

## Outcome of tibial plateau fractures managed with locking tibia plates- A clinical study

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### Abstract

**Background:** Low and high-energy tibial plateau fractures usually result from axial loading in combination with varus/valgus stress forces, present a variety of soft tissue and bony injuries that can produce permanent disabilities. The present study was conducted to assess outcome of lateral locking plate in management of tibial plateau fractures.

**Materials & Methods:** This study was conducted in the department of orthopaedics in 2014. It consisted of 82 patients having tibial fractures. Patient history, local and general examination was performed in patients. X-ray tibia was done and CT scan was also performed wherever necessary. Fractures of type I, II with <5mm of articular depression, V and VI were reduced by ligamentotaxis and manipulation on traction table and proceeded with MIPPO. Fractures of type II with >5mm of articular depression, type III and type IV were directly taken for open reduction.

**Results:** Out of 82 patients, 42 were males and 40 were females. The difference was non – significant ( $P = 1$ ). Age group 21-30 years had 10 males and 8 females, age group 31-40 years had 26 males and 22 females, age group 41-50 years had 6 males and 10 females. The difference was non – significant ( $P = 0.1$ ). 66 patients had no complication. 3 had knee joint deformity, 2 had implant failure, 1 had varus deformity, 4 had superficial infection, 3 had deep infection, 3 had limping. The difference was non - significant ( $P > 0.05$ ). 42 had no particular depression, 40 had <2mm, 2 had 2-5mm and 2 had >5mm of articular depression. The difference was non – significant ( $P > 0.05$ ).

**Conclusion:** Displaced fractures such as Schatzker Type I are well managed with closed reduction and internal fixation with MIPPO technique which gives excellent results. ORIF can be done in type II, type III, and type IV fractures.

**Keywords:** articular, failure, tibial

### 1. Introduction

Low and high-energy tibial plateau fractures usually result from axial loading in combination with varus/valgus stress forces, present a variety of soft tissue and bony injuries that can produce permanent disabilities. Tibia shaft fractures are the most common long bone fractures. Closed fractures of the tibial shaft are common. They usually occur in young and active patients and are often due to high-energy trauma like motor vehicle accidents, sports or falls from height. Direct trauma like road traffic accidents often cause concomitant severe soft tissue damage with a high incidence of open fractures. Tibial shaft fractures are severe injuries and may result in permanent disability [1].

These fractures constitute about 8% of all fractures in elderly. Potential complications vary with the degree of trauma energy and include open fractures requiring coverage procedures, compartment syndrome and neurovascular injury. Associated injuries include cruciate and collateral ligament injuries and meniscal tears. Complex fractures include significant articular comminution and depression, condylar displacement, metaphyseal fracture extension and open or closed soft tissue injuries [2].

Different treatment modalities are used for the management of different tibial fractures. Stable, non-displaced fractures of the tibial shaft can be treated conservatively by cast application. Intramedullary nailing is indicated for open and closed isolated tibia shaft fractures. This includes oblique, transverse fractures, segmental fractures, torsion fractures and debris fractures of the tibial shaft as well as open fractures even with bone loss [3]. Conventional plate osteosynthesis used to be the method of

choice for tibial shaft fractures without soft tissue injury until recently being replaced by intramedullary nailing with locking screws. Other options such as new implants and surgical techniques have provided new options for the treatment of tibial plateau fractures [4].

The present study was conducted to assess outcome of lateral locking plate in management of tibial plateau fractures.

### 2. Materials & Methods

This study was conducted in the department of orthopaedics in 2014. It consisted of 82 patients having tibial fractures. It involves males (42) and females (40). Patient demographic record such as name, age, gender etc was recorded.

Fractures with less than 4 weeks of history of trauma and closed fractures were involved in the study. Pathological fractures, fractures in children (< 18 years), pregnant females, crush injuries and previously operated fractures were excluded from the study. Patient history, local and general examination was performed in patients. X-ray tibia was done and CT scan was also performed wherever necessary. Fractures of type I, II with <5mm of articular depression, V and VI were reduced by ligamentotaxis and manipulation on traction table and proceeded with MIPPO. Fractures of type II with >5mm of articular depression, type III and type IV were directly taken for open reduction. Results thus obtained were subjected to statistical analysis. P value < 0.05 was considered significant.

### 3. Results

Table I shows that out of 82 patients, 42 were males and 40 were females. The difference was non – significant ( $P = 1$ ).

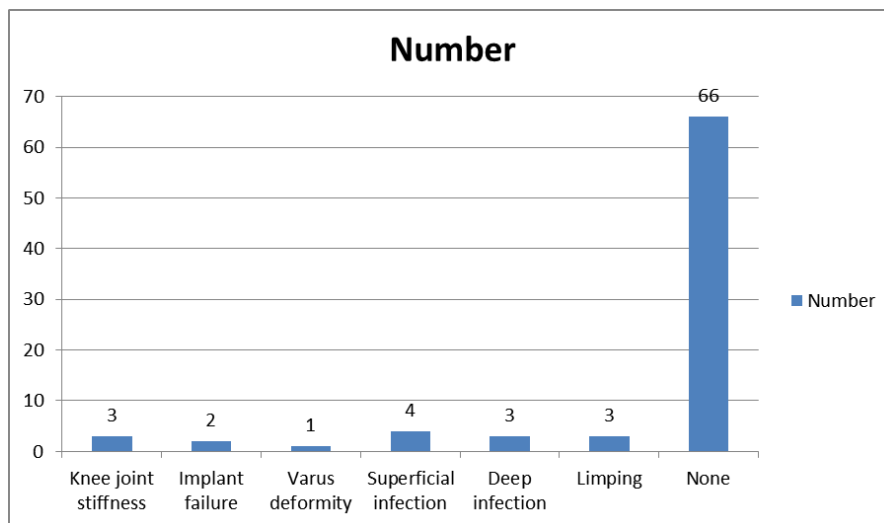
Table I shows that, age group 21-30 years had 10 males and 8 females, age group 31-40 years had 26 males and 22 females, age group 41-50 years had 6 males and 10 females. The difference was non – significant (P- 0.1). Graph I shows that 66 patients had no complication. 3 had knee joint deformity, 2 had implant failure, 1 had varus deformity, 4 had superficial infection, 3 had deep infection, 3 had limping. The difference was non - significant ( $P > 0.05$ ). Graph II shows that 42 had no articular depression, 40 had <2mm, 2 had 2-5mm and 2 had >5mm of articular depression. The difference was non – significant ( $P > 0.05$ ).

**Table 1:** Distribution of patients

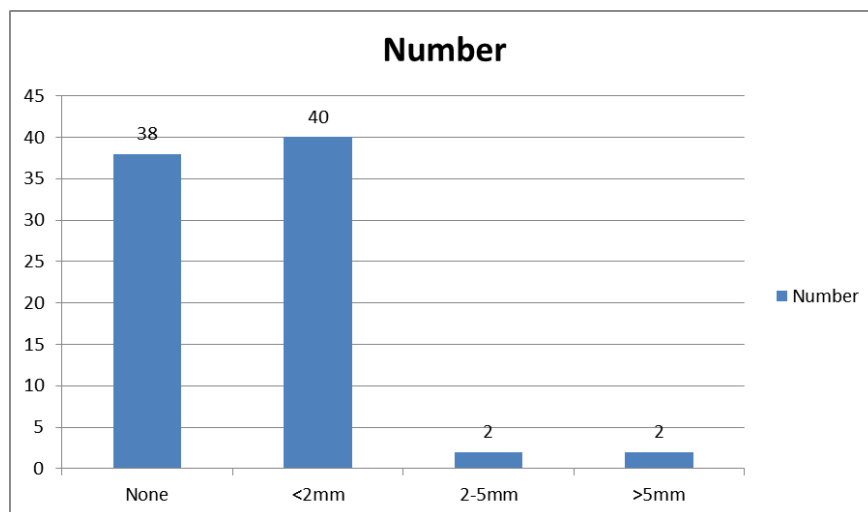
Male	Female	P value
42	40	1

**Table 2:** Age distribution of patients

Age group	Male	Female	P value
21-30	10	8	0.1
31-40	26	22	
41-50	6	10	
Total	42	40	



**Fig 1:** Complications in patients



**Fig 2:** Articular depression in patients

**4. Discussion**

Fractures of tibia plateau are quite challenging to manage & difficult to reduce, align and stabilize and are prone to develop wound complications and infections. The spectrum of injuries to the tibia plateau is so variable that no single method has proven uniformly successful. The goal of the any therapy of tibial shaft fractures are full weight bearing fast, solid bony union, avoidance of pseudarthrosis, regain full range of motion of the knee and ankle joint, avoiding infections and further soft tissue damage. High energy, complex bicondylar tibia plateau fractures, typically present with an associated severe soft-tissue injury. The present study was conducted to assess outcome of

lateral locking plate in management of tibial plateau fractures [5].

In our study, out of 82 patients, 42 were males and 40 were females. We found that maximum fractures were seen in age group 31-40 years (26 males and 22 females). Our results are in agreement with Gaston *et al.* [6].

In our study, maximum number of patients (66) had no complication followed by superficial infection, knee joint deformity, deep infection, limping, implant failure and varus deformity. This is in agreement with Krettek C *et al.* [7]. In our study, 51% of patients had no articular depression. This is in agreement with Wiss DA *et al.* [8].

The implementation of contemporary reduction techniques and novel implants allow the surgeon to attain stable fixation without compromising the surrounding soft tissues. The benefit of MIPPO plating include biological fixation without extensive soft tissue stripping, earlier mobilization and shorter duration of hospital stay. This could partially be attributed to the associated injuries that these patients had and also to the reluctance of the patients to go home without suture removal to avoid transport expenses<sup>[9]</sup>.

The selection of traditional implants is very important. For supporting comminuted or depressed lateral articular fractures, locking plate system is not ideal. The system provides two proximal screws that each angle slightly away from the articular surface. This configuration supports the medial side from collapsing into varus, but it is difficult to get these screws proximal enough to support the lateral subchondral bone. In cases that require implants to support the subchondral bone, other implants should be considered<sup>[10]</sup>.

## 5. Conclusion

Displaced fractures such as Schatzker Type I are well managed with closed reduction and internal fixation with MIPPO technique which gives excellent results. ORIF can be done in type II, type III, and type IV fractures.

## 6. References

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