

ACROMIOCLAVICULAR JOINT INJURIES AND TREATMENT IN OVERHEAD ATHLETES

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Acromioclavicular (AC) joint symptoms are common in athletes. In particular, overhead athletes place especially high demands on their shoulders. Despite this, these individuals infrequently have isolated AC joint pathology. Understanding the common pathology and associated injuries is important for a safe and quick return to competition.

KEY WORDS: acromioclavicular, overhead athletes, labrum, osteolysis

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Acromioclavicular (AC) joint injuries are common in athletes and active individuals. They represent a spectrum of pathology ranging from minor sprains to fracture dislocations and physal injuries. The additional consideration posed by athletes is the ability to quickly and safely return effectively to their activity and competition. In particular, overhead athletes place especially high demands on the upper extremity. Despite this, these athletes infrequently have complaints isolated to the AC joint.

In any discussion of AC joint injuries in athletes, it is paramount to segregate the management of overhead athletes from all others. This distinction is important in any upper extremity injury discussion. There is a clear difference in treatment and aftercare based solely on this factor. Therefore, the following discussion attempts to discern the management of these injuries and ailments in overhead athletes from that in others.

BIOMECHANICS OF THE AC JOINT IN ATHLETES

The AC joint is a diarthrodial joint that links the upper extremity to the thorax. The joint is very variable in size, shape, and inclination. Stability of this joint is primarily maintained by the AC capsular ligaments and the coracoclavicular (CC) ligaments. The superior joint capsule is the stoutest and has been shown to provide more than 50% of the restraint to posterior directed forces.¹ Other authors have confirmed that disruption of the capsular ligaments results in significant increase in horizontal but not vertical translation²⁻⁴ and increased scapular rotation.⁵

While the AC joint can be dislocated in a posterior direction with disruption of the AC ligaments alone, superior dislocation can only be achieved after disruption of

the CC ligaments.⁵ The conoid, the more medial of the CC ligaments, provides the primary restraint to superior translation and aids in resisting anterior translation.²⁻⁴ The trapezoid functions to resist posterior translation of the joint, especially at higher displacements. These authors concluded that surgical methods that reconstructed the CC ligaments as a single structure might not be sufficient to restore anterior-posterior or rotational stability to the joint, especially in overhead athletes.⁴ Finally, both the deltoid and the trapezius contribute to the dynamic stability of the joint through their attachments to the joint capsule. EMG analysis has been performed to document the role of these muscles in throwing.^{6,7} The deltoid and the trapezius function primarily to position the upper extremity in early and late cocking and are relatively quiescent in acceleration.⁶ Despite a wealth of biomechanical data, there are no studies that specifically address the motion or restraint of the AC joint in throwing athletes.

COMMON PATHOLOGY

AC SEPARATION

Treatment of AC separations is discussed in detail in other sections of this journal. There is very little deviation from standard treatment protocols when addressing the overhead athlete with an AC separation. While the treatment of type III separations remains controversial, athletes with a type III or greater separation may require earlier fixation than patients who do not put as high demands on their upper extremities. Functional studies have shown that strength differences after type III separations treated conservatively are not significant side to side.⁸ This same study also pointed out that athletes reported persistent pain with throwing following this injury. Despite the controversy, there is evidence that early fixation of type III separations results in better outcomes.^{9,10} Coracoclavicular fixation within 3 weeks of injury resulted in 81 and 96% satisfaction versus 79 and 77%, respectively, in two different studies.

Type I and II AC separations may develop late osteoarthritis and/or osteolysis. In these patients, we recommend simple distal clavicle excision as long as instability is not

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present. If conservative treatment of a type II separation fails, then surgical stabilization at the time of distal clavicle resection is recommended. Distal clavicle excision alone has resulted in failure rates as high as 42% in this specific patient population.¹¹

AC Arthritis

Degenerative changes of the AC joint are relatively common in athletes (as in the general population) but are rarely symptomatic in throwers. Arthritis is often the sequela of osteolysis, a separation or repetitive stress. Physical examination findings include tenderness to palpation and pain with cross-body adduction. There is frequently a positive O'Brien's test present. Imaging may vary from loss of the AC joint space to widening with or without osteophytic spurring. Additional imaging with MR is helpful to discern other causes of shoulder pain. Once again, selective diagnostic injections into the AC joint are very helpful in confirming the diagnosis.

The most important and reliable diagnostic tools are the physical examination findings and clinical history and symptoms. Radiographic evidence of AC joint degenerative arthritis is very common, especially on MRI.^{12,13} A large study of 100 asymptomatic patients ranging in age from 18 to 88 demonstrated changes in the AC joint consistent with arthritis in 75%.¹² Another study showed that 82% of 50 asymptomatic shoulders had arthritic changes on MRI.¹³ Even when the authors of this study stratified the subjects by age, they demonstrated a 67% incidence of arthritic change in the under 30 year old age group.

Distal Clavicle Osteolysis

With an emphasis being placed on weight training and conditioning, osteolysis of the distal clavicle has become a more common problem. In this population, it is generally the result of repetitive stress at the AC joint from heavy lifting. To our knowledge, it has not been described in an overhead athlete and attributed to the throwing motion itself.

Distal clavicle osteolysis in the overhead athlete should be treated similarly to that in all athletes. It frequently responds to conservative management and may require injections of corticosteroids. In cases where this condition fails to respond, resection of the distal clavicle results in excellent outcomes.

ASSOCIATED INJURIES AND INJURY PATTERNS

Isolated AC joint complaints occur infrequently in overhead athletes. Conversely, anterosuperior shoulder pain is extremely common in this patient population. Anterior and superior labral tears, coracoid impingement, rotator cuff tendonitis, and instability are common diagnoses that can be confused with AC joint complaints. It is also not uncommon to have complaints related to the AC joint in tandem with one or more of these other clinical entities that can produce anterior superior shoulder pain. These premises force the clinician to diligently examine and confirm the source of pain when it appears isolated to the

AC joint. Imaging (MRI, MR arthrogram, etc.) should be performed early on in the evaluation and used almost routinely to rule out other sources of pain. Additionally, selective diagnostic injections play an important role in solidifying the diagnosis. This is even more salient in the elite athlete, where downtime minimization is so important.

A combination of physical examination, imaging, and selective injections should be able to delineate most pathology in these patients. The most common physical findings in AC pathology include direct tenderness over the AC joint and pain with cross-body adduction. O'Brien's test is often positive, but is nonspecific for either of these entities. The location of pain with the common provocative tests must be noted. Patients with posterior pain on O'Brien's test are less likely to have AC involvement. During cross-body adduction testing, internal rotation of the arm can lead to coracoid impingement and produce pain anteriorly that does not localize specifically to the AC joint.

Early diagnostic imaging is important as well. Radiographs should be examined closely for evidence of osteoarthritis or distal clavicle osteolysis. Widening of the AC joint, osteopenia, and flattening of the lateral clavicle are the most common early findings. MRI will show edema in the distal clavicle in patients with osteolysis. Fluid in the subacromial bursa and high signal throughout the rotator cuff tendon are common findings in bursitis and rotator cuff tendonitis. The labrum must be inspected for tears, especially anterior and superior. Posterior superior labral tears are very common in throwing athletes and are usually accompanied by undersurface rotator cuff tears (internal impingement). We recommend an MRI arthrogram in these patients, with images in abduction external rotation (ABER views). These views very clearly demonstrate the posterior labral fraying and undersurface rotator cuff pathology with the arm in the position of symptoms.

Superior labral tears are a common occurrence in throwers either in conjunction with, or mistaken for, AC joint pathology. In a retrospective review of 20 patients with persistent pain following distal clavicle excision, 15 of the 20 patients had arthroscopic confirmation of a SLAP lesion on second look arthroscopy.¹⁴ Physical examination findings can be confusing and sometimes misleading. It is therefore wise to use all of the available diagnostic tools to come to the correct conclusion and to treat the pathology accordingly. When the diagnosis is confirmed, conservative treatment utilizing the principles of rest and activity modification, nonsteroidal antiinflammatory medication, and steroid injection should be employed. When this regimen fails, surgical resection of the distal clavicle is recommended.

SUMMARY

Acromioclavicular joint complaints are relatively uncommon in overhead athletes. They are, however, generally debilitating due to the demands placed on the upper extremity in these athletes. It is more common to have symptoms related to the AC joint when other intraarticular pathology is present. Superior labral tears, instability, and internal impingement must be ruled out before isolating

the AC joint as the source of symptoms. Acromioclavicular joint pathology in the athlete is treated in a fashion similar to that in the general population, with injections and resection if conservative treatments fail.

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