

# Outcome After Coracoclavicular Ligament Reconstruction for Acromioclavicular Joint Dislocation

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## ABSTRACT

### Background

Acromioclavicular injuries are common in athletes and road traffic injuries and there are many surgical and non surgical treatment options for it. In this study displaced acromioclavicular injuries ( Rockwood type 3 and 5) are included in the study and treated with anatomic coracoclavicular reconstruction with semi tendinosis graft and the results were evaluated.

### Methods

A hospital based prospective study including 20 cases of AC joint injuries managed with coraco-clavicular reconstruction using semi tendinosis graft over a period of March, 2017 to February, 2020 with the mean follow-up duration of 13.5 months was performed. The final outcome was evaluated on the basis of radiological finding and clinically by Constant Murley score and Simple shoulder test.

### Results

At final follow up, radiologically there was average loss of reduction of  $3.5 \text{ mm} \pm 0.85\text{mm}$  only as compared to immediate post operative finding. The Clinical outcome measured according to Constant Murley score was  $91.2 \pm 10.75$  (range 86.4-95.5) and according to Simple shoulder test, it was  $11.4 \pm 3.1$  (range 8.5-12.1). overall, the results were satisfactorily with no obvious impairment of shoulder function.

### Conclusions

Coracoclavicular reconstruction using semi Tendinosis from same patient has good outcome both clinically and radiologically in displaced high grade AC joint injuries

**Keywords:** coracoclavicular injuries; anatomic reconstruction; shoulder function score.

## INTRODUCTION

Acromioclavicular (AC) joint dislocation are common shoulder injuries, mostly seen in contact sports.<sup>1</sup> The indication for surgery in AC joint dislocation is low and the surgical treatment of high grade dislocations, mainly type III and V (Rockwood Classification) have always been debatable. There have been different surgical techniques proposed for treatment options with variable outcomes.<sup>2</sup> Many techniques exist, including reduction and fixation of the AC joint and reconstruction of the coracoclavicular ligaments with autograft or allograft.<sup>3</sup> This study was to conducted to evaluate the clinical and radiographic outcomes of patients the treated with reconstruction of the coracoclavicular ligaments (CCR) with semi

tendinosis graft for acute or chronic type III or V AC joint injuries with a minimum of 2-year follow-up. Spectrum of open fracture ranges from small puncture wounds to extensive soft tissue injuries, periosteal stripping, and comminution of bone.<sup>1</sup> Open fractures pose a risk oed to assess the rate of infection in open fractures of long bones with delayed debridement.

## METHODS

A prospective study was conducted at College of Medical Sciences and Teaching Hospital, Bharatpur, Nepal. Ethical clearance was taken from Institutional Review Committee of College of Medial Science. All the cases presenting at our hospital with acromioclavicular joint dislocation mainly type 3 and 5, within the period of March, 2017 to February,

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2020. The inclusion criteria were and exclusion criteria were included in the study. Inclusion criteria were isolated AC joint injuries, age 18 to 55 years, type III or V AC joint injuries. Exclusion criteria were bony injury of the same limb, past medical comorbidity precluding the surgery, repeat or revision surgeries or AC joint injuries of type 2,4 and 6. The patients were counseled and explained regarding the procedure and informed consent was obtained. The relevant history of trauma, age, sex, side of the injured shoulder recorded. All the patients were evaluated with plain radiograph of shoulder and other investigation required for anesthetic clearance. Each patient underwent CCR using autogenous semi tendinosus tendon. After the proper anesthesia, patients were put in beach-chair position, the incision was made vertical 3.5 cm medial to the AC joint up to the coracoid process. Dissection was performed to expose the AC joint and coracoids process. Once the clavicle was visualized, 2 bone tunnels were drilled into the clavicle, a 5-mm posteromedial tunnel was made 4.5 cm medial to the AC joint according to the anatomic insertion of the conoid ligament, and second anterolateral 5-mm tunnel was made, positioned 20 to 25 mm lateral to the center of the conoid tunnel, mimicking the trapezoid ligament maintaining a minimum distance of 20 to 25 between tunnels, and the trapezoid tunnel was distanced at least 15 mm medially from the end of the clavicle.<sup>4</sup> Under direct visualization, the graft was passed beneath the coracoid process from medial to lateral using a curved suture-passing device and the 2 limbs of the graft were crossed before being passed through the bone tunnels of the clavicle. The joint was reduced and sutured strong nonabsorbable suture. The AC joint was sutured and the wound was closed in layers. Postoperatively arm pouch sling advised and sutures removed after 2 weeks. Then mobilization of shoulder started but active upright range of motion exercises held till 8 weeks. Progressively the intensity of physiotherapy increased and the weight training and return to sports allowed after 6 months.<sup>5</sup> All the patients were followed up minimum of 1 years of duration. The radiological outcome was measured

by distance between clavicle and coracoids (CC) on radiograph AP view of shoulder. Loss of reduction was assumed when there was increase in CC distance by 5mm.<sup>6</sup> Clinical outcome was measured according to Constant Murley score<sup>7</sup> and Simple shoulder test.<sup>8</sup>

## RESULTS

In this study 20 cases of acute acromioclavicular injuries were included satisfying the inclusion criteria. The majority of them were male (80%) and female (20%). The age group ranged from 24 to 54 years and the mean±SD of age was 34±9.09 years. Most of the patients had injury on right side (60%). The most common mode of injury in this study was the injuries sustained during road traffic accident (85%) followed play ground injury (10%). One case was due physical assault. Most common side involved in our study was right (60%). Most common type injury in our study was type 3 (55%) followed by type 5(45%). All these demographic data have been summarized in (Table 1).

<b>Table 1. Age and sex distribution.</b>	
<b>Variables</b>	<b>Frequency (%)</b>
<b>Age (years)</b>	
20-30	8(40)
30-45	10(50)
45-55	2(10)
<b>Sex</b>	
Male	16 (80)
Female	4(20)
<b>Mode of injury</b>	
Road traffic accident	17(85)
Play ground injury	2(10)
Physical assault	1(5)
<b>Side injured</b>	
Right	12(60)
Left	8(40)

The mean operative time was 74.5 minutes (SD 10.62 minutes) with mean blood loss of 20 ml. All cases were operated in general anaesthesia except for 1 case operated under regional anesthesia. The mean stay at hospital was 3 days. No cases had surgical site complication. Final follow up was at the average of 13.5 months (SD ±2.06).

At final follow up, radiologically there was average

loss of reduction of  $3.5 \text{ mm} \pm 0.85\text{mm}$  only as compared to immediate post operative finding. The Clinical outcome measured according to Constant Murley score was  $91.2 \pm 10.75$  (range 86.4-95.5) and according to Simple shoulder test, it was  $11.4 \pm 3.1$  (range 8.5-12.1). overall, the results were satisfactorily with no obvious impairment of shoulder function.

## DISCUSSION

High grade AC joint injuries have debatable treatment with multitude of treatment options having no common consensus., recent literature has demonstrated significant complication rates despite the use of modern techniques, including fracture of the clavicle/coracoid, bony erosion and loss of fixation.<sup>9</sup> The available surgical options include acromioclavicular joint fixation (hook plates), coracoclavicular fixation (Bosworth screw, mersilene tape,tightrope), and ligament reconstruction (Weaver and Dunn,anatomical coracoclavicular joint reconstruction).<sup>10</sup> In our study, the patients had excellent outcome and consistent with results of many studies.<sup>11,12</sup> Mazzocca et al had described an anatomic coracoclavicular ligament reconstruction (ACCR)

technique, utilizing a semitendinosus allograft to replicate the coracoclavicular ligament in its anatomic location. This technique has shown high subjective satisfaction rates among patients with a significant reduction in pain levels and improvement in shoulder function in the short term.<sup>4</sup> In this study too same technique was used our results were consistent to the results shown in their studies. Muench et al had reported complication like heterotrophic ossification and also need of revision surgery and painful joint requiring excision of distal clavicle following anatomic coracoclavicular reconstruction. Our study doesn't show any complication. The overall rate of infection in open fractures of long boy staphylococcus aureus as main causative organism of infection.<sup>16</sup>

## CONCLUSIONS

Coracoclavicular reconstruction using autograft tendon (Semi Tendinosis) has significantly good outcome both clinically and radiologically in high grade AC joint injuries.

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