

ORIGINAL RESEARCH

## Assessment of Results of Distal Femur Fracture Fixation with A Lateral Locked Plate

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### ABSTRACT

**Background:** To assess results of distal femur fracture fixation with a lateral locked plate.

**Materials and Methods:** Seventy- six adult patients of distal femur fracture of both genders were treated with distal femur locking plate. Parameters such as muller classification, HSS score, average time to union (months), average range of flexion (degree), knee score (mean), functional score (mean) and complications were recorded.

**Results:** Out of 76 patients, males were 46 and females were 30. Muller type A1 was seen in 29 A3 in 15, C1 in 20 and C2 in 10 patients. The mean knee score was 96.2, mean functional score was 92.5, average time to union was 3.4 months and average range of flexion was 112.4 degrees. HSS was excellent in 58, good in 12, fair in 6. Complications were wound infection in 2 and 4 and non- union in 1 patient. The difference was significant ( $P < 0.05$ ).

**Conclusion:** Lateral locking plate was best choice for management of distal femur fractures.

**Keywords:** distal femur, Fracture, locked plate.

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### INTRODUCTION

Fractures of the distal femur are rare and severe. The estimated frequency is 0.4% of all fractures and 3% of femoral fractures. A classic bimodal distribution is found with a peak in frequency in young men (in their 30s) and elderly women (in their 70s). The usual context is a high energy trauma in a young patient and a domestic accident in an elderly person.<sup>1</sup>

Distal femoral fractures are associated with high energy trauma (in the youngsters) and osteoporotic bones in the elderly.<sup>2</sup> High energy injuries tend to occur in young males, whereas low energy injuries occur commonly in elderly females. These fractures often are unstable and comminuted. They are complex injuries that can be difficult to manage. Distal femoral fractures account for about 4% to 7% of all femoral fracture.<sup>3</sup>

Surgical treatment can either be retrograde intramedullary nail fixation or be plate fixation, with plate fixation having a wide indication for various fractures types.<sup>4</sup> Regarding plate fixation, basic fixation is generally recommended to achieve absolute stability using lag screws in simple fractures; however, lag screw fixation cannot be performed in transverse fractures.<sup>5</sup> Moreover, it is impossible to achieve absolute stability with rigid internal fixation in comminuted fractures. In such cases, it is necessary to use a locking plate as a bridging plate to fix the fracture site.<sup>6</sup> The present study was conducted to assess results of distal femur fracture fixation with a lateral locked plate.

## MATERIALS & METHODS

After considering the utility of the study and obtaining approval from ethical review committee of the institute, we selected seventy- six adult patients of distal femur fracture of both genders. All gave their written consent.

Demographic data such as name, age, gender etc. was recorded. Patients were treated with distal femur locking plate. Parameters such as muller classification, HSS score, average time to union (months), average range of flexion (degree), knee score (mean), functional score (mean) and complications were recorded. Data thus obtained were subjected to statistical analysis. P value < 0.05 was considered significant.

## RESULTS

**Table I Distribution of patients**

Total- 76		
Gender	Male	Female
Number	46	30

Table I shows that out of 76 patients, males were 46 and females were 30 (Table I).

**Table II Assessment of parameters**

Parameters	Variables	Mean	P value
Muller type	A1	29	0.94
	A3	15	
	C1	20	
	C2	10	
Mean knee score		96.2	-
Mean functional score		92.5	-
Average time to union (months)		3.4	-
The average range of flexion (degree)		112.4	-
HSS	Excellent	58	0.01
	Good	12	
	Fair	6	
	Poor	0	

Complications	Wound infection	2	0.05
	Non- union	1	

Muller type A1 was seen in 29 A3 in 15, C1 in 20 and C2 in 10 patients. The mean knee score was 96.2, mean functional score was 92.5, average time to union was 3.4 months and average range of flexion was 112.4 degrees. HSS was excellent in 58, good in 12, fair in 6. Complications were wound infection in 2 and 4 and non- union in 1 patient. The difference was significant ( $P < 0.05$ ) (Table II)

## DISCUSSION

The goal of locking plate is to provide better stability in fragile bone. Primary stability of the plate is independent of the friction effect as the screw presses the plate, and is obtained by locking the screw into the plate.<sup>7,8</sup> Plate design is usually anatomical which allows it to be used as a “reduction mold”, molding the bone to the plate.<sup>9</sup> The locking plate can be used during an open procedure when there is intra-articular involvement, or with mini-invasive surgery using the ancillary less invasive stabilization system (LISS) in case of an extra-articular fracture or in the presence of a simple non- displaced fracture.<sup>10,11</sup> The present study was conducted to assess results of distal femur fracture fixation with a lateral locked plate.

Our results showed that out of 76 patients, males were 46 and females were 30. Virk et al<sup>12</sup> studied the functional and radiological outcome of distal femoral fractures in skeletally mature patients treated by open reduction and internal fixation with distal femur locking plate. Twenty- five skeletally mature patients with post-traumatic distal femur fractures were included. Following all principles of fracture reduction, union was achieved in all patients with mean time to radiological union being 19 weeks. The mean Range of Motion (ROM) was 109 degrees with 20 patients having a Neer score graded as excellent to satisfactory. Our study had nine cases which required additional surgeries. Out of these, all nine cases required bone grafting, three also required antibiotic cement bead insertion initially. Three patients developed complications in the form of infection (two cases) and mal-union in 1.

Our results showed that Muller type A1 was seen in 29 A3 in 15, C1 in 20 and C2 in 10 patients. The mean knee score was 96.2, mean functional score was 92.5, average time to union was 3.4 months and average range of flexion was 112.4 degrees. HSS was excellent in 58, good in 12, fair in 6. Complications were wound infection in 2 and 4 and non- union in 1 patient. Nayak et al<sup>13</sup> evaluated treatment outcomes of minimally invasive plate osteosynthesis (MIPO) for distal femoral fractures in 31 patients. 22 male and 9 female consecutive patients aged 21 to 65 (mean, 42) years underwent minimally invasive plate osteosynthesis using a locking compression plate (LCP) for distal femoral fractures. The causes of injury were vehicular accidents (n=24), falls (n=6), and assault (n=1). According to the AO classification, the fractures were classified as types A1 (n=10), A2 (n=7), and A3 (n=14). Most fractures were closed; 3 were Gustilo type-II fractures. Clinical and functional outcomes were assessed using the Knee Society Scores. The mean operating time was 70 minutes. The mean length of hospital stay was 9 days. The mean time to union was 3.7 months. The mean follow-up period was 18 months. At the one-year follow-up, 29 of the patients had good or excellent outcomes.

Toro et al<sup>14</sup> noted that the various reasons for failure are inadequate plate length, insufficient fracture bridging and inadequate number of locking screws used for fracture fixation. They concluded that locking plate is still an emerging technique with lack of literature.

## CONCLUSION

Lateral locking plate was best choice for management of distal femur fractures.

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