

Acromioclavicular Joint Stabilization

Surgical Indications and Considerations:

Anatomical Considerations: The acromioclavicular (AC) joint is a diarthroidal joint formed by the distal end of the clavicle and the medial facet of the acromion. A capsule consisting of anterior, posterior, superior, and inferior AC ligaments supports the joint. The posterior and superior ligaments are the strongest and are invested by the deltotrapezial fascia. The primary functions of the AC joint are to transmit force from the appendicular skeleton to the axial skeleton and to suspend the upper extremity. The coracoclavicular ligaments are extra-capsular and consist of two components: the medial conoid ligament, and the lateral trapezoid ligament. The AC joint is inherently unstable and relies heavily on these ligaments to maintain its integrity. So strong are the ligaments of the AC joint and the sternoclavicular (SC) joint, that the more frequent result of impact to the area is a fractured clavicle as opposed to rupturing of any ligaments.

Pathogenesis: Injury to the AC joint is typically brought on by a force applied to the acromion with the arm adducted. A moderate force will injure the AC ligaments, and a more severe force will tear the coracoclavicular ligaments. A major trauma will involve all ligaments listed above as well as injury to the deltotrapezial fascia.

Epidemiology: AC injuries are most common among athletes in contact sports, throwing sports, or people whose occupation requires a lot of overhead activities. Other possible mechanisms include falls and strength training. Males significantly outnumber females with this type of injury.

Diagnosis:

- Anterior and superior shoulder pain
- Visible and palpable deformity at the AC joint
- Limitations in strength and range of motion, especially in abduction and flexion
- Radiographs to rule out fracture and classify the injury (see below for scale)
- MRI may be helpful in distinguishing extent of soft tissue damage

Classification is typically done using the Rockwood classification scale for acromioclavicular injuries, a scale with six levels of injury classification:

- I. Mild injury of the AC ligaments
- II. AC ligaments disrupted, coracoclavicular ligaments are intact.
- III. AC and coracoclavicular ligaments disrupted.
- IV. Ligaments disrupted, posterior displacement of clavicle through trapezius.
- V. AC joint dislocation with extreme superior elevation of clavicle.
- VI. Clavicle displaced inferior to the acromion and coracoid processes.

Nonoperative Versus Operative Management: Patients who sustained Grade I or II AC injuries typically undergo conservative, nonoperative treatment. Most patients would rather deal with the cosmetic issue of a deformed AC joint than go under general anesthesia and surgery to repair their injury. Grades IV, V, and VI are all treated surgically for reduction and fixation of the dislocated AC joint. Grade III injuries are highly controversial regarding course of treatment. In the past, most Grade III injuries were treated surgically, but multiple recent studies have shown no benefit to from nonoperative management focusing on immobilization for a period of time followed by rehabilitation to regain full strength, range of motion, and functional status. Several studies concluded that using a good splint, such as the Kenny-Howard splint, to immobilize the shoulder for several weeks was just as effective as surgical intervention at achieving restabilization. The number of complications associated with surgery are well documented. Infection and hardware malfunction were the primary concerns, and hardware has been known to migrate to the great vessels, heart and lungs.

Surgical Procedure: Surgery typically occurs shortly after injury, one to two weeks at most. However, for Grade III injuries, sometimes surgery is put off to try nonoperative rehabilitation first. Several different surgical procedures have been described, including fixation across the AC joint using Kirschner wire or hook plate, dynamic muscle transfer, coracoclavicular fixation using Bosworth screw or synthetic augmentation, reconstruction of ligaments, and excision of the distal clavicle. Lemos prefers to do reconstruction using synthetic loop augmentation. Holes are drilled in the coracoid and clavicle, and synthetic fiber is used to tie the augmentation piece between the two.

POSTOPERATIVE REHABILITATION

Note: The following rehabilitation progression is a summary of the guidelines provided by Lemos. Refer to his publication for further information regarding criteria to progress from one phase to the next.

Phase I: Weeks 1-6

Goals: Control pain and swelling
Protect the repair

Intervention:

- Sling for 4-6 weeks in with the shoulder in adduction and internal rotation
- Patient permitted to use arm for activities of daily living
- Restrict active elevation or abduction, and pushing, pulling, or carrying over 5 lbs.

Phase II: Weeks 6-12

Goal: Regain full active range of motion and strength

Intervention:

- Discontinue use of sling
- Progressive range of motion exercises
- Progressive strengthening regimen

Phase III: Weeks 12-24

Goal: Return to activities at prior level of function

Intervention:

- Continue to progress strengthening, incorporating functional activities into treatment plan
- Once patient has equal range of motion and strength bilaterally, he/she can return to pre-injury activities, including contact sports at 24 weeks

Selected References:

Clarke H, McCann P. Acromioclavicular joint injuries. *Orthop Clin North Am.* 2000;31:177-187.

Deerhake R, Olix M. Stabilization in acromioclavicular disruption. *J Sports Med.* 1976;3:218-227.

Lemos M. The evaluation and treatment of the injured acromioclavicular joint in athletes. *Am J Sports Med.* 1998;26:137-144.

Neviaser R. Injuries to the clavicle and acromioclavicular joint. *Orthop Clin North Am.* 1987;18:433-438.

Taft T, Wilson F, Oglesby J. Dislocation of the acromioclavicular joint. *J Bone Joint Surg.* 1987;69-A:1045-1051.