

**ORIGINAL RESEARCH**

# Comparison of buttress plates and cancellous screws in the management of tibia plateau fracture

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**ABSTRACT**

**Background:** A tibial plateau fracture is a type of fracture that occurs in the upper part of the tibia (shinbone), near the knee joint. The present study was conducted to compare buttress plates and cancellous screws in the management of tibia plateau fracture. **Materials & Methods:** 72 cases of tibia plateau fractures of both genders were divided into 2 groups of 36 each. Group I patients were treated with open reduction and internal fixation (ORIF) with buttress plate and group II patients were treated with cancellous screws. Parameters such as type of fractures, hospital stay (days), time of union (months), and outcome were compared. **Results:** Group I had 20 males and 16 females and group II had 18 males and 18 females. The hospital stay was 9.3 days in group I and 5.2 days in group II. The mean time of union was 4.1 months in group I and 3.6 months in group II. Pain (VAS) was 5.8 in group I and 2.4 in group II. Follow-up was 12.4 months in group I and 8.2 months in group II. The difference was significant ( $P < 0.05$ ). Type of fracture was type I in 6 and 5, type II in 14 and 12, type III in 2 and 3, type IV in 3 and 5, type V in 10 and 8, type VI in 1 and 3 patients in group I and II respectively. Outcome was excellent in 15 and 21, good in 10 and 9, fair in 7 and 5 and poor in 4 and 1 patients in group I and II respectively. **Conclusion:** Cancellous screws in the management of tibia plateau fracture were found to be effective as compared to buttress plates.

**Keywords:** buttress plates, cancellous screws, plateau fracture

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**INTRODUCTION**

A tibial plateau fracture is a type of fracture that occurs in the upper part of the tibia (shinbone), near the knee joint.<sup>1</sup> This area of the tibia is called the "plateau" because it forms a relatively flat surface that bears the weight of the body and helps stabilize the knee joint. Fractures in this region can vary in severity from mild to severe, depending on the extent of the injury.<sup>2</sup> The most common cause of tibial plateau fractures is a significant force applied to the knee, such as during a fall, sports injury, or motor vehicle accident. These fractures often occur in conjunction with other injuries to the knee or lower leg. In older adults, weakened bones due to osteoporosis can increase the risk of fractures, including fractures of the tibial plateau, with less forceful impacts.<sup>3</sup> The research has conflicting recommendations regarding the use of surgery or non-operative treatment for tibial fractures.<sup>4</sup> Exact reconstruction of the articular surfaces, stable fragment fixation, early

mobilization, and correction of any concurrent ligamentous and other soft tissue injuries are the goals of surgical care of tibial plateau fractures.<sup>5</sup> There has been a shift toward surgical care of these injuries due to advancements in surgical methods and implant technology.<sup>6</sup> The present study was conducted to compare buttress plates and cancellous screws in the management of tibia plateau fracture.

**MATERIALS & METHODS**

The present study consisted of 72 cases of tibia plateau fractures of both genders. All gave their written consent to participate in the study. Data such as name, age, gender etc. was recorded. Patients were divided into 2 groups of 36 each. Group I patients were treated with open reduction and internal fixation (ORIF) with buttress plate and group II patients were treated with cancellous screws. Parameters such as type of fractures, hospital stay (days), time of union (months), and outcome were

compared. Data thus obtained were subjected to significant statistical analysis. P value < 0.05 was considered

**RESULTS**

**Table I Distribution of patients**

Groups	Group I	Group II
Method	buttress plate	cancellous screws
M:F	20:16	18:18

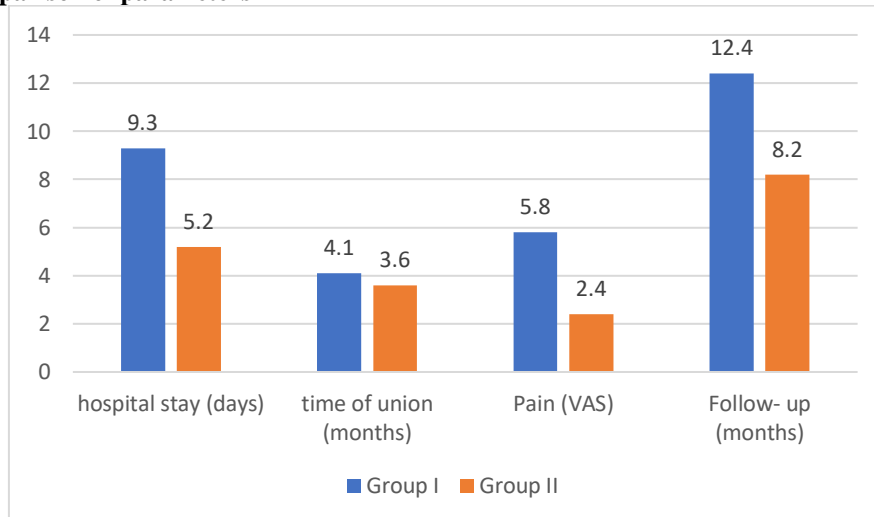
Table I shows that group I had 20 males and 16 females and group II had 18 males and 18 females.

**Table II Comparison of parameters**

Parameters	Group I	Group II	P value
hospital stay(days)	9.3	5.2	0.02
time of union(months)	4.1	3.6	0.05
Pain (VAS)	5.8	2.4	0.01
Follow- up (months)	12.4	8.2	0.03

Table II, graph I shows that hospital stay was 9.3days in group I and 5.2days in group II. The mean time of union was 4.1months in group I and 3.6months in group II. Pain (VAS) was 5.8 in group I and 2.4 in group II. Follow-up was 12.4months in group I and 8.2months in group II. The difference was significant (P< 0.05).

**Graph I Comparison of parameters**



**Table III Type of fracture and outcome**

Parameters	Variables	Group I	Group II	P value
Type	Type I	6	5	0.19
	Type II	14	12	
	Type III	2	3	
	Type IV	3	5	
	Type V	10	8	
	Type VI	1	3	
Outcome	Excellent	15	21	0.05
	Good	10	9	
	Fair	7	5	
	Poor	4	1	

Table III shows that type of fracture was type I in 6 and 5, type II in 14 and 12, type III in 2 and 3, type IV in 3 and 5, type V in 10 and 8, type VI in 1 and 3 patients in group I and II respectively. Outcome was excellent in 15 and 21, good in 10 and 9, fair in 7 and 5 and poor in 4 and 1 patients in group I and II respectively.

**DISCUSSION**

Managing complex tibial plateau fractures is still difficult in the clinic. The AO/Orthopaedic Trauma

Association classifies these fractures as either C type injuries or Schatzker Type V and VI fractures.<sup>7,8</sup> For this type of fracture, bilateral dual plating is typically

advised as the definitive fixation. Nevertheless, there are situations when this method cannot be used to treat fractures involving multiplanar articular comminution.<sup>9</sup> This is particularly true in cases of coronal fracture or posterior shearing. Treatment for tibial plateau fractures has historically been based on two-dimensional classification schemes.<sup>10</sup>

We found that group I had 20 males and 16 females and group II had 18 males and 18 females. Keogh et al<sup>11</sup> in their study 13 patients with displaced fractures of the tibial plateau treated by closed reduction and percutaneous pinning were reviewed 17 months after surgery. All the operations were performed using image intensification to aid the reduction of the fracture by ligamentotaxis and to guide screw placement. In two cases, arthroscopy was used in addition to facilitate elevation of the articular surface using a probe inserted through a cortical window in the proximal tibial metaphysis. The postoperative rehabilitation programme consisted of early mobilization and non-weight bearing for at least 2 months. Of the patients, 11 had a satisfactory result, one patient had a fair result with persistent pain and the other had a poor result when the fixation failed in a comminuted bicondylar fracture in porotic bone.

We found that hospital stay was 9.3 days in group I and 5.2 days in group II. The mean time of union was 4.1 months in group I and 3.6 months in group II. Pain (VAS) was 5.8 in group I and 2.4 in group II. Follow-up was 12.4 months in group I and 8.2 months in group II. Koval et al<sup>12</sup> in their study indirect reduction and percutaneous screw fixation were attempted in 20 displaced tibial plateau fractures in 20 patients. Closed, indirect reduction was successful in 18 fractures; two others, both Schatzker type II fractures, required open reduction. The 18 fractures were followed for an average of 16.2 months (range, 12-24 months). Of the fractures successfully reduced with indirect techniques, 13 were reduced anatomic (72.2%), and five were considered nonanatomic (27.8%). Four of the five fractures with a nonanatomic reduction were type II fractures. Clinically, there were six excellent (33%), 10 good (56%), and two fair (11%) results. No fracture lost reduction; no patient developed an infection. Indirect techniques could effectively reduce only split fragments.

We found that type of fracture was type I in 6 and 5, type II in 14 and 12, type III in 2 and 3, type IV in 3 and 5, type V in 10 and 8, type VI in 1 and 3 patients in group I and II respectively. The outcome was excellent in 15 and 21, good in 10 and 9, fair in 7 and 5, and poor in 4 and 1 patients in groups I and II respectively. Ricci et al<sup>13</sup> in their study twenty-eight consecutive patients with comminuted proximal tibia metaphyseal fractures (41A3, 41C2, or 41C3) were treated with LISS plates. The average follow-up was

23 months (range 12-48). Thirty-seven of 38 patients healed their fractures after the index procedure. The other healed after implant removal without the need for further fracture repair. Postoperative fracture alignment was satisfactory in 37 of the 38 cases and was maintained in all patients at union. There were no infectious complications. The average LEM score was 88.

The limitation of the study is the small sample size.

## CONCLUSION

Authors found that cancellous screws in the management of tibia plateau fracture were found to be effective as compared to buttress plates.

## REFERENCES

- Gardner MJ, Yacoubian S, Geller D, Suk M, Mintz D, Potter H, et al. The incidence of soft tissue injury in operative tibial plateau fractures: a magnetic resonance imaging analysis of 103 patients. *J Orthop Trauma*. 2005;19:79-84.
- Stokel EA, Sadasivan KK. Tibial plateau fractures: standardized evaluation of operative results. *Orthopaedics* 1991; 14:263-270.
- Barei DP, Nork SE, Mills WJ, Coles CP, Henley MB, Benirschke SK. Functional outcomes of severe bicondylar tibial plateau fractures treated with dual incisions and medial and lateral plates. *J Bone Joint Surg*. 2006 Aug 1;88(8):1713-21.
- Bhattacharyya T, McCarty LP, 3rd, Harris MB, Morrison SM, Wixted JJ, Vrahas MS, et al. The posterior shearing tibial plateau fracture: treatment and results via a posterior approach. *J Orthop Trauma*. 2005;19:305-310.
- Schatzker J., Mc Broom R., Bruce D: The tibial plateau fracture, the Toronto experience: 1968-1975; *Clin orthop*, 1979; 138:94-104.
- Gardner MJ, Yacoubian S, Geller D, Suk M, Mintz D, Potter H, et al. The incidence of soft tissue injury in operative tibial plateau fractures: a magnetic resonance imaging analysis of 103 patients. *J Orthop Trauma*. 2005;19:79-84.
- Georgiadis GM. Combined anterior and posterior approaches for complex tibial plateau fractures. *J Bone Joint Surg Br*. 1994;76:285-289.
- De Boeck H, Opdecam P. Posteromedial tibial plateau fractures. Operative treatment by posterior approach. *Clin Orthop Relat Res*. 1995;320: 125-128.
- Carlson DA. Posterior bicondylar tibial plateau fractures. *J Orthop Trauma*. 2005;19:73-78.
- Mueller KL, Karunakar MA, Frankenburg EP, et al. Bicondylar tibial plateau fractures: a biomechanical study. *Clin Orthop Relat Res*. 2003; 412:189-195
- Keogh P, Kelly C, Cashman WF. Percutaneous Screw fixation of tibial plateau fractures *Injury* 1992; 23:387-393.
- Koval, K.J., Sanders R., Borelli J.; Indirect reduction and percutaneous screw fixation of displaced tibial plateau fractures. *J Orthop Trauma*, 1992; 6:340-351.
- Ricci WM et al. Treatment of complex proximal tibial fractures with the LISS; *J Bone Joint Surg* 2004; 18:521- 527.