Arthroscopic Subtalar, Double, and Triple Fusion

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KEYWORDS

• Arthroscopic • Subtalar • Triple • Arthrodesis • Fusion

KEY POINTS

- An arthroscopic approach to hindfoot arthrodesis minimizes damage to the soft tissue envelope, with the aim of reducing wound complications, inpatient stay, and time to fusion.
- Either 2 or 3 sinus tarsi portals can be used to prepare all 3 joints of the triple complex for fusion.
- Cannulated screws are used for fixation.
- Complex deformity can be corrected through an arthroscopic triple fusion, although severe bone shape abnormality or significant bone loss, for example after calcaneal fracture malunion, typically requires an open approach.

INTRODUCTION: NATURE OF THE PROBLEM

Triple arthrodesis is an established procedure used in the treatment of painful and deforming conditions of the hindfoot, after the failure of nonoperative treatments. Typical indications are posttraumatic arthrosis, primary osteoarthrosis, inflammatory arthritis, tarsal coalition, and fixed planovalgus and cavovarus deformities. The aim is to produce a stiffer but well-aligned hindfoot with significantly less pain. When disease or deformity are limited to the subtalar joint then this can be arthrodesed in isolation, although in the presence of transverse tarsal joint involvement or rotational deformity the talonavicular joint and, if required, the calcaneocuboid joint should be included in the fusion.

Hindfoot fusion procedures have typically been performed through open incisions, with significant reported rates of nonunion, wound complications, and nerve injury.[1–6] In recent years, arthroscopic ankle arthrodesis has become widely accepted, with several studies suggesting benefits compared with open arthrodesis in terms of union time, functional outcome, length of inpatient stay, and blood loss.[7–11] Applying arthroscopic techniques to triple joint arthrodesis might be expected to produce similar

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benefits. Several small series of arthroscopic subtalar fusions[5,12–23] and double and triple fusions[24,25] have reported encouraging results. The ability to prepare the 3 joints largely through 2 sinus tarsi portals has been demonstrated in cadavers.[26]

This article describes a technique for performing arthroscopic subtalar, double, and triple fusion through a sinus tarsi approach, and reviews the reported results to date.

INDICATIONS/CONTRAINDICATIONS

Box 1 lists the indications and contraindications. Note that most of the relative contraindications probably apply to open techniques of surgery, with the single exception of severe deformity associated with bone loss.

SURGICAL TECHNIQUE/PROCEDURE

Preoperative Planning

A thorough history and clinical examination together with standing radiographs usually confirm the diagnosis and source of any pain. If doubt exists, for example in cases with multiple arthritic joints, targeted injection of local anesthetic confirms the extent to which a given joint is contributing to the patient's overall pain, and therefore the extent to which arthrodesis of the joint is likely to provide longer-term relief.

A decision must be made regarding whether to perform an isolated subtalar joint arthrodesis, or a double or triple arthrodesis. When the indication for surgery is painful arthritis, all joints that are severely painful are included. When the aim of surgery is to correct deformity, the relationship of the hindfoot to the midfoot is important. The talonavicular and calcaneocuboid joints are arthrodesed if significant rotational deformity

Box 1
Indications and contraindications

Indications

- All causes of end-stage hindfoot arthritis
- Symptomatic hindfoot deformity
- In particular, an arthroscopic approach is of use in patients with compromise of the soft tissue envelope; for example:
  - The elderly
  - Inflammatory arthritides
  - Long-term steroid use
  - Posttraumatic arthrosis with previous scars, skin grafts, or flaps

Contraindications (absolute)

- Active infection

Contraindications (relative)

- Severe compromise of the soft tissue envelope
- Significant bone shape deformity or bone loss requiring correction (eg, correction of calcaneal height after fracture malunion)
- Continued smoking
- Neuropathy (eg, the active stage of Charcot neurarthropathy)
- Vascular compromise (severity should be assessed preoperatively)