The Spectrum of Indications for Subtalar Joint Arthrodesis

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KEYWORDS

• Subtalar joint fusion • Sinus tarsi incision • Medial extensile
• Lateral approach incision • Subtalar fusion • Bone block fusion • Subtalar nonunion

KEY POINTS

- Subtalar fusion can be performed in isolation or in association with other procedures, and it may be done in situ or with a bone block to restore optimal foot and ankle alignment.
- The subtalar joint can be difficult to identify and open, and use of fluoroscopy to correctly locate the joint and laminar spreaders to gradually pry the space open is recommended.
- Symptoms at the subtalar joint may not necessarily be related to intrinsic problems of the joint.

INTRODUCTION

The indications for subtalar fusion are numerous, ranging from congenital to acquired deformities. The most commonly encountered subtalar pathologies include posttraumatic arthritis,[1,2] comminuted calcaneal fractures,[3] primary arthritis,[4] talocalcaneal coalitions,[4,5] and posterior tibial tendon dysfunction.[6,7]

The preferred surgical approaches are the sinus tarsi incision, the medial incision, and the extensile lateral approach. The choice of one over the other depends on the underlying pathology, previous surgeries, associated foot pathologies, soft tissue quality, and medical comorbidities. Ideally, the sinus tarsi approach should always be preferred to limit the risk of wound dehiscence, especially if previous surgeries were performed (ie, open reduction and internal fixation [ORIF] of a calcaneus fracture). Nonetheless, complex deformities such as a severe hindfoot valgus may benefit from a medial approach to avoid wound closure complications on the lateral aspect of

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the hindfoot. Conversely, patients who present with subtalar arthritis, subfibular impingement secondary to calcaneus widening, and peroneal tendon pathology, may have to be treated through a lateral extensile incision to decompress subfibular impingement.

There are 2 types of subtalar fusion procedures: fusion performed in situ and a bone block arthrodesis with structural grafting to restore the height of the hindfoot. Subtalar fusion may be performed alone or in conjunction with other procedures to address coexisting deformities or pathologies that are often encountered in patients with subtalar arthritis: peroneal or flexor hallucis longus tendinopathies, tarsal tunnel syndrome, ankle instability, or malalignment requiring the addition of a calcaneal osteotomy.

Finally, the planning of a subtalar fusion requires a thorough assessment of any risk factors for nonunion. These may include revision surgery, talus avascular necrosis, posttraumatic arthritis, smoking, rheumatoid arthritis, systemic lupus erythematosus or other autoimmune disorders, and diabetes.[8–10] Routine use of biologic or structural augments to facilitate bone healing is not necessary if a meticulous joint preparation and rigid fixation with compression are used. However, high-risk patients may benefit from bone grafting, bone morphogenetic proteins, demineralized bone matrix, or mesenchymal stem cells to prevent such a cumbersome complication.

This report discusses 6 clinical conditions that required a subtalar fusion. The indications, surgical approach, and associated procedures are discussed.

Case 1—Subtalar Joint Middle Facet Coalition

A healthy 26-year-old woman presented with bilateral foot pain after prolonged weight bearing and sporting activities. The pain was localized at the lateral aspect of the hindfoot and sinus tarsi.

On physical examination she presented with bilateral pes planovalgus and rigid hindfoot valgus. Weight bearing radiographs of both feet and ankles confirmed bilateral middle facet coalitions and a significant talar neck osteophyte (**Fig. 1**). Despite our reluctance, the patient requested having both feet treated at the same time. The surgical plan consisted of an in situ subtalar fusion, a cotton osteotomy of the first metatarsal, and exostectomy of the talar neck osteophyte.

The patient was positioned prone on the operating table in a “frog leg” position (**Fig. 2**). A sinus tarsi incision was made to access the subtalar joint. We prefer to avoid an aggressive sinus tarsi debridement to prevent devascularization; however, middle facet coalitions are particularly tedious to treat, as they make the exposure of the posterior facet difficult. At times, the subtalar joint may be obliterated to the point that one can mistakenly fall into the ankle joint instead. Placing a small retractor over the peroneal tendons and behind the tuberosity will make the posterior facet more visible and accessible for debridement. We also insert an osteotome into the subtalar space and confirm the position fluoroscopically. Then the middle facet coalition is taken down with the osteotome and a mallet. As the coalition is gradually and carefully removed, avoiding damage to the medial neurovascular and tendon structures, a laminar spreader inserted into the sinus tarsi is gradually opened (**Fig. 3**). Once the subtalar joint has been fully exposed and prepared, it can be provisionally fixed with guide pins inserted perpendicularly to the joint from anterior to posterior and from posterior to anterior. The choice of inserting at least 1 of the 2 7.0-mm screws from anterior to posterior is to decrease the odds of the patient having heel pain postoperatively, which may occur even with headless screws. Before fixation, the calcaneus should be internally rotated slightly under the talus to correct the hindfoot valgus. After the subtalar joint was fused, a second longitudinal incision was made over the talar