ROM (Range Of Motion) that will occur when this pathology rears its ugly head.

Due to the required high ROM of the shoulder, the fibrous capsule located at the GH is considered loose in comparisons to other joint capsules within the body. Adhesive capsulitis is a thickening of the capsule, and this thickening mainly occurs within the inferior and possible anterior aspects of the capsule. When the capsule thickens, it will begin to adhere to itself, for the capsule has many folds within it's tissue to allow for high ROM. Just like a linen, when you let your linen fall to the ground it will fold / wrinkle into a pile, but once it is stretched out and all of the folds are pulled out, it has the ability to a new length.

Keep in mind, collagen fiber and scar tissue are very indiscriminate, and the collagen will not only adhere to the capsule, but the fiber build-up will also adhere to surrounding muscle tissue and tendons.

The reasons for frozen shoulder vary, and many of the people that I see for this condition the pathology is deemed idiopathic (no rhyme or reason for the condition). Frozen shoulder seems to affect people whose age range from 40-60, and it occurs in a much higher incidence of woman to men, probably as high as 4/1.

Other factors for frozen shoulder are trauma to the shoulder, surgery with immobility, diabetes and emotional stress. In my experience, there are also a high percentage of the

patients that I see that have trigger points in the subscapularis muscle. This may have been a precursor to the freeze or an effect of the freeze.

The three stages of frozen shoulder are as follows:

Freezing - Anywhere from 1-6months. This leads to a gradual decrease of ROM.

Frozen - Between 4 months and 12 months. This is a limited ROM of the shoulder complex. Common ROM is 20-60 degrees.

Thawing - Gradual return of ROM. This may occur in 4-36 months. It is not uncommon to have thawing period last for years. Full ROM may never be achieved with out therapeutic intervention.

### **Signs and Symptoms**

The patient will report pain to the shoulder capsule and the mid lateral brachial areas.

Patients will often report difficulty with tasks, such as, putting on a jacket or taking off a sweater. Also, when asked to perform a simple reach over-head test, they will compensate the lack of ROM of the shoulder, by side-bending which allows their arm to achieve a higher height.

Postural assessment often reveals poor postural position of the scapula. Typically patients presenting with this pathology, the scapula is anteriorly rotated (creeping up over the top of the rib cage) and may be protracted as well. The humerus is internally rotated and often in a guarded state.

### **Assessments**

ROM testing is probably the most effective assessment tool for LMTs to utilize.

First let's check for Active ROMs. Have the patient start by simply reaching for the ceiling with shoulder flexion then perform abduction. Next, have the patient keep their humerus at their side (0 degrees) and bend their elbow to 90 degrees. From that position, have them perform external rotation (like reaching behind the passenger's seat to grab something on the floor). All ROMs will be limited, and depending on the stage (listed above) of frozen shoulder limitations in the ROM will vary.

Then perform Passive ROM: flexion, abduction, external and internal rotations. With frozen shoulder, the limited passive ROM is going to be very similar to that of active ROM. Remember, the capsule has become excessively fibrotic, so any ROM is going to be limited.

Something to keep in mind is there are other soft tissue pathologies that may present similar restrictions. For instance, if the client is restricted with abduction, but with the hand at their side is able to perform external rotation from neutral position, then shoulder impingement or a supraspinatus tear may be indicated. Those two pathologies would make abduction very difficult but allow for external rotation.

The next assessment is Apply's scratch test. As a therapist, you want to check for asymmetries in the two shoulders as well. Apply's test is simply done by asking the client to slide their unaffected hand up their back to scratch their opposite scapula. Then, the same

test on the effected side. The results should be drastically different, and they probably can't get their hand of the effected side to even the psis.

## **Treatment**

The treatments for frozen shoulder can be effective, but the earlier the shoulder is treated the quicker the thaw.

Movement with frozen shoulder is of the utmost importance. If for instance, there is a surgery to the rotator cuff, the surgeon or the physical therapist want to get the joint moving as soon as healthfully possible. Immobility is one of the biggest causes of frozen shoulder so move.. move.. move.

As far as soft tissue treatments are concerned, that is what we do best, but treatments for frozen shoulder can be time consuming. As a therapist, plan on working at least a half hour on the shoulder per treatment session, and I often work the full hour on the shoulder. Also, if possible, see the patient 1-2 times a week for at least the first month, then depending on the state of recovery, 2-4 times a month until satisfactory ROM is achieved.

The following list of muscles and soft tissue needs to be treated within the full course of the treatment plan. There isn't enough time to treat all the muscles thoroughly, so pick your battles each session.

1. All the soft tissue work should be done with slow purposeful elongation techniques, and since the ROM can be so limited and painful, utilize active participation by the patients to move the arm and scapula. This allows for them to take a participation in the therapy process and gives them a sense of control, because if you try to move the adhered joint, the patient will be guarded.
2. Treatments of the pectoralis major and minor which will open the front of the shoulder, and allow for the scapula to unlock and begin repositioning. The scapula is likely in a poor position (protracted and anteriorly rotated) due to a modified movement by the patient.
3. Incorporate side-lying work to open the tissue of the posterior axilla (latissimus dorsi and teres major) and the anterior axilla (pectoralis major).
4. The all the rotator cuff muscles also need to be addressed. Once the abduction allows access to the subscapularis muscles, it needs to be treated and treated often.
5. All the muscles of the scapula stabilization need to be addressed as well. So, trapezius, rhomboids, levator scapula, serratus anterior need to get treated, due to freezing of the capsule, all the muscles that are involved with movement of the shoulder complex are going to be short and restricted.
6. Muscle energy technique (contract, relax, stretch) to all the above muscles is also extremely effective.

Remember with the lack of ROM, all tissue that isn't being moved to its full potential will shorten. I tell my students and patients that we have all these joints and muscles in our body for a reason so move them.

The patients also need to do work outside of the practice. There is a group of stretches that I give to the patients with frozen shoulder, and they include: Wall stretches of the pectoralis; wall crawl (finger walking up the wall. i.e. climbing a ladder) to open inferior capsule; circumduction of the shoulder / arm (patient bends from the waist and lets the arm roll from the shoulder in a large circle. i.e. stirring a large pot).

Abduction is often the last motion that the patient will normalize, and in my experience this will take a minimum of 6 months of treatment. In my 15 years of experience, I haven't had anyone with true adhesive capsulitis that needed to have surgical intervention.

The gains will hit plateaus but keeping plugging away.

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