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**Case Report**
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# Closed subtalar dislocation: Long-term results

**Süleyman Yalçın**[1]* **and Kemal Somdaş**[1]

[1]Department of Orthopedics and Traumatology, University of Health Sciences, Kayseri City Training and Research Hospital, 38060, Kayseri, Turkey

***Corresponding author:** Süleyman Yalçın, MD, University of Health Sciences, Kayseri City Training and Research Hospital, 38080, Kayseri, Turkey; syalcinn00@gmail.com

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## Abstract

Talus dislocation is a rare injury that occurs as a result of high-energy trauma and is generally associated with open-type fractures. Due to the talus's extensive articular surface and limited vascular perforation area, the risk of avascular necrosis following trauma is considerably high. In this study, a case of closed medial talus dislocation resulting from a fall down the stairs is presented. The patient was immobilized with a short leg cast for two weeks after closed reduction and was followed up for three years. At the end of the follow-up period, no avascular necrosis was detected in the talus, and ankle movements were found to be normal.

**Keywords:** Talus, subtalar dislocation, avascular necrosis, foot injuries, joint dislocations

## Introduction

The talus, being the apex of the foot, is responsible for distributing forces to the subtalar, calcaneocuboid, and talonavicular joints, as well as transferring body weight to the bones of the foot [1]. Since no muscles attach to the talus, it is more vulnerable to trauma [1,2]. Despite this, closed subtalar dislocations without fractures are rare due to the strong ligaments binding the talus to the midfoot bones. This type of injury requires significant force and often results in open injuries [1-3]. Subtalar joint dislocations account for less than 2% of all large joint dislocations [1]. While medial dislocations are the most common, lateral, posterior, and anterior dislocations can also occur [1].

## Case report

A 51-year-old male patient was admitted to our emergency department with severe pain and deformity in his left foot after falling from stairs. Diagnostic tests revealed an isolated medial talus dislocation in the left foot (Figure 1). The dislocation was successfully reduced under anesthesia using a closed reduction technique three hours after the trauma. Post-reduction imaging with computed tomography (CT) showed no significant fractures except for small bone fragments in the posterior-lateral side of the talus. The patient was immobilized in a short-leg splint in a neutral position and was non-weight-bearing for two weeks. This was followed by a two-week period of partial weight-bearing, after which full weight-bearing was permitted along with rehabilitation exercises. An magnetic resonance imaging (MRI) scan performed eight months later revealed findings compatible with contusions in the talus, navicular, and calcaneus, along with disruption of the calcaneofibular ligament integrity. A three-year follow- up (Figure 2) showed regression of the initial lesions, and no significant restriction in ankle movements was detected (Figure 3). The patient achieved an excellent outcome based on the American Orthopedic Foot and Ankle Society (AOFAS) score and activity level assessment.

## Discussion

Subtalar dislocations can be classified as talocrural, subtalar, and total dislocations [1-3]. They are characterized by the loss of the anatomical relationship between the talus, calcaneus, navicular, and tibia. Due to strong ligamentous support, peritalar dislocations without a significant talus fracture are extremely rare [3,4]. Total talus dislocation accounts for 0.06% of all dislocations and 2% of talar injuries [4,14]. The talus is tightly positioned between the tibia, fibula, calcaneus, and navicular bones, reinforced by strong ligaments. Therefore, an isolated talus dislocation requires a considerable amount of force to occur. Talus dislocation is often accompanied by osteochondral fractures, malleolar fractures, talar neck or body fractures, as well as navicular and calcaneal fractures [1,5,6]. However, in our case, no significant fracture pathology was observed along with the dislocation. Although no specific injury mechanism has been universally defined, medial or lateral dislocations typically occur due to excessive supination or pronation forces pushing the talus

 

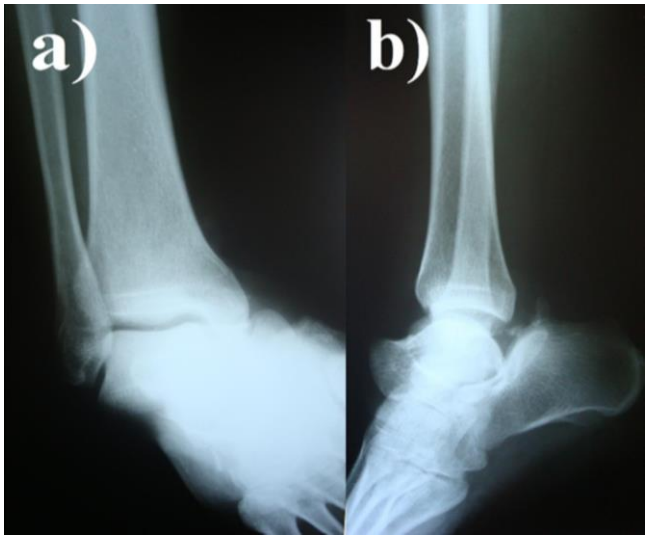


Fig. 1: (a, b) Post-traumatic images of the patient showing anteromedial dislocation of the talus.

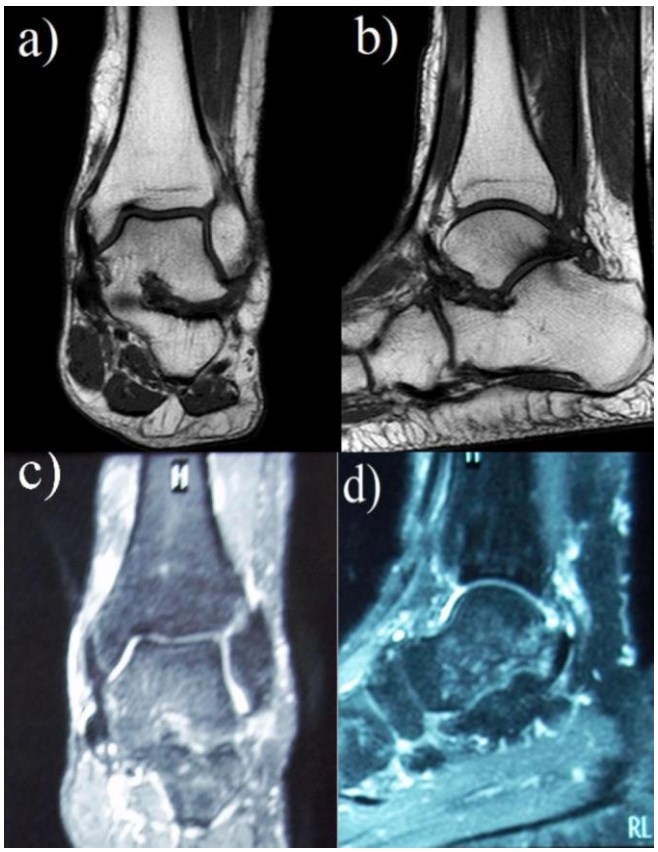


Fig. 2: Coronal (a), sagittal (b) T1-weighted and fat-suppressed proton density-weighted coronal (c) and sagittal (d) MRI images at the 3-year follow-up. Increased signal intensity consistent with bone marrow edema is observed in the ventral subchondral area of the talus and on the inferior surface adjacent to the calcaneus, more prominent on proton density-weighted sequences.


Fig. 3: At the third-year follow-up, the patient demonstrates a full range of motion in the ankle joint.

out of the mortise [2,4,7]. Subtalar joint dislocation represents the initial stage of a complete talus dislocation, which occurs when forces causing excessive pronation or supination persist. As the force increases, dislocation progresses to involve the talonavicular joint, followed by the tibiotalar joint. Anteromedial talus dislocations occur more frequently than anterolateral dislocations [1,3,4]. Since more than 60% of the talus is covered with cartilage, the areas where arteries can penetrate are limited [5,6,8]. Despite anatomical variations, the blood supply of the talus is primarily provided by the anterior tibial, posterior tibial, and peroneal arteries [7]. The anterior tibial artery gives rise to the dorsalis pedis, sinus tarsi, and lateral tarsal arteries, which supply the head, neck, and lateral side of the talus. The posterior tibial artery supplies the talar body via the tarsal canal and medial area with its deltoid branch. Arterial anastomoses remained intact post-trauma, and the level of soft tissue injury determines the rate of avascular necrosis. However, due to the large articular surface and limited vascular penetration, avascular necrosis of the talus can reach up to 90% in severe injuries [5-7]. The primary artery supplying the talus enters the bone through the superior talonavicular ligament. Therefore, preserving this ligament may help prevent avascular necrosis [8,9-11,12]. In our case, no significant ligament rupture was detected other than the calcaneofibular ligament.

Hence, we attribute the absence of avascular necrosis to the maintained joint capsule and ligaments [4,6,7,13]. Information is very limited regarding the best treatment option for this rare injury [6,14]. While literature varies on when to allow weight-bearing, we prohibited weight-bearing for two weeks, permitted partial weight-bearing for another two weeks, and then allowed full weight-bearing and movement. Factors affecting favorable outcomes in subtalar dislocations include soft tissue damage, intra-articular or extra-articular fractures, osteonecrosis, and instability [6,9,10,14]. These factors play a significant role in posttraumatic arthritic changes in the joint [8-10]. Almost all injuries involving joints may cause degenerative changes and loss of range of motion [3,9,10]. However, at the end of our case follow-ups, we did not detect any limitation in ankle movement.

We believe that early closed reduction and early joint mobilization can help reduce complications in subtalar dislocations.

## Author contributions

All authors contributed to the study conception and design. Material preparation, data collection and analysis were performed by Süleyman Yalçın, Kemal Somdaş. The first draft of the manuscript was written by Süleyman Yalçın and all authors commented on previous versions of the manuscript. All authors read and approved the final manuscript.

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### Conflict of Interest

The authors declare that they have no conflict of interest.

## Ethical statement

The authors confirm that this retrospective study was conducted in accordance with the ethical standards set forth in the Declaration of Helsinki and its later amendments.

## ORCID iD

S.Y. 0009-0009-9210-343X

K.S. 0009-0000-3696-9436

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