

# Functional Assessment Following Treatment of Acromioclavicular Joint Dislocation by Screw and Tension Band Wiring.

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## ABSTRACT

**Background:** The acromioclavicular (AC) joint is commonly involved in traumatic injuries in male athletic population. Treatment of acute complete AC dislocation is controversial in literature. Both conservative and surgical treatment has been reported with similar results. **Methods:** We report a prospective study of 17 patients of Acromioclavicular dislocations (Type III) managed with screw and tension band wiring and were followed up for a period of 3 years. Repair of Coracoclavicular Ligament was performed if found completely torn. **Results:** Patients were assessed on basis of pain relief, tenderness, functional ability, range of motion at shoulder and cosmosis. **Conclusion:** Fixation with screw and Tension band wiring is a simple, easy, less time consuming surgical technique allowing faster rehabilitation in young and adult active patients to achieve a stable, pain free shoulder with no serious intra-operative or post-operative complications.

**Keywords:** Acromioclavicular dislocation, K-wire, Tension Band wire, Coracoclavicular ligament.

## INTRODUCTION

The Acromioclavicular joint is formed by lateral end of clavicle and acromion process of scapula. AC dislocations and Subluxations account for approximately 15% of all shoulder girdle dislocations.<sup>[1]</sup> The treatment of AC joint injury has evolved over year from past to present scenario. Treatment of AC joint injury includes both operative and non-operative management. It is generally accepted that conservative management is indicated for type I and II (Incomplete dislocation) AC injuries (Rockwood classification),<sup>[2]</sup> for type IV, V, VI injuries (more severe, high velocity injury) most surgeons prefer operative modality.<sup>[3]</sup>

Type III AC joint injuries are centre of controversy for management, no perfect study exists which clearly demonstrates the clear superiority of conservative over surgical management.<sup>[4]</sup>

Non-operative treatment like strapping, bracing, splinting etc fail to perform the job because of

interposition of articular disc, frayed capsular ligament, fragments of articular cartilage between acromion and clavicle and subsequent complications, which demands further surgical correction.<sup>[5-7]</sup> Different operative procedures for management of Type III injuries have been described such as acromioclavicular reduction and fixation, Coracoclavicular repair or reconstruction, combined repair, coraco-clavicular fusion, dynamic muscle transfer from tip of coracoids process, distal clavicle excision etc. in our study we have used AC fixation with screw from clavicle to coracoid process and tension band wire along with repair of ligaments if found torn.

## MATERIALS AND METHODS



**Figure 1:** X-ray shoulder showing AC joint dislocation type III.

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All patients who attended our hospital with acromioclavicular dislocation were assessed clinically and radiographically. Patients were assessed clinically followed by radiograph. Anteroposterior view of shoulder was done and diagnosis was confirmed as type III AC joint dislocation [Figure 1]. Other types were excluded from the study.

All patients with type III acromioclavicular joint disruption in skeletally mature patient were included in the study. Patients with Prior symptoms in shoulder girdle were excluded like type I, II, IV acromioclavicular joint disruption, associated injury to clavicle, coracoid process, scapula, severe head injury, compound injuries and presence of distal neurovascular deficits and high risk patient with comorbidity.

After anaesthetic fitness patient were posted for surgery and open reduction and internal fixation with screw and tension band wiring with k-wire was done. Stitch removal was done on 12th day. Patients were followed up at 6 week, 12 week 6 month, 12 month and 3 years. Patients were assessed on basis of pain relief, tenderness, functional ability, range of motion at shoulder and cosmosis.

#### **Operative technique**

AC joint was accessed by shoulder strap incision and open reduction was achieved and screw was inserted from lateral end of clavicle to base of coracoids process. Tension band wiring was done to provide additional stability. Coracoclavicular ligament repair was done if found to be torn. Final reduction was checked under image intensifier [Figure 2].



**Figure 2: Post-operative x-ray showing AC joint dislocation treated with screw and tension band wiring and k-wire.**

Post-operative a pouch arm sling was given for 3 weeks. Gentle physiotherapy was started on 1st post op day. Active assisted movements were started by the patients after 3 week under supervision of physiotherapist. K-wire was removed after 6 months post operatively in almost all patients.

#### **Evaluation**

Patients were assessed on basis of pain relief, tenderness, functional ability, range of motion at shoulder and cosmosis.

## **RESULTS**

There were total of 17 patients included in the study of which 10 were males and 7 were female. All patients were skeletally mature. Time between the injury and the surgery ranged from one day to 3 weeks. Road traffic accident was the commonest mode of injury seen in 9 patients followed by fall on shoulder seen in 8 patients. Results were assessed at 6 weeks, 12 weeks, 6 months, 12 month and 3 years.

In our study 14 patients had excellent result having no pain or limitation of function and full range of movements. 2 patient had occasional pain during exercise and painfull terminal abduction. 1 patient had screw backout from coracoid process for which redo surgery was done again.

No further major surgery was required in operative patients except for implant removal. In 2 patients wound dehiscence was present in initial stage that was treated by debridement, dressing and antibiotic which further healed without any complication. No major complications were noted.

All patients were cosmetically satisfied with the appearance of shoulder contour and non prominence of clavicle. There was no pain and discomfort at rest and strenuous exercise. All patients returned to full activity without any significant difference in its performance as compared to opposite shoulder [Figure 3].



**Figure 3: Clinical photograph showing range of motion at shoulder joint after 3 months.**

No significant difference was detected in active and passive movement of affected shoulder as compared normal shoulder. Also there was no palpable crepitus in any case and scapular rhythm was normal.

## **DISCUSSION**

There is a controversy in literature regarding treatment of AC joint dislocation. Conservative management such as strapping / bracing / splinting leads to painful sequelae in 17% to 25% cases due to meniscal damage, interposition of fibrous tissue or persistent instability. Other disadvantages includes skin pressure sores and ulceration, necessity of wearing sling/brace for 8 weeks, poor patient compliance, interference with activities of daily living, no guarantee of freedom from pain, loss of shoulder and elbow motions, soft tissue

calcifications, late AC joint arthritis, recurrence of deformity, late muscle atrophy, weakness and fatigue.

On other hand surgical methods allow for inspection of AC joint, reduction of joint under vision, removal of damaged meniscus or loose fragments, repair of tear in capsule/ delto-trapezial fascia/muscles. Surgical methods also permit an anatomical reduction and secure fixation that usually allows the resumption of shoulder motion earlier than is possible with closed techniques.<sup>[5,10]</sup>

However most of surgical methods also leave 9 to 28 % patients with residual pain, sometimes due to complications of osteosynthesis such as AC degeneration.<sup>[10]</sup>

Most of the operative procedures for AC dislocation that have been reported had high incidence of complications as breakage or migration of metallic device, failure of fixation or erosion of bone and subsequent loss of reduction. These difficulties may result in re-dislocation, infection and prolonged rehabilitation.<sup>[8]</sup> Tension band wiring along with two smooth 1.5mm K-wires and screw from clavicle to coracoids process gives enough stability to allow early mobilization.

Our all patients have no difficulty with activities of daily living. Various methods have been suggested for CC ligament injury like Bosworth screw fixation, Percutaneous coracoclavicular screw fixation, Circlage techniques by using synthetic materials, ligament reconstruction by Weaver and Dunn, End to end repair, Arthroscopic repair by Endobutton.

A re-displacement rate of 9-11 % (maximum upto 35% with vertical screw fixation) has been reported with coraco-clavicular fixation and about 5% after AC fixation.<sup>[11]</sup>

In a study by Wei-Ching Lin, a 4.5 mm diameter of cancellous screw with supplementary techniques provided sufficient stability during the recovery period. The main advantage of this technique was its technical simplicity as compared with other techniques and the outcomes were largely similar.<sup>[12]</sup>

In a study of 24 patients by CemZeki, they reported low rate of acromioclavicular joint arthrosis with modified Bosworth technique.<sup>[13]</sup> We performed repair of Coracoclavicular ligament in whom we found it to be torn and results are satisfactory. We prefer AC fixation with screw and K-wires and tension band wiring. This method is gaining popularity because of its simplicity, ease, less time consuming technique, helps quicker rehabilitation in young, adult active patients. Incidence of post traumatic AC arthritis in surgically treated patients is 25% while those treated conservatively is 45%. Our purpose of study was to emphasize that our surgical technique gives better results. The limitations of our study were small sample size and short follow up time.

## CONCLUSION

We reached to conclusion that treatment of AC joint grade III with open reduction with screw and tension band wiring is simpler technique promising the quicker rehabilitation; giving a stable, painless shoulder in young, adult, active patients and patient is able to return to gainful employment much earlier than those treated by other techniques.

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