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Internal Fixation as Operative Management of Bilateral Calcaneal Fracture in Traveler: A Case Report

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ABSTRACT

Introduction: Calcaneal fractures, particularly displaced intra-articular types, pose significant treatment challenges due to complex anatomy and limited soft tissue. This report discusses ORIF for Essex-Lopresti joint depression-type fracture to restore mobility and accelerate recovery.

Case Presentation: A 37-year-old male tourist fell from a 5-meter height, presenting with bilateral heel pain and ankle bruising. Imaging confirmed bilateral intra-articular calcaneal fractures (Essex-Lopresti type). He underwent open reduction and internal fixation using calcaneal plates. Postoperative rehabilitation focused on early motion and gradual return to weight-bearing and activity.

Discussion: Intra-articular calcaneal fractures require anatomical reduction to minimize subtalar arthritis risk. This case of bilateral Essex-Lopresti joint depression-type fractures was managed with ORIF to restore alignment and function. Despite potential complications, surgical treatment enables earlier mobilization, especially in active patients. Soft tissue preservation remains critical to reduce postoperative morbidity.

Conclusions: The management of calcaneal fractures remains a delicate balance between operative and conservative approaches. When a young person has related soft tissue issues, which are frequently encountered, surgical management is likely to result in a better outcome and faster healing rates. Both operative and non-operative treatment exhibited complications.

Keywords: Intra-articular calcaneal fracture, Essex-Lopresti classification, Open reduction and internal fixation (ORIF), Joint depression type

INTRODUCTION

The most common type of tarsal fractures are calcaneal fractures, of which 75% are intra-articular.[1] High energy trauma and axial loading to the foot are the main causes of them. The main challenges in the management of calcaneal fractures are complex anatomy and poorly understood hind foot kinematics. Because there is very little soft tissue covering the bone and very little dense cortical bone, fracture patterns in this bone are incredibly varied. Calcaneal fractures are challenging to treat because of all these issues.[2]

There is still a lack of agreement regarding postoperative care, surgical technique, and

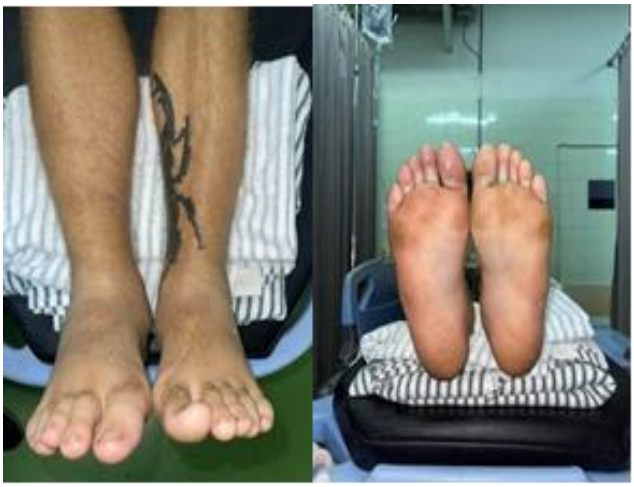
treatment, despite the fact that many patients have had better results from modern operative intervention. Achieving anatomic joint reduction and restoring the calcaneus's height, length, width, and axis are the objectives of operative management. Early motion restoration of function should be possible with stable internal fixation.[3] Patients who receive nearly anatomical reconstruction following open reduction and internal fixation of intra-articular calcaneal fractures are likely to benefit most from this procedure. Poor outcomes have been demonstrated by surgical treatment that does not lead to anatomical reconstruction.[4] Poor results are linked to comminuted displaced fractures, masculine gender, and heavy manual labor.[1]

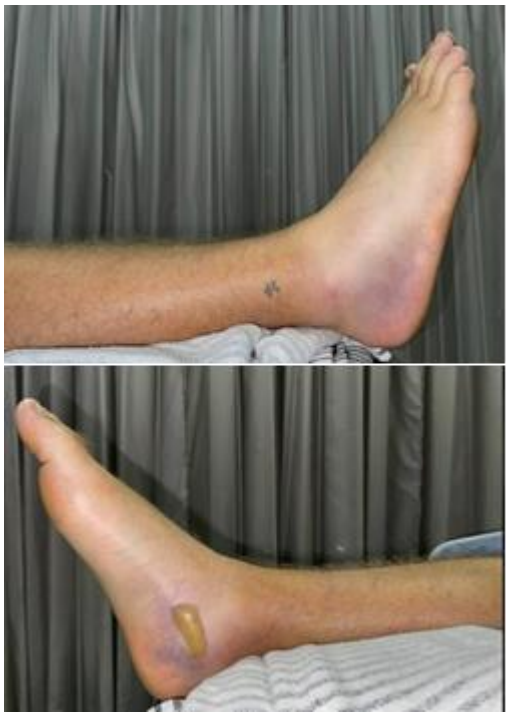
Displaced intraarticular calcaneal fractures (DIACFs) are the most difficult to treat. When compared to other calcaneal fractures, the functional prognosis for patients with DIACFs was significantly worse, according to an evaluation of their functional status[5], which indicates that patients with DIACFs have a potential risk of delayed or nonreturn to work. The best way to treat displaced intra-articular calcaneal fractures is still up for discussion, even with improvements in imaging and surgical methods for diagnosis. In the present study, we discuss the management of calcaneal fracture with ORIF in the treatment of Essex-Lopresti joint depression-type as an option for patients with traveling activities with the aim of accelerating fracture healing so as to reduce pain and restore the ability to mobilize to continue their traveling activities.

CASE PRESENTATION

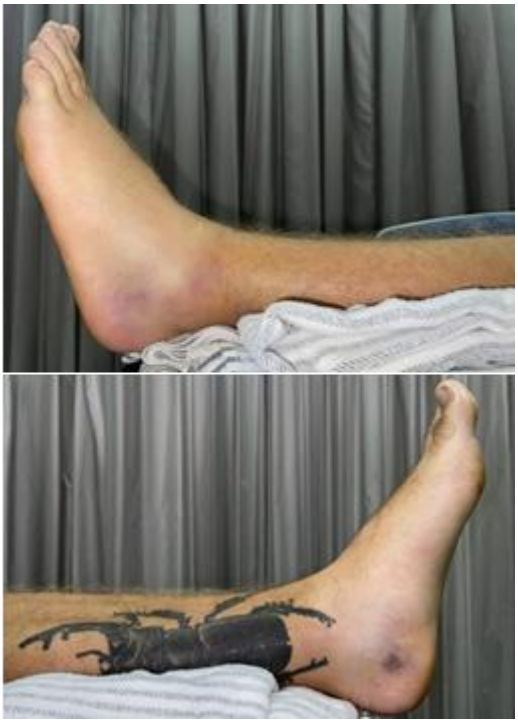
A 37-year-old male with clear past medical and surgical history fell from a 5 meters height building and landed on his hands and feet. The patient complained of pain on the lower back and both of his legs. Patient is a digital designer tourist and need to return to activities immediately, he was able to walk normally without walking aids before the incident.

Upon physical examination, the patient was discovered to be a oriented. Vascularization was good with palpable radial artery and normal saturation. While on right and left foot we found bruise surrounding both of his ankle and feel tenderness at both calcaneal sites, also found there was blister over the medial side of the right ankle. Vascularization was good with palpable dorsalis pedis artery and normal saturation. The skin covering the upper and lower extremities was unbroken. The range of motion (ROM) in both his ankle was limited due to pain.



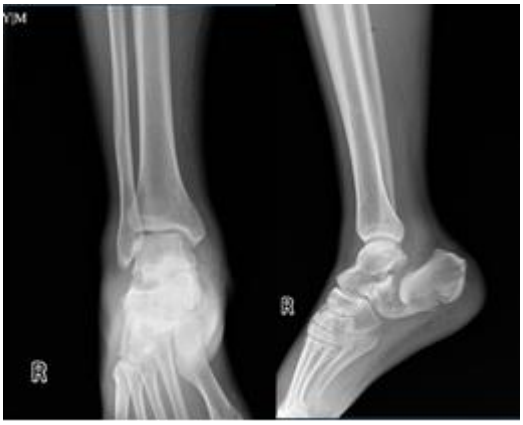


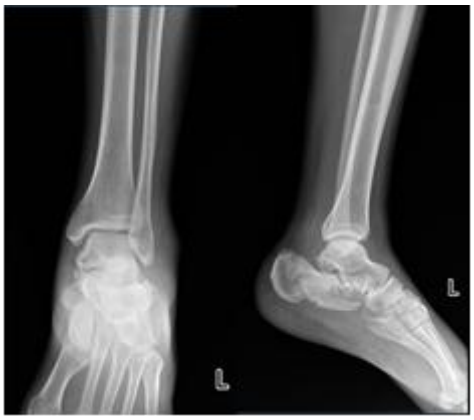
Right Foot



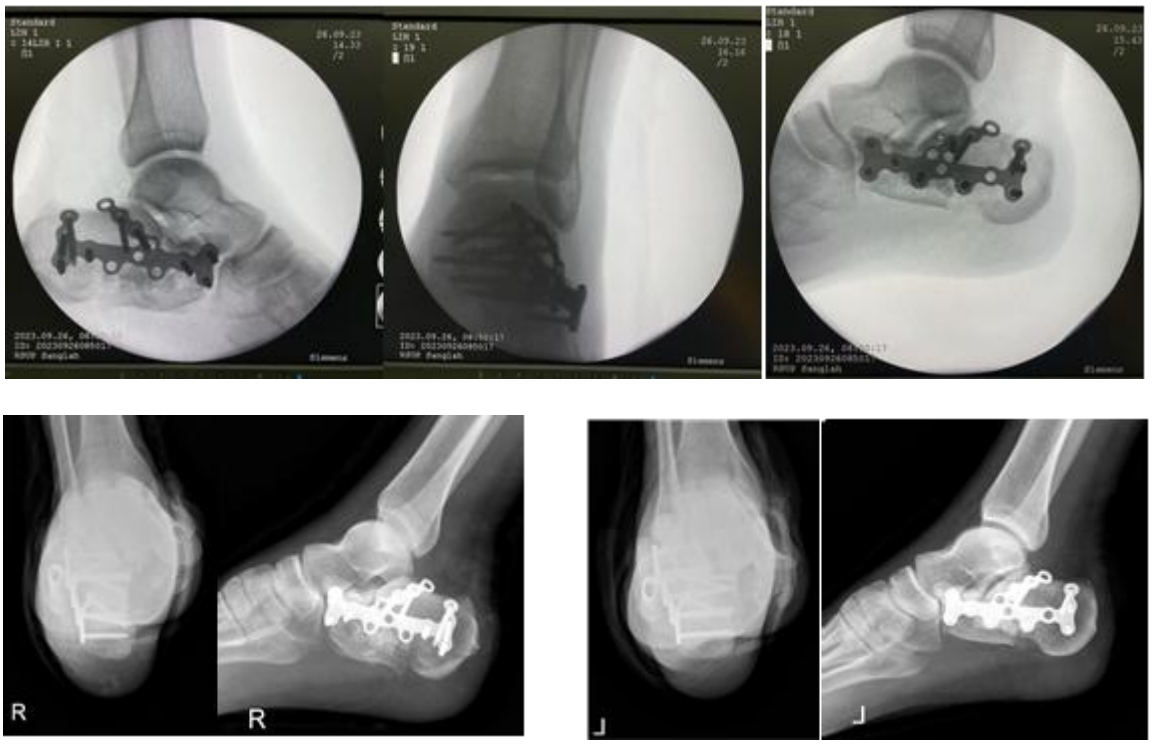
Left Foot

X-ray demonstrated a significant fracture on both calcaneal bones. From the physical examination and X-ray, we assessed the patient with close fracture bilateral calcaneus with Essex-Lopresti joint depression-type. This was followed by open reduction and internal fixation of both fractures.





Under general anaesthesia and C-arm guidance the patient was placed a lateral decubitus. We used a medial lateral approach and applied internal fixation to both feet by means of calcaneal plates. Under the C-arm, both reductions were examined.



Following the procedure, non-weight-bearing exercises such as active and passive ankle and toe flexion and extension were done. For the first day after surgery, The foot is wrapped in bulky bandage and splinted at the time of surgery, and the leg is elevated; pain control is done medically. And the 2nd week until 3rd week after the surgery, the patient can start the physiotherapy like ankle and subtalar joint inversion and eversion. After 8th week after ther surgery, partial weight-bearing can begin, depending on quality of bone and stability of fixation, considering patient factors like obesity, ability to control locomotion, extent of understanding of the situation as well degree of cooperation. The healing of the fracture determined the weight-bearing. Complete weight-bearing and assisted squat exercises were typically initiated 8–12 weeks after surgery. Typically, an outpatient review was carried out three, six, and twelve months following the procedure, and then a year after the first year of recovery.

DISCUSSION

Since intra-articular fractures are more frequent than extra-articular fractures, anatomical reduction is crucial to lowering the risk of subtalar arthritis and joint incongruity. The management of intra-articular calcaneum fractures is now more strongly recommended to use open reduction and internal fixation.[3,6]

Classifying fracture patterns is done by the Essex-Lopresti classification system using the planes of the primary and secondary fracture lines. There are always two fragments produced by the primary fracture line, which passes through the posterior facet. The secondary fracture line either occurs in the axial plane or behind the posterior facet, creating 2 unique fracture patterns. The first kind of fracture is called a joint-depression type, and it happens when the secondary fracture line crosses the calcaneus's body and exits directly behind the posterior facet. Consequently, a depressed free fragment involving the posterior facet forms.[7] Calcaneal shortening, calcaneal widening, decreased Böhler angle, and varus deformity are typical radiographic findings of the joint-depression type fracture.[8] The second fracture pattern, known as the tongue-type fracture, is less common and is defined as a secondary fracture line that extends from the tuberosity

in the axial plane posteriorly beneath the facet.[7] A posterosuperior displacement of the tuberosity is linked to these fractures, partly because of the Achilles tendon's pull. Because of this, these fractures may cause the posterior heel to tent, increasing the possibility of pressure necrosis and necessitating immediate surgical intervention.[9,12]

The surgical treatment goals were to mobilize the patient with minimal morbidity and complications and restore mechanical stability for earlier full weightbearing. The main objectives of surgical treatment are function restoration through primary stable osteosynthesis and restoration of height, length, width, and axis with anatomical reconstruction of all joint surfaces. Options include wire circular frame procedure, open reduction and arthroscopically assisted internal fixation, primary subtalar arthrodesis, and open reduction combined with internal fixation (ORIF) with or without grafting or bone cement augmentation.[3]

In this case report, the patient had bilateral Essex-Lopresti joint depression-type calcaneal fracture. Internal fixation and open reduction were used to treat both fractures. In the past, this open method was contrasted with the percutaneous closed method. Open reduction techniques were associated with higher rates of wound complications and deep infections, whereas closed reduction techniques were more commonly associated with hardware removal and revision.[6] This approach was selected in this instance because it considers the rate at which fractures heal, making it more appropriate for patients who travel frequently.

When managing the calcaneus surgically, soft tissue preservation is crucial. In their study involving the surgical treatment of 190 calcaneal fractures, Folk et al. found that wound complications occurred in 25% of cases, and 21% of these cases required surgery.[10] Li et al. conducted a study to determine the rate of complications in surgical cases. The most frequent complications in that study were pain and necrosis, with rates of 7.9% and 6.8%, respectively.[11] Other complications included loss of fixation, infection, and malunion. According to the Wei et al. study, the complication rate was 13.7% in the non-operated group and 26.2% in the operated group.[12]

CONCLUSION

The management of calcaneal fractures remains a delicate balance between operative and conservative approaches. When a young person has related soft tissue issues, which are frequently encountered, surgical management is likely to result in a better outcome and faster healing rates. Both operative and non-operative treatment exhibited complications.

Declaration by Authors

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