

# Pure Navicular Dislocation: A Case Report

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## Abstract

**Introduction:** Complete dislocation of the tarsal navicular without fracture is an uncommon injury. The rarity of this injury can be attributed to the rigid bony and ligamentous support surrounding the navicular, which usually undergoes fracture and dislocation rather than the pure dislocation of the navicular.

**Case presentation:** This manuscript reports a case with isolated navicular dislocation following a fall and successful treatment via open reduction and fixation with K-wire.

**Conclusion:** Although pure navicular dislocation is uncommon, it should be considered in patients with foot trauma, and treatment decreases complications.

**Keywords:** Navicular dislocation, Midfoot Injury, Reduction.

## Introduction

The navicular is a wedge-shaped bone that articulates with five tarsal bones, including the talus, cuboid, and three cuneiform bones, forming syndesmotic joints. Although the navicular bone is considered small, it is essential in building up the acetabulum pedis<sup>1</sup>. This bone is located in the uppermost portion of the medial longitudinal arch of the foot and hence, plays a significant role in weight bearing during ambulation. It is the keystone for the arch's vertical stress<sup>2</sup>. Complete dislocation of the tarsal navicular, without fracture of the navicular, is an uncommon injury<sup>3</sup>. The rarity of this injury can be attributed to the rigid bony and ligamentous support surrounding the navicular, which usually undergoes fracture and dislocation rather than the pure dislocation of the navicular. Therefore, the mechanism of this injury remains unclear<sup>4</sup>.

## Case presentation

A 34 years-old male patient presented to the emergency department of Baqiyatallah Hospital with an ankle sprain while falling from stairs with medial foot pain and could not stand on his foot. The patient does not suffer from a particular disease based on past medical or surgical history. In clinical examination, he has swelling of the dorsal foot and tenderness on the dorsomedial of the foot. The patient has no ulcer, ecchymosis, or other organ damage. Standard radiography was done from different views, and isolated navicular dislocation could be diagnosed with the help of the data from radiography (Figure 1).

A CT scan was obtained to diagnose further possible injuries, from which the only possible diagnosis was the isolated navicular dislocation (Figure 2).



Figure 1: Preoperative radiograph showing isolated navicular dislocation.



Figure 2: Preoperative computed tomography showing dislocated navicular.

The foot of the patient was splinted. Moreover, the pre-operational procedures were performed. Then the patient was transferred to the surgical operation unit, and closed reduction under spinal anesthesia was performed but unsuccessful. Thus open reduction from the dorsomedial incision was performed (Figure 3), and fixation with k-wire was performed (Figure 4). Lisfranc's injury under fluoroscopy was examined, and the examination was negative, but for confirmation, one screw was inserted to fix Lisfranc. After the operation foot was splinted, and the day after the operation patient was discharged. The patient was ordered to ambulate on his foot with non-weight bearing for six weeks. Two weeks later, the sutures were opened.

Moreover, six weeks later, the pins and splint were removed (Figure 5). After this procedure, the patient did not feel any pain. The patient had some movement impairments, so he received physiotherapy. In the six-month follow-up, he did not have any complaints (Figure 6).



Figure 3: Dorsomedial incision for reduction dislocated navicular.



Figure 4: Postoperative radiograph showing reduced navicular bone and fixation with K-wire.



Figure 5: Radiograph of patient after K-wire removal at 6 weeks.



Figure 6: Clinical photography after six month and excellent outcome.

## Discussion

Tarsal navicular dislocations are rare, attributed to the bone's rigid nature and solid ligamentous support, which usually result in fracture and dislocation rather than pure dislocation<sup>4,5</sup>. A review of the published data revealed only 18 previously reported cases.

Due to the infrequency of presentations, little is known about the precise mechanism of injury. It is believed to involve the application of forces in various directions, indicating a complex mechanism that can be challenging to diagnose and treat appropriately<sup>6</sup>. Mechanism of navicular dislocation has been compared to that of a perilunate dislocation of the hand<sup>7</sup>. According to previous studies, the mechanism of injury leading to tarsal navicular dislocation is thought to be a brutal abduction force with the foot in plantar flexion, as opposed to the medial swivel dislocation that primarily involves the subtalar joint<sup>3</sup>, so most cases of tarsal navicular dislocation have been reported as resulting from a plantar flexion/compressive injury, where the position of the foot and the direction of the applied force determine the direction of the dislocation<sup>5</sup>.

Treatment options for this injury vary and include closed reduction, as well as open reduction and Kirschner wire fixation, and Early anatomical reduction is the primary goal of treatment, achieved through open or closed means, depending on several factors, including the timing of surgery, the presence of fracture fragments, and soft tissue interposition, such as the anterior tibialis tendon so Preservation of the longitudinal arch is necessary for an excellent clinical outcome. Early reduction helps minimize the risk of vascular compromise<sup>2</sup>.

Dislocations with no associated fractures that are stable

after reduction are treated with non-weight-bearing casting for six weeks. On the other hand, unstable dislocations require internal fixation, followed by six weeks of non-weight bearing and assessment for pain after pin removal. A gradual return to regular activity should follow in a stepwise fashion over six weeks. Persistent pain may require a custom-molded orthotic with longitudinal and transverse arch support to help alleviate stress on the navicular<sup>8</sup>.

## Conclusion

Although pure navicular dislocation is not common, it should be considered in patients with foot trauma; Nevertheless, initial treatments decrease the risk of complications such as avascular necrosis, enabling patients to return to activity.

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## Conflict of Interest Disclosures

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## Authors' Contributions

All authors contributed equally in the study.

## Ethical Statement

The authors took informed paper consent from the

patient to present case without identity determination.

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