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A Study on Functional Outcome of Proximal Tibia Fractures (Schatzker Type 5 or 6) Treated with Bicondylar Plating

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Abstract

Proximal tibial fractures, particularly Schatzker type V and VI, represent complex intra-articular injuries often associated with significant soft tissue damage and functional impairment of the knee joint. This prospective study evaluates the functional outcome of bicondylar plating in the management of such fractures.

A total of 30 patients aged 18 years and above with proximal tibia fractures (Schatzker type V and VI) were included and followed for a period of 24 weeks. Functional outcomes were assessed using the Oxford Knee Score, while pain was evaluated using the Visual Analog Scale (VAS). Radiological union and range of motion were also documented.

The mean Oxford Knee Score improved from 22.8 preoperatively to 37.0 at 24 weeks. Pain scores decreased significantly from a mean VAS score of 7.25 preoperatively to 2.15 at final follow-up ($p < 0.001$). The average time to radiological union was approximately 12 weeks. Functional outcomes were graded as excellent in 30% of patients, good in 66%, and fair in 4%. Minor complications such as superficial infections and stiffness were observed in a few cases.

Bicondylar plating provides stable fixation, promotes early mobilization, and yields favorable functional outcomes in complex proximal tibial fractures. It remains a reliable and effective surgical option for Schatzker type V and VI fractures.

Keywords: *Proximal tibia fractures; Schatzker type V and VI; Bicondylar plating; Tibial plateau fractures; Functional outcome; Oxford Knee Score; Visual Analog Scale; Internal fixation.*

INTRODUCTION

Proximal Tibia is the region from metaphyseal- diaphyseal junction to the articular surface of the knee, involving approximately 15cm of the Proximal Tibia.

Tibial plateau fracture accounts for 5-8% of lower limb fractures

Any injury or trauma to this area causes functional impairment and instability of the knee joint.

Usually proximal tibia fractures fall in two broad categories, High energy fractures and low energy fractures.

The aim of the surgical management is to gain anatomic reduction of the articular surface

Hence Bi-condylar plating, whose biomechanical principle is splinting rather than compression, thus avoiding stress shielding and induces the callus formation.

In addition, Bi-condylar plating reduces varus collapse.

AIMS AND OBJECTIVES

Aim of the study is To study the functional outcome of Proximal Tibia fractures (Schatzker type 5 or 6) treated with Bi-Condylar plating, at Department of Orthopedics, KIMS Hospital, Bangalore

Purpose of the study is to evaluate post operative pain and post operative mobility, wound dehiscence and complications associated with open reduction and internal fixation using Bi-Condylar plating.

Sample size – 30

Study Period - 18 months

Study Design- Prospective study

Assessment of functional outcome was done according to Oxford knee scoring system.

Assessment of pain was done by Visual analog scale (VAS) scoring system.

Patients are regularly followed up at 6, 12, and 24weeks

CRITERIA

INCLUSION CRITERIA

Patients aged between 18years and above and of either of the sex.

Patients presenting with Proximal Tibia fractures (schatzker type 5 or 6) with or without osteoporotic changes are included in this study.

Fractures less than 3 weeks old.

Closed and Open (Type 1 & 2) fractures.

EXCLUSION CRITERIA

Open (type 3) Proximal tibia fractures.

Patients presenting with proximal tibia fractures (Schatzker type 1 – 4)

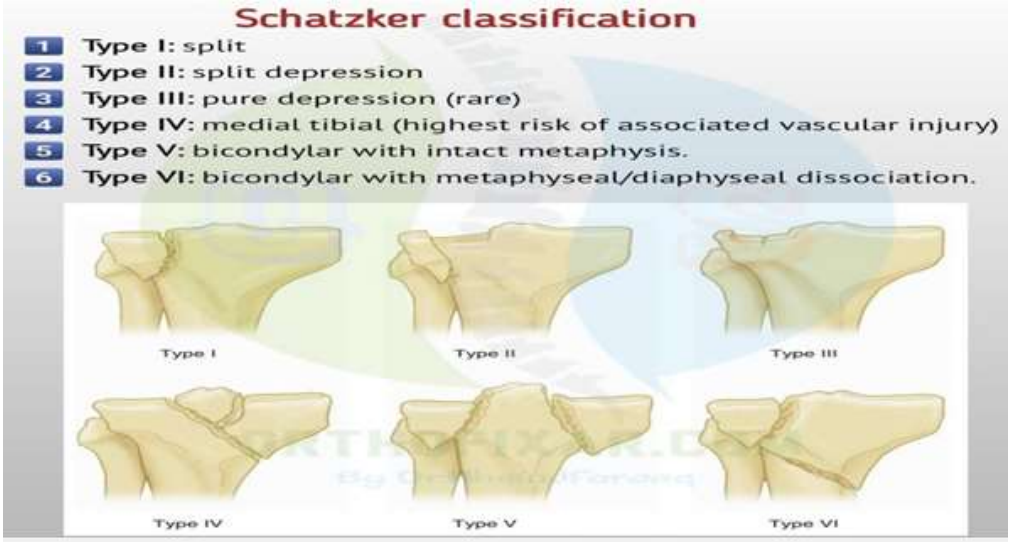
Pathological fractures in the Proximal tibia.

Pre-existing local infection/deformity.

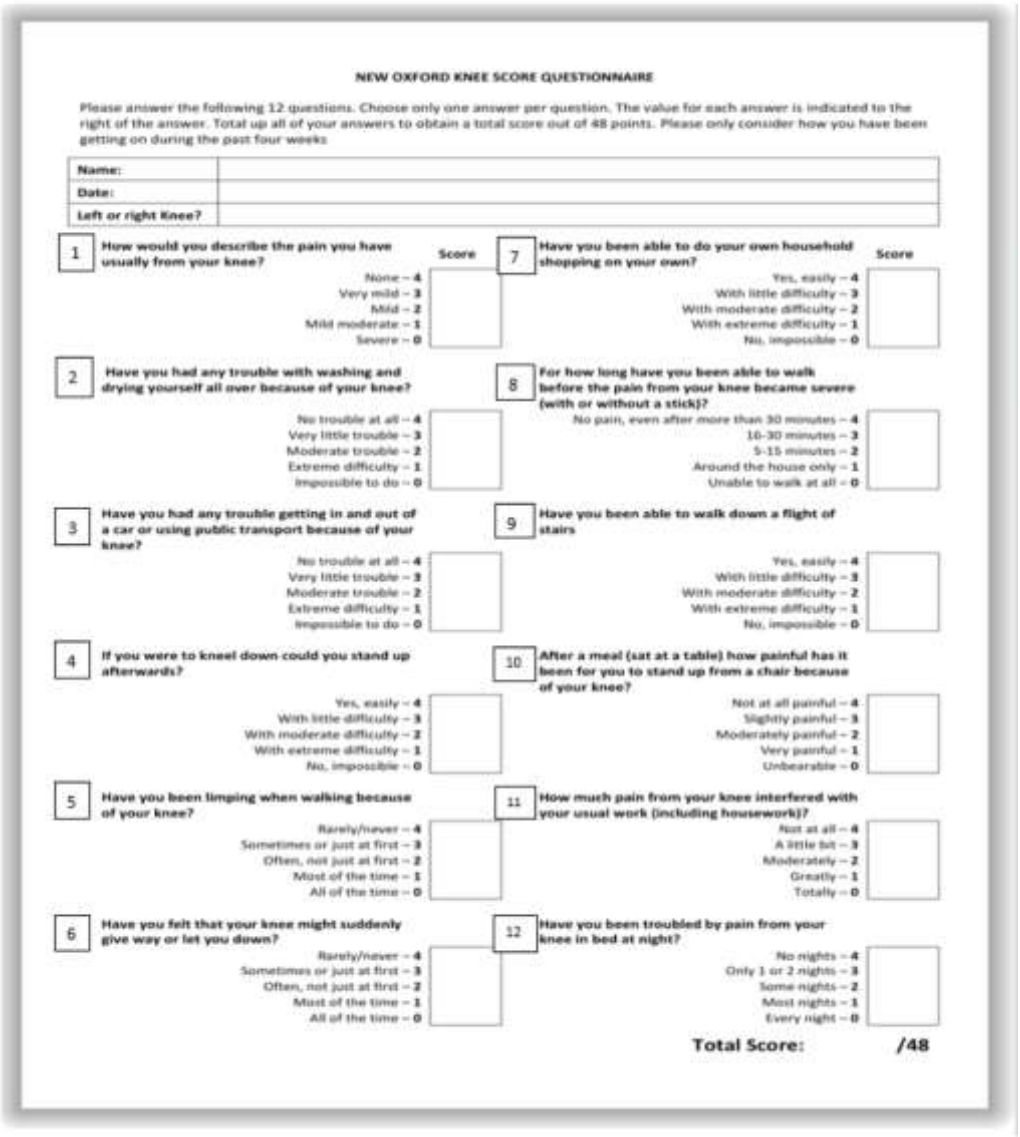
Patients conservatively managed for other medical illness.

Fractures of proximal tibia with neurovascular compromise or knee joint dislocations.

CLASSIFICATION



OXFORD KNEE QUESTIONAIRE



NEW OXFORD KNEE SCORE QUESTIONNAIRE

Please answer the following 12 questions. Choose only one answer per question. The value for each answer is indicated to the right of the answer. Total up all of your answers to obtain a total score out of 48 points. Please only consider how you have been getting on during the past four weeks

Name:	
Date:	
Left or right Knee?	

1 **How would you describe the pain you have usually from your knee?** Score
None – 4
Very mild – 3
Mild – 2
Mild moderate – 1
Severe – 0

2 **Have you had any trouble with washing and drying yourself all over because of your knee?**
No trouble at all – 4
Very little trouble – 3
Moderate trouble – 2
Extreme difficulty – 1
Impossible to do – 0

3 **Have you had any trouble getting in and out of a car or using public transport because of your knee?**
No trouble at all – 4
Very little trouble – 3
Moderate trouble – 2
Extreme difficulty – 1
Impossible to do – 0

4 **If you were to kneel down could you stand up afterwards?**
Yes, easily – 4
With little difficulty – 3
With moderate difficulty – 2
With extreme difficulty – 1
No, impossible – 0

5 **Have you been limping when walking because of your knee?**
Rarely/never – 4
Sometimes or just at first – 3
Often, not just at first – 2
Most of the time – 1
All of the time – 0

6 **Have you felt that your knee might suddenly give way or let you down?**
Rarely/never – 4
Sometimes or just at first – 3
Often, not just at first – 2
Most of the time – 1
All of the time – 0

7 **Have you been able to do your own household shopping on your own?** Score
Yes, easily – 4
With little difficulty – 3
With moderate difficulty – 2
With extreme difficulty – 1
No, impossible – 0

8 **For how long have you been able to walk before the pain from your knee became severe (with or without a stick)?**
No pain, even after more than 30 minutes – 4
10-30 minutes – 3
5-15 minutes – 2
Around the house only – 1
Unable to walk at all – 0

9 **Have you been able to walk down a flight of stairs**
Yes, easily – 4
With little difficulty – 3
With moderate difficulty – 2
With extreme difficulty – 1
No, impossible – 0

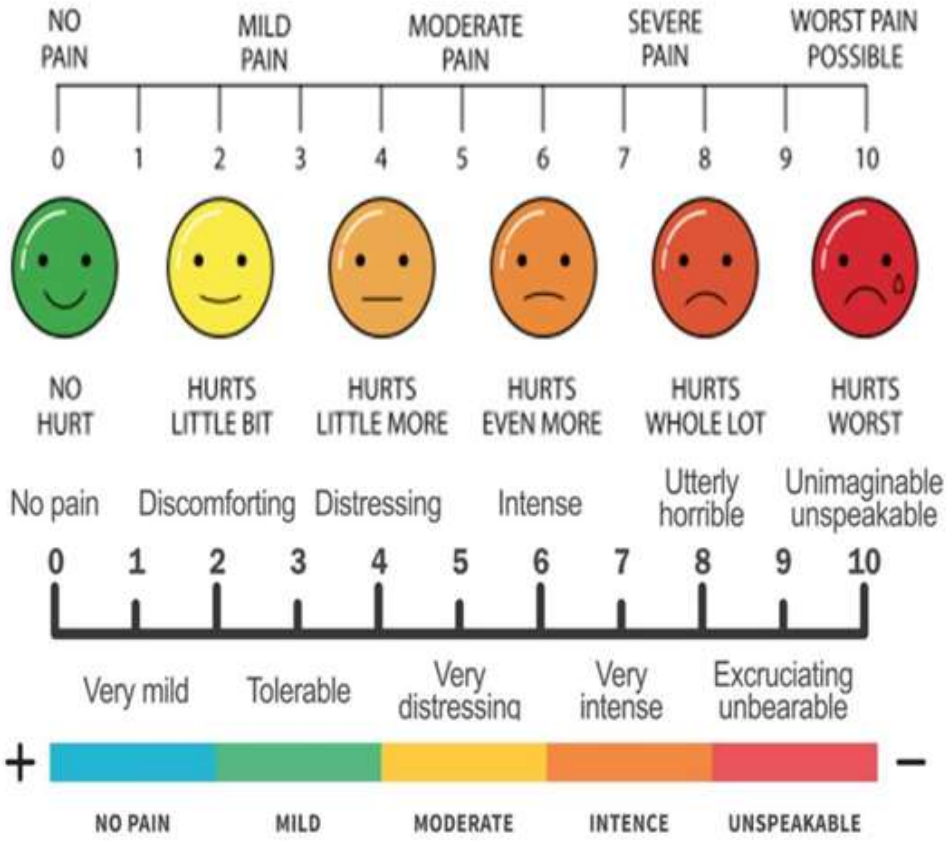
10 **After a meal (sat at a table) how painful has it been for you to stand up from a chair because of your knee?**
Not at all painful – 4
Slightly painful – 3
Moderately painful – 2
Very painful – 1
Unbearable – 0

11 **How much pain from your knee interfered with your usual work (including housework)?**
Not at all – 4
A little bit – 3
Moderately – 2
Greatly – 1
Totally – 0

12 **Have you been troubled by pain from your knee in bed at night?**
No nights – 4
Only 1 or 2 nights – 3
Some nights – 2
Most nights – 1
Every night – 0

Total Score: /48

VISUAL ANALOG SCALE



ILLUSTRATIONS

CASE- 3

PRE- OP

6 WEEKS

12 WEEKS

24WEEKS

FLEXION

FULL EXTENSION

	FREQUENCY	PERCENT	VALID PERCENT
EXCELLENT	9	30.0	30.0
FAIR	1	4.0	4.0
GOOD	20	66.0	66.0
TOTAL	30	100.0	100.0

Descriptive Statistics

	Mean	Std. Deviation
Age	52.45	19.291
Injury-Surgery Interval (days)	7.05	2.911
Pre-op VAS	7.25	.716
Pre-op Oxford Score	22.80	1.989
Duration of Surgery (min)	115.30	15.557
Hospital Stay (days)	6.65	2.540
Post-op VAS (Discharge)	5.05	.887
Weight Bearing Started (weeks)	9.85	1.226
Oxford Score 6w	29.15	1.954
Oxford Score 12w	32.25	2.099
Oxford Score 24w	37.00	2.428
VAS 6w	3.65	1.182
VAS 12w	2.90	1.021
VAS 24w	2.15	1.089
Knee Flexion (Â°)	121.05	12.369
Extension Lag (Â°)	1.20	2.648
Radiological Union (weeks)	11.95	2.038

RESULTS

The study included 30 patients with a mean age of 52.45 years.

There was a significant improvement in functional outcomes as measured by the Oxford Knee Score and Visual Analog Scale (VAS).

The mean preoperative Oxford Score of 22.8 improved progressively to 29.15 at 6 weeks, 32.25 to 37.0 at 24 weeks.

Pain levels, as measured by VAS, decreased from a mean of 7.25 preoperatively to 5.05 at discharge, and further down to 2.15 by 24 weeks, showing statistically significant improvement ($p < 0.001$).

Mobility was evaluated using knee flexion (mean 121°) and extension lag (mean 1.2°). Additionally, the mean radiological union occurred at around 12 weeks, which is within acceptable limits for this type of fracture and fixation.

Final functional grading demonstrated predominantly favorable outcomes. Good results were observed in 66% of patients, while 30% achieved excellent outcomes and 4% had fair results.The overwhelming proportion of good-to-excellent results underscores the effectiveness of Bi-condylar plate fixation in restoring alignment, facilitating union, and enabling satisfactory functional recovery in fractures of the Proximal tibia (Schatxker type 5 or 6).

CONCLUSION

This study concludes that Bi-condylar plating in proximal Tibia fractures (Schatzker type 5 and 6) provides excellent functional recovery

As reflected by significant improvements in Oxford scores and reduction in pain scores.

While the majority of patients experienced clean wound healing and early mobilization, a subset encountered minor complications such as superficial infections, stiffness, and wound discharge.

Overall, the BICONDYLAR PLATING technique is effective and safe for restoring function in PROXIMAL TIBIA FRACTURES OF (SCHATZKER TYPE 5 OR 6).

DISCUSSION

Proximal tibial fractures involving the articular surface, particularly Schatzker type V and VI, are challenging injuries due to their complexity and associated soft tissue compromise. Achieving anatomical reduction and stable fixation is essential to restore joint congruity and prevent long-term complications such as post-traumatic osteoarthritis.

In the present study, bicondylar plating demonstrated significant improvement in both functional and pain outcomes. The progressive increase in Oxford Knee Scores from 22.8 preoperatively to 37.0 at 24 weeks indicates substantial functional recovery. Similarly, the marked reduction in VAS scores reflects effective pain control and improved patient comfort postoperatively.

The average radiological union time of 12 weeks observed in this study is comparable to findings in previous literature, suggesting that bicondylar plating provides adequate stability to promote early bone healing. The achieved range of motion, with mean knee flexion of 121° and minimal extension lag, further supports the effectiveness of this technique in enabling early mobilization and preventing joint stiffness.

The majority of patients (96%) achieved good to excellent functional outcomes, which aligns with several other studies that advocate bicondylar plating for high-energy tibial plateau fractures. The dual plating technique offers better control of both medial and lateral columns, reduces the risk of varus collapse, and maintains alignment.

However, complications such as superficial infections, wound discharge, and stiffness were noted in a small number of patients. These complications are consistent with those reported in similar studies and are often attributed to the severity of soft tissue injury and the extensile surgical approach required. Proper patient selection, meticulous surgical technique, and postoperative care are crucial in minimizing these risks.

Compared to alternative methods such as external fixation or single lateral plating, bicondylar plating provides superior mechanical stability and allows for more accurate articular reconstruction. Despite the technical demands, it remains a preferred method for managing complex bicondylar fractures.

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