Ankle Arthroplasty and Ankle Arthrodesis – Prospective Gait Analysis Compared to Controls

Foot & Ankle Category: Ankle Arthritis

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Introduction
The purpose of this study is to compare patients with isolated end-stage ankle osteoarthritis, after undergoing either arthroplasty or arthrodesis, using gait analysis and outcome measures to elucidate differences between the two treatment options, as compared to a healthy control group. To our knowledge, this is the first adequately powered comparison gait study of its kind.

Methods
Prospective pre-operative and one-year post-operative gait analyses were performed on patients with isolated ankle arthritis that underwent either ankle arthrodesis or arthroplasty during a seven-year period. Validated outcome questionnaire data was obtained. Seventeen patients with arthroplasty and seventeen patients with arthrodesis were included; ten matched control subjects were included for comparison. The data were analyzed using a separate one-way ANOVA for each variable and functional score.

Results
Arthroplasty patients demonstrated improved total sagittal range of motion (18.1 vs. 13.7 degrees; p=0.019) and dorsiflexion (11.9 vs. 6.8 degrees; p=0.01) compared to the arthrodesis group, but did not improve plantarflexion motion. The ankle moments and power in both treatment groups remained significantly lower compared to controls (p<0.001 between treatment and control for both variables). Neither the arthrodesis nor ankle arthroplasty groups gait patterns were completely normalized. Patient-reported outcome data indicated that both treatments provided a similar magnitude of improvement.

Conclusion
Gait patterns of patients following three-component mobile bearing total ankle arthroplasty more closely resemble normal gait as compared to arthrodesis. Motion in the dorsal sagittal planes is primarily responsible for the differences. The reason that patients are not using the plantarflexion range of motion in the terminal stance phase demands further investigation, as does the reason for the limited increase in power generation at toe off with arthroplasty. Gait analysis did not elucidate any novel objective understanding of the reasons why patients have a subjective preference for arthroplasty. Results obtained from this study can add to the clinicians’ ability to inform patients of predicted functional outcomes prior to treatment of end-stage ankle osteoarthritis.