

The Effect of Soft Tissue Injuries on Clinical Outcomes Following Tibial Plateau Fracture Fixation

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Purpose: Tibial plateau fractures (OTA 41A-C) have a high incidence of soft-tissue injuries with rates of meniscal and ligament tears ranging from 47% to 99%. Previous studies have focused on injury patterns that are associated with these soft-tissue injuries. However, the clinical significance and the indications for surgical treatment of meniscal and ligament tears in the setting of tibial plateau fractures have not been established. The purpose of this study was to determine if soft-tissue injuries and subsequent secondary surgeries altered clinical outcomes following fixation of tibial plateau fractures.

Methods: A prospective database of operatively treated tibial plateau fractures by a single surgeon from 2004-2012 was used to identify patients. Inclusion criteria consisted of patients with injury radiographs, preoperative knee MRI, and a minimum of 12 months of clinical outcomes. MRI analysis was performed prior to operative fixation by a fellowship-trained musculoskeletal radiologist to detect tears in the medial and lateral menisci and complete ruptures of the anterior cruciate ligament (ACL), posterior cruciate ligament (PCL), medial collateral ligament (MCL), and lateral collateral ligament (LCL). Standard anterolateral and/or posteromedial approaches were used for fracture fixation as indicated by fracture pattern. Lateral meniscal tears were routinely repaired following lateral submeniscal arthrotomy, whereas other soft-tissue injuries were not addressed acutely. Clinical outcomes included the Knee Outcome Survey Activities of Daily Living Scale (KOSADLS), the Lower Extremity Functional Scale (LEFS), the Short Form (SF)-36, and knee range of motion (ROM) at the most recent postoperative visit. Subsequent secondary soft-tissue surgeries and arthroplasties were also recorded at final follow-up.

Results: 82 patients were included in the study. Average patient age was 54 years (range, 13-87), and 51% were male. 55 fractures (67%) were classified as Schatzker I or II, and the remaining 27 (33%) were classified as Schatzker IV, V, or VI. Postoperative clinical outcome scores were obtained at a mean of 31 months (range, 12-111). Using MRI to diagnose soft-tissue injuries, 49 patients (60%) had a lateral meniscal tear and 32 patients (39%) had a medial meniscal tear. MCL ruptures were seen in 23 patients (28%), LCL ruptures in 9 patients (11%), ACL ruptures in 8 patients (10%), and PCL ruptures in 2 patients (2%). 33 patients (40%) were diagnosed with injuries to multiple structures. Only four patients (5%) had a secondary soft-tissue surgery and one patient (1%) underwent total knee arthroplasty at final follow-up. Patient-reported outcomes (KOSADLS, LEFS, SF-36) and ROM assessments were not significantly different in patients with and without medial meniscal tears, in patients with and without lateral meniscal tears, and in patients with and without MCL ruptures. Patients with LCL, ACL, and PCL ruptures were too few for meaningful analyses.

Conclusion: While injuries to menisci and ligaments are common in patients with tibial plateau fractures, the clinical significance and treatment algorithms for these injuries have not been defined. In this cohort of patients with operative tibial plateau fractures, we confirmed a high frequency of soft-tissue injuries using MRI. With a minimum of 12 months of follow-up in these cohorts, meniscal and MCL injuries did not significantly affect clinical outcomes. Only five patients (6%) underwent a secondary soft-tissue surgery (4) or arthroplasty (1) at midterm follow-up. Given the small number of patients with other ligament injuries in this cohort, subsequent studies in larger cohorts will be important to pursue these results.