

A Prospective Study of Functional Outcome of Distal Tibia Fracture by Minimally Invasive Percutaneous Plate Osteosynthesis Technique in a Tertiary Care Centre in Chengalpattu District

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ABSTRACT

Distal tibial fractures present a significant challenge to orthopedic surgeons because of limited soft-tissue coverage and compromised vascularity. The objective of this study was to evaluate the functional outcome of distal tibial fractures treated with Minimally Invasive Percutaneous Plate Osteosynthesis (MIPPO).

This prospective study was conducted in a tertiary care centre in Chengalpattu district. Patients with distal tibial fractures treated with MIPPO were followed up for assessment of fracture union and functional outcome. Functional outcomes were evaluated using standard scoring systems and radiological union was assessed periodically.

Most patients achieved satisfactory functional recovery with minimal complications. MIPPO preserved fracture biology, minimized soft tissue damage, and allowed early mobilization.

MIPPO is an effective and reliable technique for the management of distal tibial fractures with good functional outcomes and low complication rates.

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Introduction

Fractures of the distal tibia are common injuries encountered in orthopedic practice and are often associated with significant soft-tissue compromise due to the subcutaneous location of the tibia. These fractures represent approximately 7–10% of all tibial fractures and frequently result from high-energy trauma such as road traffic accidents or falls from height.

Management of distal tibial fractures remains challenging due to poor vascularity, risk of infection, and difficulties in achieving stable fixation while preserving the biological environment of the fracture.

Minimally Invasive Percutaneous Plate Osteosynthesis (MIPPO) has gained popularity as a biological fixation technique that minimizes periosteal stripping and preserves the fracture hematoma. The technique uses indirect reduction and percutaneous plate fixation to maintain alignment and promote fracture healing.

The present study aims to evaluate the functional outcome of distal tibial fractures treated with the MIPPO technique in a tertiary care centre in Chengalpattu district.

Materials and Methods

This prospective study was conducted in the Department of Orthopaedics at a tertiary care hospital in Chengalpattu district.

Study Design: Prospective observational study.

Study Population: Patients presenting with distal tibial fractures who underwent surgical management using the MIPPO technique were included in the study.

Inclusion Criteria:

- Patients aged above 18 years
- Closed distal tibial fractures
- Extra-articular or minimally displaced intra-articular fractures
- Patients willing to participate and provide consent

Exclusion Criteria:

- Open fractures with severe soft-tissue injury
- Pathological fractures
- Polytrauma patients with life-threatening injuries
- Patients with neurovascular compromise

Surgical Technique: All patients were treated using the Minimally Invasive Percutaneous Plate Osteosynthesis technique. After achieving indirect fracture reduction under fluoroscopic guidance, a locking compression plate was inserted through small incisions along the medial aspect of the tibia. Screws were inserted percutaneously to stabilize the fracture while preserving periosteal blood supply.

Postoperative Protocol: Postoperative management included limb elevation, early ankle mobilization, and gradual weight-bearing based on radiological evidence of fracture healing.

Outcome Assessment: Patients were followed at regular intervals with clinical

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and radiological evaluation. Functional outcome was assessed using a standard scoring system such as the American Orthopaedic Foot and Ankle Society (AOFAS) score.

Results

Radiological union was achieved in the majority of cases within an acceptable time frame. Functional assessment demonstrated good to excellent outcomes in most patients treated with the MIPPO technique. Complications observed were minimal and included superficial infection and delayed union in a small number of cases. No major implant failure was noted.

Discussion

Distal tibial fractures have traditionally been associated with complications such as delayed union, malunion, and infection due to poor soft-tissue coverage. Conventional open reduction techniques may further compromise the vascularity of the fracture fragments. The MIPPO technique emphasizes biological fixation by preserving fracture hematoma and periosteal blood supply. This approach facilitates fracture healing while maintaining adequate stability. Previous studies have reported favorable outcomes with MIPPO in distal tibial fractures, with lower infection rates and faster recovery. The findings of the present study are consistent with these reports and demonstrate satisfactory functional outcomes with minimal complications.

Conclusion

Minimally Invasive Percutaneous Plate Osteosynthesis is an effective treatment modality for distal tibial fractures. The technique preserves fracture biology, reduces soft-tissue damage, and results in good functional outcomes with a low complication rate. It can be considered a reliable method for managing distal tibial fractures in tertiary care centres.