

## A study on various approaches of functional outcome of distal femur fractures

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### ABSTRACT

The usual mechanism of injury is high energy trauma, more often a road traffic accident (RTA) in a younger population and a domestic accident, more often a fall in elderly people. Distal femoral fractures are reported to have high morbidity and mortality associated with them. Many studies have recommended, through radiological examination, including evaluation by CT scan, considering the high proportion of distal femur fractures involving intraarticular surface, apart from routine clinical examination. As high as 55% of the distal femur fractures are reported to involve intra-articular surface. Fractures of the distal femur are relatively rare but are said to have severe consequences. The reported frequency of distal femur fractures among overall fractures is about 0.4%, and they constitute about 3% of femoral fractures. Many studies have also advised that the presence of pulsation may mislead the clinician, as it is a poor indicator of the absence of vascular injury and have recommended proper tests to rule out this serious associated injury. A femoral nerve block is indicated and recommended by the same authors in the emergency room. Various internal fixation methods have evolved over the last few decades and are in clinical practice to target distal femur fractures. Many prospective studies have been conducted in western countries to assess the long term functional outcomes of many of these techniques. But the amount of literature published on the subject relatively less from developing countries like India. Since the outcomes may heavily depend on the population characteristics, the technical skill of the surgeons and the support therapy in the preoperative period, it is the need of the hour to generate evidence specific to a particular setting, to guide future clinical decisions.



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### INTRODUCTION

The usual mechanism of injury is high energy trauma, more often a road traffic accident (RTA) in a younger population and a domestic accident, more often a fall in elderly people. Distal femoral fractures are reported to have high morbidity and mortality associated with them. Many studies have recommended, radiological examination, including evaluation by CT scan, considering the high proportion of distal femur fractures involving intraarticular surface, apart from routine clinical examina-

tion. As high as 55% of the distal femur fractures are reported to involve intra-articular surface. Many studies have also advised that the presence of pulsation may mislead the clinician, as it is a poor indicator of the absence of vascular injury and have recommended proper tests to rule out this Severe associated harm. A femoral nerve block is indicated and endorsed by using equal authors in the emergency room. Studies additionally stated a mild put off in acting suitable surgical operation of even by four days is said to have a massive escalation in mortality rates at 6 and 365 days of comply with-up duration [1].

As consistent with the primary therapeutic principles recommended by in advance research studies and remedy tips, Joint reconstruction must be step one in case of intra-articular involvement, followed by a discount of the epiphysis on the metaphyso-diaphysis and thoroughly controlling the rotation and length in case comminuted fractures. In the case of greater-articular fracture, diverse healing options are available, and in many instances, the mini-invasive surgical operation can be considered. [2, 3] In case of an intra-articular fracture, open reduction and internal plate fixation should be achieved.

External fixation is extra regularly used for brief fixation. Many studies have encouraged now not to apply outside obsession as the definitive method, more so in case of displaced intra-articular fractures, as it's miles "tough to govern alignment, the stableness of this approach is terrible (lever arm of the leg), there may be no fixation of the articular factor and stabilization of the fracture calls for bridging the knee, which will increase the danger of stiffness". [4, 5]

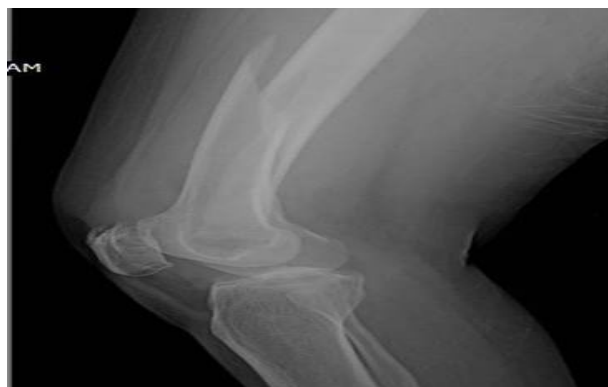
Section 2 & 3 presents the materials and strategies followed, and section 4 presents the information about the experiments and discussions. Finally, section five concludes the paper by sharing our inferences and destiny plans.

### Related Works

Fractures of the distal femur are relatively rare but are reported to have severe consequences. The reported frequency of distal femur fractures among overall fractures is about 0.4%, and they constitute about 3% of femoral fractures [6]. As per the age distribution is concerned, the distal femur fractures tend to show a typical bimodal distribution. The first peak in the spectrum of age comes among young men (in their 30s) and the second peak usually occurs in the elderly (in their 70s). Men are reported to be affected more during their 30s, but among the elderly females are more frequently affected Figures 1 and 2. [7, 8]



**Figure 1: Radiograph of the right knee, preoperatively, AP view**



**Figure 2: Radiograph of the right knee, preoperatively, lateral view**

Various internal fixation methods have evolved over the last few decades and are in clinical practice to target distal femur fractures. [9, 10] These include antegrade intramedullary nailing, retrograde nailing, simple screw fixation, blade plate, dynamic compression plate, locking compression plate and total knee arthroplasty. All these techniques have their strengths and limitations. [11] The choice of the technique depends on various factors like, fracture characteristics, associated soft tissue injury, cost and complexity of the technique and the long term structural and functional outcomes following the surgery reported 50% mortality at the 5-year follow-up among older adults, who sustained distal femur fractures, a high proportion of people losing their independence, as only 18% of patients could walk without aid. So meticulous evaluation and aggressive perioperative management is the key to reducing the morbidity and mortality associated with the distal femur fractures Table 1. [12, 13]

Many prospective studies have been conducted in western countries to assess the long term functional outcomes of many of these techniques. But the amount of literature published on the subject relatively less from developing countries like India.

**Table 1: Frequency distribution of LLD(shortening) in mm in the study group (N=30)**

LLD shortening in mm	Frequency	Per cent
0	22	73.33
5	5	16.66
10	3	10.0

Since the outcomes may heavily depend on the population characteristics, the technical skill of the surgeons and the support therapy in the preoperative period, it is the need of the hour to generate evidence specific to a particular setting, to guide future clinical decisions. [14, 15] As per the report of SOFCOT symposium 1988, which has reported the profile complications and treatment outcomes following distal femur fracture, the common complications reported are "infection and septic nonunion in 13% (29% of open fractures), aseptic nonunion in 14%, residual stiffness in 35%, secondary posttraumatic osteoarthritis in 50%, with initial chondral injury as well as incomplete reduction" [16–19]

The current study is an attempt to fill this vital gap in the knowledge, which is aimed at assessing the functional outcome following treatment of distal femur fracture with locking compression plate. The study finds it may add strength to existing evidence and may aid in better treatment decisions.

## MATERIALS AND METHODS

This prospective observational study was conducted in the Department of Orthopedics of an MVJ Medical College and Research Hospital, between June 2016 to July 2018. A total of 30 participants were recruited into the study, sequentially. AO classification Tscherne classification was used to classify the fractures and soft tissue injury. Indirect reduction techniques and LCP treated all fracture fragments. The patients were followed for one year period to assess the progress of union and possible complications. After all the aseptic precautions, thorough lateral approach long incision along the shaft of the distal femur extending up to the lateral condyle and further. Fascia lata is incised to expose the vastus laterals, vastus laterals are split and retracted medially and laterally and fracture site is identified. Indirect reduction techniques reduced fracture fragments, and LCP was applied over the distal femur, followed by stabilization using proximal and distal locking screws. Vastus lateralis and tensor fascia lata was repaired, wound closed in layers with suction drain insitu.

## RESULTS AND DISCUSSIONS

The proportion of participants below 40 years were 16 (53.3%). The percentage of participants at 40 to 60 years and above 60 years were 9(30.0%) and 5 (16.7%) respectively.

The number of patients with 0 LLD was 22 (73.33%) in the study population. The number of patients with 5 and 10 LLD was 5 (16.66%) and 3(10%) respectively. The number of males constituted 25(83.3%) of the study subjects. The number of participants with road traffic accidents and fall was 26(86.7%) and 4(13.3%) respectively. The number of Participants with A category was 15 (50.0%). The number of participants with B category and c category was 4 (13.3%) and 11 (36.7%) respectively in the study population. The mean time taken for the radiological union was  $16.13 \pm 3.30$  weeks in the study population. The mean time taken for full weight-bearing was  $16.4 \pm 3.56$  weeks in the study population. The number of people with a fair outcome was 5 (16.6%) in the study population. The number of participants with excellent and good scores was 8 (26.6%) and 17 (56.7%). None of the study participants had a poor outcome.

## CONCLUSIONS

Finally, this work concludes that the Males aged below 40 years have constituted the highest proportion for subjects affected by distal femur fractures. Road traffic injury was the most common mechanism resulting in distal femur fractures, followed by falls. After treatment with LCP, no case of nonunion was reported. The mean time taken for radiology union was  $16.13 \pm 3.30$  weeks in the study population. The mean full weight-bearing was  $16.4 \pm 3.56$  in the study population. The functional outcome, as assessed by the modified Lysholm score, was fair in 3 (10.0%) subjects. Unique and excellent functional outcome was reported in 17(56.7%) and 10 (33.3%) subjects respectively. None of the subjects reported a poor outcome. So it can be concluded that the functional outcome after LCP is good.

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## CONFLICT OF INTEREST

The authors declare that they have no conflict of interest for this study.

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