

# A Study of Management of Acromioclavicular Joint Dislocation

Neha Nadiminti<sup>1</sup>, K. S. Karthika Hathwar<sup>2</sup>

<sup>1</sup>Senior Resident Department Of Orthopedics, Government Medical College, Kothagudem, Telangana, <sup>2</sup>Assistant Professor, Department Of Orthopedics, Sri Siddharta Medical College, Tumkur, Karnataka, India

## ABSTRACT

**Background and Aims:** Acromioclavicular joint dislocation correspond to 8.6% of all joint dislocations & represents a major injury to shoulder girdle. Non operative treatment is considered standard care of Grade 1 & 2 acromioclavicular joint dislocation but the treatment of acute Grade 3 & above injuries is still controversial. The study aims to enumerate various modalities of treatment of acromioclavicular joint dislocation & to assess functional outcome & radiographic outcome & range of movement at acromioclavicular joint. **Methods:** It is a prospective observational study. The clinical and radiological examination of 12 cases with acromioclavicular joint dislocation who came to emergency department in a period of two & half years was conducted. **Results:** In our study 12 patients with acromioclavicular joint dislocation with mechanism of injury being Road traffic accident [83.33%] & fall from height [16.67%] where injury is by direct force which is produced by patient falling onto point of shoulder with arm at the side in adducted position. The condition is seen most prominently in age group between 20-30 years [66.67%]. Males are mostly affected [83%]. Involvement of left side was more than right side with a ratio 1.4:1. The condition was classified based on Tossy -Rockwood classification. Among the 12 cases one case was classified as Type -1 [8.3%], two cases were classified as Type-2 [16.67%], four cases were classified as Type-3 [33.33%], five cases were classified as belonging to Type-5. Type-5 was the most common type. Among them 5 cases [type 1-one case; type 2-two cases; type 3-two cases] were treated conservatively by jones strapping. Two cases belonging to type-3 and five cases belonging to type -5 were treated surgically by modified weaver dunn's procedure with autologous semitendinosus graft augmentation. **Conclusion:** Acromioclavicular joint dislocation was caused due to high velocity injury to shoulder girdle affecting 20-30 years age group. Males were most affected. Type 1 and Type 2 acromioclavicular joint dislocation can be managed conservatively yielding good results. Type 3 acromioclavicular joint dislocation yielded almost similar results by operative & non operative treatment. Type 5 when managed surgically yielded excellent results. Incidence of type 4 & type 6 acromioclavicular joint dislocation was very low.

**Key words:** Acromioclavicular injury, Rockwood classification, Weaver Dunn procedure

## INTRODUCTION

A serious injury to the shoulder girdle, the acromio-clavicular joint dislocation accounts for 8.6% of all joint dislocations.<sup>[1]</sup> The standard of care for Grade I and II Acromio-clavicular joint dislocations is non-operative therapy. However, there is ongoing debate regarding how to handle acute injuries of Grade III and higher.

When he suffered an acromioclavicular dislocation from wrestling, Galen (129–199 A.D.) treated himself by diagnosing the damage and bandaging it tightly. He kept the arm raised and applied tight bandages to hold the protruding collarbone down.

Dislocations of the acromioclavicular joint have been better understood since the early publications to the time of Paul of Aegina (7<sup>th</sup> century), but the course of therapy has remained largely unchanged.

### Access this article online

Quick Response Code:

Website: [www.jbmh.in](http://www.jbmh.in)

Received on: 18-11-2023

Accepted on: 22-12-2023

### Address for the correspondence:

K. S. Karthika Hathwar, Assistant Professor,  
Department Of Orthopedics, Sri Siddharta Medical  
College, Tumkur, Karnataka, India.  
E-mail: [karthikhathwarks@gmail.com](mailto:karthikhathwarks@gmail.com)

No obstruction, no matter how big or small, would result from such an injury, according to Hippocrates,<sup>[3]</sup> but there would be a tumefaction or deformity because the bone could not be returned to its original place. Even now, this assertion is true. No other joint in the body has likely received as many various types of care in an effort to “fully return” it to its “natural position.” Rockwood divided the six forms of AC joint dislocation. Acromioclavicular ligament rupture and a loss of horizontal stability define Types I and II. The coracoclavicular ligaments tear together with the loss of vertical stability in Type III, resulting in dislocation.

After reviewing 101 prior studies, Urist<sup>[4]</sup> concluded in 1946 that the results of surgery for internal fixation of the AC joint were no better than those of conservative treatment. In 1959, a thorough analysis of the management of AC dislocation, including 32 conservative treatment options and five open approaches, was published by Urist.<sup>[5,6]</sup>

The purpose of this study is to know how to manage acromioclavicular joint dislocation, to enumerate various modalities of treatment of acromioclavicular joint dislocation, to assess functional outcome and radiographic outcome, and range of movement at acromioclavicular joint.

Incidence of acromioclavicular joint injury:

Out of all dislocations occurring over about the shoulder 85% of dislocations occurred to the glenohumeral joint, 12% to the acromioclavicular joint and 3% to the sternoclavicular joint.

Male: Female ratio is 5:1.

Acromioclavicular injury is most often incomplete than complete.

## METHODOLOGY

### Source of Data

Gandhi hospital.

### Period of Study

The study was a period of 2 and  $\frac{1}{2}$  years.

### Method of Study: Observational Study

Method of collection of data: Sample size of 12 cases.

A study of 12 cases of acromioclavicular joint dislocation who satisfy inclusion criteria was conducted. The cases have come to emergency department in a period of 2 and  $\frac{1}{2}$  years to our hospital and were taken without using any sample procedure, thus the power of study cannot be determined.

The purpose of the study is to include patients with acromioclavicular joint dislocation. The patients are

admitted and examined according to protocol and associated injuries are also noted clinical and radiological evaluation done. Acromioclavicular joint dislocation was classified using Tossy-Rockwood classification. Depending on the classification type to which the case belongs, the case was managed conservatively or surgically. Routine investigations were carried out to get fitness for surgery. Patient would undergo open reconstruction techniques using autologous hamstring graft<sup>[10]</sup> and k-wire fixation under general anesthesia.

Post-operative physiotherapy followed according to protocol, to evaluate the functional outcome. Patient functional results were calculated using The University of California-Los Angeles (UCLA) scoring systems.<sup>[7]</sup>

Most common mechanism of injury was due to road traffic accident (10) and two cases were due to fall from height. Most of the cases gave history of direct trauma to shoulder girdle.

### Inclusion Criteria

- Cases of all age groups having acromioclavicular joint dislocation were included in the study.

### Exclusion Criteria

The following criteria were excluded from the study:

- Clavicle fracture
- Proximal Humerus fracture
- Patient not willing to participate in study and follow up.

### Management

#### Conservative management

A preinterventional clinical picture [Figure 7] and radiograph [Figure 9] was taken initially. The acromioclavicular joint was decreased by exerting upward pressure from the elbow and downward pressure on the medial end of the clavicle. Jones adhesive strapping [Figure 8] supports the reduction and wraps around the joint from the middle third of the clavicle to the elbow joint. Another strap is applied horizontally while the arm is in an adducted position. Strapping that is used along the length of the humerus is risky and ineffective. To prevent pressure, careful cushioning is needed around the elbow joint and the lateral end of the clavicle.

After 3 weeks of sustained immobilization, the strapping is removed, and over the following three weeks, therapy is started with gradual shoulder joint mobilization. For 8–12 weeks, avoid strenuous exercise or contact sports.

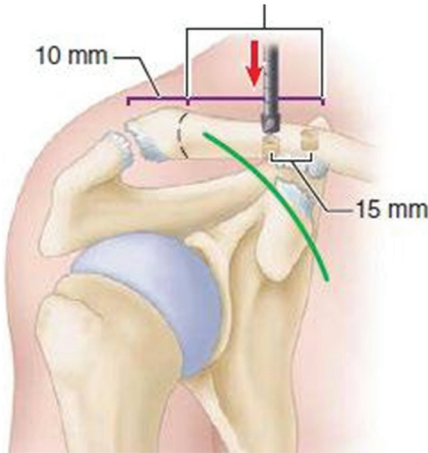
- Patient was evaluated at each follow up at 6 weeks, 3 months, and 6 months and was evaluated
- Subjectively for pain and stiffness,
- Objectively for ROM (abduction) and
- Radiographs to check for movement [Figure 10].

**Operative Techniques**

A preoperative clinical picture [Figure 2] and Radiograph [Figure 3] were taken initially General anesthesia was used in all patients.

**Patient position and draping**

Patient placed in beach chair position.



INCISION

**Surgical approach**

Modified weaver Dunn’s procedure<sup>[8,9]</sup> with autologous semitendinosus graft<sup>[10]</sup> augmentation was the choice of approach in all open reconstructions.

**Post-operative management**

- All patients are immobilized in sling
- Appropriate antibiotics and analgesics were used
- Immediate post-operative radiographs [Figure 4] were taken to determine the bone alignment and 27 maintenance of reduction. Sutures removed by about 2 weeks.

**Follow Up and Rehabilitation**

All patients were followed up every week in 1<sup>st</sup> month and every 2–3 weeks for 6 months

- A sling is worn for 1 week
- Gentle active circumduction exercises are performed in the sling for 1 week
- At 2 weeks sutures are removed, exercises are increased
- Heavy weight lifting is avoided at least for 4 weeks
- Normal activities can be gradually resumed
- Contact sports should be avoided for at least 4 weeks
- The patients underwent clinical and radiological examinations, and their range of motion and complications were evaluated [Figures 5 and 6].
- Further follow-ups were done at 6 weeks and 12 weeks

Complications	No of cases
Stiffness	1
Superficial infection	1
Skin maceration	1
Soft-tissue calcification	0
Acromio clavicular arthritis	0

and 24 weeks. The patient with shoulder stiffness given physiotherapy for 1 week–15 days on outpatient basis.

**RESULTS**

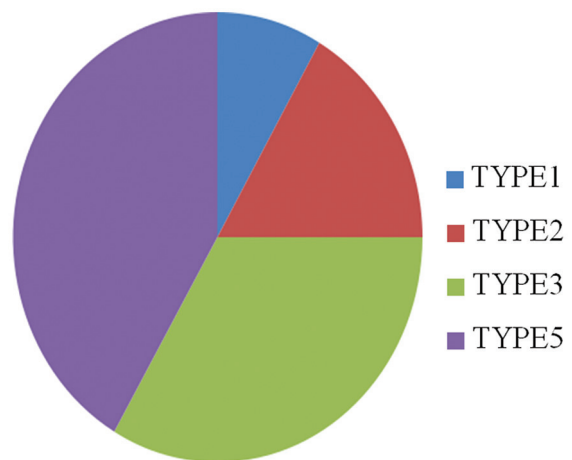
Fractures were seen in all age groups but were common in 20–30 years (66.67%).

Involvement of the left side was more than right. Ratio was 1.4:1.

In the study conducted most common mechanism of injury was road traffic accident (83.33%) and rest were due to fall from height (16.67%).

Rockwood’s Type 1 acromio clavicular dislocation was present in 8.3% cases, Type 2 was present in 16.67% cases, Type 3 was present in 33.33% cases, Type 5 was present in 41.66% cases [Figure 1].

Out of the 12 cases, seven were managed surgically by Modified weaver Dunn’s<sup>[8,9]</sup> procedure with autologous semitendinosus graft<sup>[10]</sup> augmentation and remaining five were managed conservatively by Jones strapping [Figure 8].



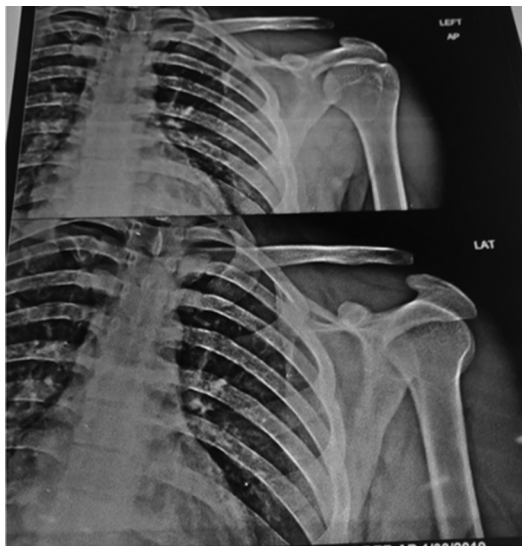
**Figure 1:** Type of acromioclavicular joint dislocation –pie chart representing case percentage depending on type of acromioclavicular injury according Tossy Rockwood classification



**Figure 2:** Clinical picture of Type -5 Tossy Rockwood acromioclavicular joint dislocation



**Figure 4:** Postoperative x-ray of Type5 Tossy-Rockwood acromioclavicular joint dislocation surgically managed with modified weaver dunn's procedure with autologous semitendinosus graft augmentation and kwire fixation



**Figure 3:** Preoperative x-ray picture of Type -5 Tossy Rockwood acromioclavicular joint dislocation

Complications such as stiffness (20%), skin maceration (20%) were seen in cases managed by conservative management with jones strapping due to prolonged immobilization. Surgically managed cases had complications like superficial skin infection (14%).

#### **FOLLOW-UP X-RAY**

A prospective study of 12 cases conducted in Gandhi Medical College and Hospital. The cases with acromioclavicular joint dislocation were initially examined in outpatient department or casualty.

In the prospective and observational study conducted among 12 patients, the mechanism of injury was road traffic accident



**Figure 5:** ABDUCTION



**Figure 6:** INTERNAL ROTATION



**Figure 7:** Clinical picture of Type 2 Tossy Rockwood acromioclavicular joint dislocation



**Figure 9:** Initial xray showing type 2 tossy rockwood acromioclavicular joint dislocation



**Figure 8:** JONES STRAPPING done for type 2 tossy rockwood acromioclavicular joint dislocation



**Figure 10:** Followup xray showing restored acromioclavicular joint

in 10 patients and in other two due to fall from height with most of them giving history of direct trauma to shoulder girdle.

All 12 cases were treated and followed up for an average period of 24 weeks. Cases were classified according to Tossy-Rockwood classification.

Out of these 12 patients, seven cases were managed surgically by Modified weaver Dunn's<sup>[8,9]</sup> procedure with autologous semitendinosus graft<sup>[10]</sup> and k wire fixation while other five were treated conservatively with Jones strapping. According to Modified UCLA<sup>[7]</sup> Scoring System, three cases had excellent results, eight cases had good results, and one cases had fair result.

The final results were graded according to UCLA<sup>[7]</sup> scoring criteria. Three cases showed excellent results (25%), eight

No of Cases	Procedure	Results (UCLA score)	Complications
7 cases	Modified weaver Dunn's <sup>[8,9]</sup>	Excellent - 2	Superficial infection-1 (14%)
	Procedure with autologous	Good - 5	
	Semitendinosus graft <sup>[10]</sup> and k wire	Fair - 0	
5 cases	Fixation	Poor - 0	Stiffness-1 (20%) Skin maceration-1 (20%)
	Jones strapping	Excellent - 1	
		Good - 3	
		Fair - 1	
		Poor <sup>49</sup> - 0	

cases had good results and one case had fair result (8.33%). None of the cases had poor results.

All patients with excellent results and good results had normal functional range of motion according to Modified UCLA<sup>[7]</sup> score. Final results were compared with study by Fremerey *et al.*<sup>[7]</sup> using Modified UCLA<sup>[7]</sup> score.

Final result	Number of patients	Percentage
Excellent	03	25
Good	08	66.67
Fair	01	8.33
Poor	00	00
Total	12	100

## DISCUSSION

Acromioclavicular joint dislocation is one of the most common injuries encountered by orthopedic surgeons. Historically, they were treated with tight bandages initially. With more understanding of biomechanics of acromioclavicular joint, various surgical techniques came into existence.

A study of 12 cases of acromioclavicular joint dislocation satisfying inclusion criteria was done which were treated either conservatively or surgically and outcome was assessed using UCLA scoring system (UCLA).<sup>[7]</sup>

In the observational and prospective study conducted on 12 cases with the aim to enumerate various modalities of treatment of acromioclavicular joint dislocation and assess functional outcome and radiological outcome and range of movement at acromioclavicular joint using University of California-Los Angeles scoring system.<sup>[7]</sup>

Out of 12 patients, seven were operated by modified weaver Dunn's procedure<sup>[8,9]</sup> using autologous semitendinosus graft and k-wire fixation and other five cases were managed conservatively by jones strapping [Figure 8].

According to UCLA<sup>[7]</sup> scoring system, two cases which were operated by modified weaver Dunn's procedure with autologous semitendinosus graft and k-wire fixation showed excellent with UCLA<sup>[7]</sup> score 19, 18 and remaining five showed good results. None of them showed poor results.

One case managed conservatively by Jones strapping [Figure 8] showed excellent result, three cases managed conservatively showed good result, and one of them showed fair result. None of the cases showed managed conservatively showed poor results.

Results were compared with Fremerey *et al.*<sup>[7]</sup> study using modified UCLA<sup>[7]</sup> score. Age of the patients was ranging from minimum of 22 to 42 years maximum with an average age of 28.58. In the conducted study, there were 10 males and two females and male to female ratio of patients was 5:1.

The left side was involved in seven cases and the right side involved in five cases and ratio was 1.2:1.

In study conducted main mode of injury was road traffic accident in 10 cases where as two cases had fall from height, most of them causing direct trauma to shoulder girdle.

Conservative management showed complications such as stiffness due to prolonged immobilization. Surgical management showed complications like superficial infections. There were no cases reported acromioclavicular joint arthritis and soft-tissue calcification.

Conservatively managed cases showed stiffness in one case (20%) and skin maceration in one case (20%). Surgically managed cases showed superficial infection in one case (14%).

## CONCLUSION AND SUMMARY

- The most frequent causes of acromioclavicular joint dislocation were high-velocity hits to the shoulder girdle, such as those from car accidents or falls from a height
- Most common age group of acromioclavicular joint dislocation is 20–30 years, i.e, younger generation is more involved
- Acromioclavicular joint dislocation occurs more commonly in males compared to females [5:1] ratio
- Deformity was present in all patients and radiographs showed superior displacement of lateral end of clavicle compared to normal side [Figure 3]
- Acromioclavicular joint dislocation was classified according to Tossy Rockwood classification
- Type 1 and Type 2 acromio clavicular joint dislocation can be managed conservatively and had good results
- Type 3 acromio clavicular joint dislocation yielded almost similar results by operative and non-operative management
- Type 4 and Type 6 acromio clavicular joint dislocation incidence was very low
- Type 5 managed surgically yielded excellent results.

## REFERENCES

1. Renfree KJ, Wright TW. Anatomy and biomechanics of the acromioclavicular and sternoclavicular joints. *Clin Sports Med* 2003;22:219-37.
2. Salter EG Jr., Nasca RJ, Shelley BS. Anatomical observations on the acromioclavicular joint and supporting ligaments. *Am J*

- Sports Med 1987;15:199-206.
3. Nakazawa M, Nimura A, Mochizuki T, Koizumi M, Sato T, Akita K. The orientation and variation of the acromioclavicular ligament: An anatomic study. *Am J Sports Med* 2016;44:2690-5.
  4. Lee KW, Debski RE, Chen CH, Woo SL, Fu FH. Functional evaluation of the ligaments at the acromioclavicular joint during anteroposterior and superoinferior translation. *Am J Sports Med* 1997;25:858-62.
  5. Willimon SC, Gaskill TR, Millett PJ. Acromioclavicular joint injuries: Anatomy, diagnosis, and treatment. *Phys Sportsmed* 2011;39:116-22.
  6. Urist MR. Complete dislocation of the acromioclavicular joint. *J Bone Joint Surg* 1963;45:1750-3.
  7. Fremerey R, Freitag N, Bosch U, Lobenhoffer P. Complete dislocation of the acromioclavicular joint: Operative versus conservative treatment. *J Orthopaed Traumatol* 2005;6:174-8.
  8. Gupta R, Sood M, Malhotra A, Masih GD, Khanna T, Raghav M. Functional outcome of modified weaver dunn technique for acromioclavicular joint dislocation. *Indian J Orthop* 2018;52:418-22.
  9. Pavlik A, Csepai D, Hidas P. Surgical treatment of chronic acromioclavicular joint dislocation by modified Weaver Dunn procedure. *Knee Surg Sports Traumatol Arthrosc* 2001;9:307-12.
  10. Saccomanno MF, Marchi G, Mocini F, et al. Anatomic reconstruction of the coracoclavicular and acromioclavicular ligaments with semitendinosus tendon graft for the treatment of chronic acromioclavicular joint dislocation provides good clinical and radiological results. *Knee Surg Sports Traumatol Arthrosc* 2021;29:2356-63.
  11. Nolte P, Lacheta L, Dekker TJ, Elrick BP, Millett PJ. Optimal management of acromioclavicular dislocation: Current perspectives. *Orthop Res Rev* 2020;12:27-44.

**How to cite this article:** Nadiminti N, Hathwar KSK. A Study of Management of Acromioclavicular Joint Dislocation. *J Bones Muscles Health* 2023;1(2):61-67.

**Conflicts of Interest:** None. **Source of support:** None.

This work is licensed under a Creative Commons Attribution 4.0 International License. The images or other third party material in this article are included in the article's Creative Commons license, unless indicated otherwise in the credit line; if the material is not included under the Creative Commons license, users will need to obtain permission from the license holder to reproduce the material. To view a copy of this license, visit <http://creativecommons.org/licenses/by/4.0/> © Nadiminti N, Hathwar KSK. 2023