

**Tibial Shaft and Pilon Fractures with Associated Syndesmotic Injury:  
A Matched Cohort Assessment**

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**Purpose:** Distal tibiofibular syndesmosis injury and treatment have been extensively studied in association with rotational ankle fractures. However, the incidence and clinical implications of syndesmotic disruption with tibial shaft or pilon fractures is less well defined. The purpose of this study is to define the incidence and severity of tibial shaft and pilon fractures with syndesmotic injury and compare their outcomes to a matched cohort of tibial shaft and pilon fractures without a syndesmotic injury.

**Methods:** A retrospective review was performed of all patients with tibial shaft or pilon fractures and associated distal tibiofibular syndesmotic injuries over a 5-year period at a Level-I trauma center. A best-fit, 2:1 control group was identified from a trauma database matching the study group for age, OTA fracture classification, and Gustilo-Anderson (GA) classification. Charts and radiographs were reviewed for demographics, neurovascular injuries, incidence of compartment syndrome, and fracture pattern. Outcomes assessed included deep infection, nonunion, unplanned reoperation, and need for amputation. Descriptive statistics, unpaired t-test and  $\chi^2$  analysis were used for statistical evaluation.

**Results:** 30 patients, including 15 tibial shaft and 15 pilon fractures, were found to have associated syndesmotic injuries and were followed until fracture union. The comparison cohort was comprised of 60 patients. In the study period, the incidence of syndesmotic injury in all tibia shaft fractures was 2.3% and in pilon fractures 3.4% ( $P = 0.292$ ). The incidence of GA 3A fractures was 43% and GA 3B fractures was 20%; no GA 3C fractures were included. The syndesmotic injury group had more neurologic injuries (23% vs 6%,  $P = 0.03$ ), more vascular injuries not requiring repair (30% vs 16%,  $P = 0.13$ ), and a higher rate compartment syndrome (6.7% vs 0%,  $P = 0.13$ ). Segmental fibula fracture was significantly more common in patients with a syndesmotic injury (37% vs 17%,  $P = 0.005$ ). Average fracture follow-up was 446 days. 50% of the syndesmotic injury group underwent an unplanned reoperation with significantly more unplanned reoperations (1.3 vs 0.5,  $P = 0.01$ ). The injury group had a significantly higher deep infection rate (27% vs 9.8%  $P = 0.046$ ), and a significantly higher rate of amputation (26% vs 4%,  $P = 0.002$ ), while the nonunion rate was similar (17% vs 16%,  $P = 0.86$ ).

**Conclusion:** While syndesmotic injuries with tibial shaft or pilon fractures are rare, they are a marker of an incredibly devastating injury. The presence of a segmental fibula fracture should alert clinicians to evaluate for syndesmotic injury, if not clearly identified on plain radiographs. Patients with tibial shaft/pilon fractures and associated syndesmotic injuries have high rates of reoperation, deep infection, and amputation. Clinicians should counsel patients on the negative impact syndesmotic injury has on outcomes in tibial shaft and pilon fractures.