

Complex Talonavicular Fracture Dislocation: A case report

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Isolated talonavicular dislocation is rare because of the strong plantar ligamentous structures that support the joint. It appears that plantarflexion and inversion of the foot is the mechanism of injury. Very often, the strong spring ligament or plantar calcaneonavicular ligament is injured. Surgical repair is often the desired treatment in case of ligamentous injury. In this case, closed reduction with percutaneous pinning is presented as an alternative to open surgery. Early anatomical reduction is the key to preventing long term complications such as midtarsal joint arthritis and faulty foot mechanics.

Complex talonavicular fracture dislocation is a rare injury of the foot. This region is usually resistant to injury because of the strong ligamentous structures around the midtarsal joint. The strongest ligamentous structures of the midtarsal joint are on the plantar side which is protected by the long and short plantar ligament, bifurcate ligament, and the plantar calcaneonavicular (spring) ligament, which are important as supports for the arch of the foot.⁶

Therefore, dorsal midtarsal dislocation resulting from disruption of these plantar ligaments is less common than other types of midtarsal dislocation. Kennedy reported a case of navicular fracture dislocation which, by the description of the incident and the reduction manoeuvre employed, suggests that plantarflexion combined with inversion were the forces required to produce the deformity.

He also concluded that understanding of the mechanism of injury in these fractures may lead to easier closed reduction and improved outcome.¹¹

Surgical repair of the short plantar ligament, bifurcate ligament and plantar calcaneonavicular or spring ligament is the desired approach to treatment and reducing the dislocation. However, closed reduction using percutaneous pin fixation appears to also be a viable option to open surgical treatment.

Case Report

A thirty-five year-old male came to our patient department with history of fall from height injuring his right foot. There was diffuse swelling, and tenderness; crepitus was felt within the talonavicular joint. Radiograph shows a complex talonavicular dislocation. (Figs. 1,2) Closed reduction of the talonavicular dislocation was performed under spinal anaesthesia and stabilized by two percutaneous K-wires using image intensifier. (Figs. 3,4)

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Figure 1 The dorsoplantar view showing talonavicular dislocation.

The post-operative period went uneventful. The patient was immobilized in a plaster-of-paris cast for six weeks. Gradual physiotherapy was performed to the ankle and foot. The cast and surgical pins were removed after six weeks. Tolerable weight bearing ambulation began at eight weeks. The patient made a quick recovery and was allowed to fully weight-bear at twelve weeks. He returned to his previous job without incident and no long-term complication was identified. After a 2 year follow-up, no complications were reported. This patient is still successfully employed as a manual worker performing normal activities.



Figure 2 Lateral view showing talonavicular dislocation with associated complex fracture.

Discussion

Midtarsal joints, including the talonavicular and calcaneocuboid joints, are functionally related to the subtalar and Lisfranc joints. Isolatedmidtarsal injury is uncommon. Main and Jowett classified a series of 71midtarsal joint injuries into 5 groups according to the direction of the deforming force and the resulting displacement: medial forces, longitudinal forces, lateral forces, plantar forces, and crush injury.¹ Only two cases ofmidtarsal dislocation were reported: pure plantarmidtarsal dislocation and plantar subtalar dislocation associated with plantar dislocation of the talonavicular joint caused by a plantar force.



Figure 3 Dorsoplantar view showing stable cross K-wire stabilization of the dislocation.

Cases of isolated midtarsal dislocation in medial, lateral, or plantar directions have been reported.²⁻⁵ In this case, dorsal forces disrupted the plantar ligamentous structure, resulting in dorsal midtarsal dislocation. The combination of dorsal dislocation of the navicular from the talus and an associated comminuted fracture of the calcaneus (transcalcaneal, talonavicular dislocation) is an unusual and severe injury and six cases have been described previously.¹⁴ Midfoot fractures, particularly fracture dislocation injuries, affect the function of the entire foot in the long-term outcome.



Figure 4 Lateral view showing stable cross K-wire stabilization of the dislocation. Manipulation of the foot has also reduced the fracture fragment.

Even in these complex injuries, an early anatomic reduction and stable fixation can minimize the percentage of long-term impairment.^{7,8,12} A swivel dislocation is an uncommon variant of a subtalar dislocation, where a medially or laterally directed force dislocates the talonavicular joint, and subluxates but does not dislocate the subtalar joint. The calcaneus rotates or swivels on an intact interosseous talocalcaneal ligament without tearing it. It is important to recognize this injury as the treatment and prognosis are different from a subtalar dislocation.¹³

Complex talonavicular fracture dislocation causes residual insufficiency of plantar ligamentous structures and results in the plantar opening of the joint space. This will lead to increased compression stress on the dorsal part of the joint, resulting in dorsal ossification. Early midtarsal joint subluxation and arthritis, secondary to the residual insufficiency of the plantar ligaments are long-term complications.

Open reduction and internal fixation gives a better outcome allowing repair of the plantar ligamentous structures, especially the plantar calcaneonavicular or Spring ligament. This improves the stability of the talonavicular joint, which is critical to normal foot biomechanics. Primary fusion of the talonavicular joint after fracture dislocation of the navicular bone is also described.¹⁰

Conclusion

Complex talonavicular dislocation is rare. It represents a severe injury to the plantar ligamentous structures. An early anatomic reduction and stable fixation can minimize the long-term impairment.

In our case, a closed anatomical reduction was achieved by closed reduction and stabilized by two percutaneous K-wires to minimize surgical trauma to the soft tissue. The K-wires were kept in place for six weeks. The reduction appeared satisfactory. After reduction, the patient was kept non-weight bearing and gradually returned to full weight-bearing after eight weeks. He went back to his manual work with normal activities and occasional pain to the foot.

References

1. Main BJ, Jowett RL. Injuries of the midtarsal joint. *J Bone Joint Surg Br* ;57:89-97, 1975.
2. Ruthman JC, Meyn NP. Isolated plantar midtarsal dislocation. *Am J Emerg Med* ;6:599-601, 1988.
3. Gaddy B, Perry CR. Chopart dislocation: a case report. *J Ortho Trauma* ;7:388-90, 1993.
4. Hosking KV, Hoffman EB. Midtarsal dislocations in children. *J Paediatr Orthop* ;19:592-5, 1999.
5. Milgram JW. Chronic subluxation of the midtarsal joint of the foot: a case report. *Foot Ankle Int* ;23:255-9, 2002.
6. McMinn RMH. *Last's anatomy: regional and applied*. 8th edition. London: Churchill Livingstone; 204-7, 1990.
7. Richter M, Wippermann B, Krettek C, Schrott HE, Hufner T, Therman H. Fractures and fracture dislocations of the midfoot: occurrence, causes and long-term results. *Foot Ankle Int* ;22:392-8, 2001.
8. Richter M, Therman H, Huefner T, Schmidt U, Goesling T, Krettek C. Chopart joint fracture-dislocation: initial open reduction provides better outcome than closed reduction. *Foot Ankle Int* ;25:340-8, 2004
9. Meister K, Demos HA. Fracture dislocation of the tarsal navicular with medial column disruption of the foot. *J Foot Ankle Surg*; Mar-Apr;33(2):135-7, 1994.
10. Johnstone AJ, Maffulli N. Primary fusion of the talonavicular joint after fracture dislocation of the navicular bone. *J Trauma*. Dec;45(6):1100-2, 1998.
11. J.G Kennedy, M.M Maher, M.M Stephens Fracture dislocation of the tarsal navicular bone: a case report and proposed mechanism of injury *Foot and Ankle Surgery* 5 (3), 167-170, 1999.
12. [Richter M](#), [Wippermann B](#), [Krettek C](#), [Schrott HE](#), [Hufner T](#), [Therman H](#). Fractures and fracture dislocations of the midfoot: occurrence, causes and long-term results. [Foot Ankle Int](#). May;22(5):392-8, 2001.
13. A. Pillai D. Chakrabarti and M. Hadidi Lateral swivel dislocation of the talo-navicular joint. *Foot and Ankle Surgery* [Volume 12, Issue 1](#), Pages 39-41, 2006.
14. William M. Ricci, MD, Carlo Bellabarba, MD and Roy Sanders, MD. Transcalcaneal Talonavicular Dislocation. *The Journal of Bone and Joint Surgery (American)* 84:557-561, 2002.