بسم الله الرحمن الرحيم

" قالوا سبحانك لا علم لنا إلا معلمتنا إنك انت العليم الحكيم "

صدق الله العظيم

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Management of Fracture Calcaneus Complications

Essay
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By
Ahmed Mahmoud Abd-Elhamid
(M.B.B.Ch)

Under Supervision of

Prof. Dr. Ashraf Abd El-Kader El-Nahal
Professor of Orthopedic Surgery
Faculty of Medicine
Cairo University

Prof.Dr. Ahmed Mahmoud Kholief
Professor of Orthopedic Surgery
Faculty of Medicine
Cairo University

Faculty of Medicine
Cairo University
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بكالوريوس الطب والجراحة

تحت إشراف

أ.د/ أشرف عبد القادر النحال
أستاذ جراحة العظام
كلية الطب
جامعة القاهرة

أ.د/ أحمد محمود خليف
أستاذ جراحة العظام
كلية الطب
جامعة القاهرة

كلية الطب
جامعة القاهرة
٢٠١٠

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Introduction

Calcaneal fractures can result in functional disability if they disrupt the subtalar joint, and many patients who sustain subtalar injuries are unable to return to work. Undeniably, a high-energy calcaneal fracture is a life and potentially career changing injury for the vast majority of people who sustain them. The high incidence of these injuries and the serious nature of the disabilities that produce constitute a serious socioeconomic problem. Calcaneal fractures account for 60% of all tarsal fractures and involve working individuals in their peak earning years (20 to 40). [1]

Soft-tissue edema and contusion are inherent aspects of calcaneal fractures. Operating through such soft tissue entails a fair risk of marginal wound necrosis. After a standard, extensile, L-shaped approach with two-layer flap closure, wound complications developed in 25% of patients with 21% requiring surgery for these complications. [2].

Loss of reduction of major fragments can occur if weight bearing is initiated too early.

Sural nerve and peroneal tendon injuries are more common with the extensile approach. The sural nerve should be protected at the proximal and distal extremes of the wound. Peroneal tendons are particularly vulnerable because the flap is elevated over a protruding lateral wall, especially if the tendons are dislocated by the wall. [2].

Regardless of treatment method, chronic pain develops in some patients, limiting their capacity to work and enjoy life. Late problems leading to a painful outcome include posttraumatic arthrosis of the subtalar joint, lateral subfibular impingement with or without problems in

the peroneal tendon, anterior ankle impingement from loss of the normal plantar flexed position of the talus, tibial or sural nerve complications, fat pad atrophy, and sympathetic-mediated pain syndrome.[3].

Patients with intra-articular calcaneal fractures can expect some degree of long-term swelling, stiffness, intermittent and sometimes constant heel pain, and functional deficit. Rarely, necrosis of the avascular posterior facet fragments may occur, but if enough time is allowed for revascularization, collapse is rare.

Nonunion is extremely rare, When nonunion does occur, it is challenging to treat and requires aggressive débridement of dead, fibrous, or infected bone. Staged revision fixation with bone grafting is recommended.[4].

Patients with failure of fixation or post-traumatic arthrosis can be treated by subtalar fusion. Late arthrodesis is relatively simple in the presence of arthrosis alone if the overall morphology has been restored in the index procedure. .[5].

Various reconstructive techniques are available for correction of hindfoot malalignment or impingement as a result of calcaneal malunion.Surgery is rarely helpful for plantar exostosis or malunion along the weight-bearing portion of the posterior tuber and is not advised except in situations of extreme prominence or displacement. .[6].

Aim of the work

The aim of this essay is to review the calcaneal fractures and describe the complications related to the fracture, to the operative management and postoperative complications and describe the recent advances in management of these complications.

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Chapter 1:

Anatomy

Anatomy

The calcaneus is designed to withstand the daily stresses of weight bearing. A sound understanding of the anatomy of the calcaneus is essential in determining the patterns of injury and treatment goals and options. The calcaneus has a relatively thin cortex. Traction trabeculae radiate from the inferior cortex, and compression trabeculae converge to support the anterior and posterior articular facets leaving a "neutral triangle" between them with sparse trabeculations .[7]

The cortical bone just inferior to the posterior articular facet is condensed to approximately 1 cm and is called the *thalamic portion* .[8].

Thickening of the cortex is also seen in the regions of the sustentaculum tali, medial wall, and critical angle of Gissane. The calcaneus has four articulating surfaces, three superior and one anterior. The superior surfaces— the posterior, middle, and anterior facets— articulate with the talus. The posterior facet is separated from the middle and anterior facets by a groove that runs posteromedially, known as the *calcaneal sulcus* (Fig 1).

The canal formed between the calcaneal sulcus and the talus is called the *sinus tarsi*. The middle calcaneal facet is supported by the sustentaculum tali and articulates with the middle facet of the talus. The anterior calcaneal facet articulates with the anterior talar facet and is supported by the calcaneal beak. The triangular anterior surface of the calcaneus articulates with the cuboid .[9].

The lateral surface is flat and subcutaneous, with a central peroneal tubercle for the attachment of the calcaneofibular ligament centrally. The lateral talocalcaneal ligament attaches anterosuperiorly to the peroneal tubercle .[9] (Fig 2).

Medially, the talus is held to the calcaneus firmly by the interosseous ligament and the thick medial talocalcaneal ligaments .[10].

The sustentaculum tali is seen at the anterior aspect of the medial surface. The groove inferior to it transmits the flexor hallucis longus tendon. The neurovascular bundle runs adjacent to the medial border of the calcaneus (Fig 3). The neurovascular bundle may be injured during trauma or during surgery by the reduction of the sustentacular fragment, which is a key element in the surgical management of calcaneal fractures. .[10]

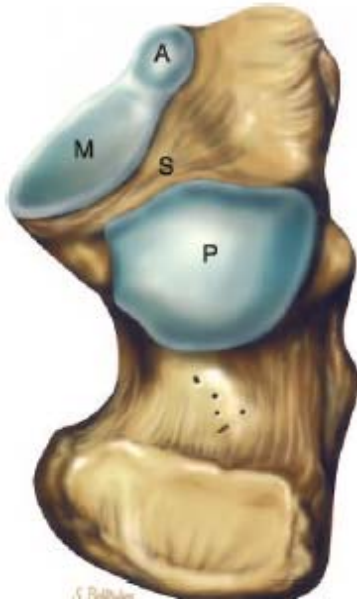
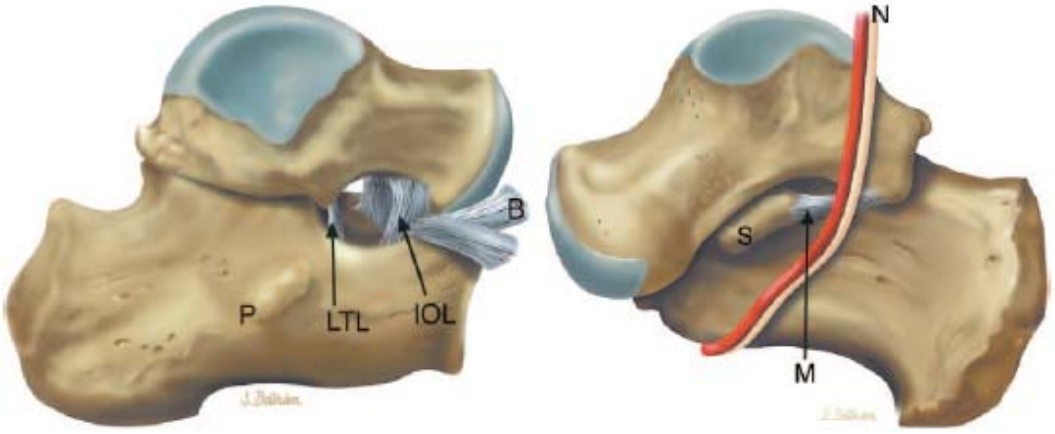


Figure [1]. Drawing of the superior surface of the calcaneus shows the anterior *(A)*, middle *(M)*, and posterior *(P)* facets of the calcaneus, as well as the calcaneal sulcus *(S)* that runs between the middle and posterior facets. The canal formed by the calcaneal sulcus and overlying talus is the sinus tarsi. .[8]



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. **Figures [2, 3] (2)** Drawing of the lateral surface of the calcaneus shows the peroneal tubercle *(P)*, as well as the lateral talocalcaneal *(LTL)*, interosseous *(IOL)*, and bifurcate *(B)* ligaments. **(3)** Drawing of the medial surface of the calcaneus shows the neurovascular bundle *(N)*, sustentaculum tali *(S)*, and medial talocalcaneal ligament *(M.)* .[9]

Chapter 2

Aetiology and pathology