



## Study of dual plating in bicondylar fracture, our experience in 25 cases at J.L.N hospital and Research Centre Bhilai (C.G)

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### Abstract

**Background:** Bicondylar fractures of tibia are common fractures occurring in young age groups. Appropriate management is necessary for optimal function and to prevent complications.

**Aims and Objectives:** To determine the union rate, anatomical reduction and articular congruity restoration, functional outcomes, assessment of surgical approaches and residual complication.

**Methods:** over a thirty month periods, 26 schatzker type five and type six fractures were treated with medial and lateral (dual) plating. Injury classification done on the basis of X ray and computed tomography. Reduction assessment done by immediate post-operative x ray. American knee society score (AKSS) was used to evaluate functional outcome.

**Results:** Eighteen male and eight female, skeletally matured, closed fracture were included in this study group. The maximum duration of follow up was 24 months, complete union shown within 6 months of post-operative period. For bi-condylar fracture tibia open reduction and internal fixation by dual plating offers satisfactory way of early mobilization and restoration of function.

### Introduction

Most important weight bearing joint in body. Injuries are complex and difficult to treat. Accounts 1.3% of all fractures. Injuries usually high energy trauma (RTA, Fall from height) Also can be with low velocity injury in osteoporotic

bone. As per Schatzkar classification bi-condylar fracture fall in to type V and VI. Surgical fixation is challenging due to metaphyseal and articular comminution. Soft tissue injury and bad skin condition further add in its difficulties. Treatment goals includes-Restoration of articular congruity.

Restoration of lower extremities alignment. Preservation of soft tissue. Achieve good range of motion. Least post op morbidity. To achieve this goal ORIF is mandatory. Dual plating via double incision provide direct visualization of articular surface. There is still remains ambiguity regarding suitable approach.

### The aims of study

- To evaluate the functional outcome of dual plating
- To evaluate anatomical restoration of articular surface.

### Material and Methods

A prospective analytical study

Study site- J.L.N Hospital and Research Centre Bhilai (C.G)

Study populations- patients admitted to orthopaedics department with bi-condylar Tibial plateau fracture.

Number of patients- 26 (18 male & 8 females)

Study period- May 2015 to Dec 2017.

Inclusion criteria

All skeletally mature patients with closed fracture

- Exclusion criteria-
- Age below 18
- Extra articular fracture
- Open fractures
- Pathological fracture
- Fracture involving ipsilateral intra-articular distal femur
- Previously Non ambulatory patients.

All patients were treated with dual plating. Lateral plate through anterolateral approach. Medial plate through posteromedial approach. All patients assessed with ATLS protocol in emergency room. Initial treatment given in form of-Above knee Pop slab and limb elevation. Calcaneal skeletal traction. External fixator spanning. After soft tissue swelling subsided written consent obtained and patient posted for elective surgery. All surgery done under spinal anaesthesia. Initial prophylactic antibiotics (cefuroxime 750 mg and amikacin 250 mg bd) given to all patients. All patients operated

under tourniquets. Sand bag used contralateral side of medial plating through posteromedial approach. After medial plating sand bag removed and lateral plating done through anterolateral approach. Continuous suction drain used in all patients. ROM exercises was started 3rd post op day after removal of compression dressing. 6 weeks non weight bearing protocol followed in all patients. Partial weight bearing allowed after 6 weeks. Full weight bearing after 12 week or full union. Patients were followed up at regular interval with clinical and radiological assessment. Functional outcomes parameter were assessed by Modified Rasmussen Scoring System. Patients were graded as excellent, good, fair and poor as per their functional outcomes.

We noted surgical site infection in two patients were managed with debridement and appropriate antibiotics in due course.

Twenty-six patients with tibial plateau fractures of Schatzker type V and VI treated by dual plating were analysed.

Majority of study subjects were male (18 out of 26) and (8 out of 26) were female.

16 patients had Schatzker type V and 10 patients had Schatzker type VI tibial plateau fracture.

Most common mode of injury was road traffic accident (22 out of 26) followed by fall from height (4 out of 26).

Mean age of study subjects was 42 years with youngest one with 28 years and oldest one with 67 yr.

In this series (18 out of 26) were male patients and (8 out of 26) were female patients.

Both the sides were almost equally affected left side accounting to 53% (14 out of 26) and right side 47% (12 out of 26).

In our study complications seen in 4 patients. out of these 4, two patients had surgical site infection (8%), one patient(4%) had articular depression and one patients(4%) had knee stiffness.

Infection managed with debridement and antibiotics course and stiffness managed with CPM and knee mobilization exercises.

### Clinical outcomes

We had 46% (12 out of 26) excellent, 38% (10 out of 26) good, 8% (2 out of 26) were fair and 8% (2 out of 26) were poor outcomes.

### Radiological outcomes

We had 38% (10 out of 26) were excellent, 54% (14 out of 26) were good and 8% (2 out of 26) were fair radiological outcomes.

There is no poor radiological outcomes in our series.

All complications were treated accordingly and recovered in due course of treatment.

Male patients had better functional outcome as compared to female patients ( $p>0.05$ )

### Discussion

In our study infection was seen in 2 patients (8%), while CC Chan et al (2012) had 13% infection in their series.

In our study articular depression was seen in one (4%) patients, while CC Chan et al (2012) also found  $> 3\text{mm}$  articular depression in similar cases.

In our study there were 10(38%) excellent, 14 (54%) good, 2(8%) fair radiological results with no patient having poor result according to modified Rasmussen score.

While in the series of Hitin Mathur et al (2005) there were 2(7.41%) excellent, 22(81.48%) good and 3 (11.11%) poor results according to Rasmussen's functional score.

In our study according to modified Rasmussen score there were 12(46%) excellent, 10(38%) good, 2(8%) fair and 2(8%) poor functional results. While in the series of Hitin Mathur et al (2005) there were 10(37%) excellent, 14(51.85%) good, 3(11.11%) fair with no poor result.

Finally, we concluded that bi-condylar tibial fracture treated with dual plating have significantly better functional outcomes because of congruous joint surface and early knee mobilization.



### Summary

Study was conducted at Jawahar Lal Nehru Hospital and Research Center, Bhilai, in between May 2015 to December 2017 under the Department of Orthopaedics.

The study comprised of 26 cases of tibial Bicondylar fractures.

There were 42 (84%) male and 08 (16%) female patients with an average age of 42 years (range, 28-67 years)

All fractures were either due to road traffic accidents or fall from height, with majority 85% (22 out of 26) of cases had a history of road traffic accident.

Patients were reviewed at regular intervals till union with an average follow up of 6 months.

Complications were minimal, infection was seen in 2 patients (8%), articular depression was seen in one (4%) patient and one patient (4%) had knee stiffness.

According to Modified Rasmussen Scoring System, clinically we had 12(46%) excellent, 10(38%) good, 2 (8%) fair and 2(8%) poor results and radiologically 10(38%) excellent, 14(54%) good, 2 (8%) fair and none poor results.

#### Conclusion

The present study was undertaken to assess the management of tibial condyle fractures by dual plating, following conclusions were drawn in our study: Tibial condyle fractures are seen maximum in 4th decade which is similar to previous study groups. Male preponderance is seen in tibial condyle fractures which is due to their more involvement in outdoor activities. Road traffic accident is more common mode of injury specially involving two wheelers.

The results of clinical assessment (modified Rasmussen score) of our study shows that outcome of tibial condyle fractures are independent of gender, side injured and age  $\leq$  or  $>$  40 years.

The results of radiological assessment (modified Rasmussen score) of our study shows that outcome of tibial condyle fractures are independent of gender, side injured and age  $\leq$  or  $>$  40 years. Stable fixation with dual plating gives early mobilization which improves functional outcome. Elevation of depressed intra-articular fragment and bone grafting restore articular architecture and provides overall favourable outcome.

#### Recommendations

Regular use of CT and MRI seems mandatory to classify and design the treatment protocol as it improves overall fracture visualization.

High velocity injuries with compromised soft tissue cover merit a wait of 1-2 weeks or even more before an attempt to internal fixation. Meanwhile a spanning external fixator can be used.

In fractures with depressed intra articular fragments, elevation of depressed fragment with bone grafting is a must, followed by stable fixation.

Pre operative counselling regarding fracture, its treatment and subsequent active exercises prepares the patient towards more cooperative role in rehabilitation phase.

Good reduction and stable fixation are key stone for achieving good results.

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