

The Burden of Revision Total Ankle Replacement Has Only Modestly Increased from 2010 to 2020

Philip P Ratnasamy, BS¹, Gwyneth C Maloy, BA¹, Oghenewoma P Oghenesume, BS¹, Sean C Peden, MD¹, Jonathan N Grauer, MD¹, Irvin Oh, MD¹

¹Yale University School of Medicine, New Haven, CT

Email of Presenting Author: Philip.Ratnasamy@Yale.edu

Disclosures: Jonathan N Grauer (Editor-in-Chief of North American Spine Society Journal, North American Spine Society Board)

INTRODUCTION: Total ankle replacement (TAR) surgery has steadily increased in recent decades. The aim of the current study was to investigate the evolving burden of revision surgery and risk factors and timing of revision or implant removal. We hypothesized that there has been an increase in revision TAR and explant surgeries in the past decade and that younger age and higher comorbidity burden are risk factors for revision and explant.

METHODS: Using the 2010-2020 PearlDiver M151Ortho dataset, this retrospective cohort study identified primary TAR, TAR revision, and TAR explant patients via Current Procedural Terminology (CPT) and International Classification of Disease Procedural (ICD-P) codes. This database contains billing claims information across all payers and sites of care in the United States. Patient factors investigated included age, sex, and Elixhauser Comorbidity Index (ECI).

Annual incidence for primary TAR was normalized per 100,000 covered lives in the dataset for each year of study and recorded. Annual incidence of revision TAR and explant were normalized per 100 TARs performed for each year of study. Multivariate logistic regression analyses were performed to determine independent risk factors for revision TAR or explant. For explants, the eventual intervention by 2 years was analyzed. Ten-year timing and survival to revision or explant surgery following unilateral TAR were characterized.

Given that all PearlDiver data is aggregate and de-identified, our institutional review board granted studies using this database exempt from review.

RESULTS: 10,531 primary, 1,218 revision, and 1,735 explant TARs were identified. After normalization, TAR utilization increased by 284% from 2010 to 2020, annual TAR revisions rose 28%, and annual TAR explants decreased 65%. Independent predictors of revision TAR were younger age (odds ratio [OR] 1.29 per decade decrease) and higher ECI (OR 1.23 per 2-point increase). Independent predictors of explant included younger age (OR 1.80 per decade decrease), female sex (OR 1.17), and higher ECI (OR 1.35 per 2-point increase). Among explanted patients, 37.7% had arthrodesis, 26.1% had amputation, 14.7% had total ankle arthroplasty, and 21.5% either had no identified procedure or an alternative procedure performed within the subsequent two years. The 10-year implant survival rate was 91.8%, of which 73% of revisions and 83% of explants occurred in the first three years following index TAR.

DISCUSSION: In the largest characterization of TAR revisions to date, the present study found that while the incidence of index TAR procedures performed annually nearly tripled from 2010 to 2020, the annual incidence of TAR revision surgery only modestly increased, while the incidence of TAR explant declined. Limitations of this study include those inherent to administrative database research and patient-specific information. Further, causation cannot be determined due to the retrospective nature of the study, preventing a more definitive characterization of the reasons for observed trends.

SIGNIFICANCE/CLINICAL RELEVANCE: The results of the present study show that, while the annual incidence of TAR surgery has markedly increased over the past decade, annual TAR revision surgeries only modestly increased, and TAR explants declined. These findings likely suggest improving postoperative outcomes - establishing a positive outlook for the future of TAR. Despite this, there is still a risk of revision and explant surgery following TAR - with potentially devastating consequences for patients. With several patient-level predictors of complications following TAR identified, candidates for TAR should be carefully selected and counseled on the risks of surgery as well as alternative management options - and particular care should be taken in the first postoperative years.

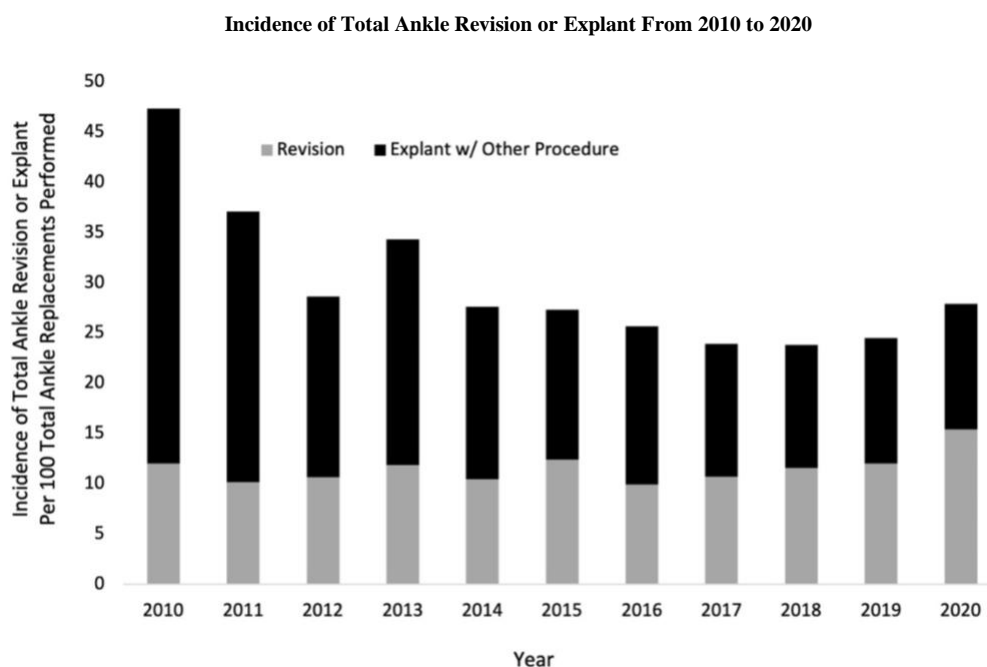


Figure 1. Annual incidence of TAR revision or explant surgery from 2010 to 2020 normalized per 100 index TAR procedures performed annually.