## No Difference in Non-Union Rates After First Metatarsophalangeal Fusion in Patients with History of Hallux Valgus Correction

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INTRODUCTION:
First metatarsophalangeal (MTP) joint arthrodesis is often used as a salvage procedure for patients with failed bunion correction surgery due to recurrent deformity or persistent pain. One of the most common complications of MTP arthrodesis is nonunion. While several studies have investigated the risk factors for nonunion, limited data exist on outcomes following MTP arthrodesis for the treatment of failed bunion correction. We hypothesized there would be an increase in nonunion rates in patients with previous bunion correction surgery versus those with first time MTP arthrodesis, and patients sustaining a non-union would have a larger correction of their hallux deformity.
METHODS:
A retrospective chart review of patients who underwent first MTP joint arthrodesis between September 2013 and September 2023 by three foot and ankle fellowship-trained orthopaedic surgeons was performed. Patients were excluded if there was less than six months of postoperative follow-up, an absence of weightbearing radiographs preoperatively and at or after six months postoperatively, and if the surgery was an MTP arthrodesis revision. Patients were divided into two subgroups – those identified as having a failed bunionectomy prior to MTP fusion ("failed group") and those with no prior bunionectomy ("control group") All patients in the failed group had preoperative and 6-month postoperative radiographs assessed for hallux abductus angle (HAA), hallux interphalangeal angle (HIA), first intermetatarsal angle (IMA), and lateral Meary's angle. Chi-square and Fisher's exact tests were used for categorical variables, while t-tests were applied to continuous variables.
RESULTS:
A total of 278 patients (222 females) were included. Of these, 53 patients had a history of failed bunionectomy, while 225 had no prior bunion correction. There were no statistically significant differences in rates of diabetes (15.52% vs. 8.44%, $p = .108$), peripheral neuropathy (12.07% vs. 9.33%, $p = .534$), or osteoporosis (8.62% vs. 8.00%, $p = .877$) between the two groups. Postoperatively, 1 patient with a previous bunion correction had a wound complication (1.89%) while there were 16 (7.11%) in the first time MTP group ($p = .384$). Non-union occurred in 5 patients (8.62%) in the bunion correction group and 19 patients (8.44%) in the first time MTP group ($p = .966$). When stratified by union status, the mean pre-operative HVA was 19.79° in the union group and 19.90° in the non-union group ($p = .495$) while the post-operative HVA was 11.48° in the union group and 18.55° in the non-union group ($p = .03$).
DISCUSSION AND CONCLUSION:
To our knowledge, this is one of the first studies to evaluate nonunion rates and postoperative outcomes following first-time MTP arthrodesis for the treatment of failed bunionectomy. Patients in the failed bunionectomy group did not demonstrate statistically significant differences in nonunion rates, revision procedures, or wound complications. Our study suggests that prior failed bunionectomy does not increase the risk of nonunion or other complications following MTP arthrodesis.