

Subtalar Arthroscopic Fusion



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KEYWORDS

• Subtalar fusion • Posterior approach • 3 portal technique • Arthroscopic fusion

KEY POINTS

- The subtalar joint is a complex joint involved in human locomotion, essential in shock absorption and propulsion in gait.
- Failure of conservative treatment warrants surgical intervention, where subtalar fusion delivers excellent results when properly aligned.
- Arthroscopic subtalar fusion can deliver faster return to activities and sports, achieving high fusion rates.
- Proper preparation of joint surfaces, excellent hindfoot alignment, and a solid construct are key elements to achieve a successful outcome.

INTRODUCTION

The subtalar joint refers to the joint between the talus and the calcaneus. It is a complex joint, which is involved in human locomotion, playing an important role in shock absorption and propulsion. Subtalar arthrodesis is an accepted surgical treatment of subtalar pathologic condition whereby conservative treatments have failed to provide a successful outcome. Common indications for subtalar fusion are posttraumatic or degenerative arthrosis, arthritis, talocalcaneal coalitions, and complex deformities.¹

BIOMECHANICS

This joint is designed to provide either a flexible shock absorption construct to the foot or a rigid propulsive one.² Every time the subtalar joint is everted, or in valgus, the foot will become a flexible structure because the transverse tarsal joints are unlocked. When the subtalar joint inverts, the transverse tarsal joints lock themselves, and this provides a rigid lever arm, which is beneficial for locomotion.³ The subtalar joint is

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divided by the sinus tarsi, into the talocalcaneonavicular joint anteriorly and talocalcaneal joint posteriorly. This fact explains why just the posterior subtalar facet is visible from the more classic surgical approaches, which do not violate the sinus tarsi.

During locomotion, pronation and supination alternate successively in a harmonious pattern. They are complex triplane movements of the foot, whereby the largest amount of motion occurs at the talonavicular joint followed by the talocalcaneal joint. Fusion of the talonavicular joint completely blocks the motions at the subtalar joint, but in contrast, fusion of the subtalar joint does allow motion at adjacent joints.² After simulated arthrodesis of the subtalar joint, the remaining motion has been calculated to be 74% for the talonavicular joint and 44% for the calcaneocuboid joint.⁴

Analyzing subtalar motion, the sagittal plane is the least dominant one, and therefore, subtalar joint pathologic condition may not affect progression of gait. This last mechanical fact explains why the subtalar joint is considered a nonessential joint for gait and posture.² Subtalar fusion for pathologic condition unresponsive to conservative treatment will therefore still be one of the treatments of choice, as long it is adequately aligned.

EVALUATION

A detailed history and physical examination must be performed when a patient presents with subtalar pain. Difficulty when walking on uneven grounds is a classic symptom, which is taught but not always present. Pain is typically found in the posterolateral aspect of the hindfoot, close and around the sinus tarsi area, or it can radiate from the posterolateral to the posteromedial aspect, including the posterior aspect of the hindfoot. Rarely, pain will be found at the anterior aspect of the hindfoot, where the ankle joint is assumed to be the source of pain. Motion at the subtalar joint is not easy to examine, because subtalar joint range of motion can be mistaken for ankle joint motion, but contralateral examination can help. Hindfoot alignment is a prerequisite, with the patient standing, from the front and from the posterior aspect. Normal mechanics must be checked; for example, when asking the patient to stand on the tip of the toes, the hindfoot must invert, and when the foot lands on the ground, a smooth eversion and pronation must occur.

Imaging generally includes radiographic imaging of the ankle, besides hindfoot alignment views. In this matter, the authors prefer complete leg standing radiographs, which include the foot. They have been more useful than the classic axial or Saltzman views. Computed tomographic (CT) scan is also useful because it evaluates the extent of the deformity, besides ruling out a coalition. Single-photon emission CT has been in use in the last few years because it allows identifying the source of pain when internal fixation is present, especially in posttraumatic cases whereby the origin of pain is not well defined by conventional imaging methods.

Nonoperative treatment should aim to reduce pain, limiting somehow hindfoot motion. Classic conservative treatments include weight modifications, analgesic medications, subtalar joint injections, shock absorption elements such as shoes or insoles, and special insoles made to limit hindfoot motion.³ Medially posted insoles can reduce eversion movements with respect to the hindfoot, and therefore, may help in controlling subtalar pain.⁵ When conservative treatment fails, a surgical intervention is justified.

INDICATIONS

Subtalar joint fusion is indicated for various conditions that affect the subtalar joint, mainly primary osteoarthritis, inflammatory arthropathy, talocalcaneal coalitions, post-traumatic arthrosis, and acquired flatfoot deformity, the most common ones. A

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