Does subspecialty matter: outcomes after ankle fracture surgery

Justin R Zhu[1], Wesley Day[2], Michael J Gouzoulis, Anthony Enzo Seddio[3], Jonathan N Grauer
[1]Yale School of Medicine, [2]Albert Einstein College of Medicine, [3]Yale School of Medicine Department of Orthopaedics

INTRODUCTION: Ankle fractures are a common injury, and surgical treatment of ankle fractures can be performed by orthopaedic surgeons of diverse subspecialties. As orthopaedic surgeons are increasingly pursuing subspecialization training after residency, it is important to better understand the effect of subspecialization on operative outcomes. This study aims to investigate the impact of subspecialty on adult patient outcomes following surgical intervention for ankle fractures.

METHODS:
Patients who received ankle fracture surgery were identified between 2010 and Q1 2022 in the PearlDiver Mariner161 Ortho national administrative database. Exclusion criteria included age younger than 18 years at the time of ankle fracture surgery and a diagnosis of ankle infection or neoplasm within 90 days before the surgery. To ensure that isolated ankle fractures were identified, patients were excluded if they had any other lower extremity fractures, upper extremity fractures, pelvic fractures, spinal fractures at all levels, or abdominal injuries (internal and external) on the day of presentation

Patient age, sex, and Elixhauser Comorbidity Index (ECI, a quantitative measure of patient comorbidity burden where higher values indicated greater morbidity) were abstracted. Cohorts were created based on the subspecialty of the operating surgeon (foot&ankle, trauma, non-foot&ankle non-trauma). Rates of surgeon-reported medical and surgical adverse events within 90 days were compared between the three subspecialty cohorts using univariate and multivariate logistic regression, with the "non-foot&ankle non-trauma" cohort serving as the reference. Significance level was set at $\alpha = 0.01$.

Furthermore, 5-year implant removal rates were also compared between cohorts using a Kaplan-Meier curve.

RESULTS:
Data from 146,421 patients receiving ankle fracture surgery were assessed. The average age of patients receiving ankle fracture surgery was 54.48, and 70.0% of the patients were female. The mean ECI was 3.72.

Compared to the non-foot&ankle non-trauma reference cohort, the foot&ankle subspecialty cohort demonstrated significant decreases in any adverse events (OR: 0.85, $p<0.001$, $\alpha = 0.01$) and major adverse events (OR: 0.82, $p<0.001$). The decrease in adverse events for the foot&ankle cohort was specifically attributed to decreases in acute kidney injuries (OR: 0.75, $p=0.005$), pneumonia (OR: 0.70, $p=0.002$), and urinary tract infections (OR: 0.79, $p=0.001$) following ankle fracture surgery. The foot&ankle cohort also demonstrated lower readmission rates (OR: 0.79, $p=0.005$).

No significant differences were noted in adverse events between the trauma cohort and the reference cohort. No significant differences were found in 5-year implant removal rates between the subspecialty cohorts (Fig 1, $p=0.022$, $\alpha = 0.01$).

DISCUSSION AND CONCLUSION: The current study found that foot&ankle surgeons demonstrated superior perioperative outcomes and readmission rates for their patients following ankle fracture surgery compared to trauma surgeons and orthopaedic surgeons of other subspecialty backgrounds. Given the differential patient outcomes, further investigation into these populations is warranted.
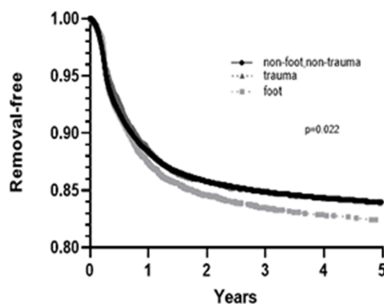
Figure 1: 5-year Kaplan-Meier curve of implant survival until removal for ankle fracture surgery patients comparing the foot&ankle, trauma, and non-foot non-trauma cohorts. No significant difference was found ($\alpha = 0.01$)