Classification, Diagnosis, And Treatments for Acromioclavicular Joint Injury

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Abstract. Acromioclavicular (AC) joint separation is a frequent shoulder injury with increasing office working hours and sports. This research examines the classification of grades, as well as the causes, diagnostic procedures, and therapies associated with each grade. Results show that young and energetic men, as well as people who regularly participate in contact sports, are high-risk groups for this injury. X-rays, bone scans, positive compression, and horizontal adduction tests are among the diagnostic and examination methods available. The six-degree classification system developed by Rockwood is the most widely used classification system for AC joint injury. A minor sprain of the AC ligament is a Type I injury. Type II injuries are characterized by a torn AC ligament and sprained CC ligaments, and they typically result in more pain and swelling than Type I injuries. Types III-VI are the most serious injuries, with a burst AC ligament, CC ligament, and joint capsule in every case. The location of the damage, as well as the treatment choices, differ by type. Non-surgical treatments are indicated for Types I-III injuries. Surgical procedures are advised for Types IV-VI injuries. It should be mentioned that the treatment plan should be tailored to the individual's needs, with the negative effects taken into account.

Keywords: Acromioclavicular Joint, Six-degree Classification, Diagnosis, Examination, Treatments

1. Introduction

People spend a lot of time at their desks, which can lead to injuries to the acromioclavicular (AC) joint. AC joint problems are thought to account for more than 40% of all shoulder injuries [1]. As a result, AC joint injuries are necessary and significant enough to warrant additional attention. The AC joint and the glenohumeral joint are the two joints that make up the shoulder. The AC joint is a joint in the shoulder where two bones meet and play a critical function in the connection, affecting the range of motion and assisting shoulder abduction and adduction. The clavicle, which is also known as the collarbone, is included in these bones. The other bone is the scapula, a portion of the shoulder blade, which acts as attachment points for the rotator cuff as well as other surrounding muscles, supporting multiple mobilities of the shoulder. When the clavicle separates from the scapula, the AC joint separates. The instant impacts such as a direct hit to the 'point' of the shoulder or a fall directly on it are the most prevalent causes.

The degrees of severity of an AC joint injury are divided into two categories. One uses Allman and Tossy's three-degree classification system, while the other uses Rockwood's six-type categorization system [2]. Furthermore, there are multiple diagnostic procedures for this injury, and different therapy methods are employed to address various degrees of AC joint separation [3]. However, there are currently just a few research on the AC joint, most of which focus on a specific topic, such as damage severity and treatment. This research introduces the major grade kinds, analyses the causes and diagnostic methods for each grade, and discusses several treatment possibilities.

2. Classification of AC Joint Injuries

Based on the degree of AC joint injury, there are two classifications. Firstly, Allman and Tossy introduce the three-degree classification. The AC joint is strained and contused in Grade 1, but there

is no deformity observable on the X-ray. Localized discomfort, edema, and deformity characterize Grade 2. In this grade, separation of the clavicle and acromion result in rupture of the AC ligament, which can be observed on x-ray with increased spacing compared to normal. With a partial tear of the CC ligaments, the coracoclavicular distance also increased when compared to the normal side. More than half the distance of the AC joint can be found in Grade 3, which clarifies the complete separation of the joint. The clavicle is under the skin, the CC distance is greatly extended, and the CC ligaments are completely torn [4]. Because the severity of the injury varies, it is classified into levels, which influence the treatment options. The debate over operational versus nonoperative treatment has centered on different types of AC joint dislocations. Non-operative therapies are utilized for grade 1 lesions, non-operative treatments and surgical procedures are both possible for grade 2 lesions, and operational treatments are used for grade 3 lesions.

In 1984, Rockwood suggested a six-degree rating system for the spacing of AC joints. (See Figure 1) According to the researcher, Cadenat and Tossy's three-degree classification methods did not conclude all of the injury patterns adequately [5]. Types I-III correspond to the Grade I-III introduced by Allman and Tossy in Rockwood's classification. It characterizes type I to type III separation as a milder AC joint dislocation, classified by the degree of damage to the AC and CC ligaments in sequential order. Types IV-VI are prolonged using the post-traumatic posture and ligament rupture. One of the bases for determining grades was the position of the misplaced relationship between clavicle and acromion. The deltotrapezial fascia's integrity is disrupted in more severe conditions [2]. The AC joint dislocations of types IV-VI are posterior dislocation, gross superior dislocation, and inferior dislocation, respectively. They are frequently accompanied by AC ligament, CC ligament and joint capsule rupture [2]. In general, the Rockwood categorization system is the most widely used for AC joint injuries. As a result, the majority of the discussion in this paper is based on Rockwood's classification.

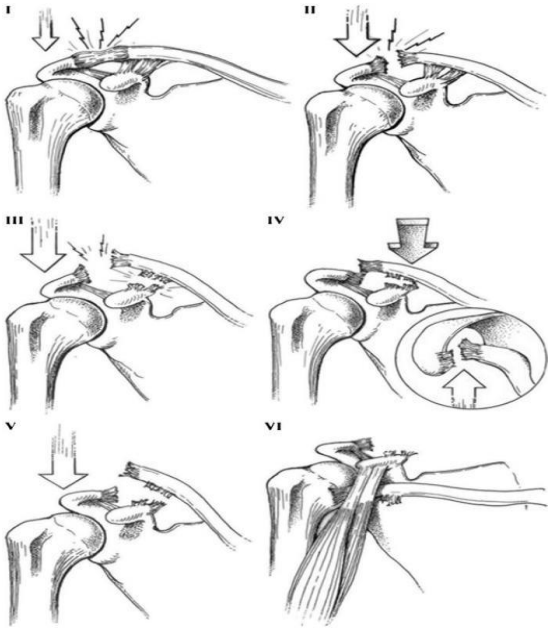

Figure 1 Rockwood classification of AC joint injuries

3. Cause and Diagnosis

3.1. Cause And Risk Factors

In the majority, AC joint separation is caused by direct force to the lateral acromion with an adducted arm. This study discusses this in terms of age, gender, and its relationship with severity.

Previous studies have pointed out that younger people (younger than 35 years) and men suffer from AC joint injuries more often than others. It is possible because they engaged in risk-taking

behaviors and more participation in contact sports, compared with older people and women. Concomitant injuries were more often seen in patients over 35 years of age carrying degenerative lesions. Sports were the cause of AC joint dislocation for both genders in all age groups, accounting for 37.4% of all [4]. High-risk sports for AC joint dislocations include football, hockey, soccer, rugby, and skiing. Injuries of this type are generally diagnosed as type V. These injuries are often accompanied by some other collateral injuries, such as rotator cuff injuries, SLAP lesions, and cartilage defects. In addition, some authors suggest that minor trauma may contribute to the occurrence of AC joint dislocation in the elderly due to the accumulation of degenerative changes as a result of aging, rather than exercise.

3.2. Diagnostic Methods

The diagnosis of AC joint injury was mainly based on a combination of physical examination and radiographs. As for physical examination, the combination of Paxino's sign and Obrien's Test is sometimes beneficial for diagnosis when used both in series and in parallel. As for radiographs, X-rays, ultrasound diagnosis, and computed tomography (e.g. CT) are very commonly used. Ultrasound-guided corticosteroid injections are both therapeutic and diagnostic and provide evidence for surgical decision-making and treatment [5]. Additionally, magnetic resonance imaging is a rarely used diagnostic method.

4. Treatments

Depending on the severity of the injury, different therapies are performed. The severity of the injury can be classified as mild, moderate, or severe, corresponding to categories I, II-III, and IV-VI, respectively. The ligaments implicated in a mild or moderate separation (types I-III) are strained or partially ruptured. In severe injuries (types IV-VI), however, the ligaments are completely ruptured and the positional relationship between the clavicle and scapula changes with movement due to the lack of ligamentous restriction, causing the last part of the clavicle to become conspicuous.

4.1. Treatments For Type I

Type I injury is a moderate AC ligament sprain that responds well to simple therapies including rest and basic motion exercises. Rest, ice, and protection are recommended at first, with sling immobilization and 1-3 weeks of rest recommended, with avoidance of putting hands up and trying to reach something, and leaning on elbows, which is harmful to the shoulders.

In addition, some basic exercises are frequently followed by a period of rest. These exercises originally aim to keep 2 capabilities, which are mobility and flexibility [6]. Weighted pendulum stretches and muscle strengthening exercises are a big part of it.

The weighted pendulum stretching exercise softly stretches the space through which the tendons pass, relieving strain on the tendons and preventing stiff shoulder growth. With five minutes once or twice a day, this exercise can be started almost soon after a shoulder injury. Muscle-strengthening activities are also important for improving shoulder muscle strength and preventing further injuries. With a treatment cycle of three to seven days, it keeps the arm upright and closes to the body. Stretching strength is often increased by adding 0.5 to 1 kilogram each week, and the diameter of the movements is gradually increased as well, however, try not to beyond half of the meter. This method should be augmented or replaced with other basic exercises to address specific regions of limitation after a few weeks. The advanced stretch can be used as a warm-up before more targeted flexibility and/or strengthening exercises. With any basic exercise, pain should be kept to a minimum level [7].

4.2. Treatments For Type II

Type II injuries are characterized by a torn AC ligament and sprained CC ligaments, and they typically result in more pain and swelling than type I injuries. Taking Rest, using ice o cool down, and using a bandage to stabilize the shoulder may be used as early and basic treatments. When

tolerated, range of motion and stretching activities can be commenced [8]. Squeezing shoulder blades that are flat with knees bent and feet flat are among the muscle-strengthening workouts. Its treatments include: (1) keep your arms straight and keep them 20 cm from the side of the body, keep the back of the hands facing outward; (2) keep the lower back flat to the floor, squeeze shoulder blades down, toward each other, toward spine; (3) make a conscious effort not to shrug shoulders and keep neck relaxed; (4) hold for 5 seconds when the should feel the downwards muscles between the shoulder blades contracting; (5) repeat above exercises 20 times per group with two or three groups a day [6].

These exercises can be begun one to two weeks after beginning swing stretching, but the range of motion and force exerted should be reduced at first to avoid generating unnecessary pain. In order to limit the danger of re-injury, the intensity of these exercises should be increased as the pain subsides. These exercises are supposed to be moderately unpleasant, though the pain should not last more than 24 hours. Severe discomfort may occur during or after rehabilitation exercises, indicating the emergence of underlying issues. If you have extreme pain, you should cease doing these exercises for a few days.

When a full range of motion and strength is returned following a type II injury, most persons can return to full activity within two to four weeks.

4.3. Treatments For Type III

Type III dislocation of the AC joint occurs when the AC ligament, CC ligament, and joint capsule are ruptured. Rest, ice, sling immobilization, and medications can be used to treat most type III patients without surgery. To aid healing and pain relief, a sling should be worn for three to four weeks. Treatment for type III injuries follows the same basic strategy as type II injuries, but at a slower pace. When the pain is bearable, range of motion and enhancement activities can begin. With pain relief, the intensity of these workouts should gradually increase [6].

Patients with type III injuries can resume normal activities 6 to 12 weeks after the accident when they will have regained full range of motion and strength. Depending on the needs of the individual activity, some may begin moving again sooner or later.

4.4. Treatments For Types IV, V, VI

The most extreme shoulder separations are Type IV, V, and VI. People who suffer from this type of damage should see a bone and joint specialist (an orthopedist). If the damage compresses nerves or muscles, surgery therapy is required immediately to limit the risk of long-term consequences [6].

A tiny incision is made across the top of the shoulder during surgery. The ruptured Coracoclavicular ligament is replaced by an artificial ligament, and the end of the collar bone is taken away because it is invariably injured. When done within three weeks of the injury, this operation has a substantially higher success rate. Although this operation can be done later, the results may not be as favorable as if it was done right after the injury. A different operation is frequently necessary for long-term and chronic injuries (This is called a Coraco Clavicular Fusion and a bone grafting procedure is required).

Also, anyone who performs heavy manual or overhead work should consider having surgery as soon as possible after an injury. This is also true for throwers and contact sportsmen [8]. With the majority of other patients, a non-operative method is appropriate if you are willing to tolerate a little amount of risk. The major goal of surgical therapy is to reduce the AC joint accurately in both coronal and sagittal planes [9]. This is accomplished either through primary repair or reconstruction of torn ligaments, with stability maintained to safeguard the repair or reconstruction [10]. Screws, plates, muscle transfers, ligamentoplasty techniques, and ligament restoration using autografts or allografts are only a few of the surgical treatments that have been documented[11]. Open and arthroscopic techniques can be used to rebuild anatomical ligaments utilizing tendon grafts. For access to the coracoid process, open surgery necessitates removal of the deltoid from the clavicle and significant soft-tissue dissection; neurovascular systems are jeopardized due to poor visibility during tendon transfer around the coracoid. Arthroscopy provides superior, clearer sight around the coracoid and

eliminates the need for extensive deltotrapezial fascia dissection [6]. Other downsides of surgery, such as the danger of infection, a longer time to return to full function, and prolonged discomfort, should be considered in some circumstances.

The physician may recommend that you wear a sling for a few days after surgery to support and preserve your shoulder. A direct recovery regimen might most likely be implemented by a physiotherapist. Before beginning range-of-motion exercises, physiotherapists normally wait four weeks. Patients commonly start with passive exercises, in which the shoulder joint is manipulated but the muscles remain relaxed. The physiotherapist massages the joint softly and stretches the arm progressively. Patients may be taught how to perform passive workouts at home. Once the ligaments have healed, active rehabilitation begins six to eight weeks after surgery. Active range-of-motion exercises aid patients in regaining shoulder mobility by utilizing muscle force. Patients should start with light isometric strengthening activities and progress to more active strengthening exercises over time [13].

Shoulder surgery recovery takes time, therefore patients must be patient and adhere to the physiotherapy regimen closely.

5. Conclusion

AC joint separation is a frequent shoulder ailment that affects young and active men as well as people who regularly participate in contact sports. X-rays, bone scans, positive compression, and the horizontal adduction test are among the diagnostic and examination modalities available.

The degrees of severity of the injury are divided into two categories. Allman and Tossy introduced one, while Rockwood did the same for the other. The Rockwood classification, on the other hand, is the most widely used categorization system for AC joint injuries. A minor sprain of the AC ligament is a Type I injury. Type II injuries are characterized by a torn AC ligament and sprained CC ligaments, and they typically result in more pain and swelling than type I injuries. More serious injuries are represented by Types III-VI, which are all accompanied by a ruptured AC ligament, as well as CC ligament, and joint capsule. Different degrees of injury have different locations. Superior dislocation of the AC joint, posterior dislocation of the AC joint, massive superior dislocation of the AC joint, and inferior dislocation of the AC joint are all types of dislocations.

Non-surgical treatments are indicated for categories I-III injuries. Surgical procedures are advised for classes IV-VI injuries. However, the treatment strategy should be tailored to the patient's specific needs, taking into account any unwanted consequences.

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