



## Efficacy of Dual Plating in Bicondylar Tibia Plateau Fractures

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### KEYWORDS

Tibial plateau fractures, Schatzker type V and VI, bicondylar plating.

### ABSTRACT:

**Introduction** – A bicondylar tibial plateau fracture is a severe orthopaedic injury characterized by the simultaneous disruption of the upper surface of the tibia's two condyles, which are the rounded bony prominences at the knee joint. This complex fracture often results from high-energy trauma and poses significant challenges in terms of diagnosis and treatment due to its impact on knee stability and function.[1]

**Material and methods** – 50 patients were included in this study (30 male and 20 female), from November 2020 to March 2023, with Schatzker V and VI fractures of tibial plateau surgically treated with bicondylar plating followed up for 1 year and functional outcomes were assessed by knee society scoring system[2,3], and radiologically by Rasmussen radiological score[4].

**Results** – In our study functional outcome by knee society at 1 year of follow up excellent – 20 (40%), good 25 (50%), fair – 5 (10%), poor 0. According to Rasmussen radiological score at 1 year follow up excellent -2(4%), good 35(70%), fair – 13(26%), poor 0.

**Conclusion-** Surgical management using dual locking fixation is a primary treatment for Schatzker type V and VI. It offers strong stabilization and has shown positive outcomes both in terms of function and radiographic assessment.

### INTRODUCTION –

The tibial plateau is a critical anatomical structure located at the upper end of the tibia (shinbone) in the human leg. It plays a pivotal role in joint alignment and stability within the knee joint. This flat, relatively circular surface serves as the articulating platform for the femur (thigh bone) in the knee joint, forming the tibiofemoral joint. The tibial plateau's significance lies in its ability to evenly distribute weight and forces transmitted from the femur to the tibia during activities such as walking, running, and jumping. Any disruption or misalignment of the tibial plateau mostly due to road traffic accidents and high velocity accidents [5], can lead to joint instability, pain, and potentially serious knee injuries, making its proper function essential for overall joint health and mobility.

A fracture of the tibial plateau is a severe and potentially devastating injury, this type of fracture is particularly significant due to its location and the crucial role the tibial plateau plays in joint stability and weight-bearing. When this essential component of the knee joint is damaged, it can result in a range of debilitating consequences, including severe pain, limited mobility, joint misalignment, and even long-term complications

such as arthritis. Fractures of the tibial plateau are often complex and may require intricate surgical interventions and prolonged rehabilitation to restore function, underscoring their devastating impact on an individual's quality of life.

The treatment of bicondylar tibial plateau fractures typically involves surgical intervention usually plating which helps promote optimal healing, restore knee joint integrity, and facilitate the recovery of knee function. Various treatment options have come into picture in a short period of time like – hybrid external fixators and circular external fixators and the standard ORIF with plating and arthroscopic assisted percutaneous plating [6]. According to patil et al[5] dual incision provide adequate visualisation and aids in better reduction of fracture fragments.

### MATERIALS AND METHODS –

50 patients were included in our study ranging from 20 to 60 years of age, both male (30) and female (20). Included being schatzker type V and VI fractures of proximal tibia, closed fractures and with no associated neurovascular injuries.



The patients were treated with bicondylar plating for tibial plateau fractures, post operatively serial follow up was done at 1 month, 3 month, 6 month and 1 year post operatively and were assessed clinically using Knee society score[2,3], and radiologically using Rasmussen score[4] the scores were recorded in each visit and the mean was calculated at the end of 1 year of follow up. The conclusions were made by assessing the mean of pre op and post op scores. The study was conducted after getting permission from ethics committee from the hospital and verbal consent was taken from the patients to include clinical images in this study. The expected complications were duly noted and reported and addressed accordingly.

## RESULTS –

In our study at 1 year follow up, the functional outcome was assessed using knee society score[2,3] excellent – 20 (40%), good 25 (50%), fair – 5 (10%), poor 0, the mean score was 16.66 (range 0-20) and the radiological assessment according to rasmussen score mean was 16.66 (range 0 -33).

Complications were knee stiffness in 10 (20%) patients, superficial wound infections – 3(6%), implant/ hardware -1(2%).

## DISCUSSION –

A bicondylar tibial plateau fracture is a severe orthopaedic injury characterized by the simultaneous

disruption of the upper surface of the tibia's two condyles, which are the rounded bony prominences at the knee joint. This complex fracture often results from high-energy trauma and poses significant challenges in terms of diagnosis and treatment due to its impact on knee stability and function.[1]

Tibial plateau fractures exhibit a diverse range of presentations, influenced by the specific trauma's mechanism and force. Various classification systems exist to categorize such injuries. In 1974, Schatzker introduced a classification system rooted in a 2D representation of the fracture. Over time, this system, comprising 6 principle types, has emerged as one of the most widely adopted methods for classifying tibial plateau fractures. [7]

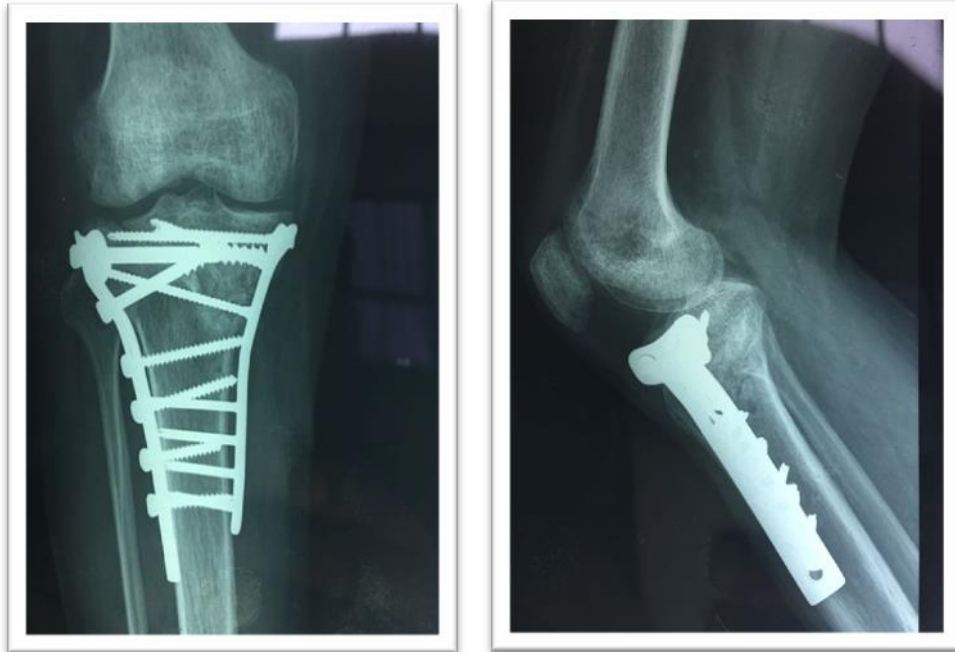
The gold standard for treating these fractures is open reduction and internal fixation (ORIF). Complex articular fractures offer the option of treatment through hybrid and ring external fixators and minimally invasive osteosynthesis (EFMO), or ORIF. While EFMO may sometimes be associated with less-than-optimal articular reduction, outcome analysis consistently demonstrates results that are comparable to, or in some cases even surpass, those achieved with ORIF. It's essential to emphasize that the ORIF approach should always prioritize achieving the optimal reduction of the articular surface. Which is consistent with our study results and also with other studies.[4,5,8,9].



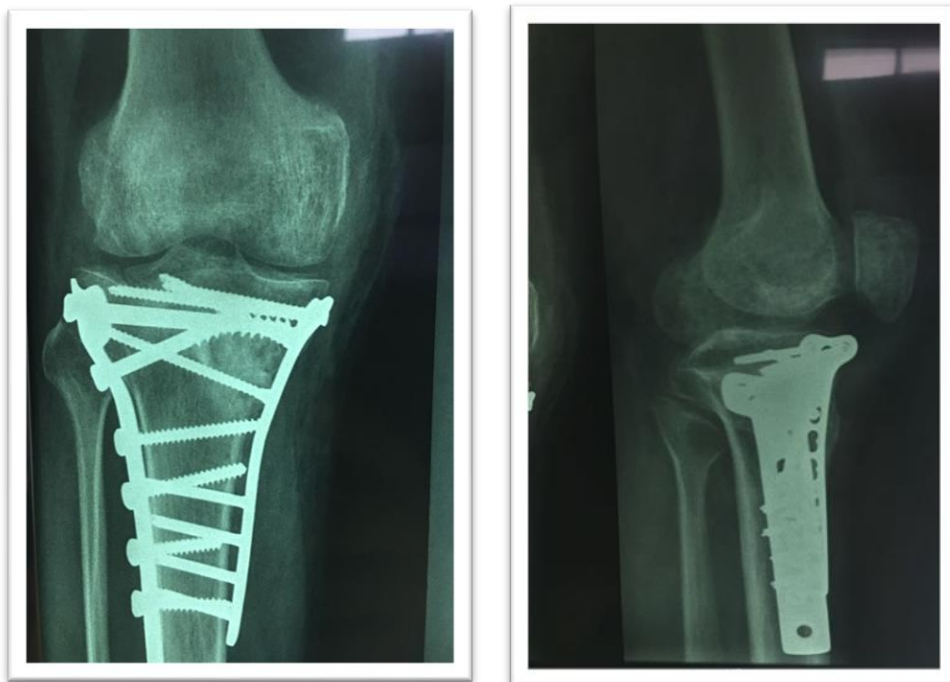
Fig 1 . AP view of Schatzker VI



Fig 2. Lat view of Schatzker VI



**Fig 3.** 6 weeks follow up AP and Lat views



**Fig 4.** 12 weeks follow up AP and Lat views

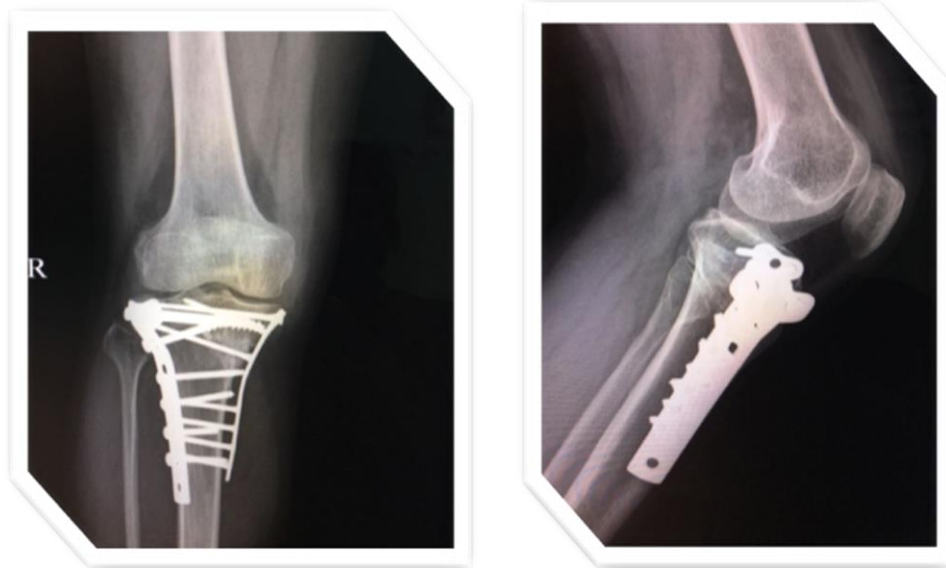


Fig 5. 24 weeks follow up



Fig 6. Clinical images after 24 weeks follow up.

When compared with ring external fixator, if skin complications are not there and fracture site is no tense then bicondylar plating is the gold standard procedure for treatment of complex tibial plateau fractures[8] , and when compared to unilateral lateral plating of bicondylar fractures – bicondylar plating is better as the medial support cannot be established by reduction only of lateral condyle fracture and just the screws holding the medial fragment.[10,11].

In our study the efficiency of the procedure bicondylar plating for schatzker type was defined based on functional outcome measured at 1 year post op period using knee society score [2] mean of >15 and radiologically using Rasmussen score [4] mean >15. In the current study the knee society score at 1 year follow up was 16.66with 90%confidence of interval, standard deviation 8.49 and Rasmussen score mean was 16.66.



In our study the complications we encountered were knee stiffness in 10 (20%) patients, superficial wound infections – 3(6%), implant/ hardware -1(2%), which are similar to other studies as well knee stiffness according to Kumar et al [12] 13.3% which had the common occurrence and was treated with passive ROM exercises

at knee most of the patients regained their normal ROM after physiotherapy, wound infections according to kumar et al [12] 10%, most of these infections were superficial infections only and only 2 patients required a graft cover. Infections [4] Raj et al 16%.



**Fig 7.** Skin Necrosis as reported in our study



**Fig 8.** Superficial skin infection

The chances of infections in bicondylar plating is relatively higher in dual plating techniques as a separate incision is being made medially for providing structural solid construct, presence of thin skin anteriorly for suturing and precarious blood supply to skin may result in necrosis of the skin and resulting in infections. Hardware problems[10] according to wand et al dual plating along with compression bolts provides a solid construct and thus reduces the chances of implant loosening or secondary fractures after surgery. Now when we see the available literature and assess the pros and cons of procedure, we can establish that dual plating for schatzker type V and VI is a better option as it provides excellent stability and also facilitates faster return of patient to carry out his daily activities.

**CONCLUSION** – Bicondylar plating is an efficient technique to achieve proper joint alignment, stability with firm fixation and early return to work.

#### **LIMITATIONS OF THE STUDY** –

The study follow up period was only for 1 year, long term complications of the procedure are not known. The follow-up examination was done by the surgeons rather than an independent investigator, the final conclusion may have been affected.

**CONFLICT OF INTEREST** – None

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