



Functional and Radiological Evaluation of Displaced Lateral End Clavicle Fractures Treated with Locking Plating

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Abstract

Clavicle fractures represented 2.6% to 4% of all fractures and 44% of those in the shoulder girdle among adults and 10-15% in children involve the clavicle, lateral-end in 12-26% of patients. Understanding the displacement of clavicle fractures necessitates a thorough understanding of the numerous muscular and ligamentous forces operating on the clavicle bone. Particular fracture patterns frequently result in issues if they are not surgically corrected and managed. The distal end is the second most prevalent location for clavicle fractures after the midshaft⁵. Because of the forces that are displacing the fracture fragments, 25% of distal clavicle fractures are unstable. For the treatment of lateral end clavicle fractures, a variety of surgical

treatment techniques have been tested, including: Coracoclavicular screws, Kirschner wires, Tension bands, Hook plates, Nonlocked and locked plates.⁹

Material & Methods: We have done 33 cases of Displaced Lateral End Clavicle Fractures treated with Open Reduction and Internal Fixation with Locking Plate and Screws at GSL medical college between Jan 2023 to Jan 2024. Cases were followed up for a period of 1 year and have been evaluated based on Constant and Murley score.

Results: In our study, all 33 patients have completed follow up for 1 year (27 males, 6 female). At final follow up 7 patients received excellent scores, while 21 patients had good scores.

Conclusion: Pre-contoured locking compression plates are a safer choice for treating lateral end clavicle fractures because they don't need to be bent during surgery, reducing overall recovery time. Further, as they are locking constructs they have good angular stability and also have very good purchase in porotic bones.

Keywords: Clavicle fractures, Shoulder joint, Kirschner wires, Hook plates

Introduction

Clavicle fractures are the most common injuries in young, active individuals, especially in those who participate in activities or sports where high-speed falls (bicycling, motorcycles) or violent collisions (football, hockey) are frequent, and they account for 2.6% of all fractures. The commonly used system of classification is that of Allman. It is divided into three groups. Group I: Middle-third fractures, Group II: Lateral-third fractures, Group III: Medial- third fractures. Because of the forces that are displacing the fracture fragments, 25% of distal clavicle fractures are unstable. a superior force applied to the medial clavicle fracture fragment and inferior force applied to the lateral clavicle fracture fragment. Using Neer's Classification, these fractures can be classified. The distal fractured fragment is tiny, making it challenging to achieve an anatomical reduction and creating issues with its fixation, leading to instability of lateral clavicle fractures. In this study, we are going to evaluate the functional and radiological outcomes of the patients in whom a locking plate is used for fixation of the lateral end of clavicle fractures.

Objectives

➤ To assess the range of motion of the shoulder joint after surgical management of displaced lateral end clavicle fractures among adults.

- To assess the radiological union of fracture after internal fixation.
- Early mobilization of the shoulder joint.

Material and Methods

We have done 33 cases of Displaced Lateral End Clavicle Fractures treated with Open Reduction and Internal Fixation with Locking Plate and Screws at GSL medical college between Jan 2023 to Jan 2024. Cases were followed up for a period of 1 year and have been evaluated based on Constant and murley score. After taking consent from the patients, under general anaesthesia, in supine position with a roll of a blanket between scapula to retract the clavicle and in beach chair position with the injured arm in a mobile position. To get a clear view of surgical site, the patient's head was turned towards the opposite side. fracture was centred by making a horizontal incision across the upper clavicle. supraclavicular nerves were then taken care of using subcutaneous dissection. clavicle was exposed by division of platysma. With the help of a short-term Kirschner wire fixation, the reduction was achieved and kept (Fig. The fracture was fixed with a precontoured lateral clavicle locking plate, using 3.5 mm locking and cortical screws on the medial side and 2.7 mm locking screws on the lateral side. The wound closure was done layer after layer. Post-operatively the arm was immobilized with the help of an arm pouch.



Figure 1:



Figure 2:



Figure 3:



Figure 4:

Post operatively, from first day patient is taught static quadriceps, ankle pump and knee range of motion exercises and partial weight bearing. Each patient was encouraged to stretch the affected ankle gently and actively from first day postoperatively. At 3rd week patients were allowed full weight bearing. Patients were assessed immediate post operatively and then followed up regularly at 1 month, 3 month and 6 months using lysholm score. Ankle biomechanics was assessed using AOFAS and FADI scores. Eversion power of ankle were noted at every follow-up and found to be normal and comparable to pre-operative power in all the patients thus there was no deterioration in ankle function.

Results

In our study, all 26 patients have completed follow up for 1 year. Out of the 26 cases, 19 cases were male(73%) and 7 cases were female(27%) . At final follow up anterior drawer test showed normal findings in 80percent, while 20percent of all examined patients had 1+ anterior laxity.

Table 1:

Patient	Pre op Lysholm score	Lysholm score at final follow-up	ACRAS at final follow-up	FADI score at final follow-up
1	88	90	95	98
2	82	85	90	95
3	88	87	92	96
4	79	87	90	94.5
5	78	86	92	93.75
6	84	85	94	93.75
7	82	85	87	90
8	80	84	88	91.5
9	72	87	85	91.5
10	88	85	88	94.75
11	89	86	85	91.75
12	78	85	88	91.75
13	78	87	88	94
14	88	87	85	90
15	84	85	82	94.75
16	88	84	86	91.75
17	84	85	82	88
18	86	87	85	94.75
19	78	86	88	90
20	72	85	85	89
21	88	87	85	94.75
22	78	86	88	94
23	75	85	85	95.8
24	88	88	88	93.75
25	72	85	85	94
26	88	84	82	90



Post operative full range of motion at 6th month at knee joint



Post operative ankle plantar flexion and dorsiflexion at 6th month

Figure 5: Clinical Picture showing function/range of motion of knee and ankle.

Discussion

Autograft choice is one of the most important considerations during ACL reconstruction surgery. In our study, we found comparable results with peroneus longus autograft at 1 year of follow-up. It also has advantage of larger graft diameter and simplicity of technique and minimal donor site morbidity^{8,9}. Complications associated with hamstring graft like thigh hypotrophy⁶, anterior kneeling pain, hypoaesthesia due to injury to infra patellar branch of saphenous nerve can be prevented. A previous study by Anghong et al mentioned possible donor site morbidity using peroneus longus autograft, such as reduced peak torque eversion and inversion, decreased ankle functions and concerns about ankle stability³. In our study mean for AOFAS is 94.5 and FADI is 94.34, which shows minimal donor site morbidity and no significant deterioration in ankle function. Peroneus longus autograft produces a excellent functional score (Lysholm scoring system) in 80% of our patients and remaining 20% patients had good functional score (Fig. 6)

Conclusion

Peroneus longus tendon is a promising autograft for ACL reconstruction¹⁰ with advantage of simplicity of harvesting technique, larger graft diameter and minimal graft complications. Proper harvesting technique does not deteriorate ankle functions, thus helps to avoid complications associated with other autografts.

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