Doomed to Fail?: Talar Height as a Predictor for Subsidence in Revision Total Ankle Arthroplasty

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INTRODUCTION:

Revision total ankle arthroplasty (rTAA) presents both clinical and technical challenges, requiring surgeons to balance alleviating pain with preserving prosthetic joint function. Both rTAA and its alternative, revision to arthrodesis, are associated with high reoperation rates, underlining the difficult decisions that surgeons and patients must make when faced with managing a failed total ankle arthroplasty. One major concern in revision planning is the adequacy of talar bone stock, however, evidence regarding the minimum threshold required to support a revision total ankle arthroplasty is limited. This study aims to evaluate the risk of talar component subsidence after rTAA based on talar height and other parameters to inform surgical decision-making when treating failed TAA.

METHODS:

This single-institution retrospective cohort study included all rTAA between 06/01/2013 and 03/06/2024. Patients were identified using CPT codes 27703 and 27704. Cases were excluded if they did not involve removal of the talar component, did not utilize a fourth-generation implant, or had less than 6 months of postoperative radiographic follow-up (or follow-up until repeat revision). 32 ankles met inclusion criteria with a mean follow up of 25.1 months (range, 7.7 - 97.8). Variables examined included talar height, talar bone density, prior subtalar arthrodesis, patient weight, patient age, and reoperation. Talar height was measured as described by Kihara et al. Clinically significant subsidence was defined as greater than two millimeters of subsidence. Statistical analyses were performed in IBM SPSS Statistics, including chi-squared and linear regression tests. A p-value < 0.05 was considered statistically significant.

RESULTS:

Of the 32 rTAA, seven experienced more than two millimeters of talar subsidence. Only one ankle with a postoperative talar height greater than zero millimeters experienced clinically significant subsidence ($p<0.001$). Patient weight was significantly related to subsidence however BMI was not ($p=0.039$ and $p=0.393$, respectively). Preoperative talar height ($p=0.175$), pre-existing subtalar arthrodesis ($p=0.659$), patient age ($p=0.663$), and talar bone density ($p=0.447$) were not significantly correlated with a decreased risk of subsidence. While five patients required reoperation after their rTAA, talar subsidence was not the primary indication in any revision.

DISCUSSION AND CONCLUSION:

Postoperative talar height less than zero millimeters was significantly associated with an increased risk of subsidence. In contrast, preoperative talar height did not display a similar correlation, suggesting that the extent of intraoperative resection may be a key risk factor. Patient weight correlated with subsidence while age and BMI did not, suggesting that mechanical factors may play a greater role than comorbidities when predicting future subsidence. Subtalar arthrodesis did not appear to protect against subsidence however, this may be confounded by other factors that may lead a surgeon to recommend a subtalar arthrodesis before final revision. As preoperative planning software becomes more widely used in TAA, these findings may help define a “danger-zone” for talar resection during revision planning.