

# Bipolar Clavicular Injury

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## Summary

While clavicular injuries are fairly common, bipolar clavicular injuries are not. They may involve dislocations at both ends of the clavicle, or a fracture at one end and a dislocation at the other. We present two cases; a patient with a bipolar clavicular dislocation, and another with a fracture in both medial and lateral ends of the clavicle with anterior dislocation of the sternoclavicular joint. Both were treated conservatively, with fairly good range of motion and return to normal activity.

**Key Words:** Bipolar clavicular dislocation, Bipolar clavicular fracture, Anterior dislocation of sternoclavicular joint.

## Introduction

The first reported case of bipolar clavicular dislocation was described by Porral<sup>1</sup> in 1831, followed by Beckman<sup>2</sup> in 1924. Currently, there has only been 26 cases, to the best of our knowledge, of bipolar clavicular dislocations reported in the literature, and 2 cases of ipsilateral sternoclavicular dislocation and clavicular fracture<sup>3,4</sup>. No standard modality of treatment has been agreed upon. Some have been treated conservatively, while others are treated with open reduction internal fixation.

## Case Report

### Case 1

A 19 years old man fell on his left shoulder

after slipping off a pull-up bar. He had severe left shoulder pain for a few weeks, and had some restriction of movement due to pain, but did not seek any medical attention. Two years later, he presented after he slipped and re-injured his left shoulder again while doing military training. He complained of pain over both ipsilateral sternoclavicular and acromioclavicular joints and pain on shoulder movements. Examination revealed anterior dislocation of the sternoclavicular joint with mild tenderness (Fig. 1) and a grade 2 dislocation of the ipsilateral acromioclavicular joint (Fig. 2 & 3). Left shoulder movements were limited by pain in both the ipsilateral sternoclavicular joint and acromioclavicular joint. There was no evidence of involvement of the brachial plexus.

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## CASE REPORT

Stress radiographs of the left shoulder revealed a grade 2 acromioclavicular joint subluxation (Fig. 2 & 3).

He was treated conservatively with analgesics, physiotherapy and was removed from vigorous military training. At six months follow-up, he had recovered well with only occasional discomfort at the affected joints. He had full range of shoulder movement. Residual deformity was noted at both the sternoclavicular and acromioclavicular joints but no instability.

### Case 2

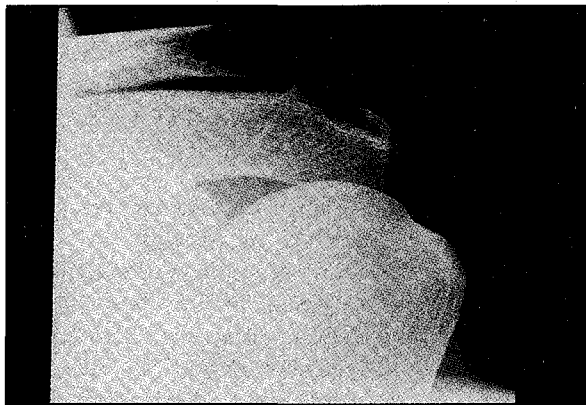
A 76 years old man sustained a fracture of his right third rib, fractures of both the medial and lateral ends of the right clavicle, with an anterior dislocation of the ipsilateral sternoclavicular joint, in a motorcycle accident. Examination at the emergency department

revealed stable vital signs. There was tenderness over the medial and lateral ends of the right clavicle and an obvious anterior dislocation of the sternoclavicular joint. Tenderness and some bruising were noted over the third rib on the right side. There was no vascular or brachial plexus injury. Radiographs revealed a fracture of the right third rib, and a crack fracture at the junction of the middle and medial third of the clavicle (Fig.4). He was admitted for observation and bed rest. The bipolar clavicular injury was treated conservatively.

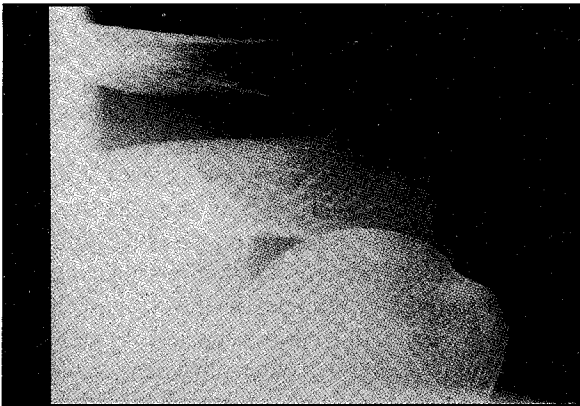
Six months after the injury, the patient had only very mild occasional pain on movement of the right shoulder. Examination showed full range of movement of the right shoulder with a residual deformity of both the sternoclavicular and acromioclavicular joints but no instability was noted.



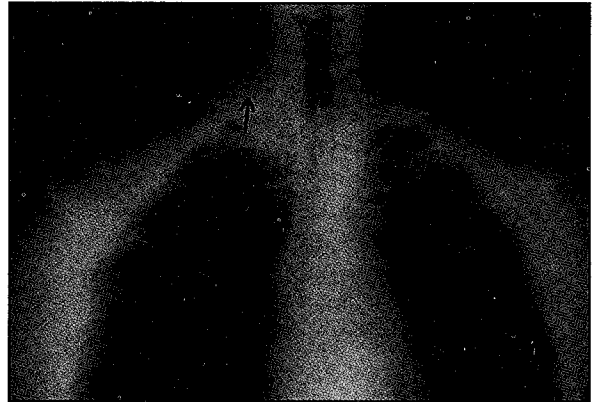
**Fig. 1: Clinical appearance of the patient (Case 1) with left sided sternoclavicular dislocation.**



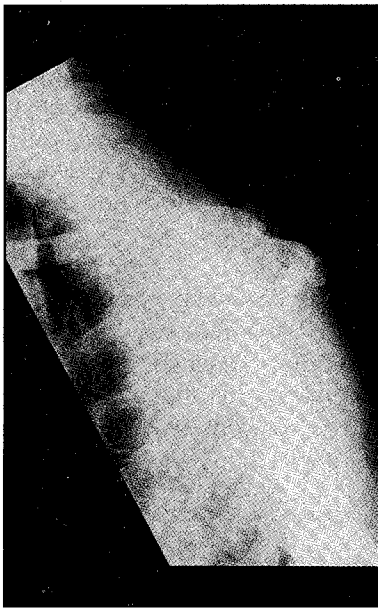
**Fig. 2: Plain radiograph showing the left acromioclavicular joint without stress (Case 1).**



**Fig. 3: Plain radiograph of left acromioclavicular joint with stress, showing grade two dislocation (Case 1).**



**Fig. 4: Plain radiograph of upper chest showing the fracture of the right clavicle, between the middle and medial third of the clavicle (arrow).**



**Fig. 5: Plain oblique radiograph showing fracture of the lateral end of the right clavicle. (Case 2).**

### Discussion

The clavicle has no inherent stability due to the geometry of its joint surfaces; it is stabilised only by ligaments medially and laterally, and by nearly circumferential myofascial attachments<sup>5</sup>. The anatomy of both the

acromioclavicular and sternoclavicular joints has been well described. The acromioclavicular joint is a diarthrodial joint with a complete or partial meniscus. The joint is held by thin ligaments and muscles that reinforce it, namely the deltoid and trapezius muscles. Strong ligaments like the conoid medially and trapezoid laterally, connect the clavicle to the coronoid process, but may also be disrupted in severe injuries of the acromioclavicular joint. The predominant mechanism of injury causing acromioclavicular separation is a downward blow to the acromion, which tears the coracoclavicular and acromioclavicular ligaments, leading to a superoposterior displacement of the distal pole of the clavicle.

Clinically, this can be palpated by feeling the lateral end of the clavicle displaced posterior to the acromion and within the substance of the trapezius. An anteroposterior radiograph may show a widening of the acromioclavicular joint space, while an axillary lateral radiograph or computed tomographic scan will show a posterior displacement of the clavicle from the acromion.

The sternoclavicular joint connects the large medial end of the clavicle with a small sternal

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site of articulation. The joint is stabilised by a fibrocartiliginous disc, coronoid ligament by the clavicle and the first rib, capsular ligaments anteriorly and posteriorly and the interclavicular ligaments superiorly. The displacement of the sternoclavicular joint may be anterior or posterior, but as with most of the reported cases and in both our cases, the dislocation is anterior. An oblique radiograph may show the anterior displacement of the medial end of the clavicle.

Bipolar clavicular injuries are rare and treatment is not standardized. These range from analgesics, immobilisation, shoulder spica<sup>5</sup> and closed reduction to open reduction and internal fixation. Beckman<sup>3</sup> in 1924 reviewed fifteen patients who had so-called double luxation of the clavicle that was treated by closed manipulation. Most patients obtained good functional result. Geaven and Petty<sup>5</sup> recommended a shoulder spica cast for patients with bipolar clavicular dislocations, in order to maintain the reduction of the clavicle at the acromioclavicular joint obtained after manipulation.

Most orthopaedic surgeons, however, agree that in cases of bipolar clavicular dislocation, the acromioclavicular lesion should be managed as if it was an isolated injury and the

sternoclavicular injury should be disregarded. In general, most surgeons recommends a trial of conservative management. If, despite conservative treatment, the patient continues to have symptoms, surgical options have to be entertained. Surgical intervention includes resection of the distal end of the clavicle and transfer of the acromial attachment of the coracoacromial ligament to the medullary canal in the remaining segment of the clavicle as a substitute for the coracoclavicular ligaments. Sanders et al added a coracoclavicular lag-screw to protect the transferred ligament, for the first twelve weeks post-operatively. Arenas et al in 1993, described using percutaneous wKirshner wires at the acromioclavicular joint and closed reduction of the sternoclavicular joint, producing good functional and cosmetic results.

Thomas et al<sup>3</sup> described using open reduction and internal fixation for treatment of ipsilateral sternoclavicular dislocation and clavicle fracture. Both their patients had complete recovery of shoulder function, with no brachial plexus neuropathy.

Both our patients with bipolar clavicular injury, had only mild symptoms and little functional demands; they attained fairly pain-free good range of motion of the affected shoulder after six months of conservative treatment. Hence, surgical options for them were not necessary.

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