



ISSN (P): 2521-3466  
ISSN (E): 2521-3474  
© Clinical Orthopaedics  
www.orthoresearchjournal.com  
2019; 3(4): 48-50  
Received: 28-08-2019  
Accepted: 30-09-2019

**Dr. Manjunatha A**  
Assistant Professor, Department  
of Orthopedics, Kodagu Institute  
of Medical Sciences, Madikeri,  
Karnataka, India

**Dr. Santhosha JB**  
Senior Resident, Department of  
Orthopedics, Kodagu Institute of  
Medical Sciences, Madikeri,  
Karnataka, India

**Corresponding Author:**  
**Dr. Santhosha JB**  
Senior Resident, Department of  
Orthopedics, Kodagu Institute of  
Medical Sciences, Madikeri,  
Karnataka, India

## Clinical profile of patients with diaphyseal fractures of femur and tibia attending tertiary care hospital

**Dr. Manjunatha A and Dr. Santhosha JB**

DOI: <https://doi.org/10.33545/orthor.2019.v3.i4a.180>

### Abstract

Earlier nails were solid or hollow cylindrical columns of wood, ivory or metal that were simply introduced into the medullary cavity, thus providing the most elementary form of internal splintage. These implants however were highly reactive and accompanied with the poor understanding and implementation of sterilization procedures, led to a very high rate of infection and non-union. Patients were evaluated clinically for fitness for anesthesia and surgery. Relevant investigations were done. Patients of diaphyseal fractures of femur and tibia attending the emergency and outpatient department of Medical College Hospital, were selected for the study.

Patients with Gustillo's grade 3 compound fractures, already infected fractures, sclerotic disease of bone with inadequate marrow cavity, periarticular fractures, patients below 8 years of age, patients with pre existing non functional limbs due to pre-existing pathology, polytrauma patients, and patients medically unfit for surgery / anaesthesia were not included in the study. All included patients underwent open or closed interlocking nailing procedure.

**Keywords:** Clinical profile, diaphyseal fractures, femur and tibia

### Introduction

The earliest evidences of intramedullary fixation of diaphyseal fractures of long bones are from Mexico in the 16<sup>th</sup> century when Aztec surgeons tried passing wooden sticks into the medullary cavity of long bones in non united fractures.

During the mid 1800s through the first decade of the 1900s, most of the works in intramedullary nailing of non-unions appear to revolve around the use of ivory pegs. It had been observed that ivory pegs would reabsorb in the human body compared to metallic implants, which became encapsulated with fibrous material. The majority of this work was reported at the time in the German literature<sup>[1]</sup>.

During the 1880s, Gluck and Birch and Konig<sup>[2]</sup>, independently recorded the first descriptions of interlocked intramedullary devices. The device consisted of an ivory intramedullary nail that contained holes at the end, through which ivory interlocking pins could be passed.

Nicolaysen in 1897<sup>[3]</sup>, was the first to describe the biomechanical principles of intramedullary devices. He proposed that the length of intramedullary implants be maximized to provide for the best biomechanical advantage.

While ivory seemed to be the material of choice reported in the German literature, Høglund of the United States<sup>[4]</sup> reported the use of autogenous bone as an intramedullary implant in 1917. He described a technique in which a span of the cortex was cut out and then passed up the medullary cavity across the fracture site.

During World War I, Hey Groves of England<sup>[5]</sup>, reported the use of metallic rods for the treatment of gunshot wounds. These rods were passed into the medullary cavity through an incision made over the fracture site. This technique had a high infection rate and was not universally accepted.

It was not until Smith-Petersen's<sup>[6]</sup> report of the successful use of stainless steel nails for the treatment of femoral neck fractures in 1931, that the application of metallic intramedullary implants began to expand rapidly. In the United States, Rush and Rush in 1939<sup>[7]</sup>, described the use of metallic Steinman pins placed in the medullary canal to treat fractures of the proximal ulna and proximal femur. While these techniques provided a foundation of principles

for the treatment of fractures with intramedullary fixation, there would be an explosion of principles and methods in the decades to come.

### Methodology

Patients were examined, haemodynamically stabilised, 1<sup>st</sup> aid administered in the form of splintage/ traction/ POP slab along with analgesics followed by radiological evaluation. Relevant data was recorded in pre-prepared proforma. Patients were evaluated clinically for fitness for anesthesia and surgery. Relevant investigations were done.

Patients of diaphyseal fractures of femur and tibia attending the emergency and outpatient department of Medical College Hospital, were selected for the study.

### Inclusion Criteria

- All diaphyseal fractures of femur and tibia including Gustillo's type 1 and 2 compound fractures.

### Exclusion Criteria

- Fresh Gustillo's grade 3 compound fracture
- Already infected fracture
- Sclerotic disease of bone with inadequate marrow cavity
- Periarticular fractures
- Young patients below 8 years of age
- Patients with non functional limbs prior to injury due to pre-existing condition
- Polytrauma patients
- Patients medically unfit for surgery / anaesthesia

### Results

Total of 218 fractures of femoral diaphysis (77) and tibial (141) diaphysis were included in the study.

Only diaphyseal fractures of femur and tibia including Gustillo's type 1 and 2 compound fractures were included in the study.

Patients with Gustillo's grade 3 compound fractures, already infected fractures, sclerotic disease of bone with inadequate marrow cavity, periarticular fractures, patients below 8 years of age, patients with pre existing non functional limbs due to pre-existing pathology, polytrauma patients, and patients medically unfit for surgery / anaesthesia were not included in the study.

All included patients underwent open or closed interlocking nailing procedure.

**Table 1:** Age Distribution

S. No.	Age group	Tibia	Femur
1	<20	12	11
2	20-30	62	31
3	30-40	31	15
4	40-50	16	9
5	50-60	11	6
6	>60	9	5
Total		141	77

**Table 2:** Sex Distribution

Sex	Tibia	Femur
Male	102	59
Female	39	18
Total	141	77

**Table 3:** Mode of Injury

S. No.	Mode	Tibia	Femur
1	RTA	88	48
2	Fall from height	27	15
3	Physical assault	20	14
4	Sports injury	6	0
5	Trivial trauma	0	1
Total		141	77

**Table 4:** Side of Injury

Side	Tibia	Femur	Total
Right	77	32	109
Left	64	35	99
Total	141	77	218

**Table 5:** Site of Fracture

S. No.	Diaphyseal site	Tibia	Femur
1	Proximal 1/3 <sup>RD</sup>	21	14
2	Middle 1/3 <sup>RD</sup>	97	54
3	Distal 1/3 <sup>RD</sup>	23	9
Total		141	77

**Table 6:** Type of Fracture

Type	Tibia	Femur	Total
Open	69	18	87
Closed	72	59	131
Total	141	77	218

### Discussion

Inspite of high incidence and availability of voluminous literature, on management of fractures of shaft femur and tibia, the standard protocol for management of these fractures has yet not been laid down. There has been a debate as to the best treatment protocol for their management.

Surgeons the world over have come up with a number of guidelines, strategies and methods of fixation of these fractures. Among them, intramedullary nailing has stood the test of time to emerge as the most reliable method of fixation of diaphyseal fractures of tibia and femur.

Intramedullary nailing has seen many stages of evolution to reach its current form. Among the various debates, has been dynamization, that aims at improving the fracture union by permitting micromovements (Kuntscher, 1940)<sup>[8]</sup> at the fracture site. However there has been debate over its appropriate timing and the overall effectiveness. Present study has been done to evaluate the effectiveness of dynamization of interlocking nailing in diaphyseal fractures of tibia and femur.

Our study encompassed a total of 218 fractures of femoral and / or tibial diaphyses (77 femoral and 141 tibial) that were admitted at our institute during the time period of 13 months (July 1<sup>st</sup>, 2015 to July 31<sup>st</sup> 2016), indicating the higher incidence of tibial diaphyseal fractures as compared to femoral diaphyseal fractures. The higher incidence of tibial diaphyseal fractures has also been reported by Brumback, Uwagi, Lakatos, Bathon and Burges in 1988<sup>[9]</sup> who studied 98 fractures having 73% tibial and 27% femoral diaphyseal fractures. Another study from Salooki and Misbahi<sup>[10]</sup> in 2013 revealed 64.3% tibial and 35.7% femoral shaft fractures among the 173 fractures studied.

The age distribution of our patients leaned towards the younger age group with 43.9% of tibial and 40.2% femoral fractures from the age group of 20-30. Similar findings were seen in the study by Brumback, Uwagi, Lakatos, Bathon and Burges in 1988<sup>9</sup> who encountered 47% cases from the age group of 20-30. This is because they are more prone to trauma due to involvement in outdoor activities, road traffic accidents and sports activities.

The sex distribution observed in our study revealed males outnumbering females (76.5% femoral and 72.2% tibial fractures seen in males). Similar data was observed in studies by Hao Ming in 1997<sup>[49]</sup> who observed 78% share of his study group to be males. This may be due to the greater involvement of males in the various etiological factors mentioned before.

The side of involvement (including both tibial and femoral fractures) in our study was right in 50% cases, left in 48% and bilateral in remaining 2% cases indicating no predilection for side. Other studies by Brumback, Uwagi, Lakatos, Bathon and Burges in 1988<sup>[9]</sup> and S. Salooki and SAR Misbah, 2011<sup>[10]</sup>, also did not mention any predilection to side.

The number of open fractures in our study was observed to be 20.5% for femoral and 48.9% for tibial diaphyseal fractures. Winquist in 1984<sup>[11]</sup>, studied 520 femoral fractures out of which 16.5% were open fractures while a study by Brumback, Reilly, Poka and Lakatos, in 1988<sup>[9]</sup>, on 122 tibial shaft fractures revealed 46.8% to be open fractures.

### Conclusion

Diaphyseal fractures of long bones have been known since the medieval times and their management strategies have evolved continuously since then. Among the various methods, intramedullary nailing has been the most widely accepted and successful one. Inadequate fixation and resulting non-union have been its pitfalls, for which concepts of interlocking, followed by dynamization came forward.

### References

1. Farill J. Orthopedics in Mexico. *J Bone Joint Surg Am.* 1952; 24:506-12.
2. Grosse A, Kempf I, Lafforgue D. Le traitement des fracas, pertes de substance osseuse et pseudarthroses du femur et du tibia par l'enclouage verrouille (a propos de 40 cas). *Rev. Chir. Orthop.* 1978; 64 (Supplement 2):33-35, 1.
3. Pintore E, Maffuli N, Petricciulo F. Interlocking nailing for fractures of the femur and tibia. *Injury.* 1992; 23:381-386.
4. Høglund EJ. New method of applying autogenous intramedullary bone transplants and of making autogenous bone-screws. *Surg Gynecol Obstet.* 1917; 24:243-46.
5. Kellam JF. Early results of Sunnybrook experience with locked intramedullary nailing. *Orthopaedics.* 1985; 8:1387-1388.
6. Soeur R. Intramedullary pinning of diaphyseal fractures. *J Bone Joint Surg.* 1946; 28:309.
7. Smith-Petersen MN. Intracapsular fractures of the neck of the femur. Treatment by internal fixation. *Arch Surg.* 1931; 23:715-59.
8. Lucas SE, Seligson D, Henry SL. Intramedullary supracondylar nailing of femoral fractures. A preliminary report of the GSH supracondylar nail. *Clin Orthop Relat Res.* 1993; 296:200-6.
9. Brumback RJ, Ellison TS, Poka A *et al.* Intramedullary nailing of femoral shaft fractures. Part III: Long-term effects of static interlocking fixation. *J Bone Joint Surg Am.* 1992; 74:106-12.

10. Solooki S, Mesbahi SAR. Orthopaedic surgery; Shiraz University of medical sciences. *Iran Red Crescent Med J.* 2011; 13(3):178-180.
11. Wiss DA, Fleming CR, Matta JM, Clark D. Comminuted and rotationally unstable fractures of the femur treated with an interlocking nail. *Clin. Orthop.* 1986; 212:35-47.