Diagnosis and Nonoperative Treatment of Acromioclavicular Joint Injuries in Athletes and Guide for Return to Play

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KEYWORDS

• Acromioclavicular joint • AC sprain • Shoulder separation • AC joint

KEY POINTS

- Acromioclavicular (AC) joint injuries are common in contact athletes.
- Many AC joint injuries can be managed nonoperatively but it is important to understand to diagnosis and treatment options in the athletic population.
- This article reviews the role for nonoperative treatment and outlines return-to-play considerations.

INTRODUCTION

In 2005 to 2006, the US Center for Disease Control and Prevention (CDC) conducted a study, which estimated that roughly 4.2 million students in the United States participated in high school sports. Within these 4.2 million athletes, there were 1.2 million injuries that occurred, 80% being new injuries.[1,2] Contact sports such as football, wrestling, and men's and women's soccer accounted for the highest number of injuries.[1] The CDC also released more current information. They demonstrated that, in 2019, 57.4% of all high school students was a part of at least one sports team compared with 56% in 2005 when the first study was performed. It can be extrapolated that there was an even higher number of injuries in 2019 given that more students were involved in sports competitions.[3]

When evaluating an athlete on the field, the trainer, coach, or physician should follow the order of "ABCDE," which stands for airway, breathing, circulation, disability, and extremity. After ruling out any immediate danger to the athlete, the attention can be

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directed toward that limb that is injured.[1] The most pressing injuries include ones that involve the brain, spine, or neurovascular injury, and those should take precedent over other injuries. Usually, if the injury involves only the upper extremity, the athlete should be able to walk themselves off of the field or court with the assistance of the trainer, coach, or physician. In this case, the evaluation should be done on the sidelines or somewhere that limits possible distractions. This helps to create an environment for a more thorough evaluation as you try to determine the mechanism, severity of injury, any concurrent injuries, and whether the athlete is safe to return to game play.

Injuries involving the shoulder consist of roughly 80% of injuries sustained in contact sports,[4] whereas injuries to the acromioclavicular (AC) joint account for 3% to 12% of all injuries.[5] The incidence of these injuries increases to roughly 40% to 50% when evaluating only those athletes involved in contact sports.[6] AC joint injuries have been found to be the third most common injury seen in college hockey players.[7] In elite college football players, AC joint injuries consist of 41% of all shoulder injuries, making these injuries the fourth most common injury sustained.[6] When looking at gender, men sustain anywhere from 2.2 to 8.5 more AC joint injuries than women.[8] Additionally, low-grade AC joint separations (Rockwood grade I and II) occur more frequently than high-grade injuries (Rockwood grade III, IV, V, and VI)[9] (**Fig. 1**).

DEFINITIONS AND INJURY CLASSIFICATION

The classification of AC joint injuries has been described by Rockwood based on the severity of injury to both the AC and coracoclavicular (CC) ligaments. A breakdown of this classification was previously described in the article, "Management of acromioclavicular joint injuries: a historical account" and can be reviewed in **Fig. 1** and **Table 1**.

DIAGNOSIS

The key to diagnosis of an AC joint injury is the history and physical examination. The first step is to discuss the mechanism of injury with the athlete and ensure that the

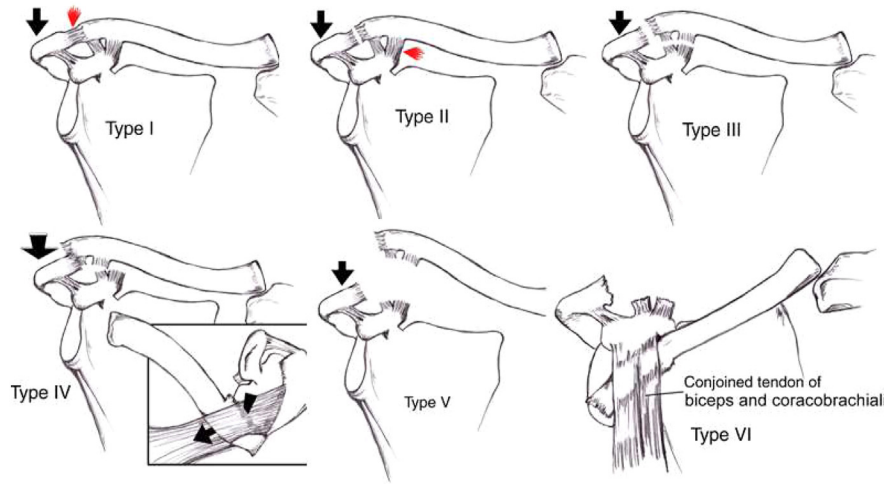

Fig. 1. Rockwood classification of AC joint injuries. The *black arrows* indicate the direction of pull on the extremity. The red arrows demonstrate structures that are injured or sprained without frank tearing. Picture representation of the spectrum of injury and the injured structures.[10]

Table 1
Verbal breakdown of injured structures and associated imaging based on the Rockwood classification of acromioclavicular joint injuries[11]

Type	AC Ligaments	CC Ligaments	Deltopectoral Fascia	X-Ray CC Distance	X-Ray AC Appearance
I	Sprained	Intact	Intact	Normal	Normal
II	Disrupted	Sprained	Intact	<25%	Widened
III	Disrupted	Disrupted	Disrupted	25%–100%	Widened
IV	Disrupted	Disrupted	Disrupted	Increased	Clavicle posteriorly displaced (axillary)
V	Disrupted	Disrupted	Disrupted	100%–300%	N/A
VI	Disrupted	Disrupted	Disrupted	Decreased	Clavicle displaced inferior to coracoid

mechanism fits the pathologic condition. The next step is to examine them preferably without any obstruction to the area. Whether in clinic or on the sidelines, this includes the removal of any pads, equipment, or even a shirt so that the area of the AC joint is well visible. Additionally, the contralateral should be exposed to allow visual inspection of bilateral shoulders with the arms hanging at the sides. Doing this will allow you to inspect the skin over the AC joint in order to determine if there are any open or impending open wounds, road rash, or abrasions over the deformity. This is important because it may change your management to include early surgical intervention or the administration of antibiotics. The physical examination should also be done in the standing or seated position to allow gravity to help exaggerate any deformity that is present.[12,13] Often, there is an obvious deformity of the AC joint compared with the contralateral side; however, in low-grade injuries, this is not always the case. Palpatory examination is also helpful in making the diagnosis on the sideline. A step-off can often be felt or motion of the distal clavicle can be elicited manually. This gives the examiner an idea about the direction of displacement of the distal clavicle with respect to the acromion. Alternatively, the athlete may only have tenderness directly over the AC joint if it a low-grade injury.

Regardless, the athlete will likely have increased pain in the area with range of motion of the shoulder. Specific tests such as the cross-arm abduction test and the active compression test (O'Brien test) can exacerbate the athlete's symptoms.[14] The cross-arm abduction test is done by elevating the arm to 90° and then adducting the arm. The O'Brien test is done by bringing the patient's arm to 90° of forward flexion with the elbow in full extension and then adducting the arm 10° to 15° medial to the sagittal plane of the body and internally rotating the am so that the thumb points downward. The examiner stands behind the patient and provides a downward force to the arm. Then the arm is fully supinated so that the palm is pointing upward and the pressure is reapplied.[12] If pain is elicited superficially over the AC joint during the first maneuver and relieved with the second maneuver, then it is considered a positive test (**Fig. 2**). This test has a sensitivity of 41% with a specificity of 94% for AC joint pathologic condition.[12] Additionally, the initial evaluation should include a simple shoulder shrug maneuver. This will help to evaluate the integrity of the deltotrapezial fascia. If the shoulder shrug reduces the AC joint, it can be assumed that the deltotrapezial fascia is intact.[15] If it does not reduce the AC joint, it would be concerning for detachment of this fascia, which may be indicated a more severe injury. This would be associated with a Rockwood grade III, IV, V, and possibly VI injury.[16] If the athlete is unable to

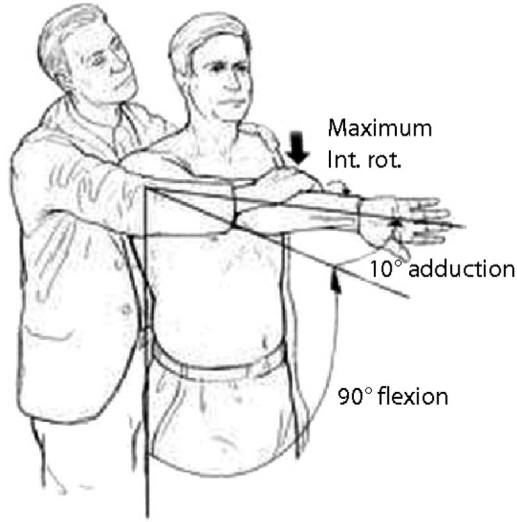

Fig. 2. Demonstrating the O'Brien test.

complete a shoulder shrug on their own due to pain and guarding the provider can help by stabilizing the clavicle and providing upward pressure on the ipsilateral elbow and looking for congruency of the AC joint. The examiner should also assess strength of the injured extremity, any deficits in strength eliminate immediate return to play during that session, regardless of grade of injury. Finally, a thorough neurovascular examination should be conducted of the upper extremity including the cervical spine to rule out any more serious and concomitant injuries.

Other tests should be conducted during the physical examination to look for any associated injuries. Palpation of the clavicle, coracoid, and sternoclavicular joint should be conducted to assess for any point tenderness, which may indicate fracture or further injury.[14] In a study conducted by Tisher and colleagues,[17] they evaluated the intra-articular injuries of 77 patients undergoing surgery for a high-grade AC joint dislocation. They found that 18.2% of these patients had intra-articular injury. Most of these consisted of a superior labrum anterior and posterior (SLAP) tear, whereas 4 patients had a fracture. Another sideline tool that may be useful for evaluation and investigation for an associated clavicle fracture is a tuning fork. This would not rule out a fracture but may give you a higher suspicion for the severity of injury and would push you to evaluate with further imaging.[1]

Another common injury that presents with pain in the neck and shoulder region but is not related to the AC joint includes a stinger. Typically, this presents with a "dead arm." The patient will have unilateral numbness or tingling and weakness in the affected arm. This is usually transient and will resolve on its own within a few minutes. This is important to differentiate from other injuries because it typically resolves quickly and the athlete can return to play without further intervention or precautions.

Regardless of sideline assessment, all presumed AC joint injuries should undergo radiographic examination. A full explanation of the radiographs is described in a previous chapter; however, we will discuss several pertinent considerations regarding selection and interpretation of select radiographic views. The 4 standard radiographic views to assess AC joint injuries include a Grashey anteroposterior (AP) or standard AP view of the shoulder, scapular Y, and axillary and bilateral Zanca views. The AP view helps to

evaluate the glenohumeral joint for associated injuries. A Grashey AP will give you a proper AP of the glenohumeral joint and may give subtle clues into a concomitant injury within the glenohumeral joint. A scapular Y view can also be obtained to evaluate the scapula as well as an orthogonal view of both the acromion and the coracoid. An axillary view is used to evaluate the horizontal displacement of the clavicle and is deemed sufficient if there is a full view of the spinoglenoid notch.[18] If an axillary view cannot be obtained due to difficulties with pain and or positioning, a Velpeau axillary lateral view can be obtained. In this situation, the patient is asked to lean backward over the cassette and the beam is directed from superior to inferior.[13] The Zanca view was developed due to the difficulty in evaluating the AC joint on the AP view, as well as the difference in penetration needed to evaluate the glenohumeral joint versus the AC joint.[13] This allows you to quantify the degree of vertical displacement of the AC joint, evaluate for any coexisting fractures of the clavicle or in a younger athlete, a physeal separation, as well as compare it to the contralateral or "normal" side (**Fig. 3**).

The Rockwood classification uses the distance between the superior aspect of the coracoid process and the inferior aspect of the clavicle. The average distance is variable, measuring between 1.1 and 1.3 cm. This variability underscores the importance of comparing to the contralateral side. If this CC distance increases more than 40% to 50% of the contralateral side or 5 mm of difference, there is considered to be a complete tear of the coracoclavicular ligaments[13,19,20] (**Fig. 4**). In terms of the Rockwood classification, if the CC distance in increased but less than 25% of the contralateral side, it is considered a type II injury. If this distance is increased between 25%

Fig. 3. Bilateral Zanca Views in 17-year-old male patient with left grade III AC joint separation.

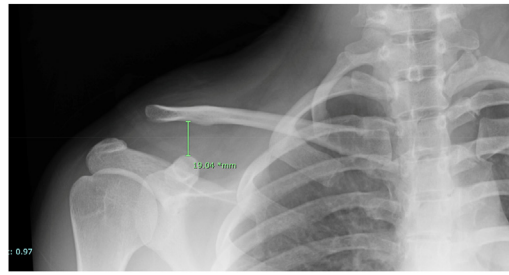

Fig. 4. Increased coracoclavicular ligament distance in a 32F with grade III AC joint separation.

and100% of the contralateral side, it is a type III, and more than 100% increase in the CC distance classifies it as a type V AC joint separation.[12] Of note, if there is an inferior AC joint dislocation, the CC distance would be less than the contralateral side; however, this is exceedingly rare. Additionally, as discussed previously, a stress view may be indicated. However, it is rarely used in clinical setting as this point because it is a painful examination that rarely provides any new information that changes management.[12]

Prompted by the pain associated with and difficulty in obtaining stress views, Vanarthos and colleagues[20] conducted a cadaveric study to determine if an internal rotation view could replace the stress view. They used an AP radiograph of the shoulder with the arm in internal rotation without any weights as seen in **Fig. 5**. They found that sometimes this is helpful to differentiate between a type II and type III AC joint separation and could be used to replace the stress view.[13] However, once again this view adds limited information and typically does not change management.

If an AC joint injury is suspected, however the AC joint seems normal on radiographs and the CC distance is within normal limits to the contralateral side, then a fracture of the coracoid needs to be considered. This is can best viewed with a Stryker notch view. This radiograph is obtained in the supine position with the arm elevated parallel to the long axis of the body and the palm placed behind the head. The x-ray beam is then angled 10° cranially.[12,22]

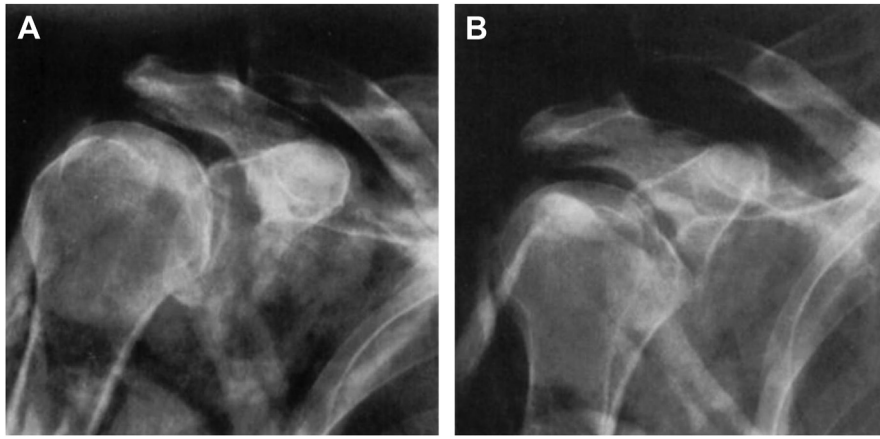

Fig. 5. Picture taken from Vanarthos and colleagues[21] demonstrating the use of internal rotation stress views in the setting of AC joint injury.

Depending on the severity of injury or concern for concomitant injuries, an MRI may be indicated. An MRI can be helpful in differentiating lower grade AC joint dislocation because it allows for the evaluation of the AC joint capsule, the CC ligaments as well as the osseous alignment directly rather than indirectly when using plain radiographs (**Fig. 6**). White and colleagues[22] conducted a study looking at AC joint injuries and evaluation with MRI in the National Hockey League (NHL). They were able to better identify bone bruising and concomitant muscular injury than with plain radiographs or physical examination alone. In this study, 23 out of 24 of their patients were diagnosed with a grade I, II, or III, whereas the last one had a grade V injury. They found that 79% of their cohort sustain a trapezius muscle strain while 50% had a deltoid strain. All of the lower grade injuries were treated nonoperatively in a sling, whereas the grade V injury was treated with surgery. All of the athletes returned to professional NHL competition; however, those with more extensive soft tissue injury, such as muscle strains or higher grade AC joint injury, missed more games.[23] An MRI may also be helpful in cases where there is concern for a rotator cuff tear. Tischer and colleagues[17] found that of 77 patients with AC joint dislocations 11 patients had an SLAP tear and 3 had a rotator cuff tear. They found that these were more likely in traumatic AC dislocations with the rotator cuff tears being more prevalent in the older age group. An MRI would be useful in evaluating these pathologic conditions because it may change your management plan.

Recently, ultrasound has been investigated as a diagnostic imaging tool. One method of assessment of the AC is by conducting a dynamic sonographic evaluation. Peetrons and Bedard[24] discussed the technique of using ultrasound while conducting a crossarm maneuver. In this case, the ultrasound probe is centered over the AC joint and the affected hand is placed on the operative shoulder. When this is done, the ultrasound will show abnormal motion at the AC joint. At rest, the clavicle is raised compared with the AC joint and when the cross-body maneuver is done, the clavicle can be seen to lower to the level of the acromion. The authors describe this examination supplement as being helpful when there are less obvious findings but a mild AC joint sprain is suspected.[24] **Fig. 7** demonstrates their findings. Heers and Hedtmann[25] looked at ultrasound (US) evaluation in relation to radiograph (XR) in the setting of AC

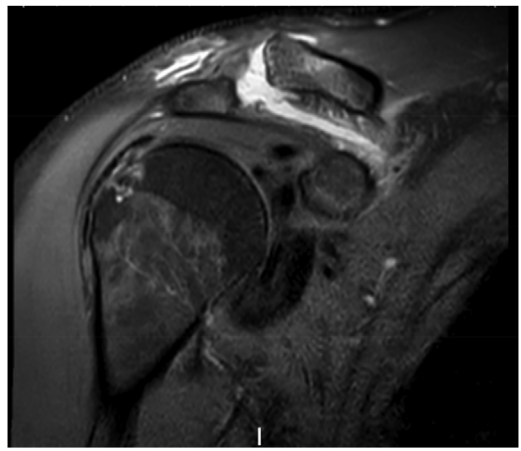

Fig. 6. Coronal MRI of R shoulder demonstrating a complete disruption of the superior and inferior AC joint capsule and coracoclavicular ligaments (type III).

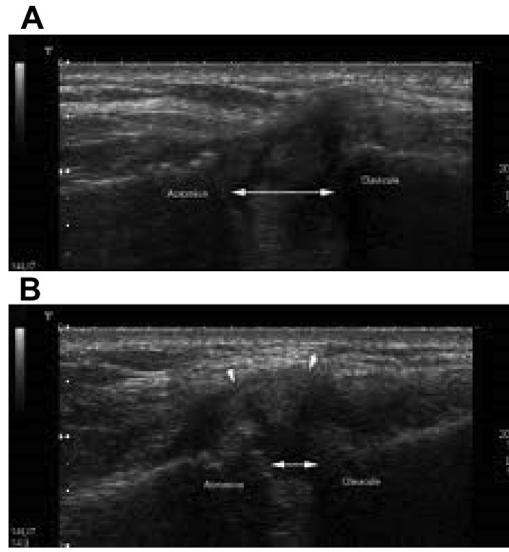

Fig. 7. Picture taken from Peetrons and Bedard[24] demonstrating the ultrasound findings for an AC joint dislocation.

joint dislocations. They determined that ultrasound may overestimate or underestimate the soft tissue injury component not seen on XR. They also stated that US evaluation is most helpful in type III injuries to evaluate the fascial disruption and deltoid or trapezius detachment, which would push the physician toward indicating the athlete for surgery. US evaluation can be helpful because it has become more common to have trained sideline physicians with portable ultrasounds readily available. This is a quick study that can be done at the time of injury on the sidelines or training room to help determine the degree of pathology and next steps quickly.

DISCUSSION

AC joint injuries are consistently treated with either conservative management for the low grade (types I, II) or surgery for the high-grade (types IV, V, VI) injuries. Type III injuries still pose controversy among surgeons. Some surgeons advocate for conservative management, whereas others opt for surgical intervention, and the literature supports both options. The decision to pursue nonoperative versus operative treatment depends on the surgeon's preference and experience, as well as the outcome of discussions with the patient and family. A meta-analysis of 1172 patients with type III AC joint injuries were studied, with 833 of these patients treated with surgery and 339 treated conservatively.[26] The authors found that 88% of those treated surgically and 87% of those treated nonoperatively has satisfactory outcomes. However, the complication rate was much higher after surgery, with infection and need for future surgery being most common. Those undergoing conservative management were more likely to have a cosmetic deformity though. The time required to return to activities, pain level, range of motion, and strength were found to be similar between the 2 cohorts. Therefore, the authors concluded that surgery showed no benefit compared with nonoperative treatment.

Another study evaluating patients treated both operatively and nonoperatively found that both have similar outcomes in terms of rotational strength.[27] However, when

compared with the bench press strength, the patients treated conservatively were 17% weaker in their injured arm compared with their contralateral arm. They found that 20% of the patients treated conservatively have suboptimal outcomes. This was mostly encountered during long-term follow-up when increasing demands of strength and endurance caused discomfort. Therefore, athletes that require high loads or collisions may benefit from early operative intervention. This can also be extrapolated to heavy laborers because the demands of their jobs may require similar demands in strength and endurance. There is no consensus in the literature as to which type of treatment is considered the gold standard.

Treatment Options and Rehabilitation

Treatment is typically guided by the Rockwood classification in which types I and II are treated conservatively; types IV, V, and VI are treated surgically; and type III can be treated either conservatively or surgically depending on the physician's preference and discussion with the patient. Surgical treatment options are discussed elsewhere; this article will focus on nonsurgical management with specific consideration regarding the athlete.

The first decision that needs to be made is whether the patient can return to competition immediately. With an AC joint injury, this is mostly dependent on the patient's pain and ability to execute the necessary skills of their position. A quick sideline assessment is needed to inspect the skin over the AC joint and test the athlete's strength. If these are both normal, they should take some time on the sidelines with sport-specific drills to see if they can tolerate those. If the athlete passes these sideline tests, then they could return to competition the same day. If the athlete's skin compromises or their pain inhibits them to being able to compete adequately, they should be held out until they can prove otherwise.

The treatment of an athlete may be different than a normal patient given the need to return them to high level of activities quickly. For athletes with type I AC joint injuries, sling immobilization and OTC medications are only indicated for pain control and usually discontinued within a few days if necessary. For type II AC joint injuries, nonoperative management typically usually includes 1 to 2 weeks of sling immobilization of the affected extremity while working on pain control with anti-inflammatories and/or tylenol as well as ice. Corticosteroid injections (CSIs) can be used immediately to help decrease the pain as well as for all them to return to the game if the injury occurred during competition. In our practice, CSI during competition is limited to athletes with intact strength but significant pain limiting return to game play, after informed consent is provided. If available sideline, this can be done under fluoroscopic or ultrasound guidance for improved accuracy. Caution is warranted for use in throwing or overhead athletes (ie, quarterback) as occasional short-term rotator cuff inhibition can occur due to analgesic potentially entering the subacromial space during injection. Additionally, in higher level athletes, local analgesic without CSIs can be administered each pregame to allow the athlete to continue playing in the subsequent weeks.

Taping may help to decrease the motion of the clavicle on the acromion, which can also help alleviate the athlete's pain. For contact sports, padding can be taped to the shoulder under the uniform to protect them from any blows to the AC joint. This can range from padding found in the training room, to a formal brace to one fitted to the athlete using orthoglass or custom 3D printed brace to protect them from contact (**Figs. 8** and **9**). The physician and trainer would need to check with their league's rules and regulation regarding what is acceptable before fitting the athlete with it. Once the athlete's pain is under control, they can start physical therapy. This usually starts with

Fig. 8. Padding over the AC joint for protection against contact.

range of motion exercises of the shoulder and scapula and progresses to isometric and then isotonic exercises. They can then work to strengthen their shoulder and scapula and work toward returning to their sport with sport-specific drills and exercises and working back into full game situations. The length of time needed before returning to competition is also dictated by the position of the athlete. In terms of football, a lineman or running back may be able to return quicker than a quarterback or wide receiver. This is because the stress on the AC joint is increased with the arm being overhead. Therefore, overhead athletes may also take longer to recover especially if it is their dominant side. In this case, range of motion and strength need to be as close to normal as possible to allow them to be successful in their position. However, there is no specific return-to-play testing or guidelines based on the different level of injuries in each sport or position.

Few studies regarding treatment of AC joint injuries discuss general rehabilitation protocol. One study reports a rehabilitation protocol focuses on mobility, scapular strengthening, shoulder strengthening, and kinetic chain exercises. It includes 12 supervised exercises done with a physical therapist. They recommend a minimum of 3 hours per week of therapy for the first 6 weeks then 1.5 hours per week until final follow-up.[28] Another study recommended a similar protocol; however, theirs included therapy visits 2 to 3 times per week for 6 weeks and progressed the patient through phases such as acute, recovery, and return-to-sport phases.[9]

Most of the literature on rehabilitation of AC joint injury agrees that protocols should focus on scapular control and kinetic chain exercises. Similarly, many emphasize therapy should only be initiated after a sufficient amount of rest to decrease or even eliminate the pain associated with the initial injury. However, elite in-season athletes with low-grade injuries may wish to initiate rehabilitation with athletic training and physical therapy immediately. Regardless, the first step in rehabilitation and return-to-play

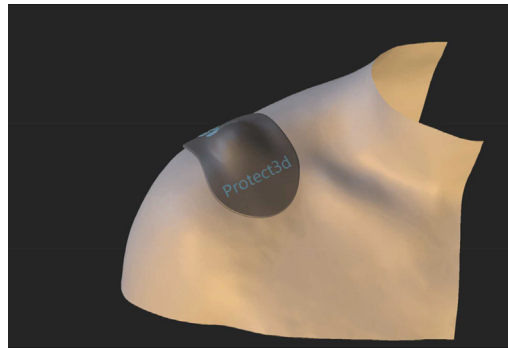

Fig. 9. Custom 3D printed AC joint brace by Protect3D (https://www.nfl.com/playerhealthandsafety/equipment-and-innovation/1st-and-future/nfl-2020-1st-and-future-winner-protect3d-using-3d-scanning-and-printing-to-help-).

progression is to work on shoulder and AC joint mobility without excessively loading the AC joint itself.[29] This includes starting with exercises with the arm in an adducted rather than abducted or forward flexed position, which would increase the lever arm and therefore stress across the AC joint. Once achieving short level arm exercises pain-free, the athlete can then progress to a longer level arm. Sciascia and colleagues[9] recommend that the exercises first be performed with the arm in 30° to 40° of abduction before progressing further. They suggest that the patient start their therapy with 1 to 2 sets of 5 to 10 repetitions without any external resistance, using only body weight and gravity. This can be increased as the patient tolerates to a goal of 5 to 6 sets with 10 repetitions in each. Once this step is obtained, resistance can be added starting with lightweights, about 2 to 3 lbs maximum with progression to elastic resistance bands. The longer lever exercises should be implemented later in the rehabilitation protocol ensuring that each step before has been mastered without worsening the patient's symptoms.

1. Exercises with the arm in 30° to 45° of abduction
   a. 1 to 2 sets of 5 to 10 reps → increase to goal of 5 to 6 sets of 10 repetitions each
   b. Body weight and gravity
2. Start adding resistance
   a. 2 to 3 lbs maximum → elastic resistance bands
3. Repeat with arm in 45° to 60° of abduction
4. Repeat with arm in 60° to 90° of abduction

Sciascia and colleagues[29] summarized their approach into 5 succinct steps. The first includes rest and activity modification to control the pain and symptoms of the acute injury. This usually takes about 1 to 2 weeks. The second step is to start exercises that address proximal segment control such as leg, truck, and core strengthening. The third step introduces exercises for scapular, shoulder, and lower extremity mobility. The next step involves short-lever interventions that use trunk and leg mobility to help with scapular positioning and control. Finally, transition through the range of abduction to start working on long lever exercises that start to include unilateral as well as bilateral maneuvers.[29] Typically, if the injury happens during the season, those with type III injuries will follow this pathway as well. Return to play can take anywhere between 1 week and 6 weeks pending the pain tolerance and physical demands of the athlete.

Physical Therapy Progression	
Phase 1	• Rest • Activity modification
Phase 2	• Exercises focusing on proximal segment control (eg, legs, trunk, core)
Phase 3	• Exercises focused on scapular, shoulder, and lower extremity mobility
Phase 4	• Short lever interventions using trunk and leg mobility to help with scapular position and control
Phase 5	• Progress through abduction to work on long lever exercises • Unilateral exercises

Some athletes may benefit from the addition of injections to help get them back to their preinjury level of play.[14] Typically, an initial injection is done within 48 to 72 hours from injury and composed of an analgesic agent such as marcaine or bupivacaine with a corticosteroid. Additional analgesic injections without concomitant corticosteroid may be repeated weekly or as needed before competition, especially for professional or high-level collegiate athletes. Often these injections are successful in allowing the athlete to return to play. Risks of this procedure include residual pain or a slight increased risk for the need of distal clavicle excision.[14] However, these injections have been deemed safe and are not a significant threat to the athlete's career.[12,30] Orchard and colleagues[29] conducted a retrospective study of 100 players in the National Football League who had been injected with local anesthetic on 1023 occasions for 307 injuries. Ninety-eight percent of the athletes stated that they would repeat the procedure again for their injury and only 6% had residual pain. There was no comment of any recurrent injuries the athletes sustained to the AC joint. Their study included more anatomic locations than just the AC joint; however, they found that these injections are both safe and helpful in the context of professional athletes.[30]

Nonoperative management is not without its complications. These can include residual instability, degenerative changes at the AC joint, distal clavicle osteolysis, and continued pain present as early as 6 months after injury.[12,31] Cox and colleagues[31] found that it was not uncommon for an athlete to have residual symptoms, positive examination findings, and radiographic changes after sustaining type I or II AC joint injuries.[32] Not all patients with radiographic changes are symptomatic; however, if they are, this can be successfully treated with an arthroscopic or open distal clavicle excision.

If any athlete fails nonsurgical treatment, surgery should be considered. This time frame for intervention can be as early as 6 weeks after injury if still symptomatic or at the conclusion of the season. As surgical techniques have advanced, delayed reconstruction has equivalent outcomes to acute.[33] Athletes who sustain types IV, V, and VI AC joint injuries have superior outcomes after undergoing surgical intervention as compared with conservative measures.[34,35] This is also true for collision athletes; however, if the athlete can tolerate it, surgery can be considered after the season.

Most studies have looked at the time frame of athletes returning to competition after sustaining an AC joint injury rather than the protocols themselves. One study showed that in a population consisting of Major League Baseball players acute AC joint injuries were more likely to occur in infielders and outfielders, and they typically missed 3 weeks before returning to play.[36] Another study that looked at professional soccer players found that those who sustained an AC joint separation missed roughly 5 to 7 weeks of competition. Eighty-one percent of their cohort was able to return to elite levels of performance similar to preinjured and healthy controls.[37] Neither of these

studies reviews their rehab or return-to-play protocols. In the NHL, one study demonstrated that their time frame to return to activity was between 3 and 4 weeks.[23] Their return-to-play criteria included objective measures including manual strength using a handheld dynamometer and Y-balance testing compared with preinjury baseline data. They also underwent functional testing, which includes push-ups, push-pull testing, ability to receive contact during practice, battle with a stick, and shoot confidently. These measures were all compared relative to their own preinjury baseline in the same extremity. Their goal was above 90% of the contralateral side before being cleared to return to professional NHL competition.[23]

Currently, literature has not identified a universal return-to-play protocol after sustaining an AC joint injury. At this point, it is understood that competitive athletes should undergo intense sport-specific movements and exercises before returning to practices and games. The agreed upon pathway thus far includes a period of rest and pain management followed by range of motion exercises and then strengthening of the trunk, scapula, and shoulder musculature. Once this is complete, sports-specific exercises can be introduced. More research needs to be conducted to better characterize sports-specific rehabilitations programs, objective measures for readiness to return to sports and timelines associated with return to play because each sport and each position has different upper extremity demands. Furthermore, once a battery of exercises and objective measures is identified, it can be used as baseline testing at the start of their season and is the marker by which any postinjury rehabilitation can be measured to allow the safest to return to competition.

SUMMARY

Injury to the AC joint is common in the athletic population, in particular in contact sports. Physical examination and imaging are key to assessing extent of injury and as a result nonoperative versus operative treatment. If nonoperative treatment is indicated, bracing/taping, injections, and physical therapy can be used to reliably return athletes to activity within game or within a few weeks depending on severity of injury, level and sport of participation, and position-specific requirements.

CLINICS CARE POINTS

- Sideline assessment of athletic AC joint injuries is key to rule out concomitant injuries such as fracture as well as assess strength and ability to return to play
- Acute corticosteroid or analgesic injections as well as taping/bracing can be used in grade I and II AC sprains to return athletes to play within same game or in subsequent games within first few weeks
- No defined return guideline exists in the literature but full strength and function as well as limited pain can serve as a guideline for athletic return
- Although nonoperative treatment can reliably return athletes to play quickly, degenerative changes at AC and residual pain can be noted even with grade I injuries

DISCLOSURE

B. Gregory is an American Orthopedic Society for Sports Medicine: Board or committee member.

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