The Treatment of Calcaneal Malunion

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KEYWORDS

• Calcaneal malunion • Bone block distraction arthrodesis • Subtalar fusion
• Chevron osteotomy • Foot biomechanics

KEY POINTS

- Do not undertake an isolated subtalar fusion in the presence of abnormal foot anatomy and biomechanics.
- Do not simply excise the lateral impinging bone in the presence of dynamic lateral impingement. In addition, correct the abnormal anatomy by a calcaneal osteotomy.
- Warn the patient of the risk of amputation.
- The extended lateral approach is a dissection of the posterior peroneal angiosome; it is a very radical exposure.
- It is better to have an incomplete correction than to close the incision under tension.
- The bone-block distraction arthrodesis only corrects talar rotation; it does not require a bone distractor.

INTRODUCTION

Calcaneal fractures continue to present a therapeutic challenge and, although operative fixation has become standardized and has its champions,[1–5] many thoughtful surgeons are unconvinced of its efficacy,[6,7] and some injuries are considered to be so severe as to defy primary surgical treatment. Therefore a significant number of calcaneal fractures will continue to be treated conservatively for the foreseeable future, and the surgical treatment of calcaneal malunion will continue to be necessary.

It is important to realize that the surgery of calcaneal malunion is very difficult and should not be performed by the occasional surgeon. The price of error is usually amputation.

A key issue in determining whether a reconstruction should be undertaken is whether an associated alteration of hindfoot biomechanics is compromising the Chopart joint and the ankle joint (**Fig. 1**). If this is the case, over time these joints will fail and the outcome of reconstruction will become progressively worse.

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Fig. 1. Altered hindfoot biomechanics resulting from a calcaneal malunion. The ankle and talonavicular joints are compromised owing to dorsal rotation of the talus, and secondary changes are occurring.

PATIENT ASSESSMENT

The assessment and treatment of disability is made difficult by the many sources of symptoms, which cause overlapping syndromes. Patients will complain of pain, limitation of walking ability, and derangement of their lifestyle. A careful, detailed clinical assessment backed by extensive radiologic investigation will usually reveal one or more of the following problems.

Subtalar Joint Derangement

Subtalar joint derangement can be either angular (Fig. 2) or, less commonly, the result of subtalar joint depression (Fig. 3).[8] Angular malalignment causes pain on walking, particularly on uneven ground, with late rest pain.

Subtalar joint depression causes a sense of insecurity on taking a step, followed by a feeling that the foot has given way and severe pain. There is usually lateral impingement with a late valgus hindfoot.

It is important not to undertake an isolated subtalar fusion in patients who have a calcaneal malunion and associated abnormal hindfoot biomechanics, as this may worsen their condition by destroying one of their compensatory mechanisms.

Heel Boss

Heel boss is usually the late result of a conservatively treated tuberosity fracture (Fig. 4).[9] The patient has difficulty in shoe wear and a weak calf, but the biomechanics of the foot are unaltered and the condition does not deteriorate.

Lateral Impingement

Lateral impingement can be either static, owing to laterally displaced bone fragments (see Fig. 12) or dynamic, resulting from lateral displacement of the body of the calcaneus (see Fig. 13). Most cases of dynamic lateral impingement also have static impingement caused by lateral shards of bone, and it is important not to simply resect the lateral impinging bone in these cases because this will simply make the problem worse as the laterally disposed calcaneus sinks into the space left by the resected bone.