

12:54 pm

Durability of Improvements in Gait Analysis after Total Ankle Arthroplasty

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Summary: This study represents a 3-year consecutive series of yearly gait analysis of a 3rd generation TAR compared to preoperative gait analysis. We tested the hypothesis that a TAR would show significant improvements in gait and these improvements would persist over a 3-year period. Gait velocity and sagittal ankle range of motion improved and maintained over 3 years, with the exception of ankle power, which only improved during the 1st year postoperatively. Diminution of ankle power may not be clinically important relative to increasing velocity and constant range of motion, although more long-term studies are necessary to continue to follow the outcomes of TAR.

Background: Total ankle replacements (TAR) have become a viable alternative to ankle arthrodesis, and 3rd generation TAR are showing promising short-term clinical results. There are limited studies utilizing 3-dimensional gait analysis to objectively evaluate functional outcomes of TAR. This study represents a 3-year consecutive series of yearly gait analysis of a 3rd generation TAR compared to preoperative gait analysis. We present additional data supporting the short-term functional outcomes of TAR. This study tested the hypothesis that a TAR would show significant improvements in gait and these improvements would persist over a 3-year period.

Methods: Twenty-five patients had unilateral implantation of the Scandinavian Total Ankle Replacement System (STAR) by a single surgeon. The patient population consisted of twenty-two with primary osteoarthritis and 3 with rheumatoid arthritis. The average age was 61.2 years. Gait analysis was performed pre-operatively and at 3 yearly intervals postoperatively. Kinematic and kinetic data were collected using a 12-camera Vicon motion capture system (100Hz) and 2 AMTI force platforms (1,000 Hz), respectively. A one-way analysis of variance for repeated measures was performed to determine statistical significance. A Tukey post hoc test was run to test for significance between analysis periods.

Results: There was a significant increase in gait velocity postoperatively (P

Conclusion: The primary advantage of TAR over arthrodesis is maintenance of ankle motion. The patients' initial increase of 3.5 degrees is consistent with the literature (1,2,3), and was maintained through the third year. After one year, gait velocity reached values comparable to other prospective gait studies (3,4), and continued to increase each subsequent year. However, peak ankle power, which initially increased in the first year, decreased in the next two. These data indicate that it may take longer than 12 months, and possibly several years, to achieve maximally efficient gait following TAR. Gait parameters improved one year following surgery and were maintained, with the exception of ankle power. Diminution of ankle power may not be clinically important relative to increasing velocity and constant range of motion, although more long-term studies are necessary to continue to follow the outcomes of TAR.

References:

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