Chapter 194  Lisfranc Injuries

Hany El-Rashidy and Anand Vora

ICD-9 CODE
838.03  Lisfranc (Tarsometatarsal) Fracture-Dislocation

Key Concepts

- The Lisfranc joint represents the junction between the midfoot and forefoot.
- Three metatarsal-cuneiform articulations (first, second, and third tarsometatarsal joints) and two metatarsal-cuboid articulations (fourth and fifth tarsometatarsal joints) (Fig. 194-1).
- Proper alignment and stability of these joints are essential for normal foot function.
- The Lisfranc joint is very stable because of its bony anatomy and strong ligamentous attachments. The base of the second metatarsal (“keystone”) is recessed and locks between the medial and lateral cuneiforms. Plantar ligaments are stronger than dorsal ligaments.
- The Lisfranc ligament is the strongest ligament and runs from the base of the second metatarsal to the medial cuneiform.
- Injuries to this joint range from mild sprains to widely displaced, unstable, debilitating injuries.
- Injuries can be bony, ligamentous, or a combination.
- As many as 20% of Lisfranc injuries initially go unrecognized. When suspected, weight bearing and/or stress radiographs are critical.
- Injuries to the tarsometatarsal joints require early accurate diagnosis with prompt anatomic reduction and internal fixation for optimal results. Severe long-term morbidity may occur if not properly treated at initial presentation.

History

- Mild to severe pain in the midfoot at rest and with weight bearing; may be unable to bear weight
- Acute injury; may be direct or indirect (Fig. 194-2)
  - Direct: crush injury
  - Indirect (more common): axial load in fixed planted foot (football, missed step off curb, landing dance jump) or twisting injury with forceful abduction of forefoot on midfoot (MVC)
- Any traumatic mechanism with significant midfoot pain should raise suspicion of a possible Lisfranc injury.

Physical Examination

- Observation
  - Abrasions, lacerations
  - Bruising (especially medial plantar surface of the foot)
  - Swelling around dorsal midfoot
  - Loss of normal arch or midfoot contour with weight bearing
- Palpation
  - Pain with palpation or manipulation of the tarsometatarsal joints
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- Range of motion
  - Passive dorsiflexion and plantarflexion of metatarsals elicits pain.
- Special tests
  - Pain at midfoot with attempted single leg heel rise suggests a Lisfranc injury.
  - Careful neurovascular examination emphasizing sensation and perfusion is essential. Lisfranc dislocation can be associated with impingement or laceration of a branch of the dorsalis pedis artery or the deep peroneal nerve, both of which cross dorsally between the base of the first and second metatarsals.
  - Severe swelling, especially in high-energy mechanisms, should alert the physician to possible compartment syndrome of the foot.

Imaging

- Radiographs: anteroposterior, lateral, and oblique views of the foot (Fig. 194-3).
  - Should be weight bearing if possible to load the ligaments and test their integrity. If not possible, obtain stress views.
  - Anteroposterior view: The medial border of the second metatarsal should align with the medial border of the middle cuneiform.
  - Oblique view: The medial border of the fourth metatarsal should align with the medial border of the cuboid.
  - Lateral view: The superior border of the metatarsal base should align with the superior border of the medial cuneiform.

Figure 194-2 Common mechanisms of injury. Axial load in a planted foot (1), MVC trauma (2), direct crush injury (3).

Figure 194-3 Normal bony relationships as would appear on anteroposterior (AP) and oblique radiographs. The second metatarsal should align with the medial border of the middle cuneiform on the AP view and the medial border of the fourth metatarsal should align with the cuboid on the oblique view.
Disruption of any these defined relationships is indicative of a Lisfranc injury (Fig. 194-4).
- Stress views help reveal displacement in subtle cases with spontaneous reduction (Fig. 194-5). Ankle block or sedation may be required.
- Computed tomography
  - Better for discerning minor displacement, associated fractures, comminution, and dislocations
- Magnetic resonance imaging
  - To assess soft-tissue damage

**Additional Tests**
- Compartment pressure monitoring in selected cases

**Differential Diagnosis**
- Tarsal, metatarsal, or phalangeal fractures of the foot
- Ligamentous injury outside the Lisfranc joint
- Soft-tissue damage around foot without fracture or ligament injury

**Treatment**
- At diagnosis
  - Initial treatment of a Lisfranc injury focuses on soft-tissue evaluation and diagnosing instability and associated fractures/dislocations.
  - For truly nondisplaced, stable injuries (negative weight bearing and stress radiographs) with normal soft-tissue/neurovascular examination, cast immobilization can be used.
  - A non-weight bearing short leg cast for 6 weeks is followed by a walking cast for an additional 6 weeks until pain and tenderness have resolved.
  - All other injuries should be referred acutely (see the following).
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Prognosis

- As many as 20% of Lisfranc injuries are overlooked, especially in polytrauma patients, with severe long-term morbidity.
- The severity of even subtle Lisfranc injuries is often underestimated, and healing may be prolonged.
- Patients should be provided with accurate prognosis at the time of diagnosis.
- The best results (95% good to excellent functional recovery) are seen in those patients who undergo open reduction and internal fixation.
- Inadequate reduction or initial damage to the joint surface directly correlates with the development of posttraumatic arthritis.
- Symptoms after Lisfranc injury may persist, but continue to subside for several years.

Troubleshooting

- Compartment syndrome usually occurs only with a high-energy Lisfranc fracture-dislocation and should be considered in any injury with severe swelling and a painful, tense foot. Any suspicion warrants immediate orthopaedic evaluation.
- Counsel patients that posttraumatic arthritis is common and related to both the initial injury and the adequacy of reduction.
- Be very wary of diagnosing a simple midfoot sprain. If a patient with a foot injury is unable to bear weight or has severe midfoot pain, he or she should be referred for orthopaedic evaluation.
- Standard radiographs may only show slight incongruity of the joint; gross instability may only be seen on stress or weight-bearing views. In any patient with a midfoot sprain, it is essential to obtain such studies to avoid missing an unstable injury.

Patient Instructions

- Instruct patients on the importance of elevation to decrease swelling, weight-bearing restrictions, and orthopaedic follow-up.
- Accurately outlining the prognosis associated with Lisfranc injuries, including a likely prolonged recovery time (immobilization up to 3 to 4 months), is an important component of the treatment plan.

Considerations in Special Populations

- Athletes with traumatic foot injury and resultant midfoot pain should be referred to an orthopaedic specialist for appropriate evaluation.
● Diabetic patients may have an underlying neuropathic (Charcot’s) arthropathy contributing to the Lisfranc pathology, especially with a history of minimal trauma.

Suggested Reading


● Davis E: Lisfranc joint injuries. Trauma 2006;8:225–231.


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