

Outcomes of Midfoot Arthrodesis after Failed Primary Open Reduction and Internal Fixation for Lisfranc Injuries: Should We be Primarily Fusing Every Lisfranc?

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INTRODUCTION:

Anecdotal evidence suggests patients who require midfoot fusion following initial open reduction and internal fixation (ORIF) for Lisfranc injury fare worse than those treated with an index arthrodesis, despite an identical final construct. Substantial data has been generated to understand optimal initial treatment of Lisfranc injuries; however, no data exists comparing the primary arthrodesis (PA) and secondary fusion (SA) populations. The purpose of this study was to compare radiographic and patient-reported outcomes (PROs) of patients who underwent PA versus SA following ORIF of their Lisfranc injury.

METHODS:

We retrospectively identified skeletally mature patients from an academic level 1 trauma center treated for midfoot injuries between 2002-2022. We identified 232 patients (234 feet) with Lisfranc injuries. A total of 65 patients underwent a fusion procedure and were included in our cohort. Demographic data, treatment, radiographic outcomes, and PROs were recorded. Patients who underwent PA as index treatment of their Lisfranc injury were compared to those who underwent index ORIF and subsequent SA. We used a composite primary outcome for comparison which included: the development of adjacent midfoot arthrosis, midfoot collapse, or mal/nonunion. Secondary outcomes were PROMIS measures of physical function (PF) and pain interference (PI). Descriptive statistics, chi-squared, and independent sample t-tests were employed for analysis. Multivariable analysis was utilized to determine the contribution of confounders on outcome. Logistic regression was used to ascertain effects of index treatment on outcome probability.

RESULTS:

Index treatment for 42 (18%) was PA. Twenty-three SAs were required (12.3% of index ORIF group). Average follow up was 4.3 years (0.3-18.2y). The mean age at fusion procedure was 48.3 years, and average time from index to fusion was 3.1 years (SD 5.29y). Poor radiographic outcomes were noted in 2 of the PA group (5.3%) compared to 5 of the SA group (27.8%, $p=0.02$). Logistic regression indicated a significant effect of index treatment, suggesting those requiring SA were 6.9 times more likely to exhibit poor radiographic outcomes ($p=0.03$). There was a non-significant trend in patients who underwent PA to exhibit higher PF scores and lower PI scores after index surgery than primary ORIF and SA (42.5 vs. 39.0, $p=0.17$; 56.3 vs. 61.6, $p=0.06$). Logistic regression revealed no significant prediction of PROMIS scores by group. There were no differences between groups in final or max PRO scores or postoperative trends. Post-hoc power analysis indicated 32% power to detect a difference in PROMIS scores.

DISCUSSION AND CONCLUSION:

While this study does not reveal robust evidence to advocate for primary fusion of every Lisfranc, results may suggest a suboptimal outcome if a patient requires SA after index ORIF compared to PA. This may be in part to effects of repeat surgery. Findings should prompt further larger scale investigations to better elucidate the merits of a single surgery approach, and warrant consideration of how to predict who might be at risk to require SA so to advocate for PA as their index procedure.