Posterior Achilles Tendon-Splitting Approach and Intramedullary Nailing versus Lateral Trans-Fibular Approach with Fixed-Angle Plating for Tibiotalocalcaneal Arthrodesis

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Introduction/Purpose: A variety of operative approaches and fixation techniques have been described for tibiotalocalcaneal (TTC) arthrodesis. As a durable, load-sharing device with favorable biomechanical properties, the intramedullary (IM) nail is commonly used. Lateral, fixed-angle plating continues to be popular as well, due to ease of use and lack of significant clinical inferiority. A lateral approach with distal fibula resection allows for direct access to the tibiotalar and subtalar joints, but the posterior, Achilles tendon-splitting (PAS) approach offers a robust soft tissue envelope. The purpose of this study was to compare the results of TTC arthrodesis with either PAS approach and IM nailing or lateral, trans-fibular (LTF) approach with lateral, fixed-angle plating.

Methods: Following institutional review board approval, all patients who underwent simultaneous tibiotalar and subtalar arthrodesis were identified with minimum one year clinical and radiographic follow up. A retrospective review of all clinic notes, operative details, and radiographs was performed by a fellowship-trained orthopaedic foot and ankle surgeon not associated with the procedures. Patients were excluded if they underwent TTC arthrodesis through an approach other than PAS or LTF, and received fixation without an IM nail or lateral, fixed-angle plate. Primary outcomes examined were union rate and complications. Statistical analysis was performed with student’s t-test for continuous data and Chi-square test for categorical variables. P-values less than 0.05 were considered significant.

Results: 38 patients underwent TTC arthrodesis with a PAS approach and IM nailing, and 28 with a LTF approach and lateral plating. The overall union rate for the PAS/IM nail group was 76.3% (29 of 38), and 64.3% (18 of 28) for LTF/lateral plating group (p=0.41). 15.8% (6 of 38) in the PAS/IM nail group underwent revision arthrodesis versus 7.1% (2 of 28) in the LTF/lateral plating group (p=0.45). Nonunion at the subtalar joint occurred in 25.0% (7 of 28) in the LTF/lateral plating group and 5.3% (2 of 38) in the PAS/IM nail group (p=0.03), but there was not a significant difference in tibiotalar union. Patients were allowed to bear weight 3 weeks earlier in the PAS/IM nail group (11.2 vs 14.4 weeks, p=0.01).

Conclusion: Despite similar overall union rates, nonunion of the subtalar joint was significantly increased in the LTF/lateral plating group. This could be due to disruption of blood supply during exposure, insufficient stability, or inadequate compression of the arthrodesis site. However, revision arthrodesis rates were similar between groups because some nonunions were not symptomatic enough to warrant correction. Patients were allowed to fully weight bear significantly earlier in the PAS/IM nail group. PAS approach and IM nailing for TTC arthrodesis may allow for quicker recovery and increased likelihood of radiographic union at the subtalar joint.