FRACTURE DISLOCATION OF THE TARSAL NAVICULAR

J. P. SIMON, I. VAN DELM, G. FABRY

A closed fracture-dislocation of the tarsal navicular is presented. Open reduction and internal fixation are mandatory in order to restore the keystone function of the navicular to the longitudinal arch of the foot.

Keywords : fracture-dislocation ; tarsal navicular.
Mots-clés : fracture-luxation ; scaphoïde tarsien.

CASE REPORT

A 20 year-old man was seen 10 days after an injury to his left foot, sustained as the result of jumping down from a 2-m high wall during a military exercise. He recalled that, while landing, his right foot was caught in a pit with his toes pointing downwards. On admission, the foot was held in slight inversion and plantar flexion. No neurovascular deficit was noted. The skin was in good condition.

Roentgenographic examination (fig. 1a, b) revealed a central fracture of the navicular with dorsolateral displacement of the lateral half of the bone. Open reduction and internal fixation were performed through an 8-cm incision parallel to the lateral margin of the anterior tibial tendon and centred over the talonavicular joint. The lateral fragment was displaced dorsolaterally. The larger medial fragment was displaced medially and distally and was trapped under the neck of the talus making the reduction difficult. Finally, a smaller triangular plantar fragment reduced spontaneously once the two major fragments were in place. Avulsion of the dorsal cuneiform-navicular ligaments from their navicular attachment was also found.

The articular cartilage of the talus showed minimal scoring at the contact area with the fracture margin of the lateral fragment. The two major fragments could be anatomically fixed with a 3.5-mm AO cancellous bone screw. The talonavicular joint proved to be unstable. A smooth Kirschner wire was therefore passed obliquely through the second cuneiform, the dorsal fragment of the navicular, and the head of the talus (fig. 2a, b). After wound closure, a padded backslab was applied to immobilize the foot and ankle in neutral position. After a week the cast was taken off three times a day to allow ankle and foot exercises. The Kirschner wire was removed at the end of 4 weeks and a below-the-knee cast was applied at that stage. Partial weight bearing was then permitted for another 2 weeks. Immobilization was continued for a total of 6 weeks. The patient's activities returned to normal during the next 6 weeks.

Five months after the injury pronation of the foot was normal, but supination of the fore part of the foot was limited to half the range of the normal foot.

DISCUSSION

Fractures of the body of the navicular are usually ascribed to forced plantar flexion and most often occur without ligamentous injury (1). A vertical fracture dislocation of the navicular bone however is an unusual injury (1, 2, 3, 4).

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Fig. 1a

Fig. 1b

Fig. 1a, b. — Fracture-dislocation of the navicular with the talar head forced against the cuneiform bones.

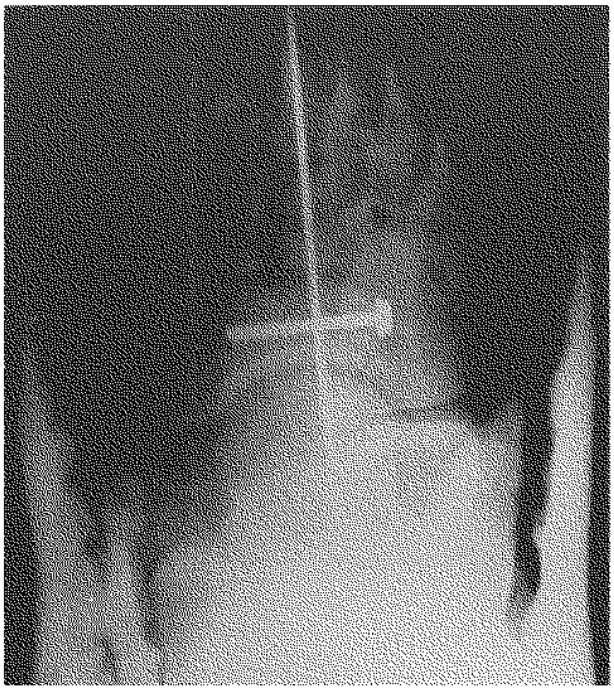

Fig. 2a

Fig. 2b

Fig. 2a, b. — Postoperative x ray after open reduction of the fracture and fixation with a 3.5-mm lag screw. A K-wire stabilizes the talonavicular joint.

The history of the accident, the type of fracture-dislocation, and the operative findings suggest that the mechanism of the injury is a forcible plantar flexion (1, 3). A longitudinal force transmitted along the metatarsal rays compresses the navicular between the cuneiforms and the head of the talus, causing a shear force in line with the intercuneiform joints. The naviculocuneiform ligaments tear, and the force along the lateral rays tends to crush the lateral fragment of the navicular while the remaining major fragment is extruded medially (3). This type of injury disrupts the normal arch of the foot. Open reduction and anatomical fixation of this fracture-dislocation is mandatory, since the tarsal navicular is the keystone of the medial longitudinal arch of the foot.

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SAMENVATTING

J. P. SIMON, I. VAN DELM, G. FABRY. Fractuur-luxatie van het os naviculare tarsi.

Een gesloten fractuur-luxatie van het os naviculare tarsi wordt beschreven. Open reductie en anatomische fixatie is noodzakelijk voor het herstel van de normale voetboog.

RÉSUMÉ

J. P. SIMON, I. VAN DELM, G. FABRY. Fracture-luxation du scaphoïde tarsien.

Une fracture-luxation fermée du scaphoïde tarsien est décrite. Une réduction sanglante et une fixation en position anatomique furent nécessaires à la restauration d'une arche plantaire normale.