



Free Flap Reconstruction Versus Amputation For Severely Traumatized Lower Extremities: Trends Over The Past Decade And Predictors Of Reconstruction Based On A Multi-database Nationwide



Theodore E. Habarth-Morales, BS, 1LT, USAR^{1,2}; Harrison D. Davis, BS¹; Arturo J. Rios-Diaz, MD¹; Robyn B. Broach, PhD¹; L. Scott Levin, MD¹; Stephen J. Kovach, III, MD¹; Saïd C. Azoury, MD¹

¹Division of Plastic Surgery, Department of Surgery, University of Pennsylvania, Philadelphia, PA; ²Sidney Kimmel Medical College, Thomas Jefferson University, Philadelphia, PA

INTRODUCTION

Technical advances have improved lower extremity (LE) salvage using free flap reconstruction (FFR). Previously, the LEAP study attempted to quantify the factors associated with FFR as opposed to amputation. Additionally, no studies have evaluated the national trends in amputations versus FFR nationally in the last decade. This topic remains an area of active debate, and an evaluation of the recent national trends is warranted.

OBJECTIVES

- Quantify national trends in amputation and FFR over the last decade.
- Determine the factors associated with FFR versus amputation in patients suffering lower extremity trauma in two national databases.

METHODS

The Nationwide Readmissions Database (NRD) and Trauma Quality Improvement Program (TQIP) were used to find all admissions for isolated lower extremity trauma from 2010-2019. Patients were then stratified by whether they received initial amputation or FFR. Trends in both treatments were determined using proportional burden per year in addition to Poisson regression analysis. The ratio of FFR to amputation was analyzed. Risk adjusted analysis was performed to determine factors associated with FFR and incremental costs in the NRD.

RESULTS

A total of 7,311,656 patients were identified with isolated LE trauma in both databases: 25,818 amputations (88.7%), 3,304 FFRs (11.3%). Out of 130,610 patients treated at the top volume quartile of centers performing FFR in the NRD, 806 received FFR (36%) while 1,422 received amputation (64%) over the study period. Annual rates of amputation decreased from 2015-2019 ($P < 0.001$) while FFRs increased ($P = 0.001$). Rates over the entire study period demonstrated a significant increase in the proportion of patients undergoing FFR instead of amputation, and Poisson regression corroborated these results (FIGURE 1). Patients who were in the highest income quartile and treated at large teaching hospitals were most likely to receive FFR. Those patients who were publicly insured, had more than 2 previously diagnosed comorbidities, and treated at private hospitals were less likely to undergo FFR (FIGURE 2). Patients with FFR were not associated with increased overall costs (USD \$841.00 [95% CI: \$-2,618.31-\$4,300.81], $P = 0.634$) compared to the amputation cohort after controlling for confounders.

FIGURE 1: Index of FFR to amputation over a decade in patients with LE trauma a national database.

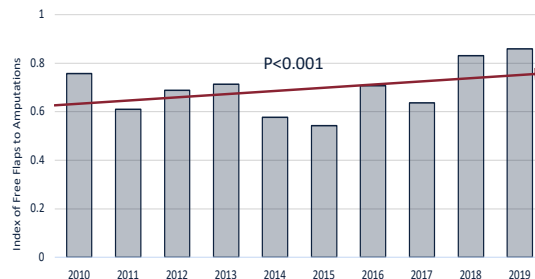
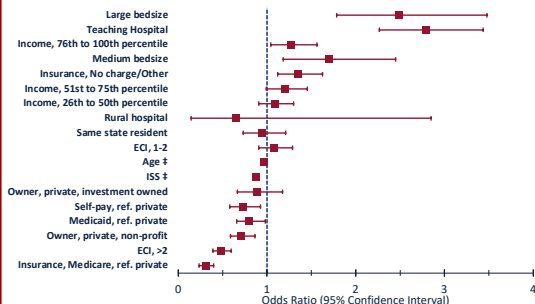
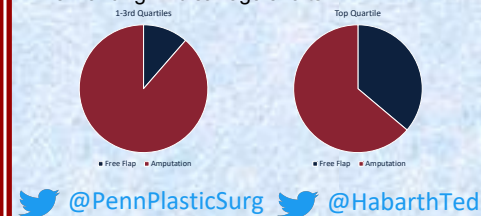


FIGURE 2: Factors associated with FFR versus amputation.



CONCLUSIONS

- Use of FFR in LE trauma has increased over the last few years while amputations have alternatively decreased.
- There remains a disparity in who received FFR versus amputation and the authors presume this has to do with inadequate referral to specialty limb salvage centers on account of the difference in proportion of free flaps being performed by center volume.
- Further studies should address the limitations of our study by utilizing data with improved granularity.
- FFR is cost effective and identification of disparities in FFR creates opportunities for enhancing limb salvage efforts.



DISCLOSURES

The views expressed are those of the authors and do not reflect the official policy or position of the US Army, Department of Defense, or the US Government.