

## Original Research Article

## Assessment of midshaft clavicle fractures treated by 3.5 LCP reconstruction plate

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## Abstract

**Background:** Fractures of the clavicle, which primarily occur in young males, constitute 2.6–4% of all fractures in adults. The present study was conducted to assess midshaft clavicle fractures treated by 3.5 LCP reconstruction plate. **Materials & Methods:** 98 cases of midshaft clavicle fractures of both genders were included. All cases were managed with 3.5 LCP reconstruction plates. Parameters such as mode of injury, Constant-Murley Score and Quick DASH and complications were recorded. **Results:** Out of 98 patients, males were 52 and females were 46. Cause of fracture was RTA seen in 60, sports injury in 25 and domestic violence in 13. The mean Constant-Murley Score was 91.4 and Quick DASH score was 12.6. Common complications noted were delayed union (11), superficial infection (5), neuropraxia (2), non-union (3), hypertrophic scar (1) and vascular lesion (1). The difference was significant ( $P < 0.05$ ). **Conclusion:** LCP reconstruction plate 3.5 in cases of clavicle fractures resulted in excellent outcome.

**Keywords:** Clavicle, LCP reconstruction plate, Quick DASH

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## Introduction

Fractures of the clavicle, which primarily occur in young males, constitute 2.6–4% of all fractures in adults. A male dominance of approximately 70% has been reported. The most frequent injury mechanism is a direct fall on the shoulder. Fractures are often sustained during sports activities or traffic accident. 2-5% of all adult fractures and ten to fifteen percent of all fractures in children affects clavicle. Clavicle lies beneath the skin and thin platysma muscle thus making it least protected bone by muscle or fat. The midshaft fractures are more likely to be displaced in comparison to fractures affecting medial and lateral third areas of the bone[1]. Many have residual deformity as either shortening or a lump, yet this results in minimal loss of function, cosmesis and activity level. When symptoms such as pain or limitation of shoulder function do occur, they may be disabling. 69–82% of fractures occur in the midshaft of the clavicle, followed by 12–26% in the lateral part and 2–6% in the medial part[2]. This can be anatomically explained by the fact that the medial and lateral parts of the clavicle are firmly secured by strong ligaments and muscles, whereas the middle part of the clavicle lacks

## Materials &amp; methods

The present study comprised of 98 cases of midshaft clavicle fractures of both genders. All patients were informed regarding the study and their written consent was obtained.

any strong attachments and thus is more vulnerable to trauma. The muscle attachments often cause a dislocation of the major fragments in clavicle fractures and a shortening of the clavicle, particularly in midshaft fractures[3]. Studies have shown plate fixation with bone graft as a reliable management method for clavicular fractures. The internal fixation provided is usually so secure that early mobilisation can be commenced[4,5]. The present study was conducted to assess midshaft clavicle fractures treated by 3.5 LCP reconstruction plate.

Data such as name, age, gender etc. was recorded. A thorough clinical examination of fractur site was carries out. The fractures were classified according to Edinburgh classification. All patients were clinically and radiologically evaluated. Radiographic assessment includes anteroposterior (AP), 45° upward projection or tangential, 45° downward projection views of the clavicle. All cases were managed with 3.5 LCP reconstruction plates. Parameters such as Mode of injury, Constant-Murley Score and Quick DASH and complications were recorded. Results thus obtained were subjected to statistical analysis. P value less than 0.05 was considered significant.

## Results

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Table 1: Distribution of patients

Total- 98		
Gender	Male	Female
Number	52	46

Table 1 shows out of 98 patients, males were 52 and females were 46.

Table 2: Cause of fracture

Cause	Number	P value
RTA	60	
Sportss injury	25	
Domestic violence	13	0.01

Table 2 shows that cause of fracture was RTA seen in 60, sports injury in 25 and domestic violence in 13. The difference was significant ( $P < 0.05$ ).

**Table 3:Constant-Murley Score and Quick DASH score**

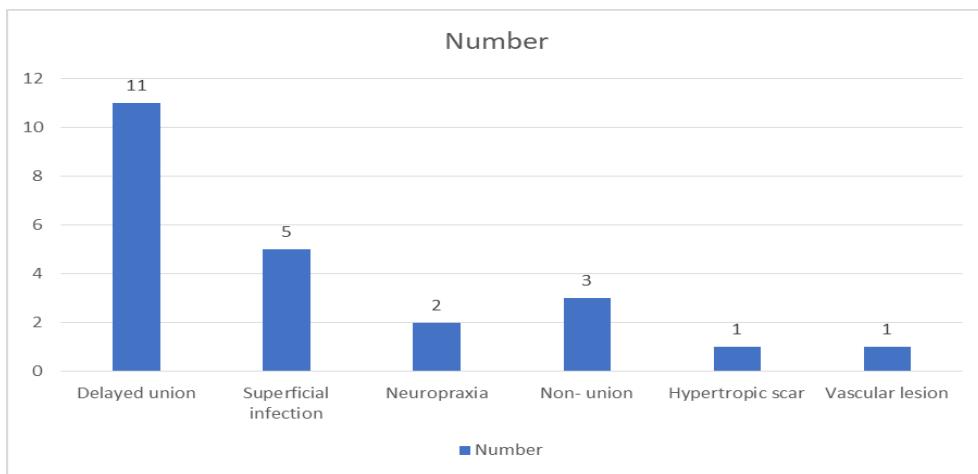
Score	Mean	Range
Constant-Murley Score	91.4	74-100
Quick DASH score	12.6	2-24

Table 2 shows that mean Constant-Murley Score was 91.4 and Quick DASH score was 12.6.

**Table 4:Complications in patients**

Complications	Number	P value
Delayed union	11	0.021
Superficial infection	5	
Neuropraxia	2	
Non- union	3	
Hypertrophic scar	1	
Vascular lesion	1	

Table 4, Fig 1 shows that common complications noted were delayed union (11), superficial infection (5), neuropraxia (2), non-union (3), hypertrophic scar (1) and vascular lesion (1). The difference was significant ( $P < 0.05$ ).

**Fig 1:Complications in patients**

### Discussion

Clavicular fractures are common, comprising 5% of all fractures. They involve all age groups and account for up to 44% of all shoulder girdle injuries. The clavicle is the first bone in the human body to begin intramembranous ossification directly from mesenchyme during the fifth week of fetal life. Similar to all long bones, the clavicle has both a medial and lateral epiphysis. The growth plates of the medial and lateral clavicular epiphyses do not fuse until the age of 25 years[6]. Peculiar among long bones is the clavicle's S-shaped double curve, which is convex medially and concave laterally. This contouring allows the clavicle to serve as a strut for the upper extremity, while also protecting and allowing the passage of the axillary vessels and brachial plexus medially[7]. The cross-sectional geometry also changes along its course. It progresses from more tubular medially to flat laterally. This change of contour, which is most acute at the junction of the middle and outer thirds, may explain the frequency of fractures seen in this area. The most commonly used operative method today is open reduction and internal plate fixation; a smaller number of fractures are treated with intramedullary nails, pins or wires[8]. Because the treatment of clavicle fractures is a debated question and because there are no national guidelines, treatment can vary between different departments, with regards both to which fractures are operated and operative method chosen. There are numerous conservative treatment options available, the most common being the use of a sling or 'figure-of-eight' bandage (also known as figure-of-eight splint, or

back-pack bandage), or a combination of these two methods. There appears to be no consensus on the optimal duration of immobilization; some have recommended two to six weeks[9]. The present study was conducted to assess midshaft clavicle fractures treated by 3.5 LCP reconstruction plate. In present study, out of 98 patients, males were 52 and females were 46. Singh et al[10] evaluated the results of use of LCP reconstruction plate 3.5 in 52 cases of displaced midshaft fractures of clavicle. In the present study, functional outcomes were assessed using Constant-Murley Score and DASH Questionnaire and the cases were followed up for a mean period of 5.6 months. They achieved excellent and good results in all 52 patients being evaluated. The mean Constant-Murley score was 91.76 and DASH Questionnaire was 12.40. They had 2 cases of delayed union. There was no case of deep infection, vascular or nerve lesions. We found that cause of fracture was RTA seen in 60, sports injury in 25 and domestic violence in 13. Shahidet al<sup>11</sup> compared the results of clavicular fracture fixation with AO Reconstruction (Recon) plate and Dynamic Compression Plate (DCP). The case notes of 39 patients with 40 acute and chronic clavicular fractures were retrospectively reviewed. The indications for fixation for acute cases comprised open fractures, the presence of sufficient skin tenting to risk skin integrity, neurovascular compromise and severe lateral displacement or comminution. Cases of symptomatic atrophic non-union after at least 12 months conservative management or previous failed 1/3 tubular plate fixation were also included in the study[11]. In total 24 fractures were fixed

with Recon Plate and 16 with DCP. Mean time to union was 4.2 months for the Recon plate group and 5.4 months for the DCP group. Eight of the DCP group complained of plate prominence requiring plate removal. We observed that common complications noted were delayed union (11), superficial infection (5), neuropraxia (2), non-union (3), hypertrophic scar (1) and vascular lesion (1). LCP reconstruction plate has the advantage of stronger fixation due to locking of the screw in the plate hole and because of its limited contact blood supply to bone is also preserved. While using conventional plate and screws stability at fracture site is due to friction of the plate to the bone cortex and hence screws need to be fixed to both cortices[12].

### Conclusion

Authors found that LCP reconstruction plate 3.5 in cases of clavicle fractures resulted in excellent outcome.

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