

## ORIGINAL RESEARCH

# Functional outcome of mippo technique using distaltibial locking plates in third tibia fractures-A retrospective study

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### ABSTRACT

Fracture shaft of tibia is the most common fracture of long bone. Axial and compression force is the most common cause for distal tibia fracture. Lower one third tibial fractures accounts for 37.8% of all tibial fractures<sup>1</sup>. Several methods of treatment are implemented including non-operative treatment, external fixation, intramedullary nailing, and internal fixation with traditional implants (standard screws and plates).<sup>2</sup>MIPPO technique using distaltibial locking plate is one such method in which percutaneously inserted plate is fixed at a distance proximal and distal to the fracture site through minimal exposure.<sup>4,5</sup> So this technique has less iatrogenic soft tissue injury and damage to the vascular bone as well as preserves the osteogenic fracture haematoma which is essential to prevent the potentially severe complications. This study aims to findout functional outcome after distal tibial locking plate using MIPPO technique. **Method:** 30 cases of lower third tibia fracture treated by MIPPO technique with distal tibial locking plate who came for review at the OPD were included in the study. The maximum period of follow up was 5 months. Patients were followed up every four weeks. At each assessment all patients were questioned with regards to pain, use of analgesics, stiffness, swelling, activities of daily living and use of walking aids and their responses using Mazur scoring system. **Result:** Majority of the study population scored good in the mazur scoring system, 30% showed fair outcome, 13% excellent and 10% poor outcome. **Conclusion:** 30 cases of closed distal one third tibial fractures which were treated with distal locking plates using MIPPO technique. The mean union time for fractures fixed by distaltibial locking plate is  $20.3 \pm 2.8$  weeks within a range of 16 – 28 weeks. The Incidence of complications were relatively less and presence of co-morbidities delayed the union. The functional outcome as measured by Mazur score, gave excellent to good results in 60% of the cases.

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### INTRODUCTION

Fracture shaft of tibia is the most common fracture of long bone. Axial and compression force is the most common cause for distal tibia fracture. Lower one third tibial fractures accounts for 37.8% of all tibial fractures<sup>1</sup>. Because of its location, the tibia is exposed to frequent injury. Several methods of treatment are implemented including non-operative treatment, external fixation, intramedullary nailing, and internal fixation with traditional implants (standard screws and plates).<sup>2</sup> However, each of these treatment options is associated with certain challenges.<sup>3</sup> Non operative treatment generally reserved to closed, stable, isolated, minimally displaced fracture caused by low energy trauma. Operative treatment indicated for most

tibial fractures caused by high energy trauma. Operative treatment allows early motion, provides soft tissue access, avoids complications associated with immobilization. MIPPO technique using distal tibiallocking plate is one such method in which percutaneously inserted plate is fixed at a distance proximal and distal to the fracture site through minimal exposure.<sup>4,5</sup> So this technique has less iatrogenic soft tissue injury and damage to the vascular bone as well as preserves the osteogenic fracture haematoma which is essential to prevent the potentially severe complications..<sup>5</sup> This study aims to findout the functional outcome after distaltibial locking plate using MIPPO technique.

**OBJECTIVES**

1. To study the functional outcome and results of MIPPO technique in lower third tibia fractures.
2. To compare the results of present study with those in literature.
3. To know the complications of MIPPO technique in lower third tibia fractures

**METHODOLOGY**

30 cases of distal third tibia fracture treated by distal locking plating technique at a tertiary care center, who came for review at the OPD were included in the study. The maximum period of follow up was 5 months.

**CRITERIA FOR SELECTION OF CASES  
INCLUSION CRITERIA**

1. Patients with closed lower third tibial fracture.
2. Patients aged between 18 and 60 years.

**EXCLUSION CRITERIA**

1. Patients with open fracture.
2. Patients with pilon fracture.
3. Aged less than 18 and more than 60.

30 patients who were treated with distal tibial locking plate who satisfies the above criteria, followed up in OPD were included in the study

**FOLLOW UP**

Patients were followed up every four weeks. At each assessment all patients were questioned with regards

**CLASSIFICATION OF INJURY**

**Table No. 1. Classification of injury**

TYPE	FREQUENCY	PERCENTAGE
A 1.1	3	10
A 1.2	13	43
A 1.3	1	3
A 2.1	2	7
A 2.2	4	13
A 3.2	3	10
A 3.3	2	7
B 1.2	1	3
B 1.3	1	3

**MAZUR SCORE AND FUNCTIONAL OUTCOME**

Majority of the study population scored good in the Mazur scoring system, 30% showed fair outcome, 13% excellent and 10% poor outcome.

**Table No. 2: Mazur score and functional outcome**

MAZUR SCORE	FUNCTIONAL OUTCOME	FREQUENCY	PERCENTAGE
80-90	EXCELLENT	4	13
70-79	GOOD	14	47
60-69	FAIR	9	30
<60	POOR	3	10

**COMPLICATIONS**

Total of 4 cases (13%) showed post operative complications. One case each of superficial infection and ankle stiffness and two cases of both deep

to pain, use of analgesics, stiffness, swelling, activities of daily living and use of walking aids and their responses were noted in the profoma.( MAZUR SCORING SYSTEM).On examination gait and skin thickening, swelling, tenderness and range of motion of ankle were evaluated. Antero-posterior and lateral radiographs of leg were made at the time of examination.

**RESULT**

Total 30 patients were included in this study. In this 17 were male and 13 were female.The mode of injury by fall 15patients, road traffic accident 10 patients, sports injury 4 patients and assault by 1 patient. In this 50% of patients fibula were fixed and 50 % fibula not fixed.

In the present study the mean time for union was 20.3 weeks with standard deviation of 2.8 weeks within a range of 16-28 weeks.40 %(12 patients) of the cases showed union by 19-21 weeks and 33%(10 patients) cases by 16-18 weeks. Two cases which were complicated by deep infection took more than 24 weeks for union. 20 % (6 patients) with union at 22-24 weeks.

The results of this study was comparable with other studies. In RongaM<sup>6</sup> series the mean time was 22.3 weeks, Lau TW<sup>8</sup> series showing a mean time of 18.7 weeks and Gupta RK<sup>9</sup>series having a mean time of 19 weeks. Whereas Ahmed MA<sup>7</sup> et al reported a mean time of 27.7 weeks for union.

infection and delayed union were observed in this study.

Non union was reported in 1 and 3 case(s) of Ronga M<sup>6</sup> series and Gupta RK<sup>9</sup> series respectively. No cases

of non union was reported in the present study.

RongaM et al<sup>6</sup>, Ahmed MA et al<sup>7</sup>, Lau TW et al<sup>8</sup> and Gupta RK et al<sup>9</sup> reported 3, 2, 8 and 1 case(s) of wound infection respectively. The present study reports 3 cases of wound infection, 2 deep and 1 superficial.

Delayed union was reported in three cases of Ahmed MA<sup>7</sup> series, five cases of Lau TW<sup>8</sup> series and seven cases of Gupta RK<sup>9</sup> series. The present study showed two cases of delayed union.

One case of implant failure was reported by Ahmed

MA et al<sup>7</sup>.

Lau TW et al<sup>8</sup> reported one and Gupta et al reported two cases requiring secondary procedure.

Two cases of wound breakdown was reported by Gupta RK et al<sup>9</sup>.

Although implant failure, secondary procedure and wound breakdown were not reported in our study, one case of ankle stiffness was present.

Hence in comparison with other studies, our study stands at par or better in terms of post operative complications.

**Table No. 3: Comparison of complications with other studies.**

Complication	RongaMet al <sup>6</sup>	Ahmed MA et al <sup>7</sup>	Lau TW et al <sup>8</sup>	Gupta RK et al <sup>9</sup>	Present study
Wound Breakdown	-	-	-	2	-
Superficial Infection	-	1	8	1	1
Deep infection	3	-			2
Chronic infection	-	1	-	-	-
Delayed union	-	3	5	7	2
Malunion	-	-	-	2	-
Non union	1	-	-	3	-
Ankle stiffness	-	-	-	-	1
Implant failure	-	1	-	-	-
Secondary procedure	-	-	1	2	-

## CONCLUSIONS

30 cases of closed lower one third tibial fractures which were treated by MIPPO technique in tertiary care center by various surgeons were followed up in the OPD in a period of 5 months.

### The conclusions of this study are:

- Most lower third tibial fractures were found in late middle aged men.
- Most commonly injured age group were in between 40-59 years.
- Males were more prone to injury compared to females, with fall being the commonest modality of injury.
- Right side was more commonly involved.
- AO type A 1.2 is the most common type of injury.
- Ipsilateral fracture of distal end of radius is the most common associated injury.
- The mean union time for fractures fixed with distal locking plating technique is  $20.3 \pm 2.8$  weeks within a range of 16 – 28 weeks.
- Incidences of complications were relatively less in the present study.
- Presence of co-morbidities delayed the union.
- The functional outcome as measured by Mazur score, gave excellent to good results in 60% of the cases.

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