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# A STUDY OF CLINICAL AND FUNCTIONAL OUTCOME OF EXPERT TIBIA NAILTM FOR FRACTURE PROXIMAL AND DISTAL TIBIA

Orthopaedics

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## ABSTRACT

In the field of trauma surgery, fractures of the leg remain the injuries with a higher complication rate. The optimum treatment for fractures of the tibia remains controversial. When the aim is stable fixation with early restoration of function without use of plaster, intramedullary nailing offers an attractive treatment option. Newer tibial nail designs has widened the range of indications for medullary osteosynthesis to include almost every type of fracture. This study was done to evaluate the outcome of use of expert tibial nail in Proximal and distal fractures of tibia.

**Objectives :** To evaluate clinical and functional outcome of operatively managed proximal and distal fractures of tibia with expert tibia nail in special reference to fracture anatomy, pattern and status of stability (Minimum 6 months Follow Up).

**Material and Method:** This was a retrospective study based on the hospital records of 35 patients who had proximal and distal shaft tibia fractures treated with Expert tibia nailing in orthopaedics department of government hospital affiliated with medical college. Detailed records of preoperative x rays, postoperative x rays and clinical assessment data of 6 months follow up of each patients were recorded and assessed.

**Results:** In this study MODIFIED KLEMM AND BORNER (MKB) scoring system was used for objective quantification of the outcome of expert tibia nail in proximal and distal tibia fracture. In our study 91% patient had excellent outcome, 9% patient had good outcome. Infection rate was 11%, there were 1 patients of non union.

**Conclusion:** In this study, as per outcome based on MODIFIED KLEMM AND BORNER score, treatment results were excellent and comparable with that of similar other studies.

## KEYWORDS

Proximal and distal tibia fracture, MODIFIED KLEMM AND BORNER score, outcome, Expert tibia nailing

## INTRODUCTION :

Rising incidence of high velocity trauma due to motor vehicle accidents usually results in fractures of long bones. The tibia is the most commonly fractured long bone in the body.[1] Due to its location, structural anatomy and sparse antero-medial soft tissue coverage the tibia is exposed to frequent injuries. Open fractures are more common,[2] because one third of its surface is subcutaneous throughout most of its length. Furthermore, the blood supply to the tibia is more precarious than that of bones enclosed by heavy muscles. The presence of hinge joints at the knee and ankle allows no adjustment for rotatory deformity after a fracture. Delayed union, non-union and infection are relatively frequent complications especially after open fractures of the shaft of tibia. Due to its frequency, topography and mode of injury it has become a major source of temporary disability and morbidity. Hence special care and expertise is necessary when treating such fractures. It requires the widest experience, the greatest wisdom and the nicest of the clinical judgement in order to choose the most appropriate treatment for a particular pattern of injury. The major advancement in intramedullary nailing of proximal tibial fractures was the introduction of modern implants like the Proximal Tibial Nail and Expert Tibial Nail. In these new implants the interlocking bolts can be introduced just below the tibia plateau, enabling the surgeon to treat very proximal tibial fractures with intramedullary nailing.

The Expert Tibial Nail System (ETNS) an intramedullary nailing system is indicated for fractures in the tibial shaft as well as for metaphyseal and certain intraarticular fractures of the tibial head and the pilon tibia. In addition to the standard static and dynamic locking options, the ETNS features multi directional locking options in the distal and proximal part of the nail.

End cap block the most proximal screw creating an angular stable construct. ETNS is having an option for compression at the fracture site (up to 7 mm) by inserting one distal locking screw and one proximal dynamic locking screw with a compression screw.

## OBJECTIVE:

1. To evaluate clinical and functional outcome of operatively managed proximal and distal fractures of tibia with expert tibia nail in special reference to fracture anatomy, pattern and status of stability (Minimum 6 months Follow Up).
2. To study fracture healing and union rates with closed expert intramedullary interlocking nailing.
3. To assess the functional outcome with regarding to knee & ankle joint movements using MODIFIED KLEMM AND BORNER score.

## MATERIAL AND METHOD:

**Type of study:** This is a retrospective study

**Duration of study:** January 2019 to December 2020

- Data was collected from the record section of the hospital's orthopaedics department.
- Patients were called and examined to record outcomes at least after 6 months of intramedullary nailing.
- Indoor and outdoor case records, preoperative x rays and postoperative x rays and clinical assessment data are assessed.
- Preoperative x rays are assessed for classifying fractures. Case records are assessed for treatment received by each patient, and for recording associated injury to soft tissue and other organs, if any.
- Immediate postoperative x rays are assessed for adequacy of reduction and alignment.
- Immediate complications were recorded from case records.
- On final follow up examination, at least after 6 months of intramedullary nailing, bony union and maintenance of reduction and alignment are assessed using x rays, and functional outcome assessed using MODIFIED KLEMM AND BORNER score, and complications noted.

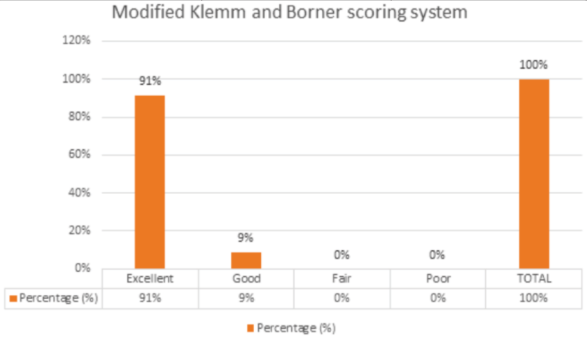
## RESULTS:

1. In our study 35 patients were managed by using Expert tibia nail in Proximal and distal tibia fractures. 63% of the fractures were closed and 37% were open (Gustillo-anderson). Majority of fractures were located in the distal-third (60%) in 15 patients and in proximal third in 9 patients (26%). Oblique and transverse fractures (49%) were common. Road traffic accidents were the main mode of injury in 46% of cases.
2. In our study, partial weight bearing was started at 4 – 8 weeks in 26 patients (74.28%), at 9-13 weeks in 6 patients (17.17%). Full weight bearing was started at 9-13 weeks in 10 patients (28.57%), 14-19 week in 11 patients (31.43%), 19-23 weeks in 12 patients (34.29%) and >23 weeks in 1 patient (2.86%). In 2 patients in our study dynamisation was done and then full weight bearing was advised.
3. In our study, superficial infection rate was 11% and it healed with dressings and antibiotics. Superficial infections occurred in two patients at the site of surgical incision over knee and both the superficial infections healed by dressings and antibiotics. Wound infections occurred in two open injury patient and one of them healed by dressings and antibiotics and one patient was taken for debridement and after which infection was subsided. In our study out of 35 Nailing only one patient's fracture went into non-union.
4. Functional score were assessed in 35 cases s available for follow

up. According to MODIFIED KLEMM AND BORNER (MKB) scoring system[3] we had 91% excellent and 9% good results in total 35 patients.

| Total knee score | Points |
|---|---|
| Excellent | 15-19 |
| Good | 10-14 |
| Fair | 5-9 |
| Poor | 4-8 |

| RESULTS | Patients | Percentage (%) |
|---|---|---|
| Excellent | 32 | 91% |
| Good | 3 | 9% |
| Fair | 0 | 0% |
| Poor | 0 | 0% |
| TOTAL | 35 | 100% |




## DISCUSSION:

Fractures of tibia continue to pose vexing problems to the orthopaedic surgeons; chief among them is selecting the optimal method of treatment. Every fracture of tibia must be assessed individually and it can be difficult to establish fixed routine of treatment for these fractures. Internal fixation of diaphyseal and metaphyseal fractures of the tibia with plates may lead to ulceration of skin overlying plate, deep infection leading to osteomyelitis and refracture and delayed union. Intramedullary nailing offers an attractive treatment option, however there are some problems in treatment of fracture tibia with conventional intramedullary interlocking nailing like difficulty in manipulating fractures of proximal and distal 1/3rd tibia communited metaphyseal fractures. These shortcomings of conventional intramedullary interlocking nail in managing proximal and distal third fractures have been overcome by the introduction of Expert Tibial Interlocking Nail due to modifications in operative techniques, its design and advancement in locking screws. Proximal and distal tibial fractures are more prone for malalignment – anterior angulation and valgus deformity. Intramedullary nailing is safe and effective technique for treatment of proximal tibia ,segmental and distal tibia fractures. Reduction of metaphyseal fracture involves various techniques like poller screws, poller pins, distracters. Buttress plate, interfragmentary screws. Malalignment which are particular for proximal tibial fractures could not be avoided completely in all cases but they were not clinically significant and did not affect the functional outcome of the patients Thus expert tibial nail design allows better control in metaphyseal tibial segments through multiple interlocking holes in close proximity to either end of the nail. Multidirectional interlocking screws ensure that alignment can be well maintained and stability preserved despite a short proximal or distal fragments.

According to MODIFIED KLEMM AND BORNER (MKB) scoring system we had 91% excellent and 9% good results in total 35 patients.In 2016 Gaurav Kumar et[4] al conducted study of " Analysis of extraarticular tibia fractures treated with interlocked intramedullary nailing" by using MKB scoring. According to this system they had 80% excellent to fair results and 20% poor result due to delayed union or non union.In 2019 Prabhav Tijorivala et al[5] conducted study on "functional outcome of expert tibia nail in upper third tibia fracture" in which patient were evaluated according to MKB scoring. According to this system 75% patients had excellent results and rest 25% patients had good results in nailing.

## CONCLUSION:

Proximal and distal tibia fractures are commonly seen in physically active young people and are commonly seen as a result of road traffic accidents.

- We also conclude that Conventional intramedullary nails used for treatment of proximal and distal third tibia fractures have a drawback of inaccurate stability provided by these nails. These disadvantage of conventional intramedullary interlocking nail in managing proximal and distal third fractures have been overcome by the introduction of Expert Tibial Interlocking Nail due to modifications in operative techniques, its design and advancement in locking screws
- Thus expert tibial nail design allows better control in metaphyseal tibial segments through multiple interlocking holes in close proximity to either end of the nail. Multidirectional interlocking screws ensure that alignment can be well maintained and stability preserved despite a short proximal or distal fragments in three planes. We evaluted our results and compared them with those obtained by various other studies.
- Expert Interlocked Intramedullary nailing of proximal and distal third tibial fractures is an accepted modality of treatment. Stable adequate intraoperative reduction is the key to early union and yields superior functional outcome. Favourable clinical and radiological outcome can be achieved by judicious patient selection and avoiding technical errors during surgery. Interlocked nailing for proximal and distal third tibia fractures is a technically demanding procedure. Hence a sound knowledge of the technique is a must, lacking which alternative forms of fixations should be considered.

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