

Original Research Article

## A Study on Management of Tibial Plateau Fractures

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**Abstract:** Fractures involving joints are the most serious, resulting in limitation of movement, instability, eventual arthritis. Intra articular fractures are frequently comminuted with small fragments, which are difficult to reduce and immobilise. Capacity of the articular surface to heal is limited. Fracture of tibial plateau comprises 1% of all fractures and 8% of the fractures of elderly. To study the various modalities of treatment the present study conducted in the st. theresa hospital, Hyderabad. Total of 16 cases observed in this 11 cases were due to motor vehicle accident. Out of 16, 14 were males and 2 females. 6 cases were treated with percutaneous cancellous screw fixation which shows excellent prognosis.

**Keywords:** Tibial plateau fracture, buttress plating, percutaneous screw fixation, long leg cast, buttress with bone graft

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### INTRODUCTION

Definition- according to Moor- plateau fracture is a compression injury of tibial condyle in which the central articular surface is fractured or the condyle is depressed without significant injury to capsule or ligaments [1]. Plateau fracture is a relatively stable fracture of the knee joint, because owing to axial impacting stress. Fracture of the proximal tibia especially tibial condyle fractures are challenging to the orthopaedic surgeon because of variety and complexity. Fractures of tibial plateau comprise 1% of all fractures and 8% of the fractures of elderly. Because the proximal tibia is an integral part of the knee mechanism, alteration of anatomy caused by fractures often result in functional impairment. The sequelae of knee stiffness, joint instability, painful ambulation, limb malalignment, post traumatic arthritis that may result from these injuries are of major concern to the orthopaedician. With an idea of overcoming these disabling problems treatment of plateau fractures underwent several modifications from complete prolonged uninterrupted enforced immobilisation to anatomic reduction, early active mobilisation of the joint. Life is movement, movement is life. This should be the guiding principle of fracture care. Full active pain free mobilisation results in rapid return of normal blood supply to both the bone and soft tissues. It also

enhances the cartilage nutrition by the synovial fluid and when combined with partial weight it greatly decreases the post traumatic osteoporosis by restoring equilibrium between bone resorption and bone formation.

### AIMS & OBJECTIVES

To study the various modalities of treatment and their outcome so as to give the patient the pre injury state

### MATERIALS AND METHODS

A retrospective study was undertaken in the treatment of tibial plateau fracture by utilising various modalities of treatment mentioned in st. Theresa's hospital, Hyderabad in the period of 2009.

### Inclusion criteria:

Only isolated tibial condyle fracture were included in the study. Avulsion fractures, tibial plateau fractures associated with other skeletal fractures, fractures of inter condylar eminence were excluded

### RESULTS

In the study 16 cases of tibial plateau fractures were treated in the orthopaedic department, St. Theresa's hospital, Hyderabad.

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### Table-1: Method of Management

Sl.no	Mode of management	No.of cases	percentage
1	Buttress plating	4	25%
2	Percutaneous cancellous screw fixation	6	37.50%
3	Long leg cast	3	18.75%
4	Buttress plate with bone graft	3	18.75%

**Table-2: Mechanism of Injury**

Sl.no	Mode of injury	No. Of cases	percentage
1	Motor vehicle accident	11	68.75%
2	Auto pedestrian	3	18.75%
3	others	2	12.50%

Automobile accidents predominated the list of mechanism of injury. Others include fall from a scooter, fall while getting down the bus.

Tibial plateau fractures occurred in wide range of age groups, youngest being 18 years and oldest 60 years.

**Table-3: Age Incidence**

Age group	Number	Percentage
Less than 20 years	1	6.25%
20-30 years	3	18.75%
31-40 years	5	31.25%
42-50 years	5	31.25%
51-60 years	2	12.50%

**Table-4: Sex Incidence**

Sex	No. Of cases	percentage
Male	14	87.5%
female	2	12.5%

**Table-5: Side Incidence**

Side	No. Of cases	percentage
Right	8	50%
left	8	50%

**Table-6: Fracture Classification**

Fracture classification (Schatzker)	No. Of cases	percentage
I	5	31.25%
II	5	31.25%
III	-	-
IV	-	-
V	5	31.25%
VI	1	6.25%

**Table-7: Method of Management and Fracture Classification**

Fracture classification	Buttress plating	Percutaneous cancellous screw fixation	cast	Buttress plate with bone graft
I	1	3	1	-
II	1	2	1	1
V	2	-	1	2
VI	-	1*	-	-

\* Along with DCP plating for tibial shaft fracture.

**Table-8: Grading Of Results**

management	excellent	good	fair	poor
Buttress	3	1	-	-
Percutaneous cancellous screw fixation	4	2	-	-
Cast	1	2	-	-
Buttress plating with bone graft	2	1	-	-

**DISCUSSION**

The aim of treating the tibial plateau fracture is to produce a pain less stable knee with good range of movements supported by strong muscles. Traditional principles of rest and prolonged immobilisation, as advocated by Hugh Owen Thomas and Watson – Jones produce stiff knee in poor position. In an effort to prevent this problem the trend in the management of these injuries has been toward beginning earlier knee movements. An attempt was made to study different modalities of treatment including long leg cast, percutaneous cancellous screw fixation, but tree planting with or without bone graft, taking into consideration the type of fracture, age of the patient, condition of the patient and associated injuries, if any.

In our series, fractures belonged to type I, II, V, VI. The rising incidence of type V & VI fractures shows that majority of fractures is the result of high velocity trauma associated with other long bone injuries. The range of motion more than 100° of flexion is achieved in most number of cases of our series treated conservatively as well as surgically. This is explained by the fact that the cases selected for conservative treatment have less articular depression and condylar widening compared of the cases treated by surgical methods. Hence, surgery is not the treatment of choice in all cases of tibial plateau fractures. Conservatively treated fractures when there is not much of articular depression or displacement (within 6mm) can give good results. In fractures where there was moderate displacement or depression (6-8mm) were treated with percutaneous cancellous screw fixation gave excellent results. All displaced fractures were fixed by surgical methods. Anatomic reduction and rigid fixation was done with buttress plate with or without bone graft, depending on the anatomy of fracture, so that early active range of motion could be started. Do intraarticular fractures require anatomic reduction? Those who favour surgical methods of management say that the defect in the articular cartilage cannot be repaired by body own healing mechanism hence it should be reduced anatomically. Proponents of surgery further state that depression in the articular surface the articular surface is a permanent source of joint instability.

In our series, in some cases where restoration of congruity of articular surface is non-anatomic radiologically but we could not demonstrate instability.

This because of contraction of opposing ligaments or because of replacement of depressed bone surface within the joint by fibrous tissue. The degree of varus/valgus instability suggested by the roentgenographic appearance was never clinically demonstrable. Restoration of articular surface in intraarticular fracture has little significance in gaining range of motion and may have significance in preventing or delaying early post traumatic osteoarthritis. As it is said, lateral meniscus has a great role in weight bearing function while load being transmitted through lateral compartment. Hence the brunt of injury is born to be at extent by lateral meniscus, which is thicker than the medial meniscus, so as to prevent the displacement of lateral tibial plateau when it is intact. It further prevent the displacement of lateral tibial plateau, which is not so with medial plateau fractures. Standard anteroposterior and lateral X-ray were taken to study the fracture pattern and articular depression. Many a times on opening the fracture site, the fracture anatomy looked different. So it is better to have preoperative tomography or CT scan for better assessment of fracture, if so available.

In cases treated with buttress plating or percutaneous cancellous screws, articular depression and condylar widening were corrected so as to restore the congruity of articular surface. Hankoneen in a long term study proved that condylar widening of more than 5mm had deleterious effect on the functioning of joint [2]. Thus buttress plating and cancellous screw fixation by reducing the articular depression, condylar widening and allowing early range of motion delays or prevents post traumatic degenerative arthritis.

In young patient, where we felt the bone quality was good, mobilisation started early. In old patient where the bone quality and bone regeneration capacity was poor, mobilisation was delayed a little longer. But, when the patient was allowed early active knee movements and intensive physiotherapy, the end results excellent, even in conservatively treated fractures with long leg cast.

Our study period is not enough to draw conclusion regarding the degenerative arthritis changes, hence a long term study is needed to study regarding role of anatomic reduction and early range of motion in preventing or delaying degenerative arthritis.

## CONCLUSIONS

- In all displaced tibial plateau fracture tomography or CT scan should be done to know the exact fracture morphology.
- Surgery is not the treatment of choice in all cases of tibial plateau fractures. Conservatively treated fractures or percutaneous cancellous screw fixation, when there is not much of articular depression or displacement, can give good results.
- After elevation of depressed articular surface , left over gap should be tightly packed with bone graft to prevent collapse
- Buttress plating provides rigid internal fixation hence in all displaced fractures buttress plating with or without bone graft should be done.
- Early range of motion should be begun after rigid internal fixation to improve cartilage healing which would have long term beneficial effects.
- A long term study should be undertaken to know the effects of condylar widening, residual articular depression on joint function and role of anatomic reduction, early active range of motion in delaying or preventing degenerative arthritis.
- Percutaneous cancellous screw fixation can be done in stable fractures to allow early range of motion.
- We agree with mason howl's remark-"these fractures are tough" [3].

## REFERENCES

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