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Irreducible Dislocation of the Metatarsophalangeal Joints of the Foot: A Case Report

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A case report describes a 21 year-old male who jumped off a roof and sustained a fracture dislocation of the talonavicular joint and associated lesser metatarsophalangeal joint (MPJ) dislocations. Attempts at closed reduction of the lesser MPJ dislocations were unsuccessful. Open reduction was performed and stabilized with k-wire fixation. This case illustrates the difficulty in attempting closed reduction of multiple lesser MPJ dislocation. The anatomical mechanism of injury and structures as they play a role in preventing successful closed reduction is reviewed.

Key words: Lesser metatarsophalangeal joint dislocations, MPJ dislocations

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Dislocation of metatarsophalangeal joints of the lesser toes is a rare injury. This article describes a case of unreduced second and third metatarsophalangeal joint dislocations. This case illustrates the difficulty of closed reduction and diagnosis in the presence multiple foot injuries. Only few cases of lesser metatarsophalangeal joint dislocations been reported in the literature.[1,2]

Case Report

A 21 year-old male jumped off the roof and landed on his feet. He presented with a fracture dislocation of the talus of the left foot. (Fig.1) There is also an apparent dislocation of the great toe in the right foot. The great toe was reduced in the emergency department. He was then taken to the operating theatre to reduce and stabilize the talar dislocation.

After fixation of the left ankle, it was revealed that the right second and third toes were slightly deformed and swollen. The head of the second and third metatarsal bones were felt along the ball of the foot. A radiograph confirmed a frank dislocation of second and third metatarsophalangeal joints with dorsal displacement of the phalanx. (Figs. 2AB)

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Figure 1 Left foot injury with Talar dislocation and talar head fracture.

Closed reduction was initially attempted by hyperextending the phalanges and by applying pressure against the bases of phalanges. Multiple attempts at closed reduction failed.

The metatarsophalangeal joints were exposed by making a dorsal longitudinal incision between the third and fourth metatarsals. The extensor tendon was retracted and the anterior capsule was opened. The fibrocartilaginous plantar plate was found to be lying between the metatarsal head and base of proximal phalanges. The flexor digitorum longus and flexor digitorum brevis tendons were found along the lateral side of the metatarsal neck and the lumbrical tendon was found along the medial side of metatarsal. An attempt at closed reduction was unsuccessful. The fibrocartilaginous plate on the plantar surface and the deep transverse metatarsal ligament on the dorsal surface of the neck of the metatarsal were divided.

Flexor tendons were retracted laterally and lumbrical tendons were retracted medially with the bone lever. The metatarsal head reduced with ease and the reduction was stabilized with transarticular K wires. (Figs. 3AB)

Figures 2AB Anteroposterior X-rays of the right foot showing dislocation of second and third metatarsophalangeal joints.

The foot was then placed in a short leg cast. Soon after the swelling had subsided, a walking heel was added and the patient was discharged encouraged to fully weight bear. The cast was removed in 6 weeks.

The patient was asymptomatic and able to dorsiflex the toes without pain. The patient was last seen 11 months postoperatively when full range of motion was restored.

Figures 3AB Anteroposterior and oblique views of the right foot showing maintenance of reduction of the second and third metatarsophanalgeal joints.

Discussion

The metatarsophalangeal articulations are of the condyloid joint. The plantar ligaments are thick, *dense*, fibrous structures known as the plantar plate. The plantar plate lies on the plantar surfaces of the joints in the intervals between the collateral ligaments, to which they are connected; they are loosely united to the metatarsal bones, but very firmly to the bases of the first phalanges.[3]

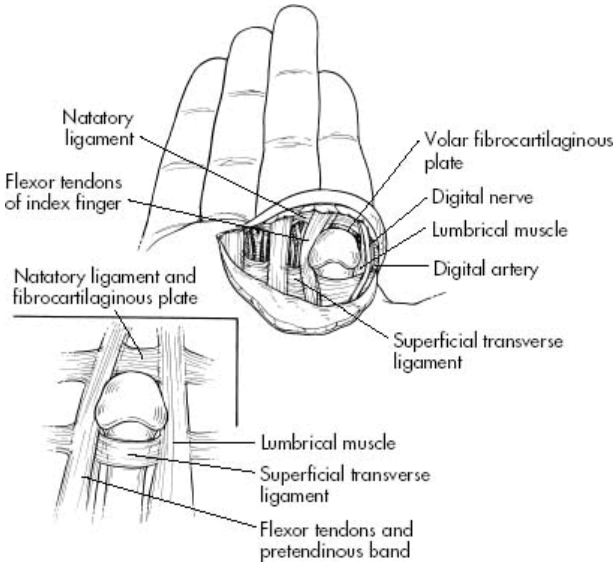

Figure 4 MCP dislocation of the hand [Kaplan]. Metacarpophalangeal dislocations [Kaplan] occur most often in the index finger.

Forcible dorsiflexion of the proximal phalanx over the metatarsal head is the most common mechanism of injury[1]. The metatarsal head is forced through the plantar plate. The proximal phalanx comes to lie dorsally. The metatarsal head is trapped between the flexor digitorum longus and the flexor digitorum brevis tendons laterally and lumbrical tendons medially. The configuration of structures including the fibrocartilaginous plate on the plantar surface and the dorsal capsule and deep transverse metatarsal ligament on the dorsal surface form a noose around the metatarsal head on dislocation. This situation is somewhat similar to that encountered in the irreducible dislocation of the metacarpophalangeal joint of the finger.[4] (Fig.4)

The configuration of structures around the metatarsal head makes closed reduction of the dislocation virtually impossible. The fibrocartilaginous plate and deep transverse metatarsal ligament and dorsal capsule have to be divided to facilitate the reduction of dislocation.

This dislocation is easy to miss as the deformity may be subtle and patient may have significant other injuries. The patient may complain of less pain from the dislocation in the presence of other injuries[2]. Careful radiological assessment and appropriate treatment is required.

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