Pediatric Tibial Plateau Fractures: Long-Term Clinical and Patient Reported Outcomes

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Purpose: Little has been reported on patients that sustain tibial plateau fractures in the setting of open physes. The purpose of this study is to report on the characteristics and outcomes of tibial plateau fractures in a pediatric population.

Methods: Patients with open physes operatively treated for a tibial plateau fracture between 2008 and 2022 were identified retrospectively. Demographics, injury characteristics, and outcomes were recorded. Primary outcomes included complications, additional surgeries, and patient-reported outcomes.

Results: 20 patients (75% male) with a mean age of 13.2 ± 1.8 years at time of injury and average follow-up of 2.6 ± 3.3 years were identified. There were 7 Salter-Harris Type 3 and 13 Salter-Harris Type 4 fractures. Based on Schatzker classification, there were 4 Type 1, 6 Type 2, 0 Type 3, 7 Type 4, 2 Type 5, and 1 Type 6 injury. The complication rate was 65.0% (13/20). 35% (7/20) developed a sagittal plane deformity, 40.0% (8/20) experienced growth arrest, and 5% (1/20) developed a deep vein thrombosis. The unplanned reoperation rate was 30.0% (6/20). 5 unplanned reoperations were epiphysiodesis, 2 in conjunction with physeal bar excision, for sagittal plane deformity. One patient required manipulation under anesthesia. Patients requiring epiphysiodesis for sagittal plane deformity trended younger, 12.2 vs 13.6 years (P = 0.13), than those not requiring epiphysiodesis. Physeal bar excision with hemiepiphysiodesis was successful in both patients. One patient without physeal bar excision failed hemiepiphysiodesis requiring a high tibial osteotomy at skeletal maturity. The mean Patient-Reported Outcomes Measurement Information System (PROMIS) PF (Physical Function), PI (Pain Interference), AS (Anxiety Symptoms), and International Knee Documentation Committee (IKDC) at final follow-up was 56.9, 45.7, 40.3, and 93.1, respectively. The mean PROMIS Pediatric Mobility, PI, AS, and Pedi- IKDC at final follow-up was 49.3, 51.7, 49.9, and 74.2, respectively.

Conclusion: This case series found that tibial plateau fractures most frequently occur as Salter-Harris Type 3 or 4 injuries and are associated with a high rate of complications and reoperation. Unilateral or bilateral prophylactic epiphysiodesis should be considered in patients nearing skeletal maturity to prevent future surgical intervention to correct alignment. Additionally, at long-term follow-up patients report favorable function, pain, and anxiety scores.