



Variant of Lisfranc injury: Floating second metatarsal, a rare isolated injury

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A 35 year old man presented to our emergency department after a traffic injury. Radiographic evaluation showed plantar dislocation of the second metatarsophalangeal joint and dorsal dislocation at the second tarsometatarsal joint. Under general anesthesia, closed reduction of the metatarsophalangeal joint was performed, followed by percutaneous fixation with a Kirschner-wire, and immobilization in a plaster cast for 6 weeks. Isolated bipolar dislocation of the second metatarsal that did not correspond to any previously reported injury of the foot, is a variant of the Lisfranc. The foot should be carefully examined considering associated injuries, as isolated dislocation is extremely rare.

Key words: tarsometatarsal, metatarsophalangeal, dislocation

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Floating metatarsal is a unique and rare injury in which the first metatarsal is dislocated both proximally and distally. Concomitant dorsal dislocation was first described by Leibner, et al., in 1997 and was referred to as the “floating metatarsal” [1]. Lisfranc joint injuries should be considered in every patient involved in a motor vehicle accident and retrospective studies have shown that these injuries are missed in up to 20% of cases on initial evaluation [2]. We report on an unusual case of an isolated floating second metatarsal in a young man. To the best of our knowledge, this injury has not been previously reported in the literature.

Case report

A 35 year-old man presented to our emergency department after a traffic injury to his right foot. Physical examination revealed no significant findings except for severe pain, tenderness, and swelling in the right foot. Radiographic evaluation showed plantar dislocation of the second metatarsophalangeal joint (Figure 1) and dorsal dislocation at second tarsometatarsal joint. After counseling the patient, general anesthesia was induced and closed reduction of the tarsometatarsal joint was performed, followed by reduction of the metatarsophalangeal joint. Percutaneous fixation of the tarsometatarsal joint with a Kirschner-wire was then performed and immobilized in plaster cast for 6 weeks.

Post-operative radiographs confirmed the successful reduction of the metatarsophalangeal joint (Figure 2). Six weeks later the Kirschner-wire and plaster cast were removed, the patient was allowed full weight bearing, and foot exercises were advised. There were no complaints or complications after a follow-up of 3 years duration. Isolated floating metatarsal injury is extremely rare and unstable injury requiring immediate reduction, fixation, and immobilization.

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Figure 1 Preoperative anteroposterior and oblique view.

Discussion

The tarsometatarsal joint is inherently stable. The base of the second metatarsal is the keystone of the Lisfranc complex, being inset so that the medial and lateral cuneiform bones provide support on either side of the base of the second metatarsal, locking it in place [1]. The other four metatarsals have relatively little bony support. The dorsal ligaments and capsule are relatively weak compared to the strong plantar ligaments, making dorsal dislocation more common [2]. Simultaneous dislocation of the tarsometatarsal and metatarsophalangeal joints in a single ray is extremely rare, and to the best of our knowledge, only seven cases have been previously reported [3]. Derangement of the Lisfranc joints usually occurs by one of the three mechanisms: (i) twisting with forced abduction of the forefoot causing lateral displacement of the metatarsal; (ii) axial loading with the toes dorsiflexed and the ankle in equinus; and (iii) crush injuries in which the force is applied on the dorsum of the metatarsal causing plantar displacement [4]. Associated injuries occur in 32–68% of Lisfranc joint fractures and dislocations and essentially any bone of the foot or ankle may be involved [5]. The diagnosis of metatarsophalangeal joint dislocation can be made easily with good quality radiographs, but it can be quite easily missed with either over penetration of the film or poor quality films.



Figure 2 Postoperative anteroposterior and oblique view.

The anteroposterior view may show only subtle widening of the joint and the lateral view can be misleading due to overlapping of the metatarsal heads [6]. When undertaking reduction of a floating metatarsal, it is important to evaluate the tension on the plantar fascia. In the case of dorsal dislocation, MTP joint reduction should be done first to alleviate the tension on the plantar fascia [7]. Similarly, in the case of concomitant plantar dislocation, reduction of the proximal side should precede the reduction of the MTP joint [4].

Conclusion

We have reported a case of an isolated bipolar dislocation of the second metatarsal that did not correspond to any previously reported injury of the foot, a variant of the Lisfranc injury. Feet should be carefully examined considering associated injuries, as an isolated dislocation is extremely rare.

Clinical message

All feet injuries should be examined thoroughly as isolated injuries are very rare, irrespective of mechanism and intensity.

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