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Delayed Treatment of a Medial Swivel Talonavicular Dislocation

Kyle E. Wamelink, DPM*

Robb Mothershed, DPM*

*Department of Foot and Ankle Orthopedics, Novant Health, Winston-Salem, NC.

Corresponding author: Kyle E. Wamelink, DPM, Novant Health, 3057 Trenwest Drive

Winston-Salem, NC 27103. (E-mail: Kyle.Wamelink@gmail.com)

This case describes delayed treatment of a medial talonavicular dislocation with a shear fracture of the talar head, comminuted posterior talar process fracture, and an intra-articular cuboid fracture with subtle medial displacement of the calcaneocuboid joint and the associated treatment. The injury was sustained in a 35-year-old male following a high-energy motor vehicle accident. Three weeks following the injury, delayed treatment was achieved following an attempted closed reduction under general anesthesia followed by open reduction and percutaneous kirschner wire fixation. After a 12-month follow-up the patient was able to return to work and regular activities pain free without complications. Several associated injuries have been described with isolated talonavicular dislocations. This case reviews the technique and care surrounding this injury pattern and its delayed treatment.
Isolated dislocation of the talonavicular joint is a rare injury caused by severe abduction or adduction of the forefoot and often associated with fractures of the navicular, cuboid, or calcaneus (1). Chopart joint dislocations and fracture-dislocations are rare injuries relative to the foot and ankle. Anatomic reduction can be challenging in Chopart joint fracture-dislocations and open reduction may be necessary. This injury pattern has been termed a ‘swivel dislocation’ and has been described as a subtype pattern of Chopart joint injuries in which a medial force applied to the forefoot disrupts the talonavicular joint but leaves the calcaneocuboid joint intact. The foot rotates medially but does not invert or evert. The interosseous talocalcaneal ligament remains intact, which is the axis of rotation (2).

Dislocations involving Chopart’s joints are uncommon in the foot and ankle. These injuries occur when significant trauma exerts severe abduction or adduction forces to the forefoot (1). In acute medial swivel dislocations of the foot Main and Jowett advocated treatment by prompt reduction and immobilization. They saw no justification for early arthrodeseis, but they advocated an arthrodeseis in the case of persistent symptoms (2, 3). Richter et al (4) recommended primary arthrodeseis to be considered in injuries with severe joint and/or cartilage destruction.

Treatment of Chopart dislocation should be directed in a stepwise fashion with an attempt at closed reduction followed by open reduction if closed reduction fails. Richter found that closed reduction yields good results in a pure dislocation injury. It was found that high
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Functional restrictions in Chopart dislocation can be minimized with initial open reduction, especially in fracture-dislocations. Richter et al (5) also noted in another study that an initial and maintained anatomic reduction with internal fixation or added external fixation was essential for good results. Inal recommend closed reduction of medial swivel dislocation of the talonavicular joint first, with open reduction only after failure of an attempt at closed reduction (6).

Early diagnosis is of greatest importance in prognosis (7). Associated injury with talonavicular dislocations is high, in upwards of 75-90% (8). Konstantinidis et al noted that prolonged immobilization following reduction of a traumatic TN dislocation is also linked to worse outcome (7). Computed tomography is necessary to identify associated fractures. Untreated fractures will result in an equinovarus deformity (6). Swivel type injuries are associated with fewer complications than pure dorsal dislocations due to a lesser degree of ligamentous structure involvement and preservation of plantar ligament integrity. Few attempts should be made at closed reduction of the deformity (9,10).

We describe a case in which a high-energy motor vehicle accident led to a near complete talonavicular dislocation, shear fracture of the talar head, subtle medial subluxation of the cuboid at the calcaneocuboid joint, an associated intra-articular fracture of the cuboid at the tarsometatarsal joint, and calcaneocuboid joint and comminuted fracture of the posterior talar process.
Case Report/Series

A 35-year-old male sustained an injury to his right foot following a motor vehicle accident. The patient described the injury in which an axial force was suddenly applied to the brake pedal with a subsequent abduction of his forefoot. The patient reported immediate pain and swelling across the dorsal medial, lateral, and posterior hindfoot. The patient presented to an urgent care facility and standard non-weightbearing radiographs were obtained revealing a medial dislocation of the talonavicular joint with an associated cuboid fracture and shear fracture of the medial talar head. An attempt at closed reduction was unsuccessful. Surgery was recommended to the patient at the urgent care facility, however he refused. He was placed into a posterior splint and was discharged with crutches. He was referred for prompt follow up with a foot and ankle specialist. The patient subsequently followed up in our office three weeks after his injury and visit to the urgent care facility. On physical exam no neurovascular deficit was noted. There was diffuse edema appreciated to the foot and ankle. Radiographs and computed tomography revealed a complete talonavicular dislocation, shear fracturing of the talar head, subtle medial subluxation at the calcaneocuboid joint with an associated intra-articular fracture of the cuboid, and comminuted fracture of the posterior talar process (Figs 1 through 5).

The patient was taken to the operating room and under general anesthesia. Multiple attempts at closed reduction were unsuccessful. Open reduction was performed through a dorsolateral incision. To aid in reduction, a Steinman pin was placed within the navicular after
making a small medial incision and was used as a joystick. A large Cobb elevator was directed along the lateral talar head into the sinus tarsi toward the medial aspect of the calcaneus to aid in relocation of the talar head dislocation and subluxed calcaneocuboid joint. The reduction maneuver was achieved by initially abducting and distracting the forefoot and by employing the Steinman pin to joystick the navicular. The Cobb elevator was then used to apply controlled pressure on the lateral talar head using the medial floor of the calcaneus as traction to relocate the midtarsal joint. Once adequately reduced, three 0.062 Kirschner wires were directed percutaneously across the talonavicular joint (Figs 6 and 7). Then the talonavicular joint was anatomically aligned the adjacent subluxed calcaneocuboid joint and posterior talar process fracture were noted to be reduced. The cuboid fracture was in good alignment and fixation was not necessary. A short leg cast was applied for six weeks. The patient was non-weight bearing with crutches during this time. At six weeks the anatomic alignment of the talonavicular joint was maintained following removal of the Kirschner wires. At 12 months the patient had returned to work as a carpenter without pain or limitation (Fig 8 and 9).

Discussion

Isolated talonavicular dislocations are rare injury patterns. Based on the literature there are several approaches to treat this type of trauma. Numerous single case reports as well as large case series have been published on this topic. Current case reports and case series on Chopart
and isolated talonavicular dislocations refer to treatment in an acute setting. Our case report
posed a notable challenge to achieve anatomic reduction based on the delayed treatment of
the injury.

An acute complete dislocation of the hindfoot can be better managed immediately.
Surgical timing had a significant effect on the ability to close reduce this particular dislocation.
We do recommend an attempt at closed reduction initially, however there should be a low
threshold to perform an open reduction. Late reduction is difficult due to stiffness and
contraction of the ligamentous and capsular tissues. A staged reconstruction has been utilized
for managing old Lisfranc injuries by gradually distracting the soft tissues and tarsal bones with
an external fixator (11). This strategy requires longer treatment, however extensive soft tissue
stripping at the time of surgery is avoided; nerves and blood vessels can also be protected.
External fixation was not necessary for our case; however, it was considered pre-operatively.

Arthrodesis is an important treatment option for missed or untreated Lisfranc injuries
with advanced arthritis or a fixed deformity. In terms of reducing the risk of recurrent
subluxation and progressive arthritis, arthrodesis may also be a better choice than joint
realignment (12). Arthrodesis allows for joint reduction and can prevent pain from post-
traumatic arthritis, however adjacent joint arthritis will likely succeed following arthrodesis of a
major hindfoot joint. In our particular case joint realignment was favored due to the patients
young age, active lifestyle and occupation as a carpenter.
Once the decision has been made to perform an open reduction a two incisional approach allows accessibility to the medial and lateral anatomy to aid in reduction of the dislocated talonavicular joint (13). Additionally, this also allows for inspection of the calcaneocuboid joint if joint reduction or fracture fixation is required. The anterior medial approach was utilized for delivery of a Steinmann pin and joy sticking of the navicular to aid in reduction. This incision will facilitate placement of fixation; however, this can be accomplished percutaneously. The anterior lateral approach provides exposure of the extensor retinaculum as well access to the floor of the sinus tarsi to gain traction and swivel the talar head from a lateral to medial direction. In our case this was accomplished using a large Cobb.

We found unique challenges related to the delayed treatment of a complete talonavicular dislocation. There should be a low threshold to for open reduction of a chronic talonavicular dislocation to achieve anatomic reduction. We do advocate a dorsal medial and dorsal lateral incision approach to aid in reduction and realignment of the joint. We were able to obtain a positive result with open reduction and percutaneous fixation, however a consideration should be made for primary arthrodesis if severe joint destruction has occurred. This case was reported due to the considerations surrounding the treatment of a chronic talonavicular dislocation opposed to the traditional treatment of acute injuries.
Financial Disclosure: None reported.

Conflict of Interest: None reported.

References


Figure 1 – lateral radiograph TN dislocation figure
Figure 2 – Anterior-posterior radiograph TN dislocation figure
Figure 3 – CT posterior talar process fracture
Figure 4 – CT cuboid fracture
Figure 5 – CT CC dislocation figure
Figure 6 – lateral radiograph TN reduced Kirschner wire fixation
Figure 7 – anteriorposterior radiograph TN reduced with Kirschner wire fixation
Figure 8 – lateral radiograph post Kirschner wire removal
Figure 9 – anteroposterior radiograph Kirschner wire removed