

Preoperative Patient-reported Outcome Measures (PROMs) Predict Postoperative Success in Patients With End-Stage Ankle Arthritis

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Introduction/Purpose: Ankle arthritis is a leading cause of pain and disability. Total ankle replacement and Ankle fusion are two common surgical treatments with successful outcomes. Despite the effectiveness of those treatments, a subset of patients remains with persistent pain and functional limitations. This has prompted the search for predictive tools capable of identifying patients who are likely to benefit from surgery which allows surgeons to provide valuable prognostic information, implement, and direct appropriate treatment programs. The purpose of this study is to use preoperative patient-reported outcome measures (PROMs) to predict which patients with end-stage ankle arthritis undergoing surgical treatment are most likely to experience postoperative improvements (a clinically meaningful change) in functional outcomes at an average follow-up of five years after surgical treatment.

Methods: A prospective cohort design used to evaluate 427 Patients with end-stage ankle arthritis at preoperative baseline and an average of five years after undergoing total ankle replacement or ankle fusion at a single academic institution. Data on demographics, comorbidities, Ankle Osteoarthritis Score (AOS), and Physical components (PCS) of SF-36 were collected. The Canadian Orthopaedic Foot and Ankle Society Ankle Arthritis Score (COFAS-AAS) was calculated from the AOS. The Minimal clinically important difference (MCID) was then determined using a distribution-based method. A multivariable logistic regression analysis examined the variables affecting the change in PROM scores. Receiver operating characteristic (ROC) analysis was used to calculate threshold values, defined as the levels at which substantial changes occurred, and their predictive ability to determine whether preoperative PROM scores were predictive of achieving MCID.

Results: Patients who scored worst at preoperative baseline made the greatest gains in function and pain relief following surgical treatment. ROC curves demonstrated that preoperative AOS, COFAS-AAS, SF-36 PCS physical function scores were predictive of postoperative improvements in physical function. Patients with preoperative AOS score above 45.7 had an 83% probability of achieving a clinically meaningful improvement in function as defined by MCID (area under the curve [AUC] 0.67). Similarly, Patients with preoperative COFAS-AAS score above 25.70 had a 78% probability of achieving MCID (area under the curve [AUC] 0.63). Patients with preoperative SF-36 PCS score below 31 had a 62% probability of achieving MCID (area under the curve [AUC] 0.64). MCIDs for AOS, COFAS-AAS and SF3-36 PCS score changes were 12.35, 9.99 and 6.43, respectively.

Conclusion: In the present study, we identified PROM threshold values that predict clinically meaningful improvements in functional outcome in patients with end-stage ankle OA. Patients with a higher level of preoperative function are less likely to obtain meaningful improvement after surgical treatment. The results of this study may be used to facilitate discussion between physicians and patients regarding the expected functional benefit after surgery and to support the development of patient-based informed decision-making tools.

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