



## A STUDY OF MANAGEMENT OF PROXIMAL THIRD TIBIAL FRACTURES USING MINIMALLY INVASIVE PLATE OSTEOSYNTHESIS (MIPPO) WITH LOCKING COMPRESSION PLATES

### Orthopaedics

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### KEYWORDS

#### INTRODUCTION:

The Tibial plateau fractures were first called as "bumper" or "fender" fractures.

The Tibial plateau fractures are one of the most prevalent intra-articular fractures. Tibial plateau fractures occur due to strong valgus or varus forces combined with axial loading, i.e., fall from a height, road traffic accidents, industrial accidents, athletics, or minor injuries like stumbling, falling from steps. The Tibial plateau fractures constitute 1% of all fractures and 8% of fractures in the elderly. Isolated lateral plateau fractures constitute 55% to 70% of tibial plateau fractures. 10% to 25% are isolated medial plateau fractures, and the rest 10% to 30% are bicondylar fractures<sup>1</sup>.

Earlier, there was great reluctance towards these fractures' operative management because of a lack of proper implants and adequate fixation techniques. However, due to a better understanding of types of implants, internal fixation principles, better care of the soft tissue, the treatment of Tibial plateau fractures is changing from conservative to surgical depending upon the fracture pattern to achieve optimal knee function.

Moore attempted to create a classification system that also considers the lateral X-ray view<sup>2</sup>.

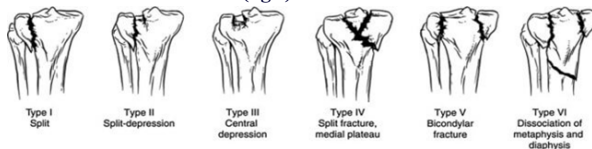
Dennis P. Weigel et al. studied the long-term outcomes of treating high energy fracture of tibial Plateau. They concluded that patients with a high energy fracture of Tibial Plateau treated with external fixation have a good prognosis for satisfactory knee function five years after injury<sup>2</sup>.

Gosling et al. presented their results in a less invasive stabilization system in bicondylar fractures of the Tibial Plateau and concluded that such injuries could be treated satisfactorily with lateral column locking plates<sup>3</sup>.

Luo developed the three-column classification system based on the CT-scan axial view. Luo classification is a helpful method concerning the correct approach choice as it is based on fracture location<sup>4</sup>.

S.M. Chang classified the Tibial plateau division into four columns, thus identifying Posterolateral and Posteromedial columns

#### Schatzker's Classification (fig 1) :



#### MATERIALS AND METHODOLOGY:

We prospectively reviewed 30 cases of proximal tibial fractures operated in our institute from June 2017 to November 2019, out of which 1 case is of Schatzker's Type-1 Tibial condyle fracture associated with osteoporosis immobilized with above elbow slab followed by definitive treatment by proximal tibial locking plate, 12 cases are Type-2 proximal tibial fractures treated with locking plate fixation and bone grafting from the ipsilateral iliac crest. Five cases are Type-3 proximal tibial fractures treated with plating and bone grafting.

Four are of Type-5 fractures, and the rest of the 8 are Type-6 treated with dual plating and bone grafting from the bilateral iliac crest. All the patients were under periodic follow up every three weeks until one year.

#### DISCUSSION:

The fixation of proximal tibial fractures remains a challenge for the surgeon. A well-designed preoperative surgical strategy with minimal unnecessary soft tissue injury must be designed to achieve a satisfactory outcome. Several treatment modalities were developed over the past few years like Above-knee pop cast immobilization, internal fixation with plating, Hybrid fixator. Above knee pop casing for prolonged duration had complications like malunion, non-union, knee stiffness. This type of complication can be avoided by internal fixation with plating. In this article, proximal tibial locking plates, 4mm cc screws with washers were used for fixation. Operative treatment goals are anatomical reduction, especially restoring the articular congruity in fractures involving tibial condyles, stable fixation for early rehabilitation, avoidance of complications like malunion, non-union, knee stiffness. Our study included a case series of 30 proximal tibial fractures followed up for one year and showed excellent results in functional outcome with greater ROM and better functional outcome. Here, the ORIF with screws and plates had the best results. Reduction of condylar fractures is done using condylar clamps, and a bone graft is placed, temporarily fracture fragments are stabilized with multiple plain K-wires passed sub-chondral in converging manner to maintain articular congruity<sup>6</sup>. Bone grafting is mandatory in case of split depression, pure depression, bicondylar fractures, osteoporosis with metaphyseal extension. Various techniques are available to elevate the depressed fractures using bone graft by making an anteromedial window and direct elevation from the proximal incision and placing the graft. In cases of bicondylar fractures, dual plating must be considered, but the risk of infection chances are very high to prevent varus collapse, and infection lag screws (4mm CC screws) can be used for supporting the medial condyle.

#### RESULTS:

Patients will be evaluated by the clinical scoring system of RASMUSSEN SCORE. Thirty patients are followed up periodically and assessed using four parameters like Pain, ROM, Loss of quadriceps function, and activity limitation. Out of 30 proximal tibial fractures, 24 patients had excellent to a good outcome. The rest six patients had a fair outcome after a year follow up. Out of 30 patients, three patients had knee stiffness, 3 had malunion in valgus position, five wound infections. The advantages of MIPPO are smaller incision, decreased blood loss, better callus formation, better callus formation, decreased soft tissue injury and less rate of infections.

#### Rasmussen Score (Fig 2) :

Pain	Points
None	6
Occasional	5
Stabbing pain in certain positions	3
Constant pain after activity	1
Significant rest pain	-3
Walking capacity	
Normal walking capacity for age	6
Walking outdoors (>1 h)	5
Walking outdoors (15 min-1 h)	3

Walking outdoors (<15 min)	1
Walking indoors only	0
Wheelchair/bedridden	-3
Knee extension	
Normal	4
Lack of extension (<10°)	2
Lack of extension (>10°)	0
Lack of extension (>20°)	-2
Total range of motion	
Full	6
At least 120°	5
At least 90°	3
At least 60°	1
<60°	-3
Stability	
Normal stability in extension and 20° flexion	6
Abnormal stability in 20° flexion	4
Instability in extension (<10°)	2
Instability in extension (>10°)	0
Power of quadriceps	
Grade 5	2
Grade 3-4	1
Grade <3	2
Maximum score	30
Excellent	28-30
Good	24-27
Fair	20-23
Poor	<20

6. Chandak RM. Fixation of inter-condylar eminence fragment in Bi-condylar Tibial Plateau fracture- Technical note .Trauma International May-Aug 2016;2(2): 50-52 .



**CASE 1 : PRE OP & POST OP X-RAY( FIG 3) CLINICAL IMAGE**



**CASE 2: PRE-OP & POST OP X-RAY (FIG 4)**



**CLINICAL IMAGE SHOWING KNEE FLEXION AT 1 YEAR (FIG 5)**

**REFERENCES :**

1. Watson JJ and Wiss AD. Fractures of proximal tibia and fibula, chapter 44 in Rockwood and Green's fractures in adults, Bucholz RW and Heckman JD Ed,5th ed vol 2: Philadelphia, Lippincott Williams and Wilkins 2001;1799-1839.
2. Weigel DP, Marsh JL, High energy fracture of the tibial plateau: knee function after longer follow-up. J Bone Joint Surg 84-A; 1541-1551, 2002.
3. Gosling T, Schandelmaier P, Muller M, Hankemeier S, Wagner M, Krettek C. Single lateral locked screw plating of bicondylar tibial plateau fractures. Clin Orthop Relat Res. 2005 Oct;439:207-14.
4. Luo CF, Sun H, Zhang B, Zeng BF. Three-column fixation for complex tibial plateau fractures. J Orthop Trauma. 2010 Nov;24(11):683-92.
5. Moore TM, Harvey JP Jr (1974) Roentgenographic measurement of tibial plateau depression due to fracture. J Bone Joint Surg Am 56: 155-160.