Medial Approach to the Subtalar Joint

Anatomy, Indications, Technique Tips

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KEYWORDS

• Triple arthrodesis • Diple arthrodesis • Subtalar joint • Subtalar arthrodesis
• Flatfoot deformity • Posterior tibial tendon dysfunction

KEY POINTS

- The medial approach to the subtalar joint allows good visualization of the articular surfaces.
- Advantages compared with the lateral approach are found particularly in flatfoot correction, because the single-incision technique can be used in corrective fusions of rigid flatfoot deformity.
- Avascular necrosis of the talus is a rare but serious complication, and the risk can probably be avoided by avoiding posterolateral screw placement in the talar dome.

INTRODUCTION

The subtalar (ST) joint can be exposed through a lateral, a medial, or a posterior approach. The medial approach to the ST joint has mainly been popularized in corrective fusions of the hindfoot in tibialis posterior tendon dysfunction. In these cases it is frequently combined with soft tissue reconstruction medially (eg, revision of the tibialis posterior tendon or a flexor tendon transfer), additional osteotomies (such as a Cotton osteotomy), or fusions (talonavicular [TN], naviculocuneiform, tarsometatarsal joints) of the medial column.

SURGICAL ANATOMY

The ST joint consists of 3 articulating facets. Large variations of the morphology and the orientation of these surfaces have been described in cadaveric and radiological

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studies. The main force transmitter is the posterior facet. Therefore, knowledge of the shape and the orientation of this portion is crucial when planning and performing surgical procedures at the ST joint. In a weight-bearing computed tomography (CT) examination, 88% of the patients had a concave shape of the posterior facet and most patients showed a valgus orientation of the posterior facet.[1] However, some patients presented with a varus-oriented posterior facet or a flat surface as opposed to a concave shape.[1] Preoperative MRI or CT scans may therefore be helpful to determine which approach best exposes the articulating surfaces.

Combined fusions of the ST joint, the TN, and even the calcaneocuboid joint are possible through the medial approach.[2–6] Jeng and colleagues[3] showed in a cadaveric study that the medial approach allows preparation of 91% of the TN, 91% of the ST, and 90% of the calcaneocuboid joint. This finding is comparable to the lateral approach, which allows removal of 80% of the cartilage of the ST joint.[7]

The medial approach is located closer to the main neurovascular structures than the lateral incision. However, a cadaveric study that used the medial incision to perform diple (ST and TN) arthrodesis found a mean safe distance of more than 2 cm between the middle facet of the ST joint and the inferiorly located neurovascular bundle.[8]

INDICATIONS/CONTRAINDICATIONS

The medial approach to the ST joint can be used to perform open fusions, resection of coalitions, and reduction/internal fixation of calcaneal fractures. The indications and the technique for ST fusions are presented here.

Indications

Indications for fusions of the ST joint include deformity correction and treatment of degenerative joint diseases. The most common indications include arthritis of the hindfoot (rheumatoid or posttraumatic),[9–11] end-stage posterior tibial tendon dysfunction,[12–14] and neuromuscular disease–mediated hindfoot deformities.[15,16]

The authors use the medial approach for all ST fusions that are combined with TN and/or other fusions of the medial column. Most of the isolated ST joint fusions are performed through a lateral approach.

Tibialis Posterior Tendon Dysfunction

The benefits of the medial approach have mainly been described in flatfoot correction. Using a single medial approach for the traditional triple and the diple arthrodesis reduces the risk of wound healing problems, particularly in patients with severe deformities.[2,4,17–20] Furthermore, placing the incision medially has been shown to improve visualization and exposure of the transverse tarsal joint[3,4,20] and to allow good control of the position of the joints to be fused.[3,4,17,20,21] The improved visualization facilitates debridement of the joints without placing the posteromedial structures, especially the flexor hallucis longus tendon, at risk.[4,17] As an alternative to the triple arthrodesis, the ST joint can be fused in combination with the naviculocuneiform joint.[22] This procedure is done through an isolated medial approach and is indicated in flatfoot deformity with the main deformity located at the level of the ST and the naviculocuneiform joint lines.

Contraindications

ST distraction arthrodesis is performed through a posterior or a lateral approach because introduction of a bone block from a medial approach is very difficult. The lateral approach is also preferred in patients with a severe cavovarus deformity in which the ST joint cannot be visualized properly from the medial side.