

Improvement in Functional Outcomes After Symptomatic Implant Removal: Upper Versus Lower Extremity

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Purpose: Implant removal (IR) is one of the most common orthopaedic procedures, but outcome studies for IR are scarce. There are no guidelines regarding hardware location, timing of removal, or expected functional improvement. The purpose of this study is to evaluate the effect of symptomatic upper and lower extremity IR using the Short Musculoskeletal Function Assessment (SMFA) dysfunction index as the primary outcome.

Methods: From 2013-2016, a prospectively collected outcomes registry of IR patients was retrospectively reviewed. Inclusion criteria were skeletal maturity, symptomatic implants, and completion of the SMFA questionnaire prior to and after IR. Exclusion criteria were nonunion, infection, or complex regional pain syndrome following initial procedure. The primary outcome was change in SMFA score from baseline. A multivariate regression analysis evaluated the effects of age, sex, body mass index (BMI), smoking status, diabetes, history of depression and anxiety, Workers' Compensation status, and time from primary surgery on outcomes.

Results: A total of 160 patients, 41 upper extremity (UE) and 119 lower extremity (LE), IRs were included. The UE cohort had a mean age of 50.3 years (range, 17 to 79) with 21 females and 20 males. The LE cohort had a mean age of 48.9 years (range, 17 to 83) with 80 females and 19 males. Follow-up SMFA questionnaires were completed at 5.9 (range, 5.0 to 8.5) and 5.8 (range, 5.0 to 11.5) months for UE and LE, respectively. The index improved significantly from baseline to follow-up for LE ($P < 0.001$) with a trend to significance for UE ($P = 0.059$). This did not significantly differ between the 2 ($P = 0.47$), although the LE cohort had a significantly worse baseline ($P = 0.02$). Multivariate regression found a significantly worse functional outcome in the LE group with regard to a history of depression and anxiety ($P = 0.039$) and a trend to significance with BMI ($P = 0.076$). No factors were found to be significantly related to outcome in the UE group.

Conclusion: Implant removal in both the UE and LE show improvement in function, with removal from the LE reaching significance. The significantly earlier IR time for UE may be related to primarily prominent implants with minimal concern regarding functional loading, while the significantly worse baseline LE SMFA may indicate greater functional impairment related to weight-bearing activities.