

# İzole Medial Subtalar Çıkık: Olgu Sunumu ve Güncel Literatürün Gözden Geçirilmesi

## Isolated Medial Subtalar Dislocation: A Case Report and A Review of The Current Literature

Emrah Kovalak\*,  
İbrahim Yıldız\*,  
Tolga Atay\*,  
Salih Korkmaz\*,  
Hüseyin Yorgancıgil\*,  
Hasan Basri Pınar\*

\*: Süleyman Demirel  
Üniversitesi Tıp Fakültesi  
Ortopedi ve Travmatoloji  
Anabilim Dalı

Yazışma Adresi:  
Emrah Kovalak  
Süleyman Demirel  
Üniversitesi Tıp Fakültesi  
Ortopedi ve Travmatoloji  
Anabilim Dalı Başkanlığı  
Çünür / ISPARTA  
e-mail:  
emrahkovalak@yahoo.com

### Öz

**Giriş:** Akut subtalar eklem çıkıkları, talokalkaneal ve talonaviküler eklemlerin eş zamanlı oluşan çıkıkları olup travmatolojinin nadir vakalarıdır. Genellikle yüksek enerjili travmalar neticesinde oluşan bu kırıklara yüksek oranda ayak bileğinde yumuşak doku yaralanması ve kırık eşlik etmektedir. İzole medial subtalar çıkıklar ise kırıklı çıkıklara göre çok daha nadirdir.

**Olgu sunumu:** Bu vaka sunumu ile 32 yaşında yüksekten düşme sonucu acil servise başvuran erkek hastayı sunduk. Yapılan fizik muayene ve radyografik tetkikler neticesinde sol ayak bileğinde izole medial subtalar çıkık tespit edildi. Acil serviste sedasyon altında kapalı redüksiyon yapılarak atele alındı ve 24 saat dolaşım takibi sonrası taburcu edildi. Üç hafta sonunda rehabilitasyona başlandı. 3 haftalık rehabilitasyon sonrası kısmi yük verildi. Sekiz hafta sonunda tam yüke geçildi. On sekiz ayın sonunda hasta semptomsuz idi.

**Sonuç:** Subtalar çıkıklar travmatolojinin acil vakalarıdır. Medial çıkıklar inversiyondaki ayağın daha instabil olması nedeni ile lateral çıkıklara nazaran daha sıktır. Redüksiyon mümkün olan en kısa sürede sağlanmalıdır. Ek kemik ve yumuşak doku patolojilerinin eşlik etmediği, erken redüksiyonun sağlandığı izole medial subtalar çıkıklarda uzun dönem fonksiyonel sonuçları mükemmeldir.

**Anahtar Kelimeler:** Çıkık; travma; subtalar eklem; talus; talotarsal eklem

### Abstract

**Introduction:** Acute subtalar joint dislocations are simultaneous dislocations of talocalcaneal and talonavicular joints with a rare incidence in traumatology. These fractures usually occur as a result of high-energy traumas and are accompanied in high numbers by soft tissue injuries and ankle fractures. However, isolated medial sub-dislocations are very rare considering the fracture- dislocations.

**Case Presentation:** In this case report, we present a 32-year-old male patient who applied to the emergency service after falling from a height. Physical and radiographic examinations revealed an isolated medial subtalar dislocation in the left ankle. The patient underwent closed reduction under sedation in the emergency service and was discharged after 24 hours of

follow-up. Three weeks later, rehabilitation was started. After 3 weeks of rehabilitation, the patient was started with partial weight bearing and switched to full weight bearing after eight weeks. At the end of 18 months, the patient did not present with any symptoms.

Conclusion: Subtalar dislocations are emergency cases of traumatology. Medial dislocations are more frequently seen due to the instability caused by the inversion of the foot. Reduction should be provided as soon as possible. In the treatment of isolated medial subtalar dislocations, immediate reduction offers excellent long-term functional outcomes particularly in cases that are not accompanied by additional bone and soft tissue pathologies.

**Keywords:** Dislocation; trauma; subtalar joint; talus; talotarsal joint

## Introduction

Acute subtalar or talotarsal joint dislocations are rare occurrences of traumatology constituting only 1-1.5% of the lower extremity traumas and 1% of all acute traumatic dislocations (1). First described by Du Faure in 1811, subtalar dislocations are seen in the form of open dislocations in 3.7-57% of the cases (1-3). Etiology usually involves high-energy traumas (1). Medial subtalar dislocations constitute approximately 80% of these cases and occur four times more often than lateral dislocations (1,3,4). The prevalence of anterior and posterior dislocations presented in the literature ranges from 1% to 2.5% (3). Subtalar dislocations are accompanied by fractures or soft tissue injuries in the feet or ankles at the percentages of 38.8% to 88% (3). Open dislocations constitute 46-83% of all cases and generally have a poor prognosis (3). The treatment of rare cases of isolated medial subtalar dislocations is an immediate closed reduction or, if not possible, an open reduction (3). Thus, correct identification of these dislocations and associated injuries as well as undertaking rapid treatment are crucial for the recovery of the full functions of the extremity.

In this case, within the context of the current literature we discuss the conservative treatment of a patient with a diagnosis of isolated medial subtalar dislocation caused by a fall from a height.

## Case Presentation



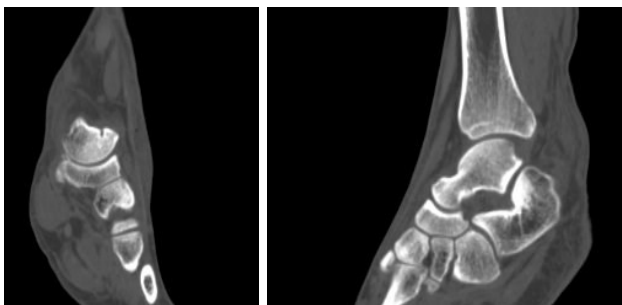
**Figure 1a-b**

A 32-year-old male was admitted to the emergency room with the complaints of deformity, limitation of movement and pain in the left foot after a fall from a height. The physical examination showed that the talus head was palpated on the dorsolateral side, and the subtalar joint was medially dislocated. There was no open wound. Peripheral vascular circulation was normal. No motor or sensory deficit was detected. The radiographic examination revealed an isolated medial subtalar dislocation in the left ankle without accompanying fracture (Figure 1a-b). After an emergency surveillance, 2.5 mg intravenous midazolam (ampoule containing 15 mg / 3 ml iv-im Dormicum solution, Deva Holding Inc., Istanbul) was used to induce conscious

sedation. The left knee joint was fixed at a flexion of 90° and reduction was performed through calcaneal traction by exerting force in the opposite direction to the medial dislocation. The physical examination undertaken after this procedure showed that the joint was stable and there was no neurovascular pathology.



**Figure 2a-b**



**Figure 2c-d**

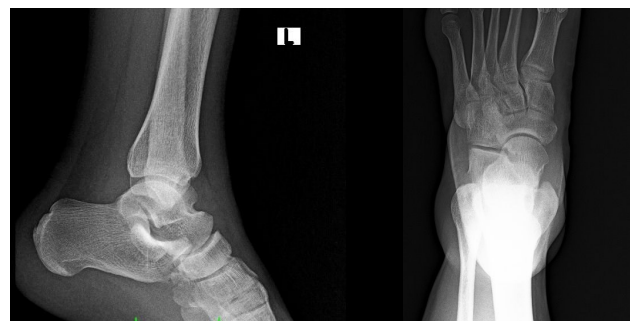
After confirmation of the success of the joint reduction through control radiographs, and joint stability via physical examination a below-knee plaster cast was used with the patient's ankle in the neutral position (Figure 2a-b). To exclude a fracture that may have been overlooked in radiographs, computed tomography (CT) was performed on the left ankle. The CT did not reveal any additional osseous pathology (Figure 2c-d). Upon the completion of the examinations, the patient was admitted to the hospital for a 24-hour follow-up assessment of circulation and pain. Then, the patient was

discharged in a stable state and asked to return to the outpatient clinic for a follow-up check weekly.

There was no problem with the weekly follow-up of the patient. Circular plaster was not required, and the plaster cast was removed at the end of the third week. Before commencing rehabilitation to increase the range motion of the ankle, the rehabilitation clinic was consulted concerning physical therapy. At the end of the three-week rehabilitation, the patient was mobilized with the amount of partial weight bearing he could tolerate. At the end of two months, since the patient did not have any pain, he was switched to full weight bearing. At the end of 18 months, the patient had a complete range of motion in the ankle and his movements were painless with an AOFAS of 100 (Figure 3a-c).



**Figure 3a**



**Figure 3b-c**

## Discussion

Subtalar dislocations are rarely seen, but their consequences may be severe (5). Young adults, particularly men (female / male = 1/6), constitute the main group affected by these high-energy injuries such as falls from heights and traffic accidents (6-8). However, in case series, 14-19% of patients have been reported to have subtalar dislocations caused by low-energy traumas such as sports injuries (2,7). In subtalar dislocations, trauma results in simultaneous injury to the talocalcaneal and talonavicular joints but the talus remains in place and the calcaneocuboid joint maintains stability (1,3). In 1853, Broca classified dislocations as medial, lateral, and posterior. This classification was modified by Malgaigne and Henkle to include anterior dislocations and is still used in diagnosis (2). Medial dislocations are more common than lateral dislocations due to the greater instability of the subtalar joint with the inversion of the foot (6). Medial subtalar dislocations occur as a result of the rupture of dorsal talonavicular ligaments, followed by that of the interosseous and finally calcaneofibular ligaments due to the forefoot being forced into the equinus position in a fast process of high-energy inversion (6). Although reduction of the joint is recommended within 6 hours of injury to prevent development of skin and possible talus avascular necrosis, no time interval has been specified (3,5). Reduction can be performed under sedation or general anesthesia (2,7). Medial dislocations can mostly be reduced closed whereas for lateral dislocations, closed reduction is often not possible due to the interposition of the tibialis posterior and flexor digitorum longus tendons (3,5). In medial dislocations, the extensor retinaculum and deep peroneal neurovascular bundle are structures responsible for preventing reduction (3). There are contradictions in the literature

concerning the percentages of open dislocations (9-11). Reported that all of their case series presented with open lateral dislocations whereas Garofalo et al. (9) found this percentage to be 80%. Conversely, Merchan (11) reported open dislocations at percentages of 41% in medial and 20% in lateral cases. In open dislocations, reduction is performed after the effective debridement and washing of the wound (2,7). The following process is mostly the same as in closed fractures. Some authors have also recommended using an external fixator or K-wire in instable dislocations presenting with severe soft tissue or bone damage (5,12,13).

In subtalar dislocations, the incidence of accompanying fractures is considerable high (3) and the most frequent fractures are of the posterior process of talus, the head of talus, lateral and medial malleoli, and the tubercle on the base of the 5th metatarsal bone (14-16). Furthermore, in 2013, Eisenstein et al. (17) presented the first case report of medial subtalar dislocation accompanied by both posterior talar process and navicular fractures. Due to the greater energy involved, the percentage of osseous injuries accompanying lateral dislocations (78%) is greater than for medial dislocations (7). Intra-articular osteochondral fractures can also accompany dislocations and increase the risk of arthrosis (6). The prevalence of arthrosis has been reported as 40% to 89%; however, one-third of these cases are asymptomatic (2). Early reduction and stable fixation can lower the percentage of late and rare cases of avascular talus to 10% (2,4,6).

The recommended immobilization period after reduction is 3-5 weeks in uncomplicated isolated dislocations and 6-8 weeks in complicated cases (7). In cases accompanied by fractures, prolonged immobilization has long-term adverse effects such as joint stiffness and osteoporosis (6,7). For favorable functional outcomes, rehabilitation should be started

immediately after immobilization and the patient should be prescribed weight bearing physiotherapy depending on his/her tolerance and the weight should be gradually increased (7).

Neurovascular injuries associated with subtalar dislocations are relatively rare and are usually seen in lateral dislocations (2,9,18). In their case series, Goldner et al. (18) reported 7 tibial nerve injuries and 5 posterior tibial arterial lacerations accompanying 10 open lateral dislocations, and Garofalo et al. (9) detected one case with posterior tibial artery laceration and another case with saphenous nerve injury. Skin necrosis can be prevented by performing reduction without delay (2).

The present case presented with isolated medial subtalar dislocation caused by a high-energy trauma, treated in the emergency service with closed reduction in the early period supplemented with a plaster cast and followed up for 18 months. At the end of the follow-up period, the patient's AOFAS score was 100 and no pathology was detected in radiography.

Positive outcomes have been reported following the treatment of isolated medial subtalar dislocations without bone and soft tissue injuries (1-4,6). However, while the results reported for dislocations caused by low-energy traumas are excellent with a 100% success rate, this can be reduced to 15% in cases resulting from high-energy traumas (2). Furthermore, it should be noted that although the radiographic findings for some patients may be good, they may still have mild pain, edema, and limitation of movement which do not restrict their daily activities (4).

In conclusion, isolated medial subtalar dislocations are injuries that can be easily diagnosed using radiography. In these cases, it is possible to achieve excellent or near-perfect outcomes by performing immediate and careful reduction without causing osteochondral damage followed by an appropriate duration of immobilization.

## References

- 1- Ruhlman F, Paujardieu C, Vernois J, Gayet LE. Isolated acute traumatic subtalar dislocations: Review of 13 cases at a mean follow-up of 6 years and literature review. doi: 10.1053/j.fas.2016.01.044
- 2- Rammelt S, Goronzy J. Subtalar dislocations. *Foot Ankle Clin N Am.* 2015;20: 253-264.
- 3- Prada-Canizares A, Aunon-Martin I, Rico JV, Pretel- Mazzini J. Subtalar dislocation: management and prognosis for an uncommon orthopaedic condition. *International Orthopaedics.* 2016;40: 999-1007.
- 4- Camarda L, Abruzzese A, La Gattula A, Lentini R, D'Arienzo M. Results of closed subtalar dislocations. *Musculoskeletal Surg.* 2016;100: 63-69.
- 5- Hoelscher-Doht S, Frey SP, Kiesel S, Meffert RH, Jansen H. Subtalar dislocation: Long-term follow-up and CT-morphology. *Open Journal of Orthopedics.* 2015;5: 53-59.
- 6- Azarkane M, Boussakri H, Alayyoubi A, Bachiri M, Elibrahimi A, Elmrini A. Closed medial total subtalar joint dislocation without ankle fracture: a case report. *Journal of Medical Case Reports.* 2014;8: 313-316.
- 7- Hoexum F, Heetveld MJ. Subtalar dislocation: two cases requiring surgery and a literature of the last 25 years. *Arch Orthop Trauma Surg.* 2014;134: 1237-1249.
- 8- Kınık H, Oktay O, Arıkan M, Mergen E. Medial subtalar dislocation. *International Orthopaedics.* 1999;23: 366-367.
- 9- Garofalo R, Moretti B, Ortolano V, Cariola P, Solarino G, Wettstein M, Mouhsine E. Peritalar dislocations: a retrospective study of 18 cases. *J Foot Ankle Surg.* 2004;43: 166-172.
- 10- Ruiz Valdivieso T, de Miguel Vielba JA, Hernandez Garcia C, Castrillo AV, Alvarez Posadas JI, Sanchez Martin MM. Subtalar dislocation. A study of nineteen cases. *Int Orthop.* 1996;20: 83-86.
- 11- Merchan EC. Subtalar dislocations: long-term follow-up of 39 cases. *Injury.* 1992;23: 97-100.
- 12- Jungbluth P, Wild M, Hakimi M, Gehrman S, Djuricic M, Windolf J, Muhr G, Källicke T. Isolated subtalar dislocations. *J Bone Joint Surg Am.* 2010; 92:890-894.
- 13- Milenkovic S, Mitkovic M, Bumbasirevic M.

External fixation of open subtalar dislocations. *Injury*. 2006; 37:909-13.

14- De Lee JC, Curtis R. Subtalar dislocation of the foot. *J Bone Joint Surg Am*. 1982 Mar;64(3):433-7

15- Bibbo C, Anderson RB, Davis WH. Injury characteristics and the clinical outcome of subtalar dislocations: a clinical and radiographic analysis of 25 cases. *Foot Ankle Int*. 2003;24:158-163.

16- Xue Y, Zhang H, Pei F, Tu C, Song Y, Fang Y, Liu L. Treatment of displaced talar neck fractures

using delayed procedure of plate fixation through dual approaches. *Int Orthop*. 2014; 38:149-154.

17- Eisenstein N, Hillier D, Ahmad S. Medial subtalar dislocations with navicular and posterior talar process fracture: the first report in the literature. doi: 10.1136/bcr-2012-007763.

18- Goldner JL, Poletti SC, Gates HS, Richardson WJ. Severe open subtalar dislocations: long-term results. *J Bone Joint Surg Am*.1995;77A:1075-1079.