

ANALYSIS OF SUBTALAR ARTHRODESIS

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INTRODUCTION

Controversy exists over the surgical management of isolated subtalar joint disorders. Triple arthrodesis has historically been favored as the surgical procedure for subtalar joint pathology. Recently, several studies have suggested isolated arthrodesis of the talo-calcaneal joint to be satisfactory for disorders specific to this area.

The authors have reviewed approximately 28 cases of isolated subtalar joint arthrodesis performed over the last several years. The authors' retrospective analysis parallels other studies in the literature, and demonstrates success for a variety of subtalar joint pathologies. This presentation will focus on patient selection, surgical technique and a statistical analysis of those patients followed at the authors' institution. The authors will provide a historical and current perspective regarding isolated subtalar fusions and provide criteria for use of this procedure as opposed to triple arthrodesis.

There are many conditions which may require fusion of the subtalar joint. (Table 1) Post-traumatic arthrosis (calcaneal and talar fracture) and talo-calcaneal coalition are the two most common in the authors' patient population. The common denominator in either case scenario is residual pain and/or instability of the rearfoot. Historically, triple arthrodesis has been the favored approach to surgical management of these as well as other disorders affecting the rearfoot. However, it seems unnecessary to fuse joints (midtarsal) which are not involved, if function can

be maintained by performing an individual arthrodesis.

Table 1

CONDITIONS WHICH MAY REQUIRE FUSION OF THE SUBTALAR JOINT

1. Post-traumatic Subtalar Joint Arthritis
 - Calcaneal Fracture
 - Talar Fracture
 2. Talo-calcaneal Coalition
 3. Degenerative Osteoarthritis
 4. Acquired Pes Valgo Planus Deformity
 5. Aseptic Necrosis (talus)
 6. Neuromuscular Disease
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A functional midtarsal joint will allow the foot more flexibility to adapt to ground reactive forces. Proponents of triple arthrodesis argue that the subtalar and midtarsal joint act in concert, and an isolated fusion of one of the components of that unit will result in excessive stress to the other segment. Hence, arthrosis will develop. Noble and Mcquillan concluded that degenerative changes at the midtarsal level did not occur or were clinically insignificant in their retrospective follow-up of isolated subtalar fusion at an average postoperative period of 7 years.

A controversial topic is the documented radiographic sign of talar beaking which is at

times associated with subtalar joint fusion. Many physicians contend that beaking of the talus is suggestive of an arthritic change at the midtarsal region. The authors feel that talar beaking is a radiographic sign of increased mobility in compensation for loss of subtalar motion. Other authors (Ross and Lyne, Harris) have observed this phenomena radiographically, yet with no correlated clinical significance.

PATIENT SELECTION

The effectiveness of any surgical procedure hinges upon its proper indication and subsequent execution. The first criteria which will determine whether a subtalar or triple arthrodesis will be performed is the specific site(s) and extent of the pathology. For example, many patients following calcaneal fracture will present with significant pain involving the rearfoot. This pain can be due to arthrosis involving the subtalar joint, as well as many other sources such as nerve entrapment or joint impingement. It is critical to clinically determine the etiology of the presenting symptoms prior to selection of a given procedure.

The second critical factor to evaluate is the relationship of the forefoot to the rearfoot. The key to successful rearfoot fusion is the alignment of the heel. A neutral to slightly valgus rearfoot position is ideal. The forefoot should also be either neutral or in a slightly valgus position relative to the rearfoot. Patients who present with a forefoot varus or supinatus deformity or medial column instability will generally require a triple arthrodesis for appropriate alignment.

CLINICALLY ILLUSTRATED SURGICAL TECHNIQUE

A two incisional approach is utilized for exposure to the subtalar joint. The primary lateral incision is used for exposure to the talocalcaneal joint. The second dorsal incision provides access to the dorsal neck of the talus for delivery of a 6.5 mm partially threaded cancellous screw. (This approach may be well suited for the 7.0 mm cannulated cancellous screw).



Figure 1. A lateral view of the rearfoot demonstrating a linear incision, provides access to the subtalar joint. The incision begins inferior to the lateral malleolus and courses distally, superior to the peroneal tendons. The incision extends distally over the lateral process of the talus just distal to the calcaneocuboid joint.

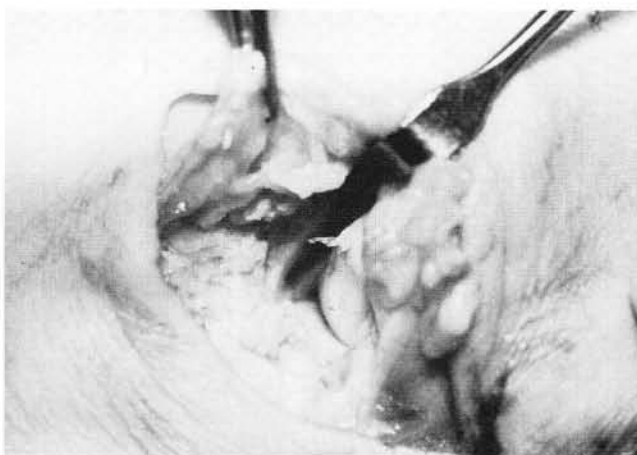


Figure 2. Dissection is carried through the subcutaneous and deep fascial tissue, exposing the lateral facets of the subtalar joint.

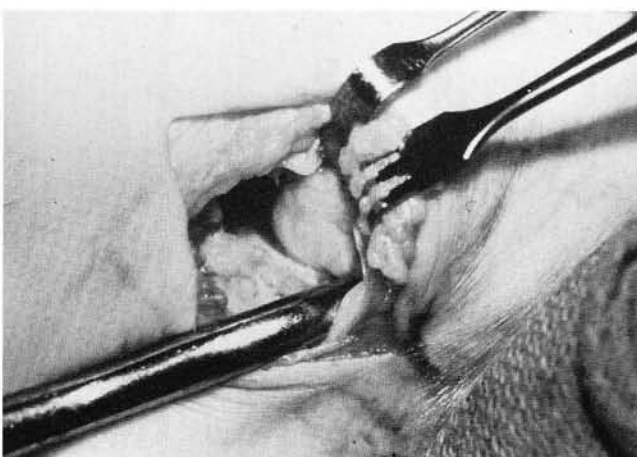


Figure 3. The posterior facet of the subtalar joint is in view. The calcaneo-fibular ligament is retracted posteriorly.



Figure 4. Following complete resection of the posterior facet, attention is directed to the anterior ankle. A small incision is created just lateral to the Tibialis anterior tendon over the neck of the talus.

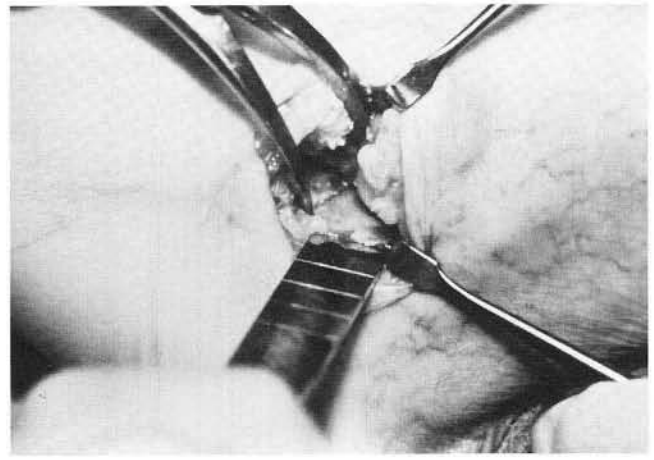


Figure 5. A critical factor in this procedure is resection of the posterior facet of the subtalar joint. Minimal joint resection at the level of the calcaneus is performed to maintain a normal relationship between the talus and navicular. Adequate exposure is necessary for direct visualization of the posterior facet. An osteotome is used to resect the cartilaginous surface of the calcaneus and talus respectively. Minimal joint resection is paramount in maintaining congruity with the midtarsal joint. A power burr or curette may also be used.

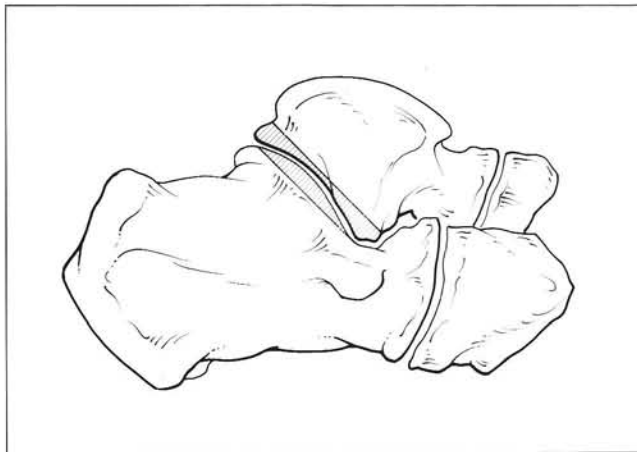


Figure 6A - 6B. Judicious bone resection from the posterior facet maintains the congruity between the dorsal surface of the talar head and navicular. By maintaining this relationship subsequent arthrosis of the midtarsal joint will be less likely.

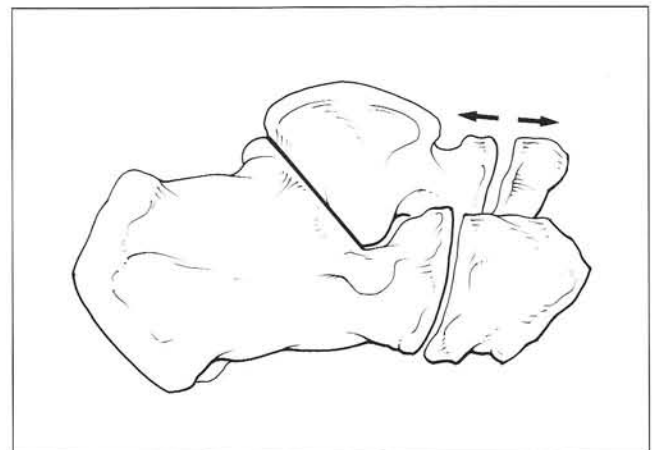


Figure 6B.

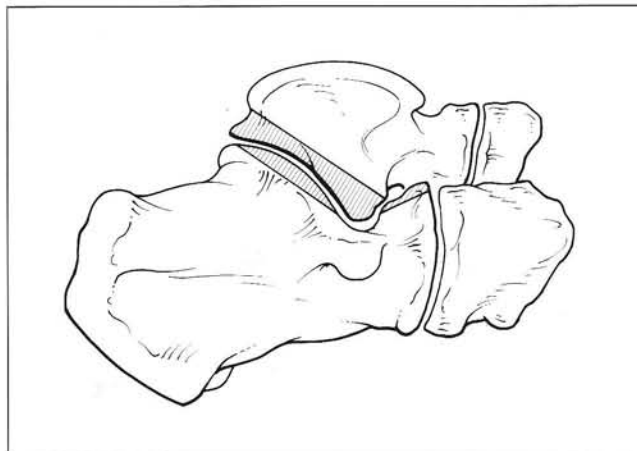


Figure 7A - 7B. Overaggressive resection of the subtalar joint will result in a malpositioned talo-navicular joint. Notice the step defect created at this level.

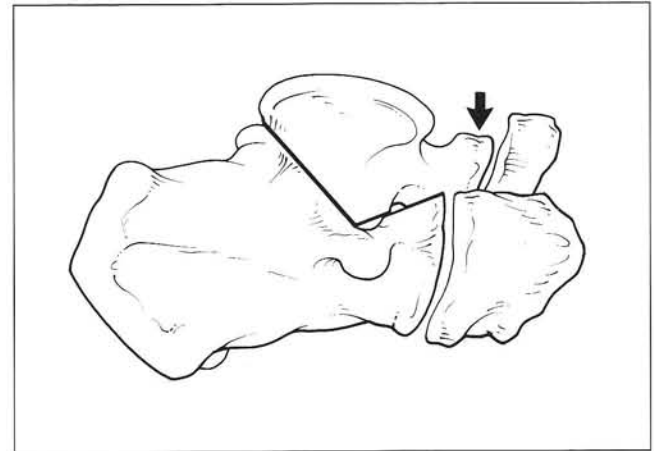


Figure 7B.



Figure 8. Ideal position of the screw with a minimal amount of osseous resection. Notice the congruity at the talo-navicular level. Proper positioning of the fixation device should be determined intraoperatively by a lateral and axial radiograph.

POSTOPERATIVE MANAGEMENT

The postoperative course following isolated subtalar joint fusion is similar to that following triple arthrodesis. Immediately following surgery, the patient is placed in a Jones compressive dressing. The surgical wound is inspected at postoperative day 2 or 3 and, if satisfactory, a short leg cast is applied. Strict non-weight bearing is maintained for a period of at least 8 weeks. Serial x-rays are performed to evaluate bone healing and partial weight bearing is then allowed.

Generally speaking, the amount of pain and edema is reduced with an isolated fusion secondary to less dissection and surgical time. The authors have had no significant wound complications following this procedure to date.

SUMMARY

A variety of subtalar pathologies have been addressed via an isolated arthrodesis of the subtalar joint. Table 2 lists the etiology and prevalence of the retrospective analysis.

To date the majority of the patient population has demonstrated a satisfactory result both by objective and subjective parameters. The authors feel that this procedure is under-utilized and serves as an excellent alternative to triple arthrodesis in the appropriate situation. Isolating the symptoms to the subtalar joint and critically evaluating foot position are requisite criteria for elective subtalar fusion. Adequate exposure and

Table 2

STATISTICAL ANALYSIS

Post Traumatic Arthrosis	9
Calcaneal Fracture	6
Talar Fracture	3
Talocalcaneal Coalition	8
Degenerative Joint Disease	2
Collapsing Pes Valgus Deformity	3
Status Post Ankle Fusion	1

minimal joint resection help reduce incongruity and possible arthrosis of the midtarsal joint.

A triple arthrodesis may be necessary at a later time if symptoms develop. Consideration to both procedures should be evaluated on a case by case scenario. However, the authors feel an isolated arthrodesis of the subtalar joint has its place in the surgical management of subtalar joint disorders.

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