Staged Triple Arthrodesis and Total Ankle Arthroplasty Using a Custom Stemmed Talar Component for Stage IV Adult Acquired Flatfoot Deformity: Early Results of a New Technique

Presenting: Scott Andrew Swanson, MD - n – nothing to disclose

Additional Authors:
John P. Ketz, MD – n – nothing to disclose
Roy W. Sanders, MD - a - DePuy, A Johnson & Johnson Company; DJ Orthopaedics; Encore Medical; Link Orthopaedics; Medtronic Sofamor Danek; Pfizer; Smith & Nephew; Stryker; Synthes; Tornier; Twin Star Medical; Zimmer 
b - DePuy, A Johnson & Johnson Company; Smith & Nephew; c - DePuy, A Johnson & Johnson Company; Smith & Nephew; Stryker; e – Smith & Nephew

Summary:
This study describes a protocol for treating patients with Stage IV Adult Acquired Flatfoot Deformity with triple arthrodesis followed by total ankle arthroplasty using a custom stemmed talar component. Our purpose was to describe the protocol and to assess the early clinical, radiographic, and functional outcomes using this technique.

Abstract:
Background:
The treatment of Stage IV adult acquired flatfoot deformity presents a challenge to the orthopaedic surgeon. These patients have historically been treated with tibiotalarcalcaneal or pantalar arthrodesis. Recently, joint sparing procedures have been described. There has been recent interest in the use of custom stemmed talar components for complicated cases of combined ankle and hindfoot pathology. The purpose of this study was to prospectively evaluate patients with stage IV adult acquired flatfoot deformity treated with triple arthrodesis and total ankle arthroplasty using a custom stemmed talar prosthesis.

Methods:
From November 2004 to December 2005, nineteen total ankle arthroplasties were performed using a custom Agility® stemmed talar prosthesis (DePuy, Warsaw, Indiana) in eighteen patients. Seven cases (six patients) were patients with stage IV adult acquired flatfoot deformity. All patients were treated with triple arthrodesis followed by total ankle arthroplasty using a custom stemmed talar component at an average of 3 months. The average age of the patients was 65 +/- 12.5 years (range 48-78). Patients were followed clinically for range of motion, function, pain and radiographic analysis. All patients were followed prospectively for a minimum of two years. Functional outcomes were assessed using the SF-36, American Orthopaedic Foot and Ankle (AOFAS) hindfoot scores and Maryland Foot Scores (MFS).

Results:
Average follow-up for patients was 28.6 months (range 24 to 37 months). All patients were female. No patients required revision of their triple arthrodesis or total ankle arthroplasty. Prospective analysis for SF-36 subscale scores, Physical Component Summary (PCS) and Mental Component Summary (MCS) was performed. The mean preoperative PCS score was 28.2 +/- 6.9 (range, 16.9 to 35.9) compared to postoperative scores 40.3 +/- 7.6 (range, 31.8 to 49.2), (p < .05). A similarly significant difference was seen in the MCS values from 50.9 +/- 9.9 (range, 37.9 to 64.1) preoperatively and 60.4 +/- 5.5 (range, 51.9 to 64.4) postoperatively (p < .05). The mean preoperative MFS was 53 +/- 9 (range, 40 to 59), and the mean postoperative MFS was 76 +/- 9 (range, 68 to 89), (p < .05). The average AOFAS hindfoot score for preoperative patients was 44 +/- 4 (range, 41 to 49) compared to a postoperative score of 70 +/- 9 (range, 60 to 79), (p<.05). Radiographic analysis was performed on all patients. There was no radiographic lysis or subsidence. The mean preoperative dorsiflexion was –2.0 deg +/- 8 deg, with an average arc of motion of 24.8 deg +/- 15 deg. Postoperatively, dorsiflexion increased to 4
5 deg. There was an overall increase in the arc of motion following surgery to 37 deg +/- 7 deg. With the numbers available, these increases were not statistically significant.

Discussion/Conclusions:
To our knowledge, this represents the first description of a treatment protocol for stage IV adult acquired flatfoot deformity employing a triple arthrodesis combined with a total ankle arthroplasty using a custom stemmed talar component. The protocol results in excellent clinical outcomes and high patient satisfaction. There was no evidence of radiographic lysis or subsidence at the minimum two year follow-up. Although the numbers are small and longer follow up is needed, this protocol represents a promising treatment alternative for select patients with stage IV adult acquired flatfoot deformity.