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Introduction/Purpose: Triple arthrodesis has historically been considered the standard of treatment for arthritis of the hindfoot with or without deformity. The complications of this surgery including non-union, malunion, nerve injury, infection and wound healing problems can occur at any of the three joints. Double arthrodesis is capable of producing a similar reduction in degrees of motion and correction of foot deformity but may also cause less patient morbidity in regard to these complications due to one less joint being incorporated into the fusion procedure. What is unknown is the patient reported outcomes, specifically physical function (PF) and pain interference (PI) between these two procedures. The purpose of this study is to evaluate the clinical outcomes for hindfoot deformity using a triple compared to a double arthrodesis.

Methods: A retrospective medical record review was performed (February 2015-December 2019), of 96 identified cases, 54 had complete data over 4 months post operation for either a double (Age = 58 (11); Body Mass Index (BMI) = 34.4 (6.0); n=24) or triple arthrodesis (Age= 55 (13); BMI = 33.0 (10.0); n = 30). Patient Reported Outcome Measurement Information System (PROMIS) physical function and pain interference were assessed at last available pre-operation and last follow up time points. Medical records were reviewed for complications (yes/no). ANOVA models were used to assess differences pre to post surgery (covariates included age, BMI, and length of follow up). Chi Square analysis was used to assess proportions of patients achieving a minimal clinically important difference (34.5) and complications by group.

Results: There were no differences between groups in terms of age ($p = 0.51$), BMI ($p = 0.44$), or length of follow up (triple = 540 (334) days versus double = 390 (336) days; $p=0.12$). There were no significant differences in PROMIS PF (pre-post change 95% CI: triple= 1.2 (-4.1 to 1.6) versus double = 0.2 (-2.5 to 2.0)). The for PROMIS PI both groups experienced lower pain (average 5.1 (1.0) with the greater decrease in pain in the triple group (Figure 1; pre-post change 95% CI: triple= 7.1 (-10.2 to -4.0) versus double = 3 (-5.5 to -0.6)). Chi square analysis showed that a greater proportion of patients undergoing a triple (triple 61.9 % versus double 33.3 %) experienced MCID improvement in PROMIS PI ($X^2=4.4$, $p=0.04$). There were 4 complications in the double group, and 6 in the triple group.

Conclusion: Double arthrodesis can allow for similar correction of foot deformities without the increased risk of wound complication, infection or nonunion/malunion. However, we found that patients who underwent a triple arthrodesis were more likely to have an improvement in minimally important clinical difference (MCID) in the PROMIS pain interference scores than those who underwent a double arthrodesis.

