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# Managing a bilateral pure total Talar dislocation: A case report

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**Abstract**
Talus dislocations are rare injuries associated with high-energy trauma and open fractures, with surgery often being necessary. Pure total talar dislocations are even rarer and there is no protocol regarding treatment of these lesions.
We present a case of a 45-year-old male with an open bilateral pantalar dislocation with no fracture associated. Surgical reduction and fixation with Steinman pins was performed. At 2 years of follow-up, the patient presented with good ankle range of motion and a congruent ankle joint bilaterally.
This case highlights that prompt diagnosis and early management of pantalar dislocations are essential to reduce early and late complications.

**Keywords:** Talus dislocations, high-energy trauma, surgery, pantalar dislocation, reduction, ankle joint

## Introduction

The talus supports the body weight transferred to the foot, making it vulnerable to injuries due to the absence of muscular attachments [1]. Its unique shape and strong ligamentous support hold it in the ankle mortise. The blood supply to the talus is derived from the dorsalis pedis artery, peroneal arteries, tarsal canal and sinus arteries, deltoid artery, and their anastomoses.

Dislocation of the talus is a rare injury first described in 1608 by Fabricius Hildanus. Typically, it results from high-energy trauma and is associated with open injuries. Pantalar dislocation without an associated fracture, defined also as pure total talar dislocation, is a rare ankle lesion that accounts for 0.06% of all dislocations and only 2% of all talar injuries. [2] It is considered a total dislocation when the calcaneus, talus, and navicular bones are involved, and partial when the tibiotalar joint alone is affected. When blood supply is disrupted, there is a high complication rate due to avascular necrosis (AVN) and subtalar arthritis, which can lead to a poor prognosis [3, 4].

The mechanism of injury usually involves forced plantar flexion of the ankle with inversion or eversion of the foot. This dislocates the talus anteriorly and rotates it 90º around a vertical axis and 90º around a longitudinal axis, orienting the talar head medially and the inferior articular surface posteriorly. In the sagittal plane, plantar flexion with inversion pushes the talus ahead of the lateral malleolus, a common cause of dislocations. Conversely, plantar flexion with eversion pushes the talus medially [5].

Closed reduction of a talus dislocation is challenging due to obstruction by the posterior tibialis tendon, flexor hallucis longus, and flexor digitorum longus, peroneal tendons, extensor digitorum brevis, and talonavicular joint capsule. Open reduction and surgery are often necessary, with post-operative rehabilitation being prolonged and arduous [6, 7].

However, there are no established guidelines for managing this rare injury.

## Case Report

A 45-year-old man presented to the emergency room (ER) after a concrete block fell onto both ankles. The patient's medical history included hypertension and a penicillin allergy.

Examination revealed evident deformities with both feet in blocked pronation and open wounds on the lateral and anterior surfaces of both ankles (images 1-3), with bone exposure. Motor and sensory functions were intact, and there were no signs of vascular impairment.

Prophylactic antibiotic therapy with clindamycin 900 mg IV was initiated, and the open wounds were irrigated abundantly with normal saline and debrided. Plain radiographs (images 4-5) showed anterolateral dislocation of both tali without fractures.

Immediate reduction attempts were partially successful: the left talus was partially reduced, but the right talus remained irreducible despite multiple maneuvers.
Under general anesthesia, the patient was taken to the operating room. Both tali and open wounds were irrigated with 9 liters of normal saline. Anatomical reduction of both tali was achieved and confirmed by fluoroscopy, using maneuvers including knee flexion, ankle plantar flexion, and supination. On the right ankle, the wound was used to access de talus and achieve the reduction.
Steinmann pins were used for fixation (image 6), inserted from the inferior calcaneus through the talus and into the tibia, due to evident joint instability. After wound debridement and skin closure, both ankles were immobilized with short plaster casts in a neutral position.
Venous thromboembolism prophylaxis with subcutaneous enoxaparin 40 mg daily was administered. Weight-bearing was prohibited for six weeks, during which the patient was monitored weekly with radiographic evaluations. At six weeks postoperatively, the Steinmann pins were removed under local anesthesia. The patient began partial weight-bearing and aggressive physiotherapy.
At 12 weeks post-surgery, on the radiographic images, both ankles maintained anatomical reduction; Magnetic Ressonance Imaging (MRI) showed avascular necrosis in the posterior aspect of the right talus and high-grade rupture of the anterior talofibular and calcaneofibular ligaments. On the left ankle, there was also avascular necrosis of the posterior talus and high-grade rupture of the anterior talofibular ligament, with the calcaneofibular ligament intact. (images 7-9)
At the six-month follow-up, the patient could walk without crutches and was almost asymptomatic, with good range of motion in both ankles and subtalar joints. The American Orthopedic Foot and Ankle Society (AOFAS) score was 82/100 for the right ankle and 79/100 for the left. The primary limitation was reduced hindfoot motion (inversion and eversion) in the left ankle.
One year post-surgery, the patient resumed normal daily activities and his previous job, with improved AOFAS scores of 96/100 for the right ankle and 92/100 for the left. After two years of surgery, patient presented clinically stable, without complains, although slightly progression of AVN was noticed on MRI. (Image 10-11)

**Image 1:** Evident deformation of both ankles on the arrival at ER.

**Image 2:** Open wound on the anterolateral side of the right ankle.

**Image 3:** Open wound and bone exposure of the left ankle.


**Image 4:** Radiographic evidence of pantalar dislocation of right ankle.


**Image 5:** Xray showing pantalar dislocation of left ankle.

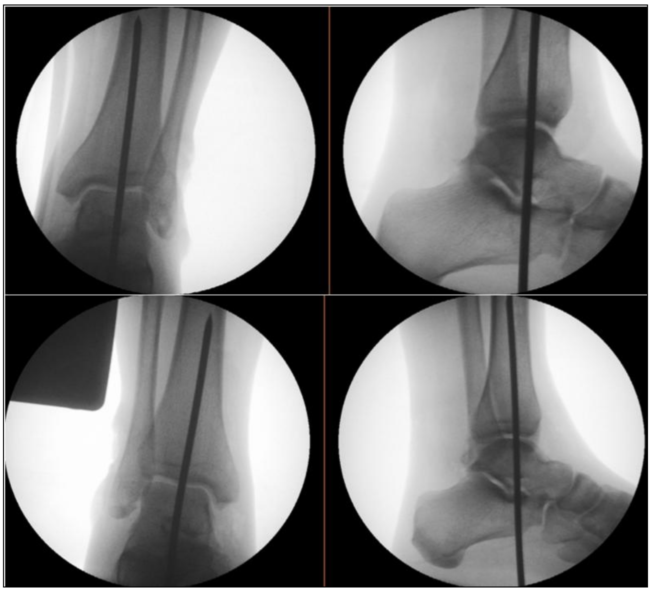

**Image 6:** Intraoperative fluoroscopy images confirming reduction and stabilization of both ankles with Steinmann pins.

**Image 7:** Xray at 12 weeks post-surgery.

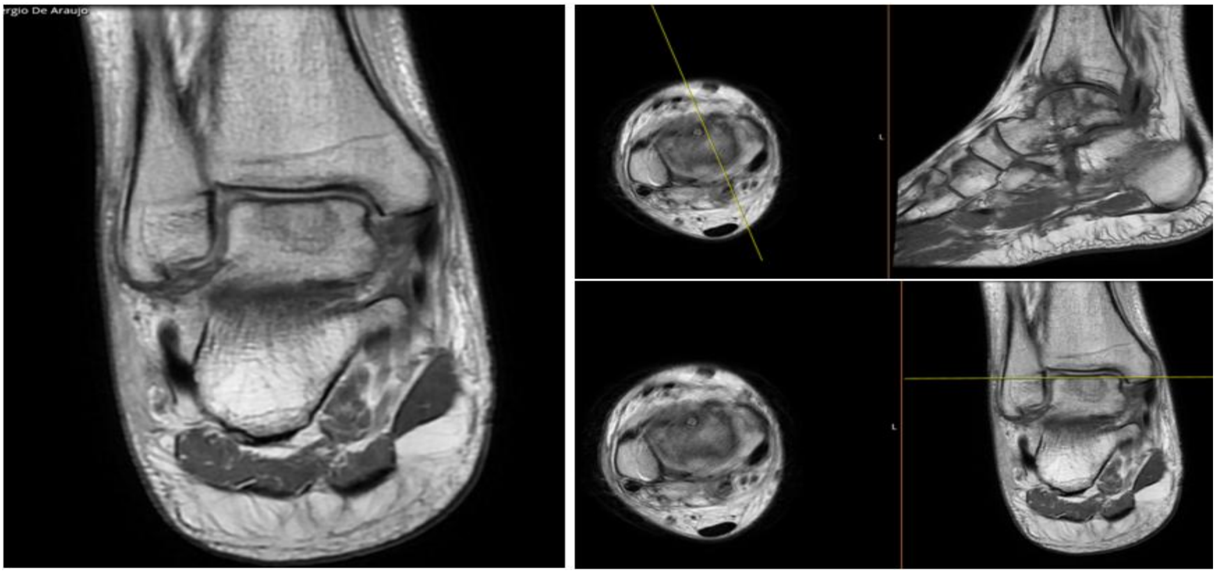

**Image 8:** MRI of the right ankle at 3 months post-op. It was already visible AVN of the posterior aspect of the talus

**Image 9:** MRI of the left ankle at 12 weeks post-op, with signs of AVN on the posterior talus.

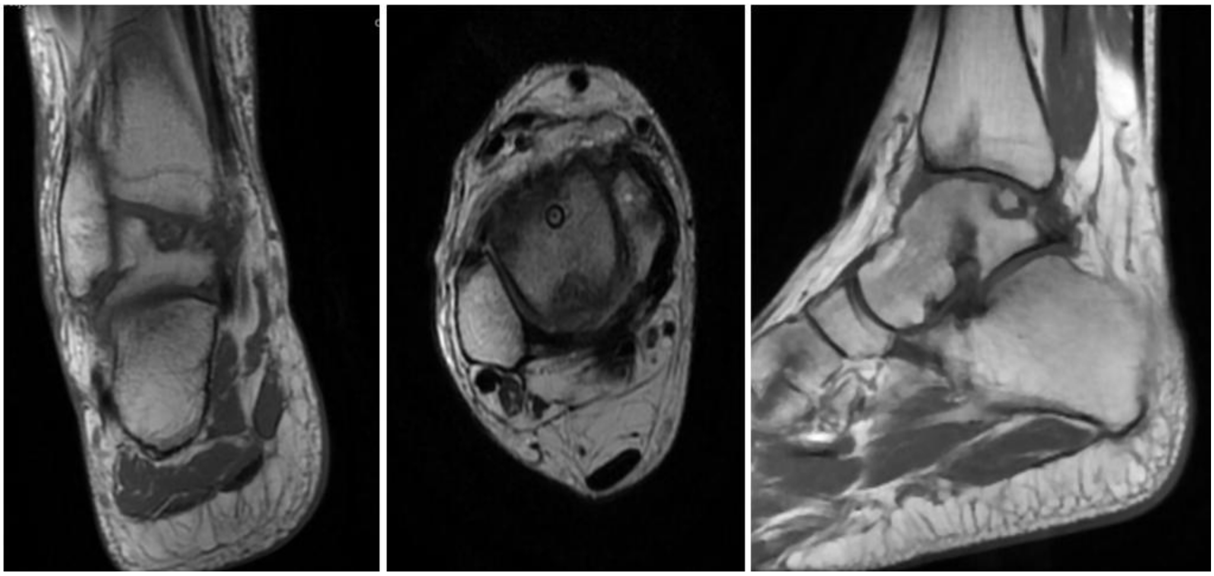

**Image 10:** MRI of the right ankle at 12 months post-surgery.

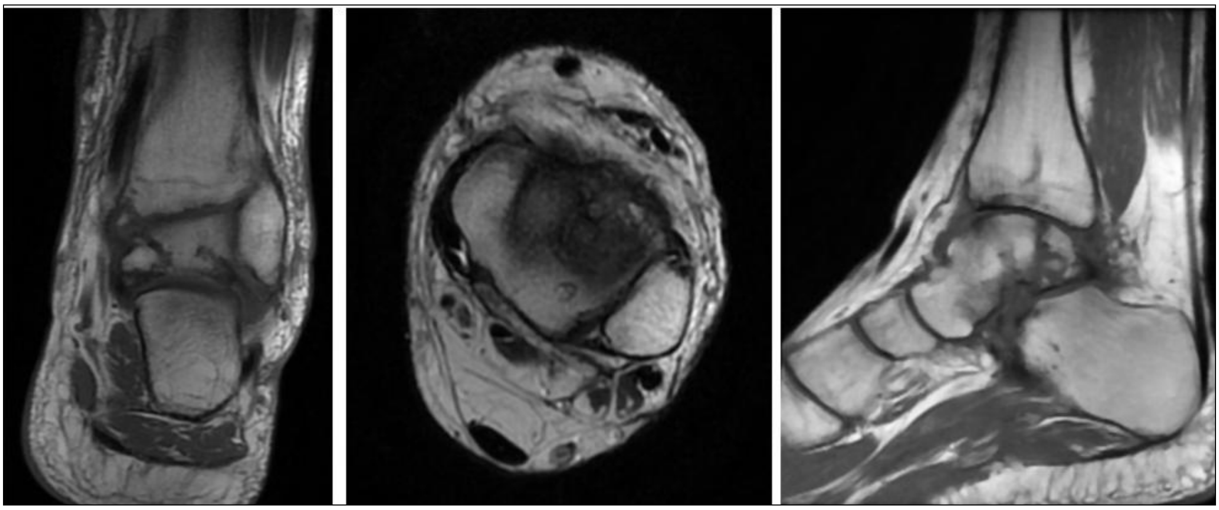

**Image 11:** MRI of the left ankle at 12 months post-surgery.

## Discussion

Total talar dislocations are rare injuries, predominantly associated with high-energy trauma, accounting for only 3.4% of talar injuries; pure total talar dislocations are even rarer and accounts for only 0.06% of all dislocations. Bilateral dislocations are even rarer, and this is the first report of a bilateral total talar dislocation without fracture, to our knowledge.

Regarding the anatomy, 60% of the talus is covered with articular cartilage with no muscular attachments which make the talus vulnerable to dislocation. Extreme supination and plantarflexion forces result in talar dislocation out of the ankle mortise, with disruption of the strong ligamentous attachments, which can result in an open injury [9]. Most of the literature describes talar extrusion with an anterolateral wound, which is similar to our case report [8, 10, 11].

Despite the lack of muscular or tendinous attachments on the talus, which theoretically increases its own vulnerability to dislocation, this injury is rare due to the talus's deep position within the tibio-peroneal mortise [13].

The best approach for managing complete talus dislocation remains controversial. However, the cornerstone of treatment is prompt and careful reduction, with thorough debridement of all open injuries [9, 11, 14].

Recent case series of open pantalar dislocation have proven that risks of osteomyelitis and AVN are intimately associated with time to reduction; the best prognosis is associated with reduction performed within three hours. The poorest prognosis is linked to reimplantation performed over 24 hours later [15].

As presented in this case, debridement, generous irrigation with normal saline and antibiotics are crucial steps in cases of open dislocations because it reduces the risk of infection [15].

Although closed reduction should be promptly attempted, pantalar dislocations often require open reduction due to soft tissue or bony obstructions, such as the interposed tibialis posterior tendon. This procedure typically exploits an antero-lateral approach to that talus and eventually combines a medial approach that allows for a complete view of the dislocated joint or engaged talus. This management can be applied even for open dislocation, using the wound as a surgical approach, as it was performed in this case report [6, 9, 16].

After achieving complete reduction, it is important to confirm joint stability. Some authors have suggested internal fixation is not necessary unless there is a burst-type open wound or an accompanying fracture [6]. On the other hand, most of surgeons typically prefer to apply one or two K-wires or Schanz pins to increase the articular stability. External fixation is also an effective solution for ankle stabilization [17].

It remains unclear, however, which stabilization system is optimal, and the choice is left to the surgeon.

Complications, including avascular necrosis, infection, post-traumatic arthritis, and the need for secondary procedures, are common and contribute to a poor prognosis [18].

Avascular necrosis risk is as high as 90% in the first year post-dislocation and remains high until the second-year post injury. It is important to diagnose AVN as soon as possible [19].

In the case presented, Hawkins sign was negative at 12-week MRI on both sides, which could indicate a poor prognosis in medium and long term; however, the patient remained nearly asymptomatic and with good clinical progression even two years after the trauma.

The second most prevalent complication is post-traumatic arthritis [20]. Literature reports a rate of 22% for radiographic osteoarthritis and a rate of 16% for clinical osteoarthritis [2]. Arthrosis could involve the tibiotalar, subtalar, or talonavicular or more than one joint together. Regardless, in the absence of talar fracture, it is difficult to predict post-traumatic arthritis.

In this case, anatomic reduction of both ankles was successfully achieved and temporary Steinmann pin fixation was performed. This approach preserved soft tissue integrity and facilitated joint stability and tissue healing. Nevertheless, due to the high-energy mechanism of the trauma, it was not possible to avoid AVN of the talus. The patient presented good clinical outcomes after two years of surgery, but follow-up should be strict to ensure early diagnosis of possible secondary osteoarthritis.

## Conclusion

Prompt diagnosis and early management of total talar dislocations are essential due to their significant potential for deformity and joint stiffness. Closed reduction should be prioritized to maintain soft tissue and blood supply. Temporary Steinmann pin fixation is a minimally invasive procedure that ensures joint stability while allowing soft tissue healing. Close follow-up is crucial to detect and manage early and late complications.

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