

ΔOutcomes a Decade After Surgery for Unstable Ankle Fracture: Functional Recovery Does Not Decay with Time

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Purpose: Ankle fractures are among the most common injuries treated by orthopaedic surgeons; however, there is a dearth of evidence regarding long-term outcomes following surgery for an unstable ankle fracture. The purpose of this OTA-funded study is to examine long-term clinical and radiographic outcomes in a well-documented patient cohort.

Methods: Between January 2001 and January 2007, 500 patients who underwent surgical repair of an unstable ankle fracture (original cohort) were enrolled in a prospective database and followed out to 1 year. Trained interviewers recorded baseline characteristics at the time of injury, including patient demographics, American Society of Anesthesiologists (ASA) classification, and medical comorbidities. Short Musculoskeletal Function Assessment (SMFA) scores and American Orthopaedic Foot & Ankle Society (AOFAS) Ankle-Hindfoot Scale scores were obtained at standard follow-up intervals. Patients were contacted by mail and telephone for long-term follow-up, which included radiographs and functional assessment with the use of the SMFA and AOFAS Ankle-Hindfoot Scale. Radiographs were evaluated for the presence of posttraumatic arthritis of the ankle. Multiple linear regression was used to identify predictors of functional recovery, binary logistic regression was used to identify predictors of radiographic osteoarthritis, and paired-samples *t*-tests were used to compare long-term functional outcome scores to scores at 1 year.

Results: Overall, 75 patients out of the 148 patients contacted (51%) returned for evaluation (follow-up cohort). The average length of follow up was 10.5 years (range, 7-13 years), and the mean age at follow up was 57 years (range, 27-85). The follow-up cohort was significantly older at the time of injury when compared to the original cohort ($P = 0.043$; mean 47.3 years vs. 43.2 years). There was no significant difference in the number of males and females in the original cohort compared to the follow-up cohort ($P = 0.547$). Based on follow-up radiographs, 23.2% of patients had no osteoarthritis, 46.4% of patients had mild osteoarthritis, 26.1% of patients had moderate osteoarthritis, and 4.3% of patients had severe osteoarthritis. Overall, 13% of patients had removal of ankle hardware, and 1 patient underwent a tibiotalar fusion secondary to symptomatic posttraumatic arthrosis. 86.2% of patients had none-to-mild ankle pain, and 89.2% of patients had no limitation of daily activities. According to the AOFAS Ankle-Hindfoot Scale, 86% of patients had $\geq 80\%$ long-term functional recovery and 58% had $\geq 90\%$ long-term functional recovery. Overall, male sex was a predictor of having radiographic osteoarthritis ($P < 0.05$). There were no other significant predictors for any severity of radiographic osteoarthritis. Overall, there was no difference in total SMFA scores at an average of 11 years compared to scores 1 year postoperatively. ASA class 1 or 2 was found to be a significant predictor of functional

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recovery based on long-term standardized total SMFA scores ($P < 0.05$). No other significant predictors of functional recovery were identified.

Conclusion: Over a decade after ankle fracture fixation, the majority of patients are doing well; despite the fact that 76% of patients have some form of radiographic arthritis, very few experience pain, and have few restrictions in function or daily activities. Patients' long-term functional outcomes are not significantly different than their outcomes at 1 year.