

Posterior Fractures of the Tibial Plateau: Are We on the Right Track?

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Posterior fractures represent less than 10% of the tibial plateau fracture total. They frequently occur due to high energy trauma, but osteopenic patients can also present this fracture pattern related to low energy events.

Posterior element fracture management has changed significantly throughout the last decade. Several classification systems, posterior approaches, and technical tricks were developed for outcome treatment improvement.

Although Schatzker classification for tibial plateau fractures is a system used worldwide, it only considers the X-Ray in anteroposterior view, lacking information about fracture location on the sagittal plane [1].

Moore attempted to create a classification system that also considers the X-Ray lateral view [2].

Recently, Luo developed the three-column classification system based on the CT-Scan axial view. Luo classification is a helpful method concerning the correct approach choice as it is based on fracture location [3].

Anterolateral and anteromedial approaches are mostly unsuitable for posterior element reduction and fixation, as they lead to poor functional outcomes.

Tscherne and Lobenhoffer first described the posteromedial approach for Moore type I split fractures, which allows direct fracture reduction and rigid fixation with an antigliding plate [4].

Fakler et al. presented their first results and a step-by-step surgical procedure for applying Lobenhoffer technique [5].

However, the posteromedial approach is frequently inadequate to treat posterior bicondylar and isolated posterolateral fractures.

Carlson described the double posteromedial and posterolateral approaches for posterior bicondylar fractures. The author highlighted the need for careful fibular nerve handling to prevent neuropraxia [6]. Bhattacharyya et al. proposed a unique posterior approach to fix this fracture pattern [7].

Although these approaches have contributed to better posterior fracture management, some fracture patterns such as associated anterior and posterior fractures remain a challenge for the orthopaedic surgeon.

Patient positioning, small posterolateral window, and fibular head are obstacles for fracture reduction and plate placement.

Solomon et al. presented his functional outcomes using fibular osteotomy for better posterolateral exposure [8]. This approach also allows fixing complex anterolateral and posterolateral fractures as it uses double plating or as described by Bermudez et al., just a single horizontal rafting plate [9]. Fibular neck nonunion and fibular common neuropraxia are potential complications related to this procedure. However, the authors described absence of complications related to the osteotomy. Rigid fixation preserving the regional blood supply and careful nerve handling are essential to avoid such complications.

Yu et al. described the partial fibular head osteotomy, preserving lateral collateral ligament to prevent knee instability [10].

Frosch et al. developed a new approach without fibular osteotomy. In a laterally positioned patient, a 15 cm skin incision starts 3 cm above the joint line and follows the fibula distally, allowing posterolateral and anterolateral windows for fracture reduction and fixation [11].

Although posterior fracture management has been improving, this fracture pattern remains a challenge for the orthopaedic trauma surgeon. The possibility of a catastrophic neurovascular injury during the procedure, the difficult surgical technique due to inadequate posterolateral exposure, and the need of combined approaches for complex fractures are some of the potential obstacles to overcome.

In high energy trauma, a two stage procedure applying a spanning external fixation until the wrinkle sign appears is recommended to prevent soft tissue complications.

In summary, X-ray in anteroposterior, lateral, and oblique views, as well as the CT-Scan are essential for the operative planning.

Complex fracture patterns mostly require multiple approaches. In bicondylar fractures, the medial fragment is generally a unique posteromedial split fracture, and starting the fixation on this fragment is recommended. Careful soft tissue handling, including the fibular nerve identification and isolation during the entire procedure, is mandatory. Anatomical reduction with rigid fixation achieving a stable joint and early movement complete the requirements to decrease complication rates related to posterior fractures of the tibial plateau.

Although current results applying these promising techniques can put us on the right track concerning posterior fracture management, long term follow-up is necessary to evaluate functional outcomes and complication rates related these encouraging procedures.

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