



## FUNCTIONAL OUTCOME AND EVALUATION OF RESULTS OF FRACTURES OF FEMUR TREATED BY DUAL IMPLANTATION

### Orthopaedics

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### ABSTRACT

**Background:** Fractures of femur comprise a majority of lower limb trauma. The evaluation and management of patients with femoral fractures has evolved on the basis of improved understanding of local anatomy and biomechanics of fixation techniques. Non union and infection are still the two most common problems we encounter in day to day practice. In this study we aim to evaluate the functional outcome and results of dual implantation on these femoral fractures and its effect on bone healing and early weight bearing particularly in cases of non union, fractures prone to non union etc

**Methods:** The study was conducted on a group of patients attending our institution over a period of two years. Patients with fractures of femur meeting our inclusion and exclusion criteria requirements were taken up for surgery and subsequently evaluated for the following parameters such as functional range of motion of knee, average time to weight bearing, time taken for radiological union.

**Results:** 30 patients were evaluated in the age group of 12-70 years in a 2 year period. Majority of the patients achieved union at 12-16 weeks and nearly 70% of patients commenced partial weight bearing by 8-9 weeks. Majority of the patients had favourable knee and hip scores.

**Conclusion:** Overall from this study Dual implantation in fractures of femur led to early radiological union, early weight bearing and favourable range of motion of knee particularly in cases of non union and other complex cases.

### KEYWORDS

Femur, non union, Dual implantation, Range of motion

### INTRODUCTION:

Fractures of femur comprise a majority of lower limb trauma. The evaluation and management of patients with femoral shaft fractures continue to evolve on the basis of the improved understanding of the local anatomy, impact of treatment and biomechanics of fixation techniques. Improved prevention and management of fracture shortening, angulation, infection and nonunion have made intramedullary nailing the primary treatment for most femoral shaft fractures.

The introduction and increased popularity of interlocking nails allowed for improved rotational control, better maintenance of femoral length, early weight bearing, the use of smaller implants and improved control of comminuted and segmental fractures.

Plating of femoral shaft fractures remain another modality of fixation besides nailing. Though not so popular in adult shaft femur fractures due to high tensile forces and torque, it has gained popularity in pediatric and adolescent femur fractures where it remains the implant of choice in many fractures.

Henceforth the incidence of dual usage of an Intramedullary implant (preferably IM nail) and an Extramedullary implant and in some cases both extramedullary implants to augment stability and provide rigid fixation has not been in much use in day to day trauma practice. This study therefore aims to highlight the concept of dual implantation in fractures of femur and to document its effect on early weight bearing and return to work along with its effect on enhanced bone healing in cases of nonunion of femur, sequelae of infected femur, implant failure and fractures of femur prone to non union. The use of plate in addition to IM nail helps in maintaining the normal anterior bow of the femur thus providing a much secure and anatomic reduction in comparison to fixation with IM nail only.

### MATERIALS AND METHODS

#### PATIENTS:

After necessary approval from the Institutional Ethics Committee the study was conducted in a group of patients attending both the emergency and outdoor of Orthopaedics department of Calcutta National Medical College & Hospital. It was conducted on 30 patients presenting with fractures of femur in the age group of 12-70 years

based on fracture morphology and surgeons choice. This was a prospective study conducted from August 2018 to August 2020. The Inclusion criteria comprised of patients presenting with proximal femur, shaft femur, distal femur fractures, nonunion shaft femur, implant failure, fractures prone to nonunion etc. Open fractures, femoral neck, femoral head fractures, fractures with associated neurovascular injuries were kept in the exclusion criteria.

#### Surgical Technique:

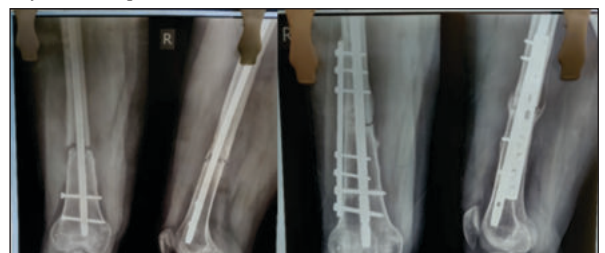
Patients presenting with femoral fractures and satisfying the inclusion criteria were initially resuscitated and later taken up for operative intervention. In most of the cases patients were placed in a lateral decubitus position and the femur was approached through a lateral approach. After a satisfactory reduction was obtained, femur was fixed with an intramedullary nail and subsequent reinforcement with a Dynamic Compression plate was done. In old cases additional bone grafting was performed.

#### POST OPERATIVE FOLLOWUP AND ASSESSMENT

Post operatively patient was advised strict non weight bearing and active quadriceps exercises and knee bending was encouraged. Patient was followed up at 6, 12, 16 weeks and 6 months duration.

During each followup all the parameters of the study were accounted for such as-

- 1) Range of motion of knee joint
- 2) Lysholm knee score
- 3) Quadriceps wasting-present or not
- 4) Ability to squat or cross leg sit
- 5) Presence of any other complication.



**Fig 1:** Nonunion Of Femur (fig A) Managed With Nailing And Plating At 16 Weeks Post Op Showing (fig B) Union

Radiological assessment was also done at each visit and depending upon callus formation ,partial weight bearing with axillary crutches was suggested.Full weight bearing was advised subsequently.



Fig 2: Cross Leg Sitting And Squatting At 16 Weeks Followup

**RESULTS**

The present study was conducted in a group of 30 patients presenting with fractures of femur in the age group of 12-70 years in a 2 year period.

The most common age group in this study was 21-30 years with a male preponderance.

LYSHOLM KNEE SCORE	NO.OF PATIENTS	% OF PATIENTS
84-92(good to excellent)	16	53.33
65-83(fair)	8	26.67
<65(poor)	3	10
Not applicable	3	10
TOTAL	30	100

Fig 3 Functional Assessment Of Knee Joint At 16 Weeks

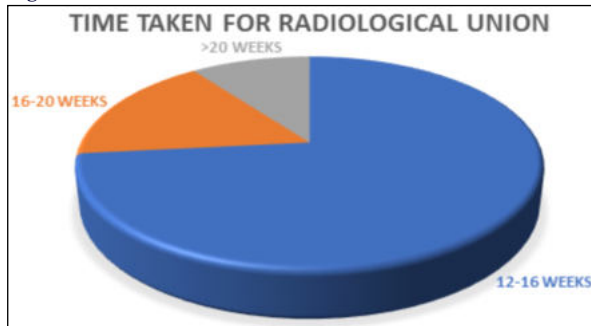


Fig 4: Pie Chart Showing Time Taken For Radiological Union

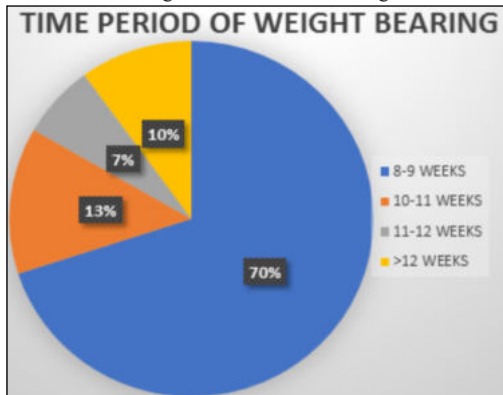


Fig 5: Pie Chart Demonstrating Time Period Of Weight Bearing

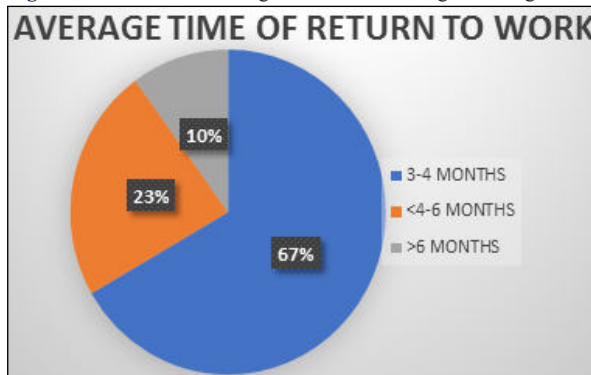


Fig 6 : Pie Chart Demonstrating Average Time Of Return To Work

Knee range of motion(ROM) evaluated at 12 weeks post operatively revealed greater than (0-110°) of knee flexion-extension arc in nearly 63% of patients.More than 60% of patients were able to squat and crossleg sit at 16 weeks post op.On analysis of the Lysholm knee score 80 % had a score above 66.

Majority of the patients achieved radiological union at 12-16 weeks .Particularly patients with non union femur achieved radiological union at 12 weeks.Patients presenting with fractures prone to non union,cases of infected femur,cases of implant failure also achieved union in nearly the same duration. 70 % of patients commenced partial weight bearing by 8-9 weeks.Approximately 67% of patients returned to their previous occupation/work by 3-4 months.

COMPLICATIONS	NO.OF PATIENTS	% OF PATIENTS
Delayed union	3	10
Stiff Knee	3	10
Superficial Infection	2	6.67
Knee pain	5	16.67
Hip pain	6	20

Fig 7: Table Demonstrating Complications

**DISCUSSION**

A large number of studies pertaining to demographic profiling of femoral fractures have been done but putting a dual implant in femur for better stability is a relatively new concept.Specially in cases of non union ,implant failure and following infection control this modality of fixation entails certain benefits.

In various studies published across the world increasing emphasis is being placed on dual implantation of femoral fractures as an effective modality of fixation.In a study published in the “European Journal of Orthopaedic Surgery and Traumatology” in March 2015 patients of femoral shaft nonunion treated with double locking plate fixation achieved nearly 100% union rates.In our study 1 Intramedullary and 1 Extramedullary implant was used .This lead to a more rigid and anatomical fixation and was instrumental in maintaining the normal anterior bow of femur leading to a better outcome afterwards.

Functional outcomes following dual implantation was quite satisfactory as seen in this study.Knee ROM at nearly 12 weeks of followup was more than 110° in a majority of patients.This can be attributed to the fact that passive and active knee bending was commenced earlier in post op period and active quadriceps exercises were initiated on the day following the surgery.Due to this factor 80% of patients had a fair to good Lysholm Knee Score.

Average time taken for radiological union was 12-16 weeks for nearly 70% of patients.This can be attributed to the fact that rigid and anatomical stabilization was done by the dual implant which provided a more better construct and could withstand axial and torsional stresses to much better extent.Patients of non union femur or other complex cases such as revision surgery in infected femur,cases of implant failure which required dual implantation with grafting also achieved radiological union in the same time frame.The use of an Intramedullary and an Extramedullary implant in these complex cases also led to a better construct thus reflecting the better healing rates. For this reason weight bearing could be commenced from 8-9 weeks onwards.Patients could be given early weight bearing due to rigid fixation and also this lead to a better quality of life and early return to work or activities of daily living.This modality of dual implantation is particularly useful in complex cases and could become the implant of choice in near future.

The study had it's own limitations also-sample size was small,period of study was less,selection of patients was based upon surgeons precision.

**CONCLUSION:**

The present study was aimed to evaluate the functional outcome and results of fractures of femur treated by dual implantation and its effect on bone healing and early weight bearing.Also it was done to study the rates of bone healing in complex cases such as non union,implant failure etc.The following results have arrived at a conclusion.

- 1) Early radiological union particularly in cases of non union and fractures prone to non union
- 2) Early protected weight bearing
- 3) Favourable Range of Motion of knee joint

- 4) Favourable Knee and Hip scores
- 5) Early return to work/previous occupation

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