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## Study on complications of tibial plateau fractures

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### Abstract

**Introduction:** There are about 6 surgical approaches in tibial plateau of which, most commonly used ones are the anterolateral and anteromedial incisions depending on the lateral or medial plateau respectively. One care to be taken while dealing with lateral plateau approach is not to go more posterior as there is likely injury to lateral popliteal nerve and in addition, tibialis anterior needs to be elevated subperiosteally in toto from its attachment rather than splitting into fibers

**Methodology:** During this period 60 patients were treated for tibial plateau fractures in which all patients were treated by internal fixation, out of which, 8 with percutaneous cancellous screw fixation method, 10 with ORIF with buttress plate and 12 with ORIF with buttress plate and bone grafting.

**Results:** The knee range of motion was excellent to very good, gait and weight bearing after complete union was satisfactory, knee stiffness in 3 cases, wound dehiscence and infection in 1 cases and non-union in none of our cases was noted

**Conclusion:** Overall surgical treatment is useful in osteochondral fractures of tibial plateau particularly depressed and displaced. It is associated with very few complications provided it is carried out properly

**Keywords:** Tibial plateau fractures, Complications, Tibial surgery

### Introduction

The luxuries of our life in the present time is at the cost of rapidly increasing industrialization, urbanization and mechanisation – so also the traumatic cases are on increase. Crowded cities, irregular traffic arrangement, fast moving vehicles are the most important contributory factors causing bony injuries, particularly polytrauma, comminuted fractures and also the soft tissue injury. Tibial plateau fracture is one of them. Tibial plateau fractures have been studied and reported extensively and exhaustively but still controversy exists over its management, whether surgical or conservative. Excellent results have been published in both groups. On one hand, we have got a group of surgeons who says that most of the tibial plateau fractures [eighty-five percent] can be managed by conservative treatment and on the other hand, other group says conservative treatment means therapeutic nihilism and except for undisplaced fracture every tibial plateau fracture should be operated upon to achieve anatomical reduction and rigid internal fixation. Even undisplaced tibial plateau fractures should be operated, so that early mobilization of knee it is possible [1-3].

There are about 6 surgical approaches in tibial plateau of which, most commonly used ones are the anterolateral and anteromedial incisions depending on the lateral or medial plateau respectively. One care to be taken while dealing with lateral plateau approach is not to go more posterior as there is likely injury to lateral popliteal nerve and in addition, tibialis anterior needs to be elevated subperiosteally in toto from its attachment rather than splitting into fibers. Even in bicondylar fracture dual plating by open methods is not advised now-a-days because of likely complication of wound dehiscence. In such cases the approach should be on side at which it is more comminuted or depressed and the intact soft tissue. Two incisions over the knee joint are not advocated, if so the minimum distance between them should be 5-7cm. Single anterior midline incision as in TKR can also be employed in any type of tibial plateau fracture [4].

Direct posterior or posteromedial approach is used in coronal fractures; the incidence of such fracture is very rare [5].

In all the cases periosteum should be elevated as minimal as possible, in doubtful cases, joint needs to be opened and articular surface to be viewed. Before fixing the plate with screws the wound is checked for approximation without tension of else the incision has to be modified.

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## Methodology

The patients were first seen in the casualty. The history was taken followed by general and local examination of the patient. Concerned specialists undertook appropriate management of the associated injuries. Intensive care was given to those patients who presented with shock and immediate resuscitative measures were taken. Once the patient's general condition was fit, relevant X-rays were taken. Higher investigations such as CT scan were done for tibial plateau fractures when ever necessary.

The treatment method was based on the type of fracture, the amount of displacement and the amount of depression of the tibial plateau. Surgical method of treatment was done for all type of fracture and amount of displacement or depression and the degree of instability. The patients were taken for surgery at the earliest possible time depending on their medical condition, skin condition and the amount of swelling. All surgeries were done under C-arm image intensifier control. Fractures were fixed either with percutaneous technique or by open reduction and internal fixation. The fixation devices consisted of T Buttress plate, L Buttress plates, hockey stick shaped plated, 4.5 mm cortical screws and 6.5mm cannulated and non-cannulated cancellous screws. Bone grafts were used in depressed and comminuted fractures. The source of bone graft was ipsilateral iliac crest of femoral condyles.

Postoperatively patients were immobilized with an above knee posterior slab or a compression bandage for 3 weeks. The sutures were removed on the 12<sup>th</sup> postoperative day. Antibiotics were given till suture removal by 5 days of intravenous and 7 days of oral. The patients were advised static quadriceps exercises for initial 3 weeks followed by passive range of motion with protected knee brace and non-weight bearing crutch walking up to 6 weeks after 6 weeks knee mobilization and weight bearing crutch walking. An immediate postoperative X-ray was also done later on repeated at 6 weeks, 3 months, 6 months and 9 months.

The first follow up was done at 2 weeks, during which the surgical scar was inspected and range of movements noted. The second follow up done at 6 weeks during which an X-ray was taken to look for signs of fracture union and loss of reduction if any.

The third follow up was done at 3 months during which one more X-ray was done and a clinical evaluation of union done. Based on the clinical and radiological signs of union patients were allowed partial weight bearing and gradually progressed to full weight bearing. The patients were then followed up at 6 months and 9 months, during which time the anatomic and functional evaluation was done using the modified Rasmussen clinical and radiological criteria.

Totally 30 patients were treated for tibial plateau fractures in which all patients were treated by internal fixation, out of which, 8 with percutaneous cancellous screw fixation method, 10 with ORIF with buttress plate and 12 with ORIF with buttress plate and bone grafting.

## Results

**Table 1:** Frequency of Sex incidence

	Frequency	Percent
Male	54	90
Female	06	10
Total	60	100

In this study 90% were male patients and 10% patients were female patients' highly significant association of this study with male patients.

**Table 2:** Frequency of Age incidence

AGE	Frequency	Percent
<30	06	10
31-40	12	20
41-50	30	50
51-60	12	20
Total	60	100

In this study 70% were in the 3<sup>rd</sup> and 4<sup>th</sup> decade highly significant association fracture in the 4<sup>th</sup> and 5<sup>th</sup> decade.

**Table 3:** Frequency of Occupational incidence

Occupation	No. of cases	Percentage
Employee	18	30
Student	06	10
Businessman	18	30
Housewife	06	10
Labourer	12	20
Total	60	100%

The high incidence of fracture is seen in occupation involved in more mobility like businessman and employee which is around 60%.

**Table 4:** Frequency of mode of Injury

Mode Of Injury	Frequency	Percentage
R.T.A	38	63.33
F.F.H	14	23.33
F.L.S	08	13.34
Total	60	100.00

In this study mode of injury is highly associated with road traffic accident which accounts for about 63.33%.

**Table 5:** Frequency of Complications

Complications	No. of Cases	Percentage
Knee stiffness	06	10%
Varus deformity	02	3.4%
Infection and wound dehiscence	00	0.0%
Normal	52	86.6%
Total	30	100%

All fractures united within expected time except one with varus deformity, not a single case of nonunion was noted in our series. The one cases with varus deformity also had stiffness of the knee joint.

## Discussion

In our series we have not formulated any criteria as to particular method of fixation for particular type of fracture. So each case was individualized and treated accordingly as it needed. Most of the type I, some type II and a case of type IV were treated with percutaneous cancellous screw fixation. The split fracture, of >3 mm displacement was treated by ORIF. Bone grafting was included along with ORIF with Buttress plate and screws in type II, III, V and VI wherever necessary. The period of immobilization was standardized to 3 weeks for all type of fracture.

The major problem faced by us during the study was knee stiffness and varus deformity. The knee stiffness might be attributed to careless physiotherapy by the patient.

In spite with all these associated bony fractures ligament injuries and complications, we are able to achieve 40% excellent result 43.3% good results (overall 83.3% acceptable results) with our standard surgical care using various terms of

functional outcome. These results are comparable and on par with other documented standard studies.

Roberts J.M. <sup>6</sup>	-	93% acceptable
Seppo E. <sup>7</sup>	-	86% satisfactory
Sirkin <sup>8</sup>	-	86% Satisfactory
Our study	-	83.3% satisfactory

We have employed conventional techniques though we had satisfactory results with the standard conventional methods. Probably, if the follow up period was longer than 6 months, our results would have been more than satisfactory.

### Conclusion

- Complication seen in our series are knee stiffness and varus deformities these complications are mainly seen in high energy injuries
- Overall surgical treatment is useful in osteochondral fractures of tibial plateau particularly depressed and displaced. It is associated with very few complications provided it is carried out properly

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