

Treatment of Stage III Adult Acquired Flatfoot Deformity With Combined Talonavicular Arthroscopic Subtalar Arthrodesis

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Purpose & Literature Review

Hindfoot arthrodesis been considered the reference standard for operative correction of advanced flat foot and arthritic deformity. Arthroscopic subtalar joint arthrodesis has the associated benefits of less soft-tissue disruption and respect of the vascularization of the calcaneus and talus, both of which may promote fusion (1). Arthroscopic portals offer excellent access to the posterior facet and have been shown to be safe and reproducible (1). While isolated arthroscopic subtalar arthrodesis was initially described in 1992 by Tasto and several subsequent investigators have reported their results using arthroscopic techniques, there have been no reports of a combined arthroscopic subtalar and open talonavicular arthrodesis (2). This cases series documents our surgical technique and the initial results of arthroscopic subtalar arthrodesis combined with traditional open talonavicular arthrodesis for treatment of stage III adult acquired flatfoot deformity. This combined surgical approach has not been described in the literature.

Case Study

The patient is placed in the supine position. A 2-portal technique was used for arthroscopic subtalar joint arthrodesis. The anterolateral portal of the sinus tarsi was used to introduce a 30 degree 2.7 mm arthroscope. No traction is applied. An accessory central portal 1 cm anterior and 1 cm distal to the tip of the fibula was utilized to introduce the shaver for joint debridement. The articular surfaces of the posterior facet are then sequentially denuded using a curette and by switching viewing and working portals. Fluoroscopy is used to ensure that access to the entire joint has been attained. A 4.5-mm burr is then used to sequentially remove all subchondral bone down to a bleeding bed, taking care to maintain the overall geometry of the joint. Demineralized bone matrix is then applied to the fusion site which is visualized arthroscopically. Injectable bone graft substitute was utilized. Provisional fixation of the subtalar joint is achieved via K-wire and a single 7.0 mm headless compression screw is advanced over the guide wire. Talonavicular arthrodesis is then performed through a dorsal incision. Standard joint prep of the talonavicular joint is done via curettage and subchondral drilling. Demineralized bone matrix is applied to the fusion site. The talonavicular joint is provisionally fixated with a k-wire and a single 5.0 mm headless compression screw is advanced over the guide wire. A dorsal locking plate is then applied to span the talonavicular joint. The patient is nonweight bearing in a splint until 6 weeks post operation. Postoperative radiographs are obtained a 6 week, 3 month, 6 month, and 1 year intervals.

Figure 1. Pre-operative Radiographs



Figure 2. A Intraoperative fluoroscopy confirming arthroscope and shaver position in subtalar joint. B Arthroscopic view of subtalar joint C QR link for arthroscopic application of injectable bone graft

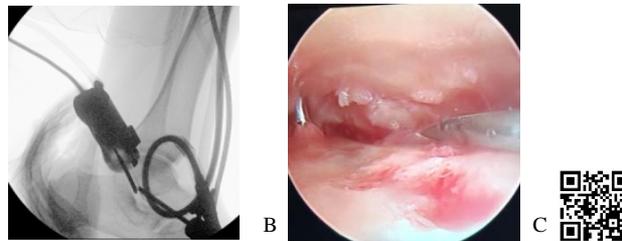


Figure 3. Post-operative radiographs showing osseous fusion with no recurrence of deformity or ankle valgus



Methodology

5 consecutive patients with stage III adult acquire flatfoot deformity undergoing open talonavicular and arthroscopic subtalar joint arthrodesis are included in this study. Patients with preoperative MRI that showed no deltoid ligament attenuation were included in this study. Preoperative standard radiography was reviewed in each case including AP, oblique, and Lateral foot and ankle views. Talar head uncovering, Calcaneal inclination, talar declination, Kite's, and talocrural angles were measured preoperatively.

Results

All 5 patients went on to osseous fusion of the subtalar and talonavicular joint with no complications including infection or removal of hardware. There was no recurrence of deformity or incidence of ankle valgus at 1 year followup postoperatively.

Discussion

The medial approach to hindfoot fusion has been popularized owing to concerns over lateral soft tissue and bony healing in the standard triple arthrodesis (1). This procedure requires portions of the deltoid ligament to be transected to access the subtalar joint from the medial side. A theoretical concern of the medial double approach is that it could increase ankle valgus postoperatively owing to the potential for deltoid ligament disruption as a part of the medial exposure (4). Our technique preserves the integrity of the deltoid ligament and allows direct dorsal exposure for talonavicular arthrodesis joint preparation and internal fixation. Recent innovations in surgical technique tend toward less invasive approaches allowing for a quicker recovery. There are few comparative studies of open and arthroscopic arthrodesis, but arthroscopic techniques tend to achieve quicker union, with a lower complication rate (1). A systematic review by Stegeman and colleagues reported time to bony union was 9 weeks in the arthroscopic group vs. 18 weeks in the open group (5). In recent a consecutive case series of 65 isolated arthroscopic subtalar arthrodesis there was a union rate of 95.4% after an average of 11.2 weeks (6).

Discussion

Consistent with the literature, all 5 of our patients went on to osseous fusion of the subtalar and talonavicular joints with no complications. Although the above cases only represent a small sample size, the results have been comparable to the high fusion rates that have been reported for open medial double arthrodesis with the added benefit of preservation of the deltoid ligament.

Disclosures

Dr. McMillen is a consultant for Wright Medical

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