

## Original Research

### Outcome of clavicle fractures managed with locking plates

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#### ABSTRACT:

**Background:** Five to ten percent of fractures are clavicle fractures. The present study evaluated outcome of clavicle fractures managed with locking plates. **Materials & Methods:** 80 cases of clavicle fractures of both genders were selected. A 3.5 mm locking plate with lateral extension was used for open reduction and internal fixation. The visual analogue scale (VAS) was used to measure the postoperative discomfort. Using the Disabilities of the Arm, Shoulder, and Hand (DASH) scoring, the functional outcome was evaluated at the end of the second and sixth month. **Results:** Out of 70 patients, males were 40 (57.1%) and females were 30 (42.9%). Side involved was right in 28, left in 22 and both in 20. Mode of injury was RTA in 42, fall in 20 and violence in 8 cases. The difference was significant ( $P < 0.05$ ). The mean VAS on day 1<sup>st</sup> was 5.8, on day 3<sup>rd</sup> was 3.0 and on day 10<sup>th</sup> was 0. DASH at 2 months was 12.1 and at 6 months was 4.9. The difference was significant ( $P < 0.05$ ). Functional outcome was excellent in 52, good in 11 and moderate in 7 cases. The difference was significant ( $P < 0.05$ ). **Conclusion:** A better outcome was obtained when distal end clavicle fractures were managed with compression plating.

**Keywords:** Clavicle, RTA, Soft tissue injuries

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#### INTRODUCTION

Five to ten percent of fractures are clavicle fractures. Approximately 25% of all clavicle fractures occur at the lateral end, with the midshaft being the most common location. One of the most frequent injuries among adults is a clavicle fracture. It is frequently linked to head, upper limb, and rib injuries as well.<sup>1</sup> As seen by the rising number of young people experiencing high-velocity trauma, these fractures are becoming more common. These unintentional injuries result in further soft tissue injuries, which shift the fracture fragments and necessitate proper reduction and fixation. Furthermore, because younger patients have higher functional demands, there has been a recent rise in the surgical fixing of these fractures.<sup>2</sup> Because of the displacement forces operating on the fracture fragments—an inferior force acting on the lateral clavicle fracture fragment and an anterosuperior force acting on the medial clavicle fragment—25% of these fractures are unstable.<sup>3</sup> For the treatment of lateral clavicle fractures, a variety of surgical techniques have been used, such as tension bands, coracoclavicular screws, Kirschner wires, hook plates, nonlocked and locked plates, and tension bands.<sup>4</sup> For the surgical treatment of clavicle fractures, the pre-contoured locking plate is currently

the implant of choice. Again, this should allow for the application of greater forces than with conventional reconstruction or dynamic compression plates (DCP) plates since the locking plate purportedly affords increased attachment stability.<sup>5</sup> The present study evaluated outcome of clavicle fractures managed with locking plates.

#### MATERIALS & METHODS

The present study consisted of 80 cases of clavicle fractures of both genders. All gave their written consent to participate in the study.

Data such as name, age, gender, etc. were recorded. A comprehensive analysis was conducted. An investigation was done before surgery. A 3.5 mm locking plate with lateral extension was used for open reduction and internal fixation. Following the surgical treatment, postoperative radiographs were taken on the first day and every six weeks. On postoperative days 1, 3, and 10, the visual analogue scale (VAS) was used to measure the postoperative discomfort. Using the Disabilities of the Arm, Shoulder, and Hand (DASH) scoring, the functional outcome was evaluated at the end of the second and sixth month. The outcomes underwent statistical examination. P value less than 0.05 was set significant.

## RESULTS

**Table I Patients distribution**

Total- 80		
Gender	Male	Female
Number	45	35

Table I shows that out of 80 patients, males were 45 and females were 35.

**Table II Assessment of parameters**

Parameters	Variables	Number	P value
Mode of injury	RTA	38	0.05
	Fall	26	
	Violence	16	
Side	Right	35	0.18
	Left	20	
	Both	25	

Table II shows that the mode of injury was RTA in 38, fall in 26 and violence in 16 cases. The side involved was right in 35, left in 20 and both in 25. The difference was significant ( $P < 0.05$ ).

**Table II Assessment of VAS, DASH and functional outcome**

Score	Variables	Number	P value
VAS	1 <sup>st</sup>	5.4	0.05
	3 <sup>rd</sup>	2.6	
	10 <sup>th</sup>	0	
DASH	2 months	11.4	0.01
	6 months	4.2	
Functional outcome	Excellent	54	0.02
	Good	22	
	Moderate	4	

Table III shows that the mean VAS on day 1<sup>st</sup> was 5.4, on day 3<sup>rd</sup> was 2.6 and on day 10<sup>th</sup> was 0. DASH at 2 months was 11.4 and at 6 months was 4.2. Functional outcome was excellent in 54, good in 22 and moderate in 4 patients. The difference was significant ( $P < 0.05$ ).

## DISCUSSION

The middle part of the clavicle is where about 75% of these fractures are found, and most of the fractures are displaced. The best course of action for displaced mid-shaft clavicle fractures is still up for discussion, despite the very high occurrence of these injuries.<sup>6</sup> The Neer's Classification can be used to categorize these fractures. Because the lateral fractured fragment is tiny, it is challenging to achieve anatomical reduction and presents challenges for fixation, leading to instability of the lateral clavicle fractures.<sup>7</sup> For the management of such fractures, numerous therapeutic techniques have been employed. It is supported by biomechanical studies that look at how torsional and bending load forces affect locking and DCP that better fixing is obtained when a locking plate is used.<sup>8</sup> The present study assessed outcome of clavicle fractures managed with locking plates.

We found that out of 80 patients, males were 45 and females were 35. All 105 patients' locking plate osteosynthesis for mid-shaft clavicle fractures was discovered by Fridberg et al.<sup>9</sup> With 104 patients and 86 males, the study group of 105 fractures had a median age of 36 years (14–75 years). The duration of the follow-up was 0.5–3.5 years. For a period of six weeks, no patient was permitted to load their upper limb. In total, 31 cases (30%) involved the removal of

plates due to discomfort. Five cases (5%) of osteosynthesis failure were observed; two happened early, around six weeks after surgery, and three late, about ten to thirteen months after surgery.

We observed that the mode of injury was RTA in 38, fall in 26 and violence in 16 cases. The side involved was right in 35, left in 20 and both in 25. In Nordqvist et al.'s<sup>10</sup> investigation, 32 patients with clavicle fractures at the lateral end were included. The operation did not result in any intraoperative problems. After surgery, the mean VAS score was discovered to be 5 on day 1, dropping to 3 on day 2, and then to 0 on day 10. By the end of the second postoperative month, the mean DASH score was 11.63; by the end of the sixth month, it was 4.6. In a single instance of malunion, careful management was used and the overhead abduction was limited but not uncomfortable.

We found that the mean VAS on day 1<sup>st</sup> was 5.4, on day 3<sup>rd</sup> was 2.6 and on day 10<sup>th</sup> was 0. DASH at 2 months was 11.4 and at 6 months was 4.2. Functional outcome was excellent in 54, good in 22 and moderate in 4 patients. Kalamaras et al.<sup>11</sup> were the first to report the concept of locking plate in distal clavicle fracture in their study where distal radius locking plate was used and finally concluded that the use of the locking plate gave good results and was promising for the

management of the lateral clavicle fracture as it showed to have a better control on the distal fracture fragment.

The nonoperative and surgical management of type II distal clavicle fractures were compared by Rokito et al.<sup>12</sup> Out of the thirty patients who were diagnosed, sixteen were found to be undergoing nonoperative treatment, and fourteen were undergoing open reduction and coracoclavicular stabilization. For the nonoperative group, the average follow-up was 53.5 months, while for the operative group, it was 59.8 months. After surgery, all patients underwent evaluations for isokinetic strength, discomfort, function, range of motion, and fracture healing. Within six to ten weeks, surgically repaired fractures were united. Seven non-unions were the consequence of nonoperative treatment. The mean UCLA, Constant, and ASES scores did not differ significantly between the two groups. The functional outcome or strength was not significantly impacted by non-union status.

### CONCLUSION

Authors found that a better outcome was obtained when distal end clavicle fractures were managed with compression plating.

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