

Tibial Plateau Fractures in Low- and Middle-Income Countries: A Systematic Review of Treatment Modalities, Functional Outcomes, and Complications

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AIM

This systematic review synthesizes evidence from low- and middle-income countries (LMICs) regarding the treatment methods, functional outcomes, and complications associated with tibial plateau fractures (TPFs). The management and outcomes in LMICs differ significantly from high-income countries (HICs) due to a higher prevalence of **high-energy trauma** and constraints on health system **resources**.

Methods

The review included 15 studies, comprising a total of 1,213 patients, primarily from South Asia and Africa. The researchers conducted a systematic search of PubMed, EMBASE, Scopus, and regional databases for studies published up to May 2025.

Patient Profile:

Demographics: Patients in LMIC studies were predominantly male (65–75%).

Age: The mean age was between 35 and 45 years.

Cause of Injury: The leading cause of TPFs was high-energy trauma, particularly **road traffic accidents** (RTAs).

Fracture Type: Reflecting the high-energy mechanism, severe bicondylar fractures (**Schatzker V–VI**) were the most common, accounting for 40–50% of cases.

Treatment Findings and Outcomes

The review compared the primary surgical techniques used in LMICs:

Dual Plating

Pros: This method yielded superior alignment and higher functional scores. It is considered the gold standard for bicondylar fractures.

Cons: It carries a significantly higher risk of infection and wound complications, with rates reported between 10–18%.

Ilizarov and Hybrid External Fixation

Pros: These methods are valuable, resource-appropriate alternatives, especially for complex cases with compromised soft tissue. They achieve high union rates (over 90%).

Cons: Complications are common, particularly pin-tract infections (15–20%) and malalignment (10–12%).

Innovations

Arthroscopy: Arthroscopic-assisted fixation was shown to improve the reduction of the joint surface but is limited to specialized tertiary centers.

Mobilization: One randomized trial found that immediate weight-bearing improved gait recovery and reduced fall risk, challenging traditional delayed-loading protocols.

Complications and Systemic Barriers

A central finding is that complication rates for TPFs in LMICs are substantially **higher** than those reported in HICs. While satisfactory **union** rates are achieved, the high complication burden is driven by **systemic challenges**, including:

- . Limited access to rehabilitation and physiotherapy.
- . Scarcity of implants.
- . Inadequate soft tissue care.
- . Limited access to advanced imaging like CT scans for preoperative planning.

Conclusion

Despite resource limitations, high-quality fracture care and satisfactory union rates (>90%) for TPFs are achievable in LMICs. Dual plating offers the most stable fixation for complex fractures, while Ilizarov fixation is a critical and effective alternative. However, complication rates remain **high** due to systemic barriers. The review calls for system-level improvements in rehabilitation, infection prevention, and trauma infrastructure to narrow the outcome gap with HICs.

