# Title: Total Ankle Arthroplasty With and Without Tibial Stem: Exploring Differences in Post-Operative Migration and Beta Angles

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# Disclosures

- This research did not receive any specific grant from funding agencies in the public, commercial, or not- for-profit sectors.

- Institutional Review Board approval was granted for this study and all aspects of this study were conducted ethically.

- Declarations of Interest: None

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# Introduction

- The advent of the lateral approach to total ankle arthroplasty has led to more accurate visualization, reconstruction, and alignment of the ankle joint
    - The two main procedures utilize implants either with or without tibial stems
- Little research has been conducted regarding which of the two implants lead to better long term outcomes
- Outcomes extrapolated from measuring tibial slope (beta angle) and migration
    - Extent of migration of the implanted arthroplasty components is directly correlated with the stability, and therefore efficacy, of the implant.
- The purpose of this study was determine which implant is superior by examining and comparing the differences in:
    - Migration
    - Post-operative tibial slope

# Methods- Study Design

- Retrospective analysis study

- Inclusion criteria: Patients who have undergone total ankle replacement over the past ten years. Revision case data also included. Patient's must have had regular follow ups over the three years following surgery.

- Exclusion Criteria: Mortality within three years of the procedure. Incomplete follow up cycle.

- 40 total patients were surveyed
  - 20 had tibial implants with a stem
  - 20 had tibial implants without the stem

Figure 1: Approach for Total Ankle Arthroplasty Courtesy of Dr. S Ali Ghasemi and Einstein Health Network
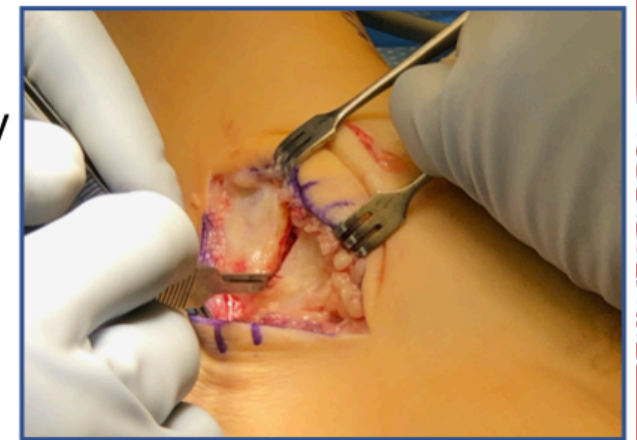
# Methods- Variables and Data Analysis

- The key variables considered included migration (AP and anterior/posterior), DTA, TTA, beta angles, gamma angles, coronal translation, and talar tilt.

  - Measurements were taken at first post-operative follow up (pre) and most recent post-operative follow up (post)

- Two tailed T-tests were utilized to determine statistically significant results.

# Sample Measurements



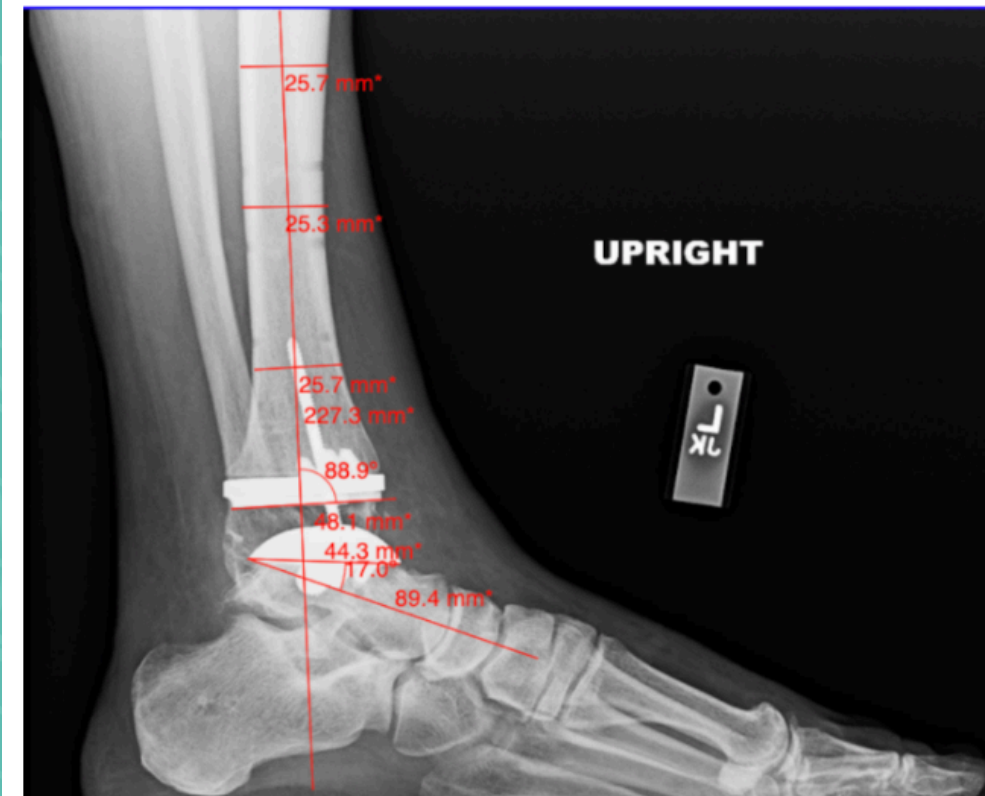Figure 2: Post-Operative Measurement for Migration in an AP view—Implant with no Stem



Figure 3: Post-Operative Measurement for Beta Angle in a Lateral view—Implant with no Stem

# Results- Group Characteristics

- Differences in measurements from the first post-operative weight bearing x-ray to the most recent weight bearing x-ray were considered.
  - Mean Age (No Stem): 68.7 years
  - Mean Follow Up (No Stem): 29.8 Months


- • Mean Age (Stem): 65.4 years
  - Mean Follow Up (Stem): 24.1

# Results - Migration and Beta Angles

- Patients receiving <u>tibial implants without the stems</u> had significantly <u>less migration</u> in the AP view X-rays (Figure 2) when compared to their tibial implant with stem patient counterparts in both X-rays at both time points considered ($p<0.03$).

- Patients who underwent total ankle arthroplasty <u>without tibial stem</u> had significantly <u>larger beta angles</u> (Figure 3) than patients with the tibial stem in both x-rays at both time points considered ($p<0.04$)

# Conclusions and Future Directions

- Total ankle arthroplasty utilizing <u>tibial stems</u> was correlated with <u>greater instability</u>, as indicated by increased migration, when compared to that without said stems.
    - However, it was also correlated with more physiological and therefore <u>more effective long term joint alignment</u> as indicated by B-angles.
- Research regarding the efficacy and long-term outcomes of each of these implants for total ankle replacement must be conducted to further refine these findings
    - Specifically, clarification on which of these two outcome indicators lead to greater <u>patient satisfaction</u> and lower <u>rates of revisions</u>