

Risk Factors for the Development of Posttraumatic Arthritis After Torsional Ankle Injury

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Purpose: Torsional ankle fractures are common, and restoration of alignment is anticipated to result in return to function without long-term sequelae in most cases. Injury or patient factors that may portend risk for developing posttraumatic arthritis (PTA) are not well-described. The purpose of this study was to identify risk factors for PTA following displaced torsional ankle fracture.

Methods: 1333 adult patients treated for a torsional ankle fracture (OTA 44) at a single Level-I trauma center over 13 years were reviewed. PTA was defined by presence of osteophytes, joint space narrowing, sclerosis, or cysts subsequent to the ankle fracture or progression of such preinjury findings following the fracture. Patients with minimum 1 year of radiographic follow-up were included, unless PTA was noted prior to that time.

Results: 339 patients had adequate follow-up, of whom 167 (49.3%) had radiographic evidence of PTA of the ankle. Patients with PTA were older (44.9 years vs 41.8 years, $P = 0.05$) and more often had sustained high-energy motorized collisions (33.5% vs 18.0%, $P = 0.001$). Open fractures and dislocations were associated with PTA (25.7% vs 8.1%; and 55.1% vs 28.5%, respectively; both $P < 0.001$). 146 total patients had a posterior malleolar fracture; the size of the posterior malleolar fragment was significantly larger in those developing PTA (19.6% of articular surface vs 14.4%, $P = 0.015$). A greater proportion of those with PTA had a malunion (4.8% vs 0.6%, $P = 0.02$) or nonunion (11.4% vs 4.1%, $P = 0.01$). Those with PTA more often had at least 1 medical comorbidity (54.8% vs 43.3%, $P = 0.03$), with a trend toward more diabetes (19.8% vs 12.8%, $P = 0.08$). Rates of obesity were similar among those who developed PTA (60.2%) compared to those who did not (54.5%) ($P = 0.3$). 30% of patients who developed PTA previously underwent unplanned secondary procedures compared to only 12.8% of those who did not develop PTA ($P < 0.001$), including removal of painful implants (18.0% for PTA vs 9.9%, $P = 0.03$) or arthrodesis (7.2% for PTA vs 0.6%, $P = 0.002$).

Conclusion: Posttraumatic arthritis of the ankle occurred in half of patients following torsional ankle injury, with PTA more common after high-energy motorized collisions, open fractures, and/or dislocations. Interestingly, there did not appear to be an association between diabetes or obesity and developing PTA. Those who developed PTA were more likely to have previously experienced malunion or nonunion of their fracture, and were more likely to undergo secondary procedures for pain relief.