



Case Presentation

Functional Outcome of Schatzker Type V and Type VI (Bicondylar) Tibial Plateau Fractures Treated by Dual Plating: A Prospective Case Series

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ABSTRACT

Background: Tibial plateau fractures are complex intra-articular injuries involving a major weight-bearing joint. Schatzker type V and VI fractures are associated with high-energy trauma and significant soft tissue damage.

Case Series: A 42-year-old male with bicondylar tibial plateau fracture was treated with dual plating. Functional and radiological outcomes were assessed using Modified Rasmussen criteria and 19 other patients were included in the study.

Results: The patient achieved fracture union at 20 weeks, knee ROM of 126°, and excellent functional recovery and 19 other patients fracture union, knee ROM and functional recovery was measured. Temporary knee stiffness resolved with physiotherapy.

Conclusion: Dual plating provides stable fixation, early mobilization, and excellent outcomes in bicondylar tibial plateau fractures.

Keywords: Schatzker, Bicondylar, Plateau Fractures, Functional, radiological.

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INTRODUCTION

Tibial plateau fractures are intra-articular fractures involving a major weight-bearing joint and account for approximately 1% of all fractures in adults^{1,2}. These injuries commonly occur in the third to fifth decade of life and are frequently associated with high-energy trauma such as road traffic accidents³.

Schatzker classification remains the most widely used system for categorizing these fractures, with type V and VI representing bicondylar fractures involving both medial and lateral condyles and often associated with metaphyseal-diaphyseal dissociation⁴. These high-energy injuries contribute to approximately 20–40% of tibial plateau fractures and are frequently associated with severe soft tissue damage, comminution, and instability^{5–8}.

Management of Schatzker type V and VI fractures is challenging due to the need for anatomical reduction, restoration of articular congruity, and preservation of surrounding soft tissues. Various surgical techniques have been described; however, dual plating has gained popularity due to its ability to provide stable fixation of both medial and lateral columns, allowing early mobilization and improved functional outcomes⁹.

Previous studies have demonstrated that dual plating offers superior biomechanical stability compared to single lateral plating and is associated with better alignment, reduced collapse, and improved functional recovery^{10–14}. Therefore, the present study was undertaken to evaluate the functional and radiological outcomes of Schatzker type V and VI tibial plateau fractures treated with dual plating.

CASE PRESENTATION

A 42-year-old male presented with:

- Pain
- Swelling
- Inability to bear weight

Following road traffic accident.

Clinical findings:

- Knee swelling
- Tenderness
- Restricted movement
- No neurovascular deficit

Radiological evaluation confirmed **Schatzker type VI fracture**.

PRE-OPERATIVE RADIOLOGY



Figure 1: Pre-operative radiograph showing Schatzker type VI fracture.

INTRAOPERATIVE FINDINGS (DUAL PLATING)



Figure 2: Intraoperative image showing dual plating fixation.



POST-OPERATIVE RADIOLOGY



Figure 3: Post-operative radiograph demonstrating anatomical reduction.

REHABILITATION AND FUNCTIONAL OUTCOME



Figure 4: Functional outcome at final follow-up showing good range of motion.

METHODOLOGY / MANAGEMENT

- Supine position under tourniquet
- Temporary external fixation
- CT scan evaluation
- Definitive fixation with dual plating
- Drain removal after 48 hrs
- Knee mobilization from POD 4
- Non-weight bearing for 10 weeks

Follow-up:

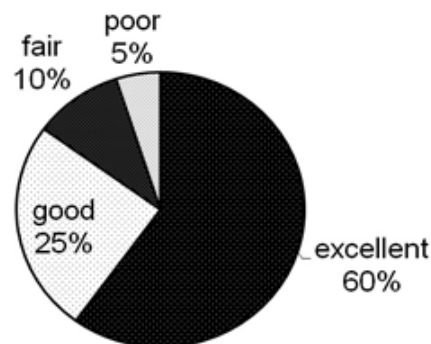
- 2 weeks
- 1 month
- 3 months
- 6 months
- 1 year

Assessment:

- Modified Rasmussen functional score
- Modified Rasmussen radiological score

RESULTS

Radiological Score	Pts	Clinical-Functional Score	Pts	
Depression	None	Pain	No pain	6
	<5 mm		Occasional pain	5
	5-10 mm		Stabbing pain in certain positions	4
	>10 mm		Constant pain after activity	2
Condylar widening	None	Walking capacity	Significant rest pain	0
	<5 mm		Normal for age	6
	5-10 mm		Outdoor > 1 h	4
	>10 mm		Outdoor > 15 min	2
Angulation (varus/valgus)	None	Extension	Only indoors	1
	<10°		Immobile	0
	10-20°		Normal	6
	>20°		Lack of extension < 10°	4
			Lack of extension > 10°	2



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	>20°		Lack of extension < 10°	4
			Lack of extension > 10°	2



Functional Outcome

Functional Outcome:

- Excellent: 14 patients
- Good: 6 patients
- Fair/Poor: 0 patients

Radiological Outcome

- Majority scored 16–18
- Good anatomical alignment achieved

Overall Results

- Mean age: 42.9 years
- Mean ROM: 126°
- Union time: 20 weeks
- All patients returned to pre-injury status

Complications

- Knee stiffness: 6 cases (resolved)
- No infection
- No implant failure

DISCUSSION

High-energy bicondylar tibial plateau fractures (Schatzker type V and VI) are complex intra-articular injuries that pose a significant challenge to orthopedic surgeons due to associated soft tissue compromise, comminution, and instability¹⁻⁴. The primary goals of treatment include anatomical reduction, restoration of joint congruity, stable fixation, and early mobilization while minimizing complications such as infection, malalignment, and stiffness⁵⁻⁸.

In the present study, dual plating provided a stable construct that allowed early mobilization and resulted in good to excellent functional and radiological outcomes. These findings are consistent with the study by Prasad et al., who reported satisfactory functional outcomes in patients treated with dual plating for Schatzker type V and VI fractures⁹.

Barei et al. demonstrated that bicondylar fractures treated with dual plating using a two-incision technique showed improved fracture stability but were associated with potential complications if soft tissue handling was inadequate¹⁰. Similarly, Jiang et al. compared LISS plating with dual plating and found that dual plating provided better stability in complex bicondylar fractures, particularly in cases with medial column involvement¹¹.

Lee et al. reported that dual plating achieved better functional outcomes and alignment compared to unilateral lateral plating, emphasizing the importance of addressing both columns in bicondylar fractures¹². Furthermore, Yao et al. showed that dual plating significantly reduced the risk of varus collapse and malalignment compared to single plating techniques¹³.

Recent studies such as Haider et al. have also demonstrated that dual plating results in high rates of fracture union, improved knee range of motion, and satisfactory patient outcomes, further supporting its role as a reliable treatment modality¹⁴.

The advantages of dual plating include better visualization of fracture fragments, especially the posteromedial fragment, fixation of both medial and lateral columns, achievement of interfragmentary compression, and provision of a rigid construct that allows early knee mobilization. Early mobilization plays a crucial role in enhancing fracture healing, preventing joint stiffness, and improving functional recovery.

However, the procedure is technically demanding and requires careful preoperative planning and meticulous soft tissue handling to minimize complications. In the present study, complications were minimal and manageable, which correlates with existing literature emphasizing the importance of surgical expertise and timing of intervention.

Overall, the findings of this study reinforce that dual plating is an effective and reliable technique for managing Schatzker type V and VI tibial plateau fractures, providing stable fixation, facilitating early rehabilitation, and resulting in favorable functional and radiological outcomes.

Dual plating provides:

- Stable construct
- Better visualization of fragments
- Fixation of both medial and lateral columns
- Interfragmentary compression
- Early mobilization

Advantages of Dual Plating

1. Better visualization (especially posteromedial fragment)
2. Fixation of both columns
3. Interfragmentary compression
4. Rigid stability
5. Early knee mobilization

Advantages of Early Mobilization

1. Enhances fracture union
2. Prevents stiffness
3. Improves functional recovery

Complications like infection and compartment syndrome can be minimized by:

- Proper timing
- Gentle soft tissue handling
- Meticulous surgical technique

CONCLUSION

Bicondylar tibial plateau fractures treated with dual plating show:

- Good to excellent functional outcomes
- Excellent radiological alignment
- Stable fixation
- Early recovery

Dual plating remains a reliable and effective treatment modality for Schatzker type V and VI fractures. However, larger multicentric studies are required to validate long-term outcomes and complications.

Author Contributions

- 1) **Dr. Vinay B. Patil**: Study conception, surgical management, manuscript review
- 2) **Dr. Santosh Shegedar**: Data collection, literature review, manuscript drafting
- 3) **Dr. Eshwar Masgal**: Case documentation, imaging interpretation, follow-up
- 4) **Dr. Nishant Melkundi**: Data analysis, manuscript editing, formatting

Conflict of Interest

- 1) The authors declare no conflict of interest.

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Ethical Approval

- 1) Ethical approval was obtained from the Institutional Ethics Committee, and written informed consent was obtained from the patient for publication of this case report.

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