Does Hardware Removal Improve Function Following Ankle Open Reduction and Internal Fixation?

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Introduction/Purpose: Orthopaedic hardware removal (HWR) is one of the most common orthopaedic procedures performed, with rates reported between 5% and 16%. Despite the high rates of HWR, there is still no consensus or guideline for removal after osseous healing without infection. Outcome studies for HWR are scarce, particularly in the lower extremity. The purpose of this study is to evaluate the effect of removal of symptomatic ankle hardware using the Short Musculoskeletal Function Assessment (SMFA) dysfunction index as the primary outcome. We hypothesize that HWR after ankle fracture will result in improved functional outcomes.

Methods: Utilizing a prospectively collected ankle fracture registry, all patients that underwent HWR between 2013 and 2016 were retrospectively reviewed. Inclusion criteria were skeletal maturity, closed intra-articular ankle fracture, symptomatic ankle hardware and completion of the SMFA questionnaire prior to and 5-months after hardware removal. Exclusion criteria were development of a nonunion, infection or complex regional pain syndrome from initial surgery. The primary outcome was change in SMFA score from baseline. Paired t-test was used to compare baseline and follow-up SMFA scores. A multiple linear regression model evaluated the effects of age, sex, body mass index (BMI), smoking status, number of comorbidities, and Lauge-Hansen fracture classification on outcomes.

Results: The study included 43 patients (31 females, 12 males), mean age 49.9 (range, 19 to 83). Mean time from initial surgery to HWR was 37±46 months (range, 2.2 to 209). Follow-up SMFA questionnaires were completed 5.7±0.5 months (range, 5.1 to 7.4) after HWR. The fractures were classified as 23 (53%) supination-external rotation, 6 (14%) pronation-external rotation, 2 (4.7%) pronation-abduction and 1 (2.3%) supination-adduction. Eleven fractures (26%) were classified as pilons. The SMFA dysfunction index improved significantly from baseline to follow-up (3.71±7.4, p=0.002). Significant improvement was seen in the secondary outcomes of SMFA bother index (4.40±8.9, p=0.003) and SMFA daily activities domain (4.12±9.1, p=0.006). Regression analysis revealed a significant improvement in the bother index correlating with female gender (p=0.01) and decreasing number of comorbidities (p=0.03).

Conclusion: Our study demonstrates that patients with ankle fractures have a significant improvement in function following the removal of symptomatic ankle hardware. Patients also showed a significant improvement in the bother index and daily activities domain of the SMFA. Further investigation into the specific indications for HWR and the impact of injury and fracture pattern on outcomes is warranted.

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