



# Case Report: An Atypical Presentation of a Lisfranc Fracture

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Lisfranc fractures comprise only 0.2% of all fractures and are missed as much as 20% during initial presentations. When misdiagnosed and left untreated, Lisfranc fractures could lead to significant chronic pain and permanent disability. This case presentation illustrates how a Lisfranc injury was properly diagnosed in a 59-year-old male. A basic review of diagnosis and primary care management of Lisfranc injuries will also be presented.

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## Case Presentation

This case involves a 59-year-old Hispanic man who presented to the emergency department approximately two hours after having “rolled” his right ankle. He was complaining of severe pain in the right ankle and foot. The patient stated that he had been drinking earlier that morning, became involved in an altercation with another individual and lost his balance, causing him to twist his right ankle. He had no other history of any previous injuries to the right lower extremity. He did, however, have a history of a left tibial plateau fracture and subsequent osteomyelitis five years prior as the result of a car accident. He had no other significant past medical or surgical history. After furthering questioning, it was discovered that he has a history of alcohol abuse.

On physical examination, the patient was noted to have normal vital signs. The focused physical examination showed moderate swelling of his right lower extremity, mostly in the dorsal aspect of the midfoot. There was no erythema or ecchymosis present. Range of motion (ROM) of the ankle

was normal with no joint laxity. There was no medial or lateral malleolar tenderness. Severe tenderness was present at the bases of the second and third metatarsals upon palpation. There was increased passive ROM at the tarsometatarsal (TMT) joints when compared with the left foot, with the second and the third metatarsal bases found to be anteriorly displaced upon palpation. The dorsalis pedis pulse was present and no neurovascular compromise was noted.

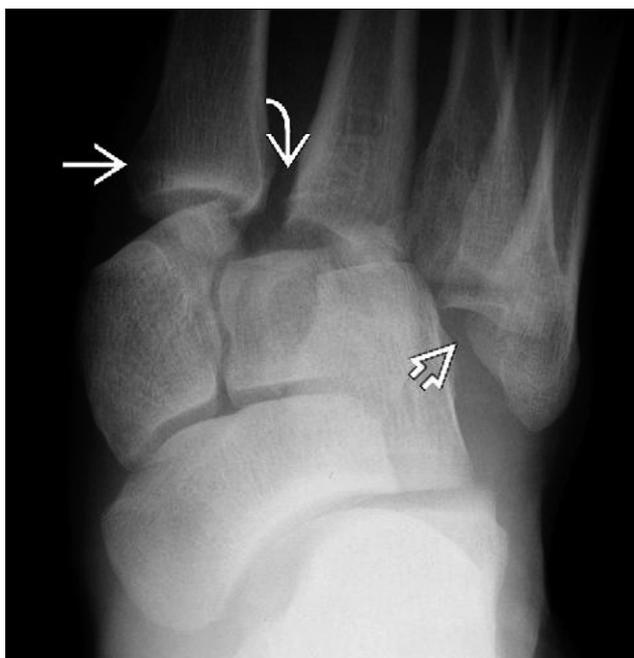
The patient was sent for ankle and weight-bearing foot radiographs. Radiographs of the ankle were normal; however, radiographs of the foot revealed a Lisfranc fracture–dislocation located at the base of the second metatarsal (Fig. 1). Orthopedic surgery was consulted by telephone and it was decided to place a non–weight-bearing short-leg splint and schedule the patient for elective surgical repair of the TMT joint. The patient was discharged from the emergency department with follow-up instructions and medications for pain control.

## Discussion

Lisfranc injuries make up 0.2% of all fractures, but up to 20% are missed at initial presentation. The majority of these injuries are sustained within the third decade of life, usually in male athletes.<sup>1</sup> Lisfranc injuries are very important to

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**Figure 1** An example of an anteroposterior radiograph showing a similar homolateral Lisfranc injury, with lateral displacement of all 5 MT (white arrow), as well as a gap between the bases of MT 1 & 2 (white curved). Note the complete dislocation of MT 4 & 5 (white open). Used with permission from Amirsys, Inc.

diagnose correctly because if they are left untreated, chronic pain and disability can occur. Therefore, a high index of suspicion is required in patients with ankle or foot injuries, especially in athletes or diabetics.

The Lisfranc joint was named for Jacques Lisfranc de Saint-Martin (1790-1847), who served as a field surgeon in Napoleon's army. He developed an amputation technique for soldiers afflicted with frostbite to prevent gangrene from spreading further into the foot. The amputation site was at any of the TMT joints and prevented the need for bone osteotomy. The fracture or dislocation at this joint, however, was first described years later in equestrian riders who fell from their saddles with one foot still in a stirrup.<sup>2</sup>

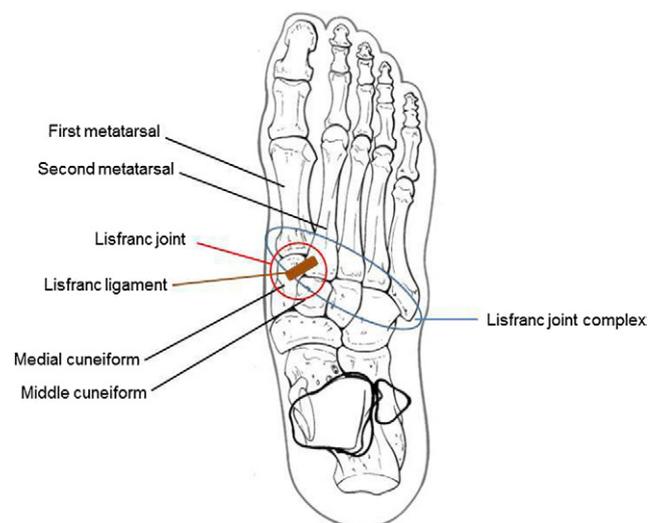
The general Lisfranc joint complex comprises the five TMT articulations of the midfoot. This complex is held together by TMT ligaments and intermetatarsal ligaments. The more specific Lisfranc joint actually refers to only the articulations of the first and second metatarsals with the medial (first) and middle (second) cuneiform bones in the medial aspect of the foot. The ligamentous band on the plantar aspect that stabilizes the medial cuneiform and the base of the second metatarsal is called the Lisfranc ligament (Fig. 2). The tendons of the tibialis posterior and anterior provide additional stabilization to this joint. The specific Lisfranc joint is the only connection between the medial column and the middle/lateral columns of the foot and thus plays a crucial role in stability of the foot.<sup>3,4</sup> It is the stability of this anatomic structure that makes this injury uncommon, and the location and connections involving the joint that make

these injuries extremely disabling if they are not treated promptly and appropriately.

When Lisfranc fractures or dislocations occur, they are usually a consequence of two mechanisms: (1) indirect trauma that places extreme pressure on the TMT articulations or (2) direct crush-type injuries. The most common cause is the former mechanism with indirect trauma causing a plantar-flexed foot to be forcibly rotated. Not unexpectedly, most injuries are therefore found in the athletic population.<sup>5,6</sup> However, there have been case reports describing Lisfranc injuries in diabetic patients with peripheral neuropathy that resulted from even minor traumatic mechanisms.<sup>6</sup>

Physical examination findings of a Lisfranc injury include pain and swelling of the midfoot on either the dorsal or plantar aspect. Tenderness is typically present along the TMT joint line. Pain is also elicited with pronation of the forefoot. The conclusive diagnosis of a Lisfranc injury is made with radiographic studies. Regular foot radiographs may show an obvious fracture at the base of the second metatarsal. Weight-bearing radiographs are more sensitive and should always be attempted if suspicion for Lisfranc injury is high. It may be helpful to obtain weight-bearing anteroposterior (AP) images of both feet on the same film for comparison views. The "fleck sign" on an AP image represents an avulsion fracture at the base of the second metatarsal or the medial cuneiform and is pathognomonic for a Lisfranc injury. If the patient is unable to bear weight, then a computed tomography scan should be obtained. For cases that are difficult to diagnose, a bone scan is also an excellent option. Magnetic resonance imaging is useful in identifying partial or subtle injuries to the Lisfranc ligament.

Treatment for Lisfranc injuries remains controversial. Traditionally, a purely ligamentous injury or a stable metatarsal fracture was treated conservatively with a short leg cast for a minimum of six weeks. A non-weight-bearing cast was preferable to help ensure maximum immobility of



**Figure 2** Anatomy of the foot showing (1) Lisfranc joint, (2) Lisfranc joint complex, and (3) Lisfranc ligament.

the foot. If bony displacement was present or if the fracture-dislocation was unstable, surgery would be required. However, some authors state that nonoperative treatments are not effective and all Lisfranc injuries should be corrected surgically.<sup>7,8</sup> Many feel that consultation with an orthopedic specialist should be made for prompt decisions concerning treatment plans.<sup>1,9,10</sup> Most patients are immobilized with or without surgery in a non-weight-bearing device for six to eight weeks with extremely gradual progression to full weight-bearing status. Much of the literature states that full recovery often takes a year or longer.<sup>1,11</sup>

## Conclusion

Lisfranc injuries are relatively uncommon and can therefore be missed easily in the acute clinical setting. All patients who present with midfoot pain should be evaluated for a Lisfranc injury. It is important to note that if these injuries are not treated early or properly, significant long-term disability can occur. A high level of suspicion is warranted in patients who present with foot pain caused by a traumatic force, particularly if the mechanism of injury is questionable.

The patient in this case had an atypical presentation for a Lisfranc injury. He was close to his sixth decade instead of the typical third decade. Further, the mechanism of injury described by the patient sounded more typical of an ankle sprain. The activity the patient was engaged in while he sustained the injury was unusual for creating sufficient force to damage the Lisfranc ligament and disrupt the integrity of the Lisfranc joint. The patient had no history of previous

foot injury, arthropathy, diabetes, or peripheral neuropathy that may have predisposed him to be at higher risk for a Lisfranc injury.

Despite his atypical presentation of this type of injury, the correct diagnosis was made and prompt treatment was initiated with consultation of an orthopedic specialist.

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