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Case Series

Clavicular hook plate fixation for acromioclavicular joint injuries and lateral clavicle fractures: a case series of 13 military patients

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ABSTRACT

Acromioclavicular joint (ACJ) injuries and lateral clavicle fractures are common among military personnel due to high-energy trauma sustained during training, sports, and operational activities. Reliable fixation is essential to restore function and enable early return to duty. We present a case series of 13 serving naval patients treated with clavicular hook plate (CHP) fixation between September 2012 and November 2018 at the Navy General Hospital, Colombo, Sri Lanka. Inclusion criteria were Rockwood Type III/IV ACJ injuries or lateral clavicle fractures. Functional outcomes were assessed using the Disabilities of the arm, shoulder, and hand (DASH) score. The mean patient age was 32.8 years (range: 21-41). Mechanisms of injury included road traffic accidents (53%), accidental falls (31%), and sports injuries (15%). Diagnoses comprised Rockwood type III ACJ injuries (79%), lateral clavicle fractures (14%), and Rockwood type IV injuries (7%). The mean interval from injury to surgery was 14 weeks. At follow-up, 69% achieved excellent outcomes (DASH<2), while 23% reported moderate impairment. One patient developed ACJ separation following plate removal. This case series demonstrates that clavicular hook plate fixation combined with structured rehabilitation is effective for Rockwood Type III and lateral clavicle injuries in young, active military personnel. Early intervention facilitates favorable recovery, though implant-related complications highlight the need for careful monitoring.

Keywords: Acromioclavicular joint injuries, Clavicle fractures, Hook plate fixation, Military personnel, Functional outcomes, Sri Lanka

INTRODUCTION

Acromioclavicular joint injuries and lateral clavicle fractures are frequently encountered in military populations due to high-energy trauma from training, sports, and operational activities. These injuries compromise shoulder stability and functional capacity, necessitating reliable fixation methods.

The clavicular hook plate (CHP) has become a widely accepted method of fixation.[2,4] offering mechanical stability during healing and enabling early mobilization. While its use is well documented in civilian populations, evidence in military cohorts- where rapid return to duty is critical- remains limited.[2,5] This case series evaluates functional outcomes of CHP fixation in serving naval personnel.

CASE SERIES

Patient selection

Between September 2012 and November 2018, 13 serving naval patients underwent CHP fixation for ACJ injuries or lateral clavicle fractures at the Navy General Hospital, Colombo. Inclusion criteria were Rockwood Type III/IV ACJ injuries or lateral clavicle fractures. Exclusion criteria included civilians, compound fractures, polytrauma, neurovascular injury, concomitant upper limb trauma, and loss to follow-up.

Surgical technique and post-operative care

All procedures were performed by a single consultant orthopedic surgeon. All procedures were performed under general anesthesia with the patient positioned in the beach-chair position. A transverse incision was made over the lateral third of the clavicle, centered above the AC joint. The subcutaneous tissue was carefully dissected, and the deltotrapezial fascia was incised to expose the distal clavicle and AC joint. The joint was inspected, and any interposed soft tissue was cleared. Reduction of the AC joint was achieved under direct visualization, restoring the anatomical alignment between the distal clavicle and acromion. A pre-contoured clavicular hook plate of appropriate length was selected. The medial portion of the plate was applied to the superior surface of the clavicle, while the lateral hook was gently introduced beneath the acromion posterior to the AC joint. Care was taken to ensure that the hook engaged securely without causing subacromial impingement. The plate was fixed to the clavicle with cortical screws, providing stable fixation of the AC joint. The deltotrapezial fascia was repaired over the plate, followed by layered closure of subcutaneous tissue and skin. A sterile dressing was applied, and the arm was immobilized in a sling. Routine plate removal was scheduled at 6 months. Postoperatively, patients were immobilized in an arm sling for 2-3 weeks, followed by supervised physiotherapy beginning at 2 weeks.

Outcome measures

Functional outcomes were assessed using the DASH score[1], range of motion, muscle strength, and return to duty status.

Results

Demographics

The mean age of patients was 32.8 years (range: 21-41), and all were male naval personnel. The majority of injuries occurred on the left side (62%) (Table 1).

Table 1: Patients demographics and Injury characteristics.

Characteristics	Value	Range
Mean age (years)	32.8	21-41
Gender	All males	
Side of injury		
Left	62%	
Right	38%	

Mechanism of injury

Road traffic accidents were the leading cause (53%), followed by accidental falls (31%) and sports-related trauma (15%) (Figure 1).

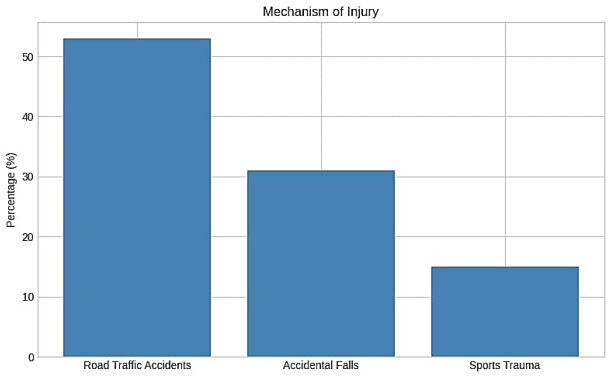

Figure 1: Mechanism of injury.

Injury types

Rockwood Type III ACJ injuries predominated (79%), with lateral clavicle fractures (14%) and Rockwood type IV injuries (7%) observed less frequently (Figure 2).

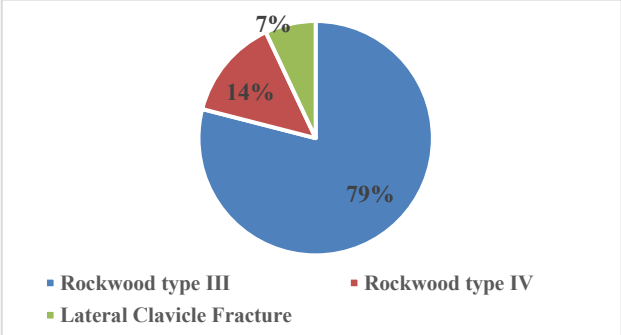

Figure 2: Injury types.

Functional outcomes

At follow-up, 69% of patients achieved excellent recovery (DASH<2), while 23% reported moderate impairment. One patient developed recurrent ACJ separation after plate removal. Pain was common, with 54% experiencing transient postoperative pain and 31% reporting persistent pain until plate removal (Table 2 and Figure 3).

Table 2: Functional outcomes.

Outcome category	N	%
Excellent recovery (DASH<2)	9	69
Moderate impairment(DASH 49-60)	3	23
ACJ separation post plate removal	1	8
Transient postoperative pain	7	54
Persistent pain until plate removal	4	31

Return to duty

All but one patient regained full functional capacity following physiotherapy.

Functional outcomes

Functional recovery categories following clavicular hook plate fixation, demonstrating that 69% of patients achieved excellent outcomes (DASH<2), while 23% experienced moderate impairment, and one patient developed recurrent ACJ separation after plate removal.

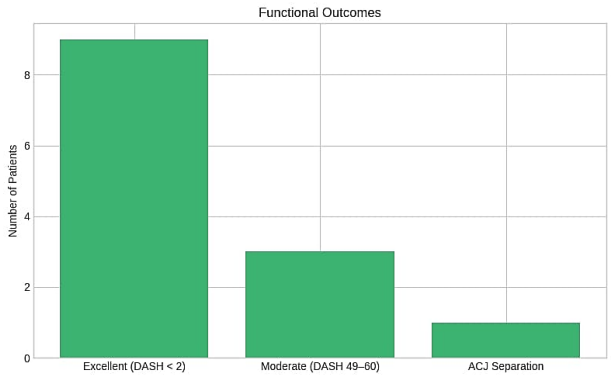

Figure 3: Functional outcomes.

DISCUSSION

This series demonstrates that clavicular hook plate fixation provides reliable outcomes in a military cohort, with most patients achieving excellent recovery (Table 2). The predominance of Rockwood Type III injuries (Figure 2) reflects the high-energy trauma typical of military training and operations. Mechanisms of injury (Figure 1) highlight the occupational risks faced by service members, particularly road traffic accidents. The majority of patients achieved excellent functional recovery, underscoring the utility of CHP in enabling early mobilization and return to duty.

Alternative fixation methods such as tension band wiring, K-wire fixation, and suture anchors have been described for acromioclavicular joint injuries.[3] While these techniques are less invasive and cost-effective, they often provide inferior mechanical stability compared to the clavicular hook plate. Studies report higher rates of loss of reduction and hardware migration with K-wires, and persistent pain with tension band wiring. In contrast, CHP fixation offers reliable stabilization and facilitates early mobilization though implant-related complications such as subacromial impingement remain a concern.[2,4,5] Our findings support CHP as a preferred option in military populations where rapid return to duty is critical.

The homogeneity of the study population- serving naval personnel with comparable occupational demands- strengthens the consistency of observed outcomes. Complications such as persistent pain and ACJ separation emphasize the need for individualized treatment planning and careful follow-up, particularly during the implant removal phase.[2]

Our findings align with existing literature supporting CHP fixation for high-grade ACJ injuries and lateral clavicle fractures.[2,4,5] However, limitations include the small sample size and descriptive design, which restrict generalizability. Despite this, the series provides valuable insights into managing shoulder injuries in resource-limited military hospital settings.

CONCLUSION

Clavicular hook plate fixation is a reliable surgical option for Rockwood Type III and IV ACJ injuries and lateral clavicle fractures in young, active military personnel. Early surgical intervention combined with structured rehabilitation supports optimal recovery, though implant-related complications must be anticipated and managed proactively.

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