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## **Segmental Fracture of the Clavicle (a Very Rare Case in Trauma Surgery).**

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### **Abstract:**

Clavicle is the S shaped collar bone having two wider ends. Fracture of the clavicle is a common traumatic injury and comprises 4% of all fractures in adults. Amongst these, mid-shaft injuries account for the majority and medial fractures are uncommon. Whilst segmental fractures have been reported in the literature, concurrent lateral and medial injuries are very rare. Mechanism of clavicular fracture includes fall over outstretched hand and direct trauma of shoulder.

The nature of segmental fractures can pose a difficult management problem for numerous reasons, and initial operative fixation is usually indicated.

Early diagnosis is therefore imperative, and as such, clinical examination is essential even if an obvious mid or lateral shaft fracture is seen on X-ray.

We present a rare case of segmental fracture of clavicle caused by direct trauma.

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**Key Words: clavicle, segmental fracture.**

## Introduction:

Clavicle is the S shaped collar bone having two wider ends. The most important function of clavicle is to increase the band ring power of shoulder.

Clavicle fractures are common and easily recognized because of their subcutaneous position. Fracture union usually progresses regardless of the treatment initiated. In spite of the innocuous appearance of these fractures, the potential difficulty in treatment and possible complications warrant careful attention to this injury<sup>(1)</sup>.

Mechanism of clavicular fracture includes fall over outstretched hand and direct trauma of shoulder. Recent studies have shown that the direct trauma to shoulder is the most common mechanism. Clavicular injuries account for 10-16% of all fractures and 44% of all shoulder girdle injuries. Eighty-two percent of injuries occur in the middle third clavicle, 12% occur in the distal third, and 6% occur in the proximal third. Clavicular injuries affect 1 in 1000 people per year<sup>(2)</sup>. The commonest site of clavicle fracture is the medial third, but fracture at lateral third and middle third of clavicle are also seen. Classical fracture of clavicle at lateral third part mostly needs surgery. Fracture at medial third or at the center of clavicle are managed by classical conservative 8 shaped bandage, sling or shoulder immobilizer.

A roentgenographic classification of distal clavicle fractures has been developed by Neer and Rockwood <sup>(3)</sup>, divide the fractures into 3 types, as follows:

- Type 1 fractures are minimally displaced and occur lateral to an intact coracoclavicular ligament complex. These

fractures may be treated nonoperatively  
and                      symptomatically.

- Type 2 fractures occur when the medial fragment is separated from the coracoclavicular ligament complex. The resulting deformity leads to marked displacement of the fracture ends, predisposing this fracture type to a higher prevalence (up to 30%) of non-union.
- Type 3 fractures are nondisplaced and extend into the AC joint. As with type 1 fracture, these injuries can be treated symptomatically.

Besides these, we encountered with a fourth type of clavicular fracture that is the Segmental fracture. The segmental fracture of clavicle is very rare. Though fracture of clavicle along with the fracture of scapular Glenoid and the classical fracture along with the dislocation of acromion have been reported. Fracture of the clavicle is a common traumatic injury and comprises 4% of all fractures in adults. Amongst these, midshaft injuries account for the majority and medial fractures are uncommon. Whilst segmental fractures have been reported in the literature, concurrent lateral and medial injuries are very rare<sup>(4)</sup>.

These injuries are, therefore, susceptible to being missed, due to failure to look for a second injury after the initial diagnosis, and difficult X-ray interpretation around the area of the medial clavicle. The nature of segmental fractures can pose a difficult management problem for numerous reasons, and initial operative fixation is usually indicated. Early diagnosis is therefore imperative, and as such, clinical examination is essential even if an obvious mid or lateral shaft fracture is seen on X-ray.

We present a rare case of segmental fracture of clavicle caused by direct trauma.

**Case Presentation:**

A 30 year old lady suffered a direct trauma of right shoulder caused by fall from height leading to segmental fracture of right clavicle. She complained of

pain and inability to move her right shoulder. There was no open wound. On physical examination and review of systems, no other organ was injured. Scapula and shoulder joint was normal on physical examination and radiographic study. There were two simultaneous fractures, one at the lateral third and other at medial third of right clavicle. (Fig. 1 and 2).



Figure 1.



Figure 2.

Management of segmental fracture applied in this particular case was plate reconstruction for medial third and pin fixation for the lateral third fracture of clavicle. New x-rays of the clavicle and shoulder were performed, revealing a displaced mid-shaft fracture of the clavicle, and lesion of the acromioclavicular joint; this last one was difficult to correctly classify in standard radiographs, appearing as a segmental clavicle fracture with widening of the cromioclavicular joint.

No intraoperative or post operative complication developed. The patient was discharged on satisfactory condition. She was followed up regularly. (Fig. 3) The lateral pin was extracted out under anaesthesia after healing of the fracture(after three months) and there were no surgical complications. Shoulder function was restored to the pre-injury level. Physiotherapy and active movements of shoulder joint was continued till complete union of the clavicle.



Figure 3.

#### **Discussion:**

The combination of mid shaft fracture of the clavicle with acromioclavicular dislocation is very rare. There are only three reports in the English literature similar cases; and none had an associated coracoid fracture. The recognition of these combined injuries requires a careful clinical and radiological examination. The combination of midshaft fractures of the clavicle with acromioclavicular dislo-

cation is very rare. There are only three reports in the English literature of similar cases; and none had an associated coracoid fracture<sup>(4)</sup>. The recognition of these combined injuries requires a careful clinical and radiological examination; the acromioclavicular component of the injury may not be apparent because of the marked posterior displacement of the clavicle (it remains in the same plane of the acromion in the antero-posterior radiographs), and coracoid fractures may

not be diagnosed in standard x-rays; thus, additionally to clavicle and shoulder radiographs, we found CT-scan helpful in the assessment of the complete injury pattern.

The exact mechanism of trauma could not be identified in this case, but high-energy direct trauma onto the shoulder is usually the mechanism of injury. The result of a downward force applied to the superior aspect of the shoulder is either that the acromioclavicular and coracoclavicular ligaments brake, or a fracture of the coracoid process or clavicle occurs; usually, if no fracture occurs, the force first disrupts the acromioclavicular joint, and then ruptures the coracoclavicular ligaments; only in rare cases the coracoid process may be avulsed.

Although treatment algorithms are clear for these lesions in isolation<sup>(5)</sup>, decision making is made more complex when they present in combination. There is general agreement that midshaft fractures of the clavicle associated with types I and II acromioclavicular separation should be treated non-operatively; but discussion remains concerning the ideal treatment for types III, IV, V, and VI acromioclavicular separations associated to midshaft clavicle fracture; while some surgeons advocate surgical treatment, others have obtained similar results with non-operative treatment<sup>(6)</sup>.

At the same time, different methods of surgical treatment have been described to stabilize the acromioclavicular Joint (acromioclavicular transfixation pins, coracoclavicular cancellous bone screw with approximation of the coracoclavicular ligaments, or wire cerclage with Kirschner pins)<sup>(7)</sup>.

Although we do not yet have access to clavicle hooked plates, they might represent another treatment option for this type of lesion, because they avoid entering the acromioclavicular joint, decreasing the incidence of secondary arthrosis.

In the patient we are reporting, the acromioclavicular joint and distal clavicle were stabilized using open reduction and internal fixation with a wire cerclage and two 2.0mm Kirschner pins, left in place for 12 weeks, and the clavicle fracture was stabilized with a 3.5mm LC-DCP plate; we did not repair the deltoid and trapezius ligaments, as proposed by Rockwood, and there are others authors that obtained similar results without repairing them; neither did we place a coracoclavicular screw, because of the associated coracoid fracture. Because of rarity of segmental fracture of clavicle, routine surgical technique has not been described in the text. We successfully managed it by pin and plate fixation.

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