

Functional Outcomes of Direct Posterior Approach in Posterior Column Proximal Tibia Fracture - A Case Series

Dr. Sakthi Kumaran Arul Dhanakar, Dr. Vijayanand Balasubramanian, Dr. R. Ajay

Email: sk3170@srmist.edu.in

Email: vijayanb@srmist.edu.in

Email: ar2444@srmist.edu.in

Received: 15th Jul, 2026 | Revised: 25th Jul, 2026 | Accepted: 5th Aug, 2026 | Available Online:
12th Aug, 2026

ABSTRACT

Proximal tibial fractures of the posterior column provide considerable management difficulties owing to their hidden position and the constraints of traditional anterior methods. This case series details 2 cases: a 53-year-old female suffering from a posterior column proximal tibia fracture treated using open reduction and internal fixation (ORIF), and a 45-year-old male had a posterior column proximal Tibia fracture addressed through a direct posterior technique and dual buttress plating. Both cases illustrate effective anatomical reduction, prompt mobilisation, and positive functional results, underscoring the need of customised posterior fixation methods in intricate tibial injuries.

Keywords: Posterior column, Proximal tibial fracture, Tibial plateau, Surgical fixation

How to cite this article: Dhanakar SKA, Balasubramanian V, Ajay R., Functional Outcomes of Direct Posterior Approach in Posterior Column Proximal Tibia Fracture - A Case Series. Int J Drug Deliv Technol. 2026;16(76s): 502; DOI: 10.25258/ijddt.16.76s.44

Introduction

Proximal tibial fractures that affect the posterior column are complicated injuries typically caused by high-energy trauma, like motor vehicle collisions or falls. The hidden anatomical position of the posterior column and its proximity to vital neurovascular pathways render these fractures challenging to visualise and manage with standard anterior or anterolateral surgical techniques. Precise reduction and firm fixation are crucial for restoring joint congruity and preventing long-term problems such as instability or osteoarthritis. Recent advancements in surgical methodologies,

especially the implementation of direct posterior methods and buttress plating, have enhanced access to posterior fragments, facilitating accurate anatomical reconstruction and prompt mobilisation. This case series outlines the surgical management and results of two patients with complicated proximal tibia fractures, highlighting the significance of direct posterior procedures for improved stability and recovery.

Materials and methods:

Case 1:

A 45-year-old male patient presented following a motorbike skid, reporting intense

left knee pain, swelling, and diminished mobility, patient unable to walk post-trauma. The examination revealed abrasions on the proximal leg and considerable soft tissue damage, with neurovascular function preserved. Imaging, demonstrated a comminuted fracture within the posterior column on the tibial plateau with a posterior shift of the articular fragments. The clinical and radiological evidence substantiated the necessity for surgical fixation (**Figure 1.A**).

Case 2:

A 53-year-old female patient was admitted after a domestic accident in which a heavy object fell upon her left leg. She endured intense pain and significant swelling on the proximal tibia, accompanied by an inability to bear weight and walk post-trauma. The clinical examination indicated tenderness, swelling and restricted knee mobility. Radiographs verified a closed Schatzker Type V fracture of the proximal tibia, characterised by compression and displacement affecting both medial and lateral condyles, and also involvement of posterior column with involvement of the articular surface. She was immediately arranged for surgical intervention (**Figure 1.B**).

In both cases, the surgical procedure employed a similar technique designed to effectively manage the involvement of the posterior column. In surgery, a S-shaped incision was performed along the posterior portion of the leg to reveal the fracture location. A thorough dissection was conducted to safeguard adjacent

neurovascular systems. The medial head of the gastrocnemius muscle was meticulously extended laterally to facilitate the direct observation of the posterior tibial surface and fracture fragments (**Figure 1.A and B (i)**).

Subsequent to exposure, comprehensive debridement of the haematoma and adjacent soft tissues was performed to enable reduction. Thereafter, fluoroscopic guidance was employed to attain anatomical realignment of the misplaced fragments (**Figure 1.A and B (ii)**). Upon ocular and radiographic confirmation of adequate reduction, fixation was implemented via dual buttress plating—one plate placed posteromedially and another posterolaterally. Low-profile plates were affixed using a combination of locking and non-locking screws, with the strategic insertion of 6.5 mm cancellous screws to guarantee fragment stability. Intraoperative stability was assessed using fluoroscopy to verify the preservation of reduction and the correct placement of hardware.

Following fixation, the surgical incisions were filled with saline, and a vacuum drain was inserted to avert haematoma development. The incision was meticulously sutured in stages, ensuring appropriate soft tissue tension and alignment. Postoperative care comprised antibiotic administration, pain management, and the prompt commencement of a physiotherapy protocol focussing on regulated knee mobilisation and gradual weight-bearing was enhanced as indicated by radiographic evidence of healing (**Figure 1.A and B (iii)**).

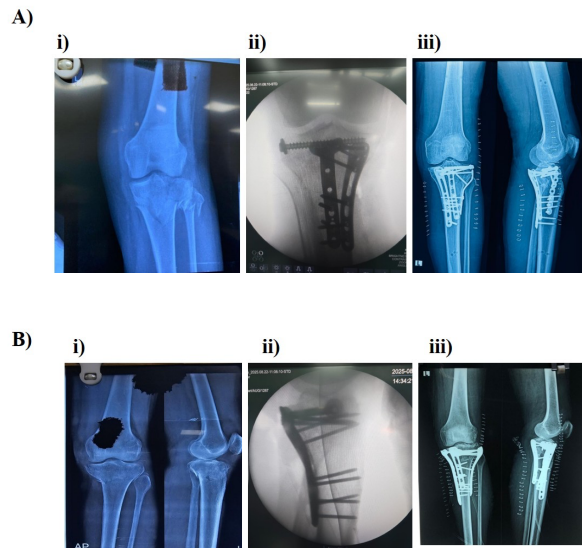


Figure. 1. A) and B): (i) Radiographs of Preoperative anteroposterior, **(ii)** images of Intraoperative fluoroscopic and, **(iii)** anteroposterior and lateral views of Postoperative radiographs

Results

Both patients exhibited exceptional surgical outcomes, with preserved anatomical reduction evidenced by radiographic imaging. The initial patient had gradual reduction of pain, decrease in swelling and improved knee flexion and extension motion within weeks. No evidence of infection, subsequent fracture displacement, or neurovascular problems was noted. Progressive therapy facilitated the shift from passive to active knee movements, resulting in near-normal functionality and complete weight-bearing ambulation.

Likewise, the second patient achieved stable fixation, facilitating early mobilisation without complications. Knee flexion reached 110 degrees at follow-up visits, correlated with reductions in pain levels and enhancements in functional evaluations, including the Lysholm and KOOS scores.

Radiographs verified congruent joint surfaces and steady posterior slopes, with no hardware failure observed. Neither patient demonstrated postoperative stiffness, wound complications, and thromboembolic occurrences.

Both cases confirm that customised posterior fixation—via posteromedial/posterolateral or direct posterior techniques can ensure dependable fracture union, regained articular congruity, and full functional recovery with low morbidity.

Discussion

Proximal tibial fractures of the posterior column provide surgical difficulties owing to their anatomical intricacies and the biomechanical stresses exerted on the posterior tibial plateau. Conventional anterior or anterolateral surgical techniques frequently offer restricted access for direct observation and stabilisation of posterior fragments, compromising adequate reduction and leading to potential secondary displacement. This constraint has resulted in the heightened use of several posterior techniques namely direct posterior, posteromedial, posterolateral, and modified Frosch methods that enhance anatomical reduction via superior exposure. Our cases, addressed with a direct posterior method utilising dual plating, correspond with an expanding corpus of research that highlights stable fixation, preservation of posterior tibial slope, and prompt mobilisation as significant advantages. Similar research indicates reduced operating durations and improved postoperative range of motion when employing posterior approaches compared to anterior-only treatments. These methods help reduce soft tissue dissection

and safeguard neurovascular systems by precise surgical technique.

However, posterior methods necessitate technical proficiency and provide harm to neurovascular structures, including the common peroneal nerve. Such methods could be constrained in patients with inadequate soft tissue conditions or polytrauma. Despite these limitations, the prevailing evidence supports a personalised, three-column fixation approach—specifically targeting posterior column fractures as separate entities to enhance mechanical stability and functional recovery. Our results corroborate these observations, underscoring the need of posterior fixation in intricate tibial plateau fractures.

Conclusion

Direct posterior fixation for proximal tibial fractures of the posterior column offers greater anatomical reduction and robust mechanical support, facilitating early knee mobilisation and improved functional recovery relative to only anterior techniques. It guarantees excellent preservation of articular congruity and tibial inclination, essential for enduring joint functionality. Future innovations must concentrate on creating minimally invasive posterior fixation methods to minimise tissue damage and promote expedited healing, while also investigating patient-specific implants and intraoperative navigation technology to enhance precision and results. Extensive, future research are required to corroborate these improvements and formulate standardised treatment methods.

References

1. Martz P, Le Baron M. High-energy tibial plateau fracture. *Orthopaedics & Traumatology: Surgery & Research* 2025;111(1, Supplement):104072. Doi: 10.1016/j.otsr.2024.104072.
2. Zecca F, Shah A, Guggenberger R, Iyengar KarthikeyanP, Botchu R, Shah A. Bone Trauma. In: Davies M, Botchu R, and Iyengar KarthikeyanP, editors. *Imaging of the Hip & Bony Pelvis: Techniques and Applications*. Cham: Springer Nature Switzerland; 2024. p. 141–214.
3. Focsa MA, Florescu S, Gogulescu A. Emerging Strategies in Cartilage Repair and Joint Preservation. *Medicina (Kaunas)* 2024;61(1):24. Doi: 10.3390/medicina61010024.
4. Porche K, Hoh DJ, Mohamed B, Polifka A, Decker M. Complex Spine Surgery. In: Mahanna Gabrielli E, O’Phelan KH, Kumar MA et al., editors. *Textbook of Neurointensive Care: Volume 2: Perioperative Management, Monitoring, Pharmacotherapy*. Cham: Springer Nature Switzerland; 2024. p. 37–59.
5. DePhillipo NN, Cinque ME, Chahla J, Geeslin AG, LaPrade RF. Anterolateral Ligament Reconstruction Techniques, Biomechanics, and Clinical Outcomes: A Systematic Review. *Arthroscopy: The Journal of Arthroscopic & Related Surgery* 2017;33(8):1575–83. Doi: 10.1016/j.arthro.2017.03.009.
6. Tran J, Yu H, Paprosky WG, Sheth NP. Systematic Exposure in Revision Total Hip Arthroplasty: The Posterior Approach. *JAAOS - Journal of the American Academy of Orthopaedic*

- Surgeons 2023;31(19):e736. Doi: 10.5435/JAAOS-D-22-00724.
7. Senthurvelan A et al. Functional Outcomes of Bicolumnar Plating in Schatzker Type V and VI Proximal Tibial Fractures: A Prospective Study. Cureus 2025. Doi: 10.7759/cureus.86399.
8. García Vélez DA, Headford M, Suresh KV, Liberatos PM, Bledsoe G, Revak T. Biomechanical analysis of dual versus lateral locked plating in elderly bicondylar tibial plateau fractures: Does medial comminution matter? Injury 2022;53(10):3109–14. Doi: 10.1016/j.injury.2022.08.039.