

# A Prospective Analysis of Functional Outcome of Supracondylar Femoral Fractures Treatment with Locking Compression Condylar Plates Technique

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## ABSTRACT

**Background:** Distal femur fractures account for about 0.4% of all human fractures and 3 - 6% of all femoral fractures. While these fractures primarily occur in young patients due to high-speed collisions, low-energy trauma from ground level falls in the elderly population may cause similar fracture trends. Fixation of distal femoral fractures is associated with nonunion and/or malunion with varus collapse with a lateral plate alone. The propensity to collapse of varus can be minimised by locking compression plates. Therefore, in patients with distal femoral fractures who were treated with locking compression plates, we measured the union rates and functional and anatomical findings. **Methods:** The study included patients with supracondylar fracture of femur who were treated with locking compression plate and followed up for a minimum of six months at our institute. Patients with open distal femoral fractures type A and C. The method used for fracture fixation was minimally open reduction and internal fixation with locking compression plate. **Results:** About 4 (20%) patients had healed in 16 weeks, 9 (45%) patients had heal in 18 weeks, 4 (20%) patients had healed in 22 weeks and 3 (15%) patients had healed in 24 weeks. The average healing was 20 weeks. **Conclusion:** The locking compression plate is an ideal implant for the fixation of femoral supracondylar fracture (A-C), especially in the C2 type where there is articular comminution. Post-operative distal femoral alignment is well preserved and articular surface collapse does not occur. In particular, LCP provides a stable construct in cases of metaphysical comminution and allows early mobilisation. Complications such as plate or screw breakage are not deprived of this procedure, but careful selection of patients and strict adherence to the core principles of fracture fixation would go a long way to minimise the complications of fracture fixation using locking compression plates.

**Keywords:** Locking compression plate (LCP), Supracondylar fracture, Femur.

## INTRODUCTION

Distal femur fractures account for about 0.4% of all human fractures and 3 - 6% of all femoral fractures.<sup>[1]</sup> While these fractures primarily occur in young patients due to high-speed collisions, low-energy trauma from ground level falls in the elderly population may cause similar fracture trends.<sup>[2]</sup>

The distribution of Bimodal age is shown. In patients under 40 years of age, usually males, undergoing high-energy trauma, peak incidence is seen. Incidence increases again in patients >50 years of age, usually women with osteoporosis, who undergo relatively low energy trauma. Axial load to the femur is a typical injury mechanism and less commonly rotational forces lead to distal femoral fractures. Distal femur fractures are complex injuries affecting both supracondylar and intercondylar distal 15 cm of femur, whose

treatment is an arduous process, since they are inherently vulnerable to high morbidity.<sup>[3]</sup>

Axial loading with valgus or varus, or with rotational forces, is the mechanism of injury in most cases. Fractures are often formed by the force acting directly over the distal femur. The deformities are mainly produced by the direction of the initial displacement of the fracture and, secondly, by the pull of the thigh muscles. Hamstring and quadriceps pull contributes to shortening of the limb and angulation at the fracture site.<sup>[4]</sup>

Fixation of distal femoral fractures is associated with nonunion and/or malunion with varus collapse with a lateral plate alone. The propensity to collapse of varus can be minimised by locking compression plates. Therefore, in patients with distal femoral fractures who were treated with locking compression plates, we measured the union rates and functional and anatomical findings.<sup>[5]</sup>

## MATERIALS AND METHODS

The study included patients with supracondylar fracture of femur who were treated with locking compression plate and followed up for a minimum of six months at our institute. Patients with open

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distal femoral fractures type A and C. The method used for fracture fixation was minimally open reduction and internal fixation with locking compression plate. The plate and screws used were manufactured from 316L stainless alloy with gun drilling technique. LCP is available with 6 to 18 combi holes in shaft. Combi hole is a combination of locking screw hole with a dynamic compression hole, providing either locking capability or axial compression function. Preoperative investigation Complete blood picture, random blood sugar, renal function tests, serum electrolytes, blood group and Rh typing, coagulation profile, electrocardiograph, 2D ECHO, chest X ray PA view and any additional investigations as advised by anesthetist.

**Surgical technique**

After appropriate anesthesia was given, a small bolster is placed under the hip to prevent external rotation of the limb and knee is maintained in 30-degree flexion with support of rolled sheets. Through lateral approach, incision is given from distal third femur in mid-lateral line and curved distally towards tibial tuberosity, the skin and subcutaneous tissues, iliotibial band were cut in line, hemostasis achieved, blunt dissection done to

elevate vastus lateralis from intermuscular septum antero-medially.

**Fracture site is reached;** reduction of fracture fragments was achieved by manual traction with knee in flexion and temporarily stabilized with K wires. Reduction, restoration of limb length and alignment is confirmed under C arm guidance and fixed with locking compression plate. Surgical drain is placed and wound is closed in layers after hemostasis is achieved.

**RESULTS**

**Table 1: Distribution of age and sex**

Age	Male	Female
20-30	4	0
31-40	9	2
41-50	4	1
Toatal	17	3
Percentage	85%	15%

[Table 1] shows the age distribution of total study subjects (20), where 85% of study subjects were males and 15% were females. In both male and female groups, majority of subjects belonged to age group of 31-40 years and least number of subjects were in the age group of 20-30 years.

**Table 2: Distribution of types of fracture and treatments**

Number of Patents	Type of Fracture (OTA)	Initial Treatment	Definitive Treatment	Union in week	ROM Knee Flexion
4	C1 closed	Thomas splint	ORIF with LCP + BG	16	0°-70°
9	C2 closed	Splint+skin traction	ORIF with LCP + BG	18	0°-80°
4	A1 closed	UTPT	ORIF with LCP + BG	22	0°-90°
3	A2 closed	UTPT	ORIF with LCP + BG	24	0°-100°

About 4 (20%) patients had healed in 16 weeks, 9 (45%) patients had heal in 18 weeks, 4 (20%) patients had healed in 22 weeks and 3 (15%) patients had healed in 24 weeks. The average healing was 20 weeks.

**DISCUSSION**

Our LCP analysis was compared with other study groups using different treatment modalities for femur supracondylar fractures.

In our analysis, the average time for the union was 20 weeks. In his report, Krbec et al., reported the average union time as 18 weeks.<sup>[6]</sup> Siliski et al., reported the average union time as 13.6 weeks,<sup>[7]</sup> Stewart et al., as 17.6 weeks and Paknikar et al., 23 weeks.<sup>[8]</sup>

The outcome score was calculated as per the score of the Knee society. It was considered excellent in our analysis at 80 percent, good at 70 percent, decent at 60 percent and bad at less than 60 percent. Our outcome findings are acceptable in almost more than 50 percent of cases. Implant advances have enhanced the ability to successfully stabilise these fractures, and surgical care results in a substantial reduction in adverse outcomes relative to nailing and

other plates. One common method of treatment for comminuted distal femoral fracture has been locking plate fixation.

**CONCLUSION**

The locking compression plate is an ideal implant for the fixation of femoral supracondylar fracture (A-C), especially in the C2 type where there is articular comminution. Post-operative distal femoral alignment is well preserved and articular surface collapse does not occur. In particular, LCP provides a stable construct in cases of metaphysical comminution and allows early mobilisation. Complications such as plate or screw breakage are not deprived of this procedure, but careful selection of patients and strict adherence to the core principles of fracture fixation would go a long way to minimise the complications of fracture fixation using locking compression plates.

**REFERENCES**

1. Schandelmaier P, Gössling T, Partenheimer A, Krettek C Distal fractures of the femur. *Chirurg* 2002; 73(12):1221-33.
2. Loosen A, Fritz Y, Dietrich M. Surgical Treatment of Distal Femur Fractures in Geriatric Patients. *Geriatr Orthop Surg Rehabil* 2019; 10: 2151459319860723.

3. Konuganti SR et al. Management of distal femur fractures with locking compression plate: a prospective study . Int J Res Orthop 2018; 4(2):208-13.
4. Collne AC, Wiss DA. Rockwood and Green fracture in adults. 7th edition. Philadelphia: LWW; 2009.
5. Girisha BA et al. Outcome of distal femoral fractures treated with locking compression plates. Int J Res Orthop 2017; 3(4):676-80.
6. Krbec M, Motycka J, Lunáček L, Dousa P. Osteosynthesis for periprosthetic supracondylar fracture above a total knee arthroplasty using a locking compression plate. Acta Chir Orthop Traumatol Cech 2009; 76(6):473-8.
7. Siliski JM, Mahrng M, Hofer HP. Supracondylar-intercondylar fractures of the femur. Treatment by internal fixation. J Bone Joint Surg Am 1989; 71:95–104.
8. Paknikar KP, Malve S, Kulkarni GS, Kulkarni MG, Kulkarni SG, Takalkar AA. Supracondylar fracture of femur: our experience of treatment with locking compression plate from rural Maharashtra. Int J Res Orthop 2019;5:xxx-xx.

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