

# Isolated Segmental Fracture Dislocation of the Tarsal Navicular: A Case Report

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## ABSTRACT

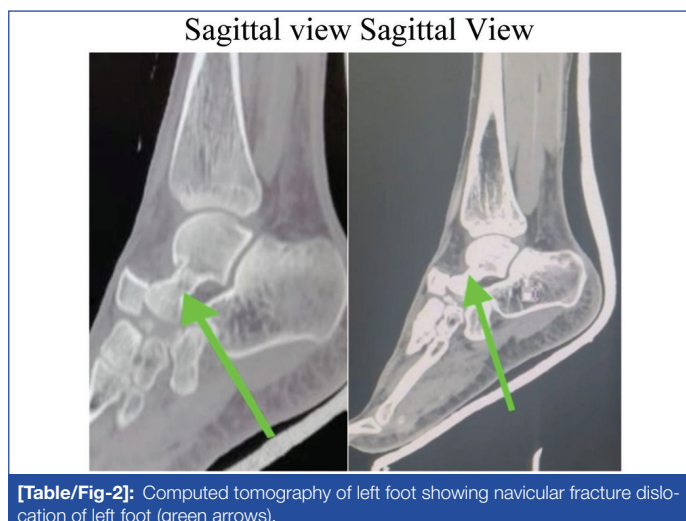
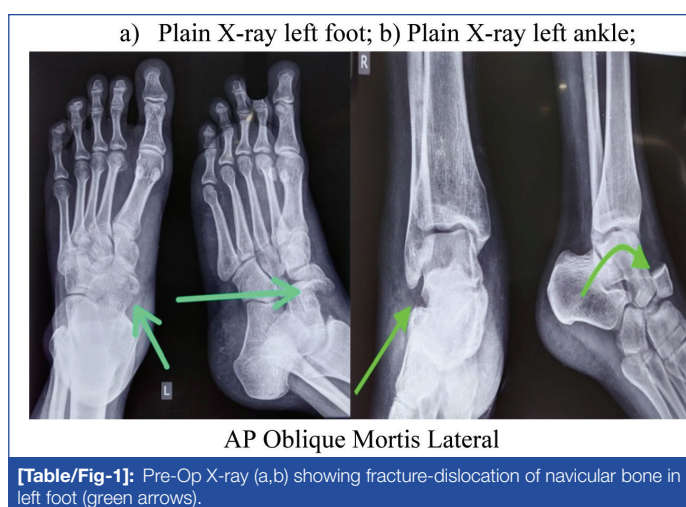
Isolated segmental fracture–dislocation of the tarsal navicular is an exceptionally uncommon midfoot injury due to the bone's rigid anatomy and strong ligamentous support. It typically results from high-energy trauma causing severe abduction force on a plantar-flexed foot. A 31-year-old presented to casualty with pain, deformity, and was unable to weight bear on the left foot after falling from a height of 10 feet. Clinical examination revealed a dorsal-medial bony prominence without neurovascular deficit. Radiographs and Computed Tomography (CT) of the left ankle confirmed an isolated dorsal dislocation of the navicular with segmental fractures at its medial and lateral ends. Attempts at closed reduction failed due to soft-tissue interposition. Open reduction was performed through a dorsomedial approach, revealing rupture and interposition of the talonavicular joint capsule. Due to comminution and instability from fractures on both sides of the navicular, naviculo-cuneiform arthrodesis was performed using a 4 mm cannulated cancellous screw to stabilise the medial column. Postoperatively, the limb was immobilised in a below-knee slab for six weeks of non weight-bearing. Gradual weight-bearing was allowed thereafter. At one-year follow-up, the patient achieved an American Orthopaedics Foot and Ankle Society (AOFAS) midfoot score of 90, with excellent function and no radiographic evidence of avascular necrosis or arthritis. Segmental navicular fracture-dislocation is a serious injury that compromises the medial column of the foot. Early surgical intervention with careful soft-tissue handling can result in excellent functional outcomes and prevent long-term complications.

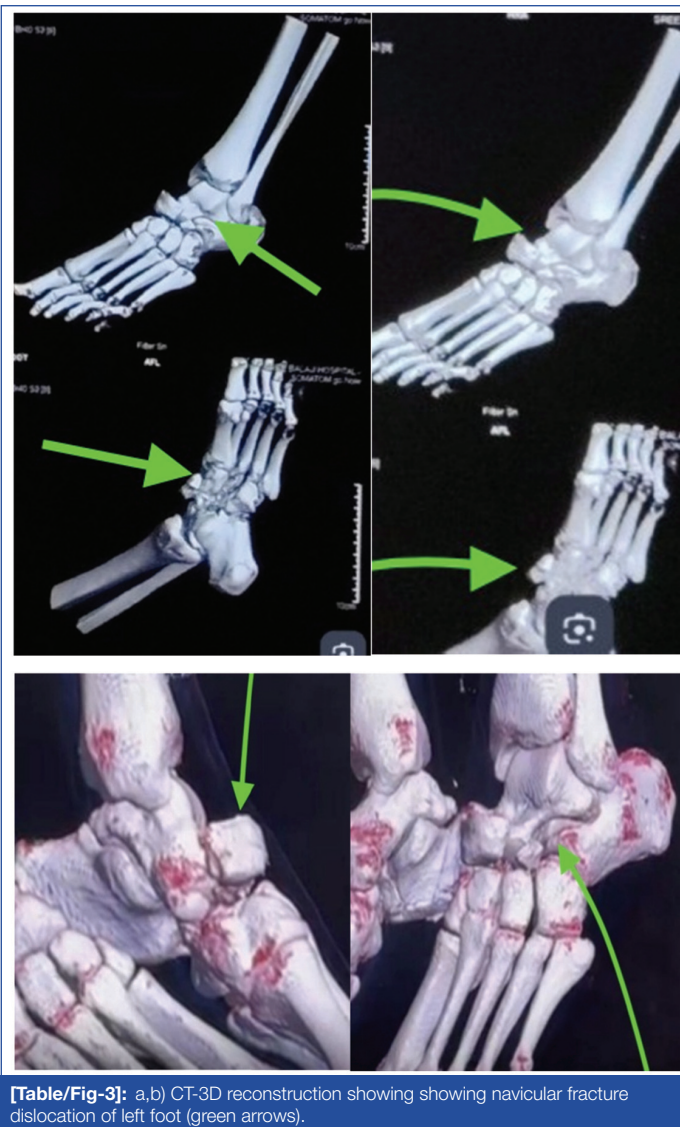
**Keywords:** American orthopaedics foot and ankle society, Knee slab, Midfoot injury, Naviculo-cuneiform arthrodesis

## CASE REPORT

A 31-year-old male painter presented to the emergency medicine department within six hours of injury with severe pain, swelling, and deformity of the left foot following an accidental fall from a height of approximately 10 feet from a building at his workplace. He was unable to bear weight on the affected limb. There was no history of loss of consciousness or associated injuries. Clinical examination revealed a prominent bony swelling over the dorsomedial aspect of the left midfoot. The overlying skin was intact without abrasions or blistering. Distal neurovascular examination was normal. Plain radiographs of the left foot and ankle demonstrated an isolated dorsal dislocation of the talonavicular joint with fractures involving both the medial and lateral ends of the navicular bone [Table/Fig-1a,b]. Computed tomography [Table/Fig-2] with 3D reconstruction [Table/Fig-3a,b] confirmed a segmental fracture pattern of the navicular with medial and lateral fragments, dorsal dislocation of the talonavicular joint, and no associated fractures of the talus, calcaneus, or cuboid [Table/Fig-2,3a,b]. Arterial doppler examination showed normal flow in the dorsalis pedis artery.

An attempt at closed reduction under intravenous sedation was performed within eight hours of injury using longitudinal traction and manipulation, but was unsuccessful due to a mechanical block. After discussion with the patient regarding surgical options, including fixation versus fusion and their implications, informed written consent was obtained. Surgery was performed the following day (approximately 24 hours after injury) under spinal anaesthesia with tourniquet control. A dorsomedial approach to the midfoot was used. The extensor hallucis longus tendon was identified and retracted. Intraoperatively, rupture of the talonavicular joint capsule with capsular interposition within the joint was noted, explaining the failed closed reduction. Segmental fractures of the navicular involving the medial and lateral ends were confirmed, with severe comminution of the medial fragment and inadequate bone stock laterally. Articular cartilage of the navicular fragments was found to be damaged.





**[Table/Fig-3]:** a,b) CT-3D reconstruction showing showing navicular fracture dislocation of left foot (green arrows).

Initial attempts at fracture fixation were unsuccessful due to instability and poor bone quality. Although talonavicular arthrodesis had been considered preoperatively, intraoperative assessment revealed that the talonavicular joint could be reduced and was reasonably preserved once the capsule was cleared. However, persistent instability of the medial column due to segmental navicular comminution necessitated a change in strategy. Therefore, naviculo-cuneiform arthrodesis (navicular–middle cuneiform) was performed using a 4-mm cannulated cancellous screw to restore medial column stability. Fusion stability was confirmed intraoperatively by stressing the midfoot. The tourniquet time was 65 minutes, and estimated blood loss was approximately 120 mL. No drain was used. The wound was closed in layers, and a sterile dressing with a below-knee posterior slab was applied.

Postoperatively, the patient was kept non weight-bearing for six weeks. Wound healing was uneventful. Progressive partial weight-bearing was initiated after six weeks, advancing to full weight-bearing by 10 weeks. Follow-up radiographs at six weeks [Table/Fig-4], six months [Table/Fig-5], and one year [Table/Fig-6] showed maintained alignment and solid fusion without evidence of avascular necrosis or degenerative changes. At one-year follow-up, the patient reported minimal pain only after prolonged walking, relieved by rest. The AOFAS midfoot score was 90, indicating an excellent functional outcome [1].

## DISCUSSION

Isolated injuries of the tarsal navicular are rare due to its central location and strong ligamentous constraints [2-4]. Total navicular dislocations account for less than 2% of all midfoot injuries, and



AP Oblique

**[Table/Fig-4]:** Post-op X-ray of left foot at six weeks follow-up (arrow showing naviculo-cuneiform fusion using 4mm cc screw).



AP Oblique

**[Table/Fig-5]:** Post-op X-ray of left foot at six months follow-up (arrow showing naviculo-cuneiform fusion using 4mm cc screw).



Mortis AP Lateral

**[Table/Fig-6]:** Post-op X-ray of left ankle at one year follow-up (arrow showing Naviculo-cuneiform fusion using 4mm cc screw).

truly isolated injuries are even less common [2,3]. Segmental fractures of the navicular associated with talonavicular dislocation are exceptionally rare, with only sporadic case reports described in the literature [5-7]. These fractures vary from undisplaced navicular fractures associated with medial dislocation of the talonavicular joint to unstable dorsal fracture-dislocations, which require surgical stabilisation. CT is invariably underscored as an important diagnostic tool for determining the configuration of the fracture. Conservative management is recommended for stable fractures,

while unstable fractures are best treated by open reduction and internal stabilisation [5-7].

Midtarsal (Chopart) joint injuries were classified by Main BJ and Jowett RL into longitudinal, compression and swivel types [8]. In swivel injuries, the deforming force disrupts the talonavicular joint while the interosseous talocalcaneal ligament remains intact. Medial swivel injuries result in medial talonavicular dislocation with an intact calcaneocuboid joint [9,10]. The presence of both medial and lateral fracture components in the navicular, producing a segmental fracture pattern, as seen in the index case, is extremely uncommon.

Failure of closed reduction in talonavicular dislocations is often due to interposition of the joint capsule, extensor hallucis longus tendon, or impacted articular fragments [11,12]. In the index patient, capsular interposition was the primary mechanical block. Clinical outcomes in navicular fracture-dislocations vary. Schmid T et al., reported a mean AOFAS midfoot score of 83.8 following open reduction and internal fixation of navicular body fractures [13]. The index patient achieved an AOFAS score of 90 at one year, comparable or superior to reported outcomes, supporting the role of selective arthrodesis in unstable fracture patterns.

## CONCLUSION(S)

Segmental fracture-dislocation of the tarsal navicular is a rare, high-energy injury that threatens medial column stability and foot biomechanics. When closed reduction fails due to soft-tissue interposition and fixation is precluded by comminution, naviculo-cuneiform arthrodesis provides a reliable solution for restoring alignment and function. Early surgical intervention, careful intraoperative assessment, and individualised decision-making can result in excellent functional outcomes.

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