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## An unusual case of bipolar segmental clavicle fracture: A case report and review of literature

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### Abstract

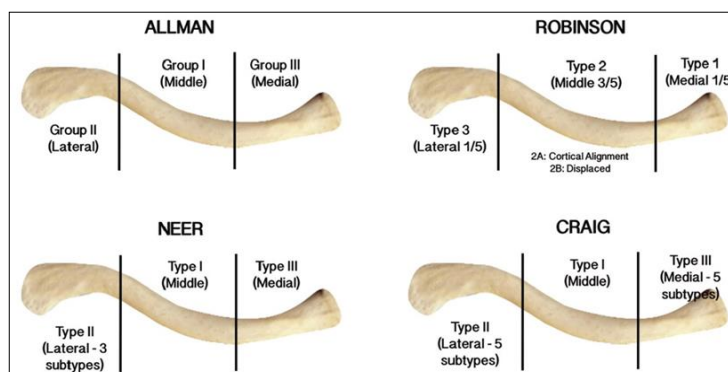
Fracture of the clavicle is a common traumatic injury and comprises 4% of all fractures in adults. Although midshaft injuries account for the majority and medial fractures are rare. Whilst segmental fractures have been reported in the literature, combined lateral and medial injuries are very rare. These injuries are, therefore, susceptible to being missed and high index of suspicion mandates for the diagnosis. 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 radio graphs. The aim is to present an unusual case of segmental clavicle fracture in an adult who was treated surgically and an excellent result was achieved. Similar cases in the literature are reviewed and their management is discussed.

**Keywords:** Clavicle, Segmental Fracture

### Introduction

Among clavicle fractures, 69% occur in the diaphysis, 28% in the lateral extremity and 3% in the medial portion<sup>[1]</sup>. Meanwhile, segmental fractures are very rare, with few articles described in English literature. Clavicle fractures usually have a very easy diagnosis as their anatomical position is very superficial, and their consolidation is achieved even without treatment in most cases. They occur less often after direct trauma, and this has been the mechanism described in segmental fractures in which there is generally multiple trauma in the clavicle<sup>[3]</sup>. In segmental fractures, the fractured segment suffers the action of muscular forces and may evolve with blood supply failure, for which reason fixation should be performed early<sup>[3, 4]</sup>. Allman<sup>[5]</sup>, in 1967, was the first to classify fractures dividing the clavicle anatomically into three segments. Other modifications were made, and finally with more details, by Craig<sup>[6]</sup> in 1991. The purpose of this study is to present a rare fracture of the clavicle. The purpose of this paper is to highlight the rarity of this case and the fact that segmental fracture of clavicle should be kept in mind whenever a clavicular fracture is diagnosed in adults as well as in adolescents.

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**Fig 1:** Showing the classification of clavicle fracture

### Case report

Male patient, age 41, who fell had sustained injury to his left shoulder came to the orthopedic department. He did not present neurovascular deficit in the shoulder girdle. Clinically, there was mild deformity in the medial third of the clavicle (Figure 1), the only site about which the patient complained on lateral side and, radiologically, The fractures were classified in group III (diaphysis), and the lateral fracture in group II, (Figure 4). Radiographs were taken in two views in plain neutral AP and with 45° cephalic tilt to classify and decide on the treatment. Osteosynthesis of the medial side fracture with clavicle LCP and percutaneous fixation for lateral side were done with two Kirschner wires. Post operatively 2 weeks of shoulder immobiliser applied. The wires were removed after 6 weeks. Patient achieved excellent clinical outcome with Shoulder ROM retains to normal range after 6 weeks.

### Discussion

Among clavicle fractures, 69% occur in the midshaft, 28% at the lateral end, and the remaining 3% at the medial end [1]. Segmental fractures have been reported but usually combine midshaft and lateral clavicle injuries or clavicle fracture with proximal clavicular physis injury in children. The overlying structures in the chest can make it difficult to assess the medial clavicle well on X-ray. The rarity of double clavicle injuries and indeed of solitary medial ones would also preclude one from identifying a second fracture evaluation.

Although the majority of clavicle fractures can be managed non-operatively In general, segmental fractures are also fixed due to the risk of non-union. The clavicle forms one of the struts of the shoulder girdle and is essential for the support and function of the upper limb on the axial skeleton.

Non-union of a clavicle fracture can, therefore, have considerable consequences in terms of functional deficit and pain, and also have complications at the medial site due to the large vessels lying posterior [4]. Primary operative treatment has also previously been recommended for all displaced lateral end fractures due to the high incidence of nonunion [1]. One of the most significant predisposing factors to non-union is the initial degree of displacement of the fracture fragments, irrespective of the mechanism of injury [1, 4].

Both fractures in this case were displaced Segmental long bone fracture almost invariably results in rapid union at one fracture site and delayed or non-union at the other, though most of the literature concerns segmental tibial fractures. These are renowned for their high risk of complications and non-operative treatment is considered unacceptable. The same principles can be applied to the clavicle. It is proposed that the high non-union rate at one fracture site occurs due to the subcutaneous position of the bone and the associated direct injury to the surrounding soft tissues. The intermediate segment is problematic due to the uncertain blood supply and lack of control over its position due to the multiple forces acting on it from attached muscles.

Thus segmental clavicle fractures must be fixed, and therefore diagnosed, early. Segmental long-bone fractures are generally unstable injuries with a high risk of nonunion, and non-operative treatment is often considered unacceptable, with poor outcomes [8, 9]. Consensus has not been reached on how segmental clavicle fractures should be managed the literature regarding bipolar clavicle injuries is scarce. Heywood *et al.* conclude that all segmental fractures should be considered for operative fixation due to an unstable intermediate fracture segment and a high risk of non-union.



Fig 2: Preoperative X-Ray

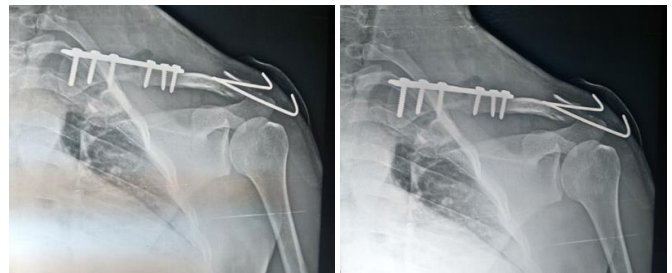


Fig 3: Post-Operative X-Rays



Fig 4: Clinical Picture Showing Range of Movements

### Conclusion

Segmental clavicle fractures are rare, but need a good radiological examination of the whole bone in more than one view for diagnosis and treatment, whereas surgical indication ensures a satisfactory functional outcome. Proximal clavicle fractures comprise 2-3% of clavicle fractures and the diagnosis may be missed. Management of bipolar clavicle fractures should be based on individual fracture pattern and patient circumstance our case report highlights importance of clinical examination of the entire clavicle despite radiographic findings & high index of suspicion is mandatory for diagnosing segmental clavicular injury as they should be referred for consideration of operative fixation to give a excellent clinical and functional outcome.

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