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**Prospective Comparison of Ankle Arthrodesis and Ankle Arthroplasty, 1 to 3 Year Follow-up.**

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 Summary. Ankle arthrodesis and ankle arthroplasty increased patients’ function at a high activity level over a three-year period as indicated by step counts and self-reported measures.

Background: There is uncertainty about optimal treatment of end-stage ankle arthritis and comparative outcome data is lacking. Both physicians and patients are in need of high-quality evidence comparing arthroplasty to the “gold standard” of arthrodesis to guide clinical care.

Setting: Patients receiving clinical care at Harborview Medical Center (Seattle, WA), Orthopaedic Associates of Michigan (Grand Rapids, MI), Orthopedic + Fracture Specialists (Portland, OR), and Twin Cities Orthopedics (Edina, MN). Methods We prospectively examined 269 patients undergoing ankle arthrodesis (n=98, MBMI=30.9) or arthroplasty (n=171, MBMI=28.9). Subjects wore a StepWatch3™ Activity Monitor for 14 days and completed a Musculoskeletal Functional Assessment (MFA) and SF-36 preoperatively and at 3, 6, 12, 24, and 36 months postoperatively. We used linear mixed effects regression analysis to determine if outcome measures significantly changed across follow-up. Significance for each pairwise comparison was set at .0071 using Bonferroni’s correction for multiple comparisons (0.05/7).

Results. Average step activity at a high activity level (>40 steps per minute) significantly increased across the overall study period (p<.0001) with the greatest average change of 212 steps occurring between baseline (M=604 steps) and 12 months. Sustained activity measures generated by the StepWatch™ software revealed significant improvement from baseline to 12, 24, and 36 months (p<.0001). Neither surgery significantly improved the total number of daily steps over the course of the study. Self-reported function did not differ by surgery type. However, MFA scores decreased strongly for arthrodesis and arthroplasty across all follow-up periods, indicating increased function (p<.0001). The greatest mean change in MFA scores occurred between baseline (M=38.0) and 24 months (-15.8), with a trend showing better scores in patients treated with arthroplasty (-17.1) compared to arthrodesis (-13.0). Change scores at 36 months were similar in arthroplasty patients (-14.7) arthrodesis patients (-14.9). Furthermore, SF-36 scores indicated overall improvement in the areas of physical functioning, bodily pain, vitality, social functioning, and mental health across the 3-year follow-up period (p<.0001).

**Conclusion**. Results indicate both ankle arthrodesis and arthroplasty increased step activity at a high level and patients’ self-reported function. Trends suggest that arthroplasty patients show more improvement compared to arthrodesis patients. Data analysis is ongoing as 216 subjects are actively participating in follow-up procedures.