



MINIMALLY INVASIVE PERCUTANEOUS PLATE OSTEOSYNTHESIS FOR PROXIMAL TIBIAL FRACTURES-A PROSPECTIVE STUDY

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ABSTRACT

**INTRODUCTION:** Proximal tibial fractures are most common in road traffic accidents,are difficult to manage due to limited soft tissue coverage. Conventional method of plate and screws can devitalize soft tissue. To overcome such complications MIPPO TECHNIQUE is widely used.

**METHODS:** The functional outcome of proximal tibial fractures in 30 patients treated by MIPPO technique has been evaluated. These patients were followed for 6 months postoperatively and assessed by modified Rasmussen score.

**RESULTS:** In our analysis of 30 patients ,18(60%) patients had excellent results, 9(30%) patients had good results, 3(10%) had fair outcome.

**DISCUSSION:** Fracture of proximal tibia involves lot soft tissue damage,this compromised soft tissue condition must be considered while treating them. MIPPO is more of biological fixation with less soft tissue damage,hence wound healing is faster.

**KEYWORDS :** Minimally Invasive Percutaneous Plate Osteosynthesis.,biological Fixation,proximal Tibia Fractures.

Proximal tibial fractures with intraarticular extensions are very difficult to manage<sup>1</sup>. Complex biomechanics of weight bearing position, complex ligamentous stability and articular congruency are the main concerns to the surgeons in these type of fractures.

The ideal treatment of high energy tibial plateau fracture is controversial. Open reduction and internal fixation with plate and screws method helps to achieve good anatomical reduction<sup>2</sup>,but devitalize the soft tissue and the rate of wound infection is high.

To prevent this complication the trend of treatment is towards biological fixation with minimal soft tissue damage which can be accomplished by MIPPO technique

**MATERIALS & METHODS**

This prospective study was conducted from November 2017 to June 2019. In this 30 patients of proximal tibial fractures extending to diaphysis,closed fractures, schatzker type 2 to type 6 and patient's age more than 18 years were included. Patients with compound fractures, impending compartment syndrome, Schatzker type 1 and patient's age less than 18 years were excluded from the study. The consent of the patient for anesthesia and surgery was obtained.

Patient was Immobilized and adequate limb elevation was given. Patient were placed in supine position, under MIPPO technique anterolateral approach skin incision was made in between gerdy's tubercle and anterior to head of fibula. Fascia was incised,indirect reduction of fracture was done by manual traction and reduction was maintained with reduction clamps. Appropriate size locking compression locking plate was placed extra-periosteally and fixed with K- wires temporarily.

Alignment was checked and fixed with both proximal and distal screw. Depressed fragments were elevated in some cases,void filled with bone grafting, 6.5mmscrews were fixed proximally and 5mm cortical locking screw was applied through multiple mini stab incisions. K wires were removed.

Postoperatively wound was inspected at 2<sup>nd</sup> post operative day. Post-op X RAY was taken. Non-weight bearing and static

quadriceps exercises were started on the 1<sup>st</sup> post operative day .Knee range of movements and quadriceps strengthening were started from 2<sup>nd</sup> post operative day .

Patient were followed at 6 weeks,3 months,6 months intervals for functional outcome by modified Rasmussen criteria<sup>4</sup>.

**RESULTS:**

In our 30 patients,the mean age group was 44.23years , 22 (73. 33%) patients were male 8 (26.66%)patients were female.12 patients had right side tibial plateau fracture,18 patients had left side tibial plateau fracture.Road traffic accident was the most common mode of injury (26 patients).10 patient had schatzker type 2 fracture,12 patients had schatzker type 5, 8 patient had schatzker type 6 fracture.22 patients had knee range of movements > 120 degrees, 7 patients had >90- 120 degrees, 1 patient had knee range of movements of 80 degrees.

In (figure 3 , 4) patient with schatzker type 6 with flexion of > 120 degrees.

The average time for bone union was 14.16 weeks .Functional outcome of 30 cases of proximal tibial fractures is provided in Table 1.Functional outcome was divided into 4 categories based on modified rassmusen criteria,18 patients had excellent outcome ,9 patients had good outcome, 3 patients had fair outcome.There was no poor outcome in our study.27(90%) patients had acceptable outcome which are comparable with other studies

Complications were noted in 4 patients ,2 patients had knee stiffness,one patient had superficial skin infection,one patient had screw backout.(Fig:5)

**TABLE:1**

Functional Interpretation (modified Rasmussen Criteria)	No Of Patients	Percentage
Excellent	18	60
Good	9	30
Fair	3	10
Poor	0	0
Total	30	100

FIGURE: 1



PRE OP XRAY

FIGURE: 2



AT 6 MONTHS

FIGURE: 3



FIGURE: 4

FIGURE: 5



Complication: Screw back out.

### DISCUSSION:

Treatment of proximal tibial fractures are challenging due to limited soft tissue cover and even a small irregularity on articular surface in the joint leads to early arthritis, instability and stiffness<sup>3</sup>. There are various treatment options from closed reduction and casting to open reduction internal fixation with plate and screws. Open reduction and internal fixation with plate and screws can cause extensive devitalization of soft tissue leading to delayed wound healing and infections. In our study we managed these fractures by minimally invasive percutaneous plate osteosynthesis (MIPPO). This technique is widely accepted for treatment for peri articular fractures in which we reduce and stabilize the fracture without opening the fracture site with minimal incision providing favourable environment for fracture healing. In our study most of the patients were male who are in active age group as they involve in travel sports and motor riding activities.

It shows high velocity nature of tibial plateau fracture which can be compared with Albuquerque et al study<sup>5</sup>.

In our series of 30 patients 77.33% of patients had knee range of movements of >120 degrees. Mean range of movements was 122.83 degrees which is comparable with Changwug oh et al study<sup>6</sup>.

In our study we used modified Rasmussen criteria for evaluation of functional outcome. 90% of the patients had acceptable outcome which can be compared with Hassain Raza et al<sup>7</sup> and Neil Rohra et al studies.<sup>8</sup>

In our study average time for bony union was 14.16 weeks. All the fractures united. There was no case of non union in our study.

There were 4 complications noted in our study. Two patients had knee stiffness due to poor follow up, which recovered after physiotherapy. One patient had superficial skin infection which resolved following antibiotics. One patient had screw back out.

### CONCLUSION:

MIPPO technique is simple and more effective compared to the conventional plating system. It is more of a biological fixation with less soft tissue damage hence wound healing is faster.

### DECLARATION OF PATIENT CONSENT

The authors certify that they have obtained all appropriate patients consent forms. In the form, the patients have given their consent for their images and other clinical information to be reported in the journal. The patients understand that name and initial will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Nil

### CONFLICTS OF INTEREST:

There are no conflict of interest

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