

Fracture-dislocation of the tarsal navicular in a soccer player

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We describe an unusual injury of the mid-tarsal region in a soccer goalkeeper. The injury occurred in a training game as a result of an abduction-plantar-flexion. Radiographs showed a fracture-dislocation of the tarsal navicular. The patient was treated by closed reduction with percutaneous

fixation using two Kirschner wires. The end-result was satisfactory but the patient felt pain in the mid-foot during and after sports activities and was unable to continue playing as a goalkeeper.

Mid-tarsal injuries are usually the result of multidirectional forces (Main & Jowett, 1975). An isolated fracture and dislocation of the tarsal navicular is a rare injury (Drummond & Hastings, 1969). Moreover, isolated dislocations without a fracture of the body of the tarsal navicular are extremely rare (Vaishya & Patrick, 1991).

A review of the literature from 1920 onwards produced only 12 cases of either a total or an isolated dislocation of the navicular bone (Dhillon & Nagi, 1999). Until recently, no reports of a soccer player with a dislocation of the tarsal navicular or of the tarso-navicular joint have been found in the literature. We describe a case of a 25-year-old-soccer goalkeeper with a tarsal navicular fracture-dislocation.

Case report

During a normal training the goalkeeper jumped to catch a cross and during landing his right foot twisted, probably in plantarflexion and abduction. The ground was uneven in front of the goal.

In the right mid-foot, a tender bony prominence was present on the dorsomedial side. The ankle joint was normal. Radiographs showed a dislocation of the tarsal navicular with a fracture of the distal medial corner of the talus and the inferior distal part of the tarsal navicular (fig. 1(a,b)). The medial part of the dislocated tarsal navicular was dorsally located.

Within two hours, a closed manipulation reduced the tarsal navicular and the reduction was maintained by two Kirschner wires (fig. 2(a, b)). After reduction, the right mid-foot and the ankle were immobilized using an

elastic bandage. Partial weight bearing was allowed after four weeks. The Kirschner wires were removed after four weeks. Full weight bearing was allowed after eight weeks.

The patient resumed sports activities gradually and returned to play as goalkeeper after 12 weeks. He received a tailor made plantar mid-foot orthosis and was able to play as a goalkeeper on the second highest competition during the remaining season. He complained about foot stiffness, but without disturbing pain. Radiographs showed degenerative changes in the talo-navicular joint (figs 3 (a,b) and 4).

Later, the patient complained of an increasing pain, and a MR imaging examination was performed 10 months after the injury. The examination revealed a bone marrow edema, indicating avascular necrosis of the bone. Further, an inhomogeneous area was noticed in the medial part of the tarsal navicular. In addition, a secondary osteoarthritis was noticed in the talo-navicular joint (fig. 5 (a,b)).

Because of the suspicion of avascular necrosis, all sports activities were forbidden. The patient accepted this decision. Five months later a new MR imaging was performed. The findings were less pronounced than five months earlier. There was only a slight bone marrow edema and no sign of sclerotic changes at the T1 and T2-weighted images. However, osteoarthritis was found in the talo-navicular and talo-cuneiforme joints.

Two years after the injury, the symptoms were unchanged. The patient still had periodical pain in the foot. As a result, the patient has been forced to give up sports.

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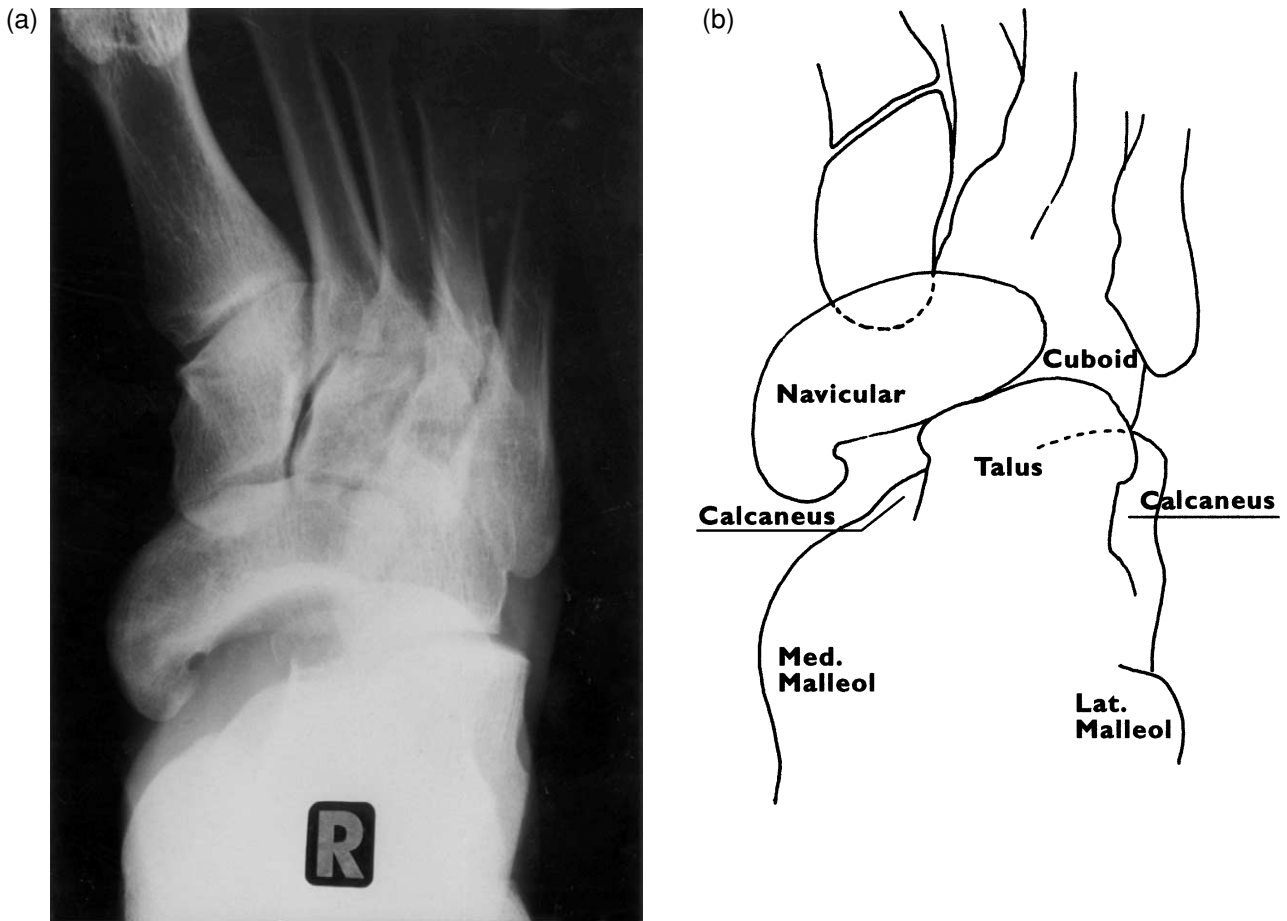


Fig. 1. (a) AP view of the foot demonstrates a fracture-dislocation of the tarsal navicular. (b) Schematic drawing of the radiography.

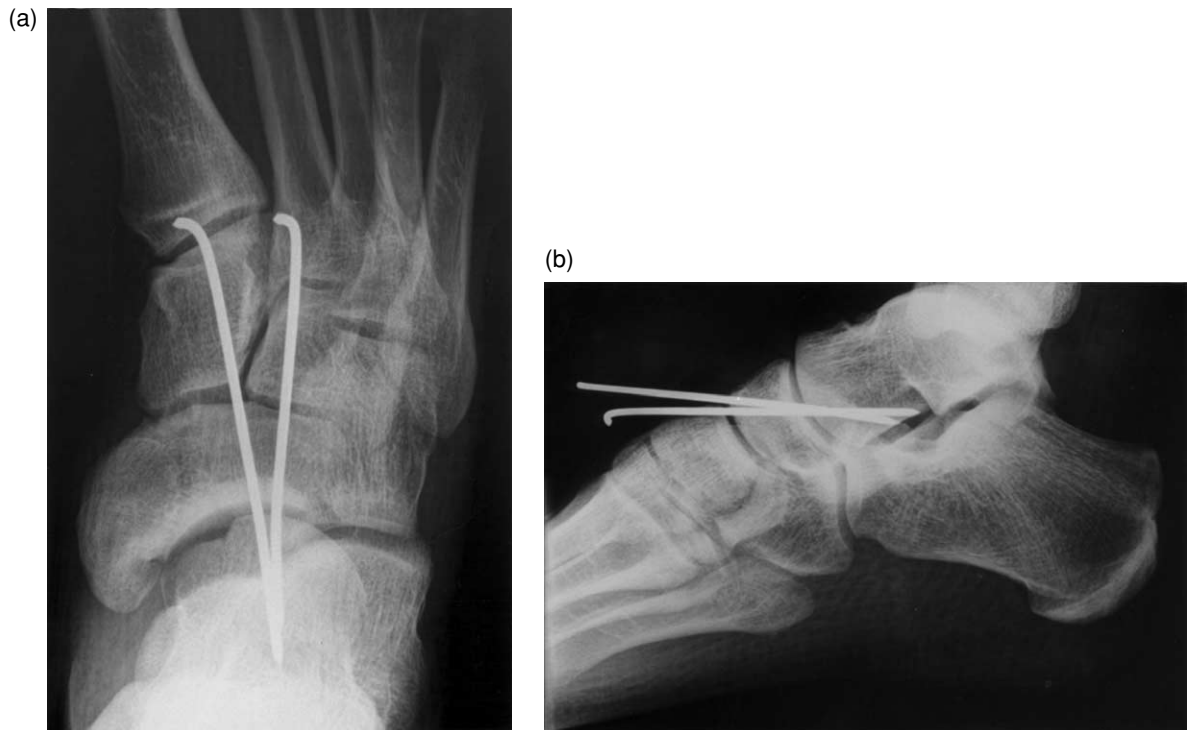


Fig 2. (a) and (b) AP and lateral views of the postoperative situation.



Fig. 3. (a) and (b) AP and oblique views of the foot 9 months after the injury.



Fig. 4. Standing lateral radiograph of both feet 9 months after the injury.

Discussion

Dislocation involving the hind-foot and mid-foot occur most frequently in the tarso-metatarsal (Lisfranc) and/or the subtalar joint (Rogers & Campbell, 1978).

Isolated dislocations of the tarsal bones are rare, and they most frequently involve the talus, producing a high incidence of subsequent aseptic necrosis (Bonnin, 1940; Pinzur & Meyer, 1978). The most frequent dislocations involving the tarsal navicular include the subtalar dislocation that involves the talo-navicular and talo-calcaneal joints, and the Chopart dislocation that involves the talo-navicular and calcaneo-cuboid joints (Pathria, Rosenstein, Bjorkengren, Gershuni, Resnick, 1988). Additionally, isolated disruption of the talo-navicular joint without subtalar dislocation or injury to the calcaneo-cuboid joint is a rare phenomenon (Meister & Demos, 1994). Dislocations and especially fracture-dislocations of the Chopart and Lisfranc joints are mostly seen as high-energy injuries, and in 50% of the cases they occur in traffic accidents (Randt, Schikore, Dahlen, Zwipp, 1998). In multiple traumatized patients this kind of injury can be missed (Randt et al., 1998).

According to Dhillon and Nagi (1999), an isolated dislocation of the tarsal navicular is impossible without a complete or transitory mid-tarsal dislocation or subluxation. The dislocation involves extensive disruption of both the dorsal and plantar ligaments attached to the navicular, as well as the capsular structures (Dhillon & Nagi, 1999). It has also been stated that an isolated dorsal dislocation of the tarsal navicular without fracture would be impossible (Freund, 1989).

Symptomatic osteoarthritis frequently follows mid-foot fractures and fracture-dislocations (Chen, 1995). According to Hesp et al. (1984), intra-articular fractures in the tarso-metatarsal joints resulted in

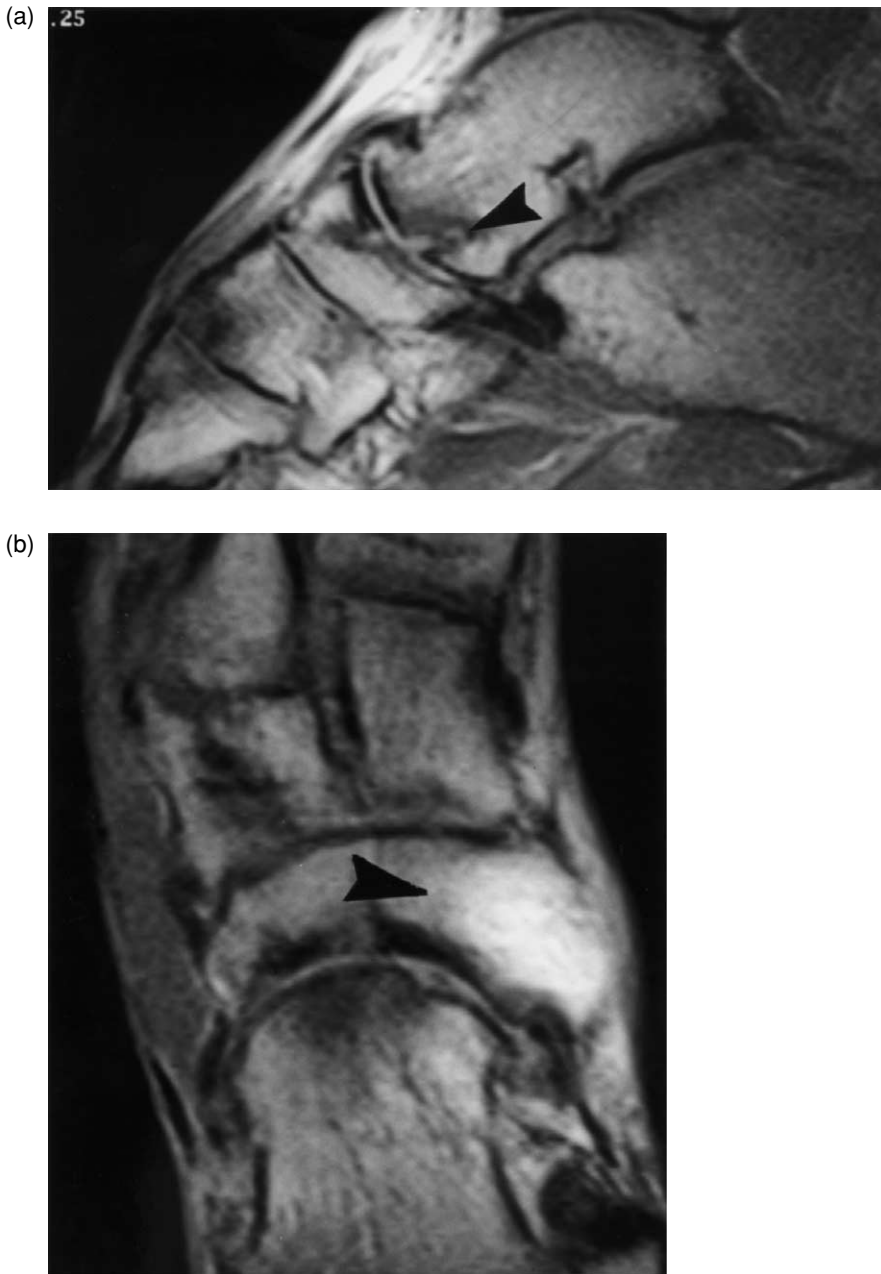


Fig. 5. (a) MR imaging of the foot 10 months after the injury. Note the increased subchondral sclerosis (arrow). (b) Bone marrow edema (arrow) 10 months after the injury.

osteoarthritis in all cases. Mid-foot injuries are also commonly associated with mid-foot collapse (Chen, 1995). Mid-foot fracture in soccer, however, is rare. In a prospective study of injuries in male soccer players among 12 teams in 1993 in Finland, 317 injuries occurred in 170 players (Lüthje et al., 1996). Of the injuries, only two were mid-foot fractures (Lüthje et al., 1996; unpublished data).

Perspectives

A mid-foot injury in soccer can vary between a sprain, a fracture, or a dislocation. The inability of the player to return to the playing field may be the first indication

of a more severe injury than initially understood by the player or the examiner. Standard plain radiographies (three views) are necessary for correct diagnosis. Weight-bearing views can sometimes be helpful in differentiating between a sprain and a complete ligamentous disruption. MR imaging or CT scanning may also be necessary in the diagnosis.

This case report shows that a very rare injury is possible in soccer. In severe mid-foot injuries a careful follow-up is necessary to minimize the early and late complications.

Key words: Fracture-dislocation; tarsal navicular; soccer.

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