Radiographic Analysis of Subsidence in Total Ankle Replacement: 2-Year Follow-up

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Introduction
Total ankle replacement (TAR) continues to grow as an alternative to arthrodesis for patients who suffer from end-stage arthritis. Previous reports in TAR have reported that implant subsidence particularly of the talar component is of major concern. Implant subsidence following TAR can alter implant stability and patient outcomes over time. Therefore, this study examined implant subsidence in patients who received a TAR.

Methods
Radiographs from 77 consecutive TAR patients between 2007 and 2008; 38 INBONE (IB) and 39 Salto-Talaris (ST) were assessed retrospectively. Implant failure occurred in 1 ST and 3 IB patients within two years of surgery leaving 73 patients with radiographs taken 6, 12, and 24 months following TAR that were used for this analysis. A single rater measured sagittal plane tibial and talar implant angles, vertical talar component distance, AP talar distance (lateral images), plus vertical and horizontal component sizes (control for radiographic magnification), medial tibial component angle, and prosthetic and native (contralateral) joint height (AP images). The inter-class correlation coefficient (ICC (3,1)) was used to determine measurement reliability. A 2X3 repeated measures ANOVA (Implant x time) was used to determine significant differences between the groups (P<0.05).

Results
ICC for all variables ranged from 0.46 to 0.993. There was no evidence of subsidence during the initial 2 years post TAR (P>0.05). The S-T implant had an increased medial tibial component angle (P=0.004). There were no differences for implant height between implants (P=0.14) or across time (P=0.89).

Conclusion
The implant failure rate of 5.19% within the first 2 years following TAR is higher than was expected. However, no evidence of post-operative TAR subsidence was found at 2-year follow-up after removing the patients who had an implant failure. In the first 2 years post-surgery, there was little evidence of change in radiographic alignment when using the INBONE and Salto-Talaris total ankle replacement implants. It is unknown if subsidence might become a clinical concern, but our data suggests that these TAR implants (IB, ST) remain stable over the initial two years after surgery. These findings could be the result of newer implant instrumentation which allow for more precise cuts causing less collapse on open unseen cavities underneath the prosthesis that could have been present with prostheses that were implanted in the past.