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# A brief review of tibial shaft fractures treated using interlocking intramedullary nail

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#### Abstract

Tibial shaft fractures are treated surgically by different methods. In the last few years interlocking intramedullary nailing has emerged as a gold standard for tibia shaft fracture. The clinical and radiological outcome is better and the complications like compartment syndrome, neurovascular injuries, infection, non-union are relatively less for interlocking intramedullary nailing of tibia. The use of ILIM nail also shows the reduce risk of reoperation. Nail is considered better as it is a load sharing device, it also neutralises both axial and torsional deforming forces. Other contributory factors for the better and natural process of bone healing in case of nail is that closed intramedullary nailing leads to minimum injuries of soft tissue, neurovascular structures and hematoma at fracture site. The nail is also locked at proximal and distal fragments which decreases the prevalence of mal-union of comminuted fractures. One distinct advantage in patients treated with interlocking nailing is their early return to weight bearing and work.

Keywords: Tibia fracture, shaft fracture, intramedullary nail, interlocking nail

### Introduction

Tibia is the bone of leg, its shaft is vertical within the leg and cross section is triangular and it is anteriorly subcutaneous throughout its length, due to subcutaneous location it is more vulnerable to fracture in trauma. High energy trauma lead to open fracture while low energy causes closed fracture.

The surgical management of open tibia shaft fractures is controversial till now. Due to subcutaneous nature it is deficient in soft-tissue coverage and it also have the precarious blood supply. These two factors make it vulnerable to nonunion and infection. Higher the grade of the open fracture as per gustilo & Anderson higher is the rate of infection. The infection rate is almost 50% in grade-IIIB open fractures <sup>[1, 2]</sup>. So to reduce the above-mentioned complication we need to follow aggressive protocol for the open fracture which include immediate thorough wound wash, intravenous two or more antibiotics coverage, debridement of soft-tissue, fracture stabilization and fixation, soft-tissue coverage and bone grafting if required <sup>[3, 4]</sup>. For surgical management of close fracture such aggressive protocol is not required. Close fracture can be treated conservatively if it is unicortical. But bicortical and displaced fracture need surgical management.

Application of external fixator is one of the choices for stabilizing open fracture because it is relatively easier, quicker and has very limited effect on the blood supply of the tibia, these advantages are outweighed by the high rate of pin-track infection, difficulties in soft-tissue management and malunion <sup>[5, 6, 7]</sup>.

Interlocking intramedullary nail is now the treatment of choice because it has overcome almost all the complications mentioned above and also have contributory effects like minimal injuries to soft tissue, neurovascular structures and hematoma at fracture site <sup>[8-16]</sup>.

# Methodology

Eligibility: The articles which met the following criteria were identified:

Target population: those cases having open and closed tibia shaft fractures.

**Intervention:** External fixation for open fracture, plating, interlocking intramedullary nailing.

**Primary outcome:** In form of reoperation: any additional surgeries such as bone grafting, dynamization, revision nailing in case of nonunion and broken implant.

**Methodology:** Published or unpublished, prospective, randomised or quasi-randomised studies.

**Study identification:** All Studies were taken from a Medline search (1969 to 1998), PubMed, a SCIHUB, a COCHRANE database search, and hand searches from national and international orthopaedic journals.

**Quality assessment:** It was done by randomisation (present and concealed); blinding, double blinding. Follow up of patients and those lost the follow-up. The use of appropriate statistical methods for data collection, sample size calculations, charts and graphs, confidence intervals, appropriate tests. The overall quality score for the studies was calculated in percentage.

Data extraction all the information regarding inclusion and exclusion criteria of the population, surgical intervention and functional out-come from various articles were extracted by the authors. Also, the data were collected regarding reoperation, mode of reoperation, complications such as neurovascular injuries, compartment syndrome, infection, nonunion, malunion, anterior knee pain, shortening, angulation, varus and valgus deformity. The data extraction sheet of all the authors were verified for the accuracy.

Statistical analysis all data were entered in Excel 2010 and statistical analysis was performed using the statistical software SPSS 25.0. Quantitative data were expressed as mean values (with standard deviations) and categorical data were expressed as frequency (with percentages).

The functional outcome in our study were graded as excellent, good, fair or poor using Johner & Wruh's criteria.

### Conclusion

Tibia shaft fractures are common in the young people and predominantly occur in males as a result of road traffic accidents. Interlocking intramedullary nail is best surgical option as it shorten the operative time, undergo minimal surgical trauma, maintain the length and alignment of bone and prevent the rotational deformity. It also preserve the periosteal blood supply and causes minimal disturbances to fracture site hematoma thus help lowering infection rates. It also helps in early callus formation thus decreases the rate of non-union and mal-union and can be used in different fracture patterns. Patients can be mobilized from the first day postoperatively. The patient with ILIM nailing for tibia shaft fracture attain early mobility, shorter duration of hospital stay, early return to work and thus boost the morale of the patients. Interlocking intramedullary nailing can be regarded as gold standard for shaft fractures of tibia.

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