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Pre-operative Gait Speed As An Indicator Of Subjective And Functional Recovery Following Total Ankle Replacement

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Abstract:
End-stage ankle arthritis is as functionally debilitating as congestive heart failure and end-stage kidney disease and is often treated with total ankle replacement surgery (TAR). However, following TAR patients have persistent functional deficits.
PURPOSE:To understand the effect of preoperative (PRE) gait speed on 1 and 2 year post-operative (POST) function and patient reported outcomes.
METHODS:Patients with end-stage ankle arthritis (N=123) were enrolled in this study. Subject's average age and weight were 64.1yrs and 83.8kg, respectively. PRE data were collected prior to TAR; patients were examined using the same methods 1 and 2 years POST. A series of questionnaires (AOFAS Hindfoot Scale, SF-36, FADI), functional tests (Timed Up and Go (TUG), Sit to Stand (STS), and the Four Square Step Test (4SST)), and walking speed were collected. Patients received no formal rehabilitation. Subjects were divided into 4 cohorts based on mean PRE walking speed (Mean+/-1SD, Mean +/- 2SD). A series of 3 X 4 (time X walking speed group) mixed model, repeated measures ANOVAs were completed.
RESULTS:Significant interactions existed for TUG, STS, and walking speed. The largest gains were observed for all groups between PRE and 1 year ($p < 0.01$) with no differences between 1 and 2 years ($p = 0.40$). The groups with lower gait speed PRE exhibited the largest improvements over the course of the study. During the 4SST, the groups below the mean walking speed exhibited 37-50% improvements between PRE and 1 year. The fastest walking speed group had no change in 4SST performance between PRE and 1 year, yet this group did show a 34% increase in performance between 1 and 2 years. Visual analog pain, FADI, SF36, and AOFAS were all improved following surgery ($p < 0.01$); however, no differences existed between 1 and 2 years POST and no differences existed across walking speed groups.
CONCLUSIONS:PRE gait speed appears to be associated with patient outcomes following TAR. It is interesting to note that over the course of the study, only the high PRE walking speed group achieved community ambulation walking speed (1.3m/s). This suggests that other factors may be influential in returning patients to "normal" and that rehabilitation may be appropriate and relevant in patients with lower PRE walking speed in order to maximize POST functional recovery.
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