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Visual Journal of Emergency Medicine

journal homepage: www.elsevier.com/locate/visj

Visual Case Discussion

A tarsometatarsal fracture-dislocation; also known as Lisfranc injury

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ARTICLE INFO

Keywords:

Lisfranc injury

Tarsometatarsal fracture-dislocation

Emergency department

A 74-year old obese woman presented to the emergency department (ED) after she missed the last step of the stairs and fell down on her right foot. After the fall, she was unable to bare weight on her right foot. Physical examination showed a severe swelling of the midfoot and local tenderness at the basis of the first to the fifth metatarsal bone. In addition, there was also swelling and local tenderness on the medial side of the foot located at the navicular and medial cuneiform bone. There was no tenderness or swelling around the ankle-joint, no plantar ecchymosis and the neurovascular status was normal. An x-ray of the right foot was obtained and showed a lateral subluxation of the first and second metatarsal bone suggestive for a tarsometatarsal fracture-dislocation or Lisfranc injury¹ (Fig. 1). An additional CT-scan was performed and confirmed the diagnosis Lisfranc injury with multiple additional avulsion fractures at the basis of the first to the fourth metatarsal bone and fractures of the medial, intermediate and lateral cuneiform bone and cuboid bone. Because of the tension on the soft tissues, a closed reduction of the fracture was performed at the ED (Fig. 2). A delayed surgical reduction and screw fixation was performed ten days later (Fig. 3).

Lisfranc injuries are rare and approximately 58% are associated with high energy accidents with a direct force on the dorsum of the foot. However, low energy injuries, as described in this case, can also cause this type of severe injury. In particular due to a hyperplantar flexion trauma of the forefoot through an axial load. As a consequence, unfortunately, up to 20% of the Lisfranc injuries are misdiagnosed at the ED as the injury is mistaken for a simple sprain. Resulting in long-term malalignment and severe functional impairment.¹

In general, treatment consist of a non-weight bearing cast for stable fractures and an open reduction and internal fixation (ORIF) or primary arthrodesis (PA) for unstable fractures. Though, current literature is inconclusive which of the two surgical options produces best outcomes.^{2,3}

After open reduction and screw fixation by a dorsal approach, our patient was treated with an immobilization cast for a period of 10 weeks of which the first 6 week without weight bearing.

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<https://doi.org/10.1016/j.visj.2019.100674>

Received 28 August 2019; Accepted 7 October 2019

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Fig. 1. X-ray of the right foot.



Fig. 2. X-ray of the right foot in cast after closed reduction at the ED.

Questions

- 1 What is the location of the Lisfranc ligament?
 - a Between the base of metatarsal I and II
 - b Between the medial cuneiform bone and the base of metatarsal I
 - c Between the medial cuneiform bone and the base of metatarsal II
- 2 A Lisfranc injury is not associated with?
 - a High energy accidents
 - b A direct force on the dorsum of the foot
 - c A hyperplantar flexion trauma of the ankle-joint
- 3 Jacques Lisfranc Saint-Martin (1790-1847) was a French Napoleonic surgeon who is most famous for his surgery at the tarsometatarsal level, now known as “Lisfranc-joint”. What kind of surgery did he perform?
 - a A reconstruction of the Lisfranc ligament

- b A midfoot amputation at the tarsometatarsal level
- c An open reduction of a tarsometatarsal fracture-dislocation

Answers

- 1 Between the medial cuneiform bone and the base of metatarsal II. Explanation: It's the ligament between the medial cuneiform bone and the base of metatarsal II.
- 2 A hyperplantar flexion trauma of the ankle. Explanation: It is caused by a hyperplantar flexion trauma of the forefoot instead of the ankle-joint.
- 3 A midfoot amputation at the tarsometatarsal level. Explanation: Jacques Lisfranc Saint-Martin performed a midfoot amputation at the tarsometatarsal level as a way of treating gangrenous and frostbitten feet during the Napoleonic wars.



Fig. 3. X-ray of the right foot after open reduction and screw fixation.

Supplementary materials

Supplementary material associated with this article can be found, in the online version, at [doi:10.1016/j.visj.2019.100674](https://doi.org/10.1016/j.visj.2019.100674).

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