## Examination of Preoperative Conditions and Fixation Techniques on Outcomes Following Tibiotalocalcaneal Arthrodesis

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## INTRODUCTION:

Tibiotalocalcaneal (TTC) arthrodesis is commonly performed for complex deformity, arthritis, or unstable Charcot about the hindfoot. Due to this complexity, these procedures are often associated with increased morbidity and postoperative complications. There is limited data analyzing the prevalence of various preoperative diagnoses and comorbidities, as well as treatment modalities on the outcomes of TTC arthrodesis. As such, this study aims to investigate how various preoperative and intraoperative factors affect the outcomes of patients undergoing TTC arthrodesis. METHODS:

A multi-center retrospective review was conducted on the TTC fusions performed from 2016-2023 by one of four fellowship trained foot and ankle surgeon at an academic medical center. 74 ankles (75 patients) underwent TTC arthrodesis. Preoperative diagnosis and indications, fixation method, clinical success, and complications were obtained from the patients' charts. Surgical indications included arthritis (n=39), Charcot neuropathy (n=23), post-traumatic (n=14), and cavovarus (n=10), osteomyelitis (n=4), and foot drop (n=3). Patients were excluded if their clinical or radiographic data were unavailable for review, or if they had less than 6 months of follow-up. Mean age was 58.2 (range 31-81) years and mean follow-up was 1.7 (range .50-5.17) years. Statistical analysis was performed using *t*-Student and Chi-squared tests with a *p*-value of 0.05 defining significance. Midline tibiotalar angle (MTA) was measured before and after surgery to assess position of fusion. Thirteen (17.3%) patients had preoperative ulcers at the time of surgery. RESULTS:

Of the 74 subjects in the study, 32 (43.2%) experienced postoperative complications, 14 (18.9%) had postoperative infection, 17 (23.0%) underwent reoperation for hardware removal, 10 (13.5%) experienced wound breakdown, 8 (10.8%) experienced nonunion, and 4 (5.4%) underwent below knee amputation. There was no statistical association between any surgical indication and adverse postoperative outcome, including patients with Charcot neuropathy. Majority of patients received a TTC nail (n=68, 94.4%) as opposed to plate (n=4; 5.6%), with plate configurations experiencing higher rates of overall complication (plate=100%, nail=39.7%; p=.031) and hardware removal (plate=75%, nail=20.6%; p=.039). There was no statistically significant difference in rates of any adverse outcomes when stratifying by use of combined external fixation and internal fixation (n=12;16.7%), 3D printed cage implant (n=7;9.5%), or use of graft (n=63;85.1%). DISCUSSION AND CONCLUSION:

TTC arthrodesis continues to have high rates of postoperative complications and adverse outcomes. The present study found increase rates of complication in patients receiving patients receiving a plate construction. There was no difference in rates of adverse outcomes when considering preoperative indication, including Charcot neuropathy, nor use of graft, 3D printed cage, or both external and internal fixation. Further studies with larger sample size are needed to confirm these findings and further identify factors which place patients at increased risk for adverse postoperative complications.