



QUESTION | I HAVE A PATIENT WHO HAD SPRAINED HIS FOOT WHILST PLAYING RUGBY. I SUSPECT A LISFRANC INJURY BUT I AM NOT SURE IF HE REQUIRES SURGERY? COULD YOU GIVE ME YOUR OPINION ON THESE INJURIES?

Dr Todd Gothelf answers this month's question:

ANSWER: | A midfoot sprain may seem to be a minor sprain to a patient, but potentially can be a devastating injury. Having had what seems to be a minor sprain, a patient may think that the nuisance of pain and swelling will subside in a few weeks. He or she may find that they are correct in their assumption; that the size of the foot reduces and they can return to their sport. However, with a Lisfranc injury, the pain may soon return with increased activity and may even render him/her unable to run for several months or longer.

This scenario is common in patients that have a missed Lisfranc midfoot sprain. These injuries are commonly over-looked as they are difficult to detect with plain radiographs. Studies have shown that up to 40% of Lisfranc injuries are missed with standard radiographs of the foot. Furthermore, a failure to recognize and treat a displaced midfoot sprain can result in a 70% chance of a poor result. Early treatment and anatomic reduction has resulted in 95% of patients having excellent outcomes. An awareness of Lisfranc injuries and prompt diagnosis is essential to initiate proper treatment and to achieve successful outcomes.

The bases of the metatarsals fit together in a tight-fitting way to provide inherent structure to the midfoot. The anatomic fit of these bones with the cuneiforms and cuboid forms the rigid and stable arch of the foot (figure 1). The strongest ligaments holding this structure together are the plantar ligaments. The second oblique ligament connects the medial cuneiform to the second metatarsal, and is the primary stabilizer of the Lisfranc joint complex. This ligament is the one most commonly ruptured to allow widening of the complex at the 1-2 interspace.



Figure 1: Note the normal relationship between the base of 2nd metatarsal and medial cuneiform

A severe midfoot sprain is usually the result of a direct blow from a major injury. A crush injury from a car running over the foot is an example. These more severe injuries usually reveal obvious soft tissue injury and displacement of bones or fractures on x-rays. A Lisfranc sprain can also occur from a lower energy insult, such as a twisting of the ankle or foot, or extreme plantar flexion. A rugby player may get his foot caught in a tackle resulting in this more indirect type injury. The more common mechanism is forced abduction of the forefoot or fixed plantar flexion.

Because subtle fracture-dislocations or sprains without persistent subluxation can be easily missed, it is important to be very careful and thorough when evaluating anyone with an ankle or foot sprain. Any pain and swelling over the midfoot, especially between the base of the first and second metatarsals, should prompt evaluation for a Lisfranc injury. Stress of this area using a pronation-abduction manoeuvre may elicit pain and indicate the need for further work-up.

Since up to 40% of plain radiographs may miss a Lisfranc injury, other studies are needed to help identify the injury. Since this sprain may be solely a soft tissue injury, a study that can demonstrate a ligamentous tear (MRI) or one that can demonstrate instability of the bones is needed. A weight-bearing radiograph of the affected and opposite side is performed to help detect this subtle injury (Figure 2).



Figure 2: Note the widening between the base of second metatarsal and medial cuneiform. This represents an unstable Lisfranc sprain

Any displacement of the metatarsals, even 1mm, represents an unstable injury and indicates the need for treatment. If a weight-bearing radiograph is equivocal but there is high suspicion, then examination under anaesthesia is warranted to assess for stability. MRI and CT scans are helpful for a type III Lisfranc injury, but since they are non-weight bearing they may not pick up all type II Lisfranc injuries. (Figure 3)



Figure 3: MRI of a ruptured Lisfranc ligament complex. Note oedema at the base of second metatarsal

A stable Lisfranc sprain, as determined by a negative weight bearing view or negative stress test under general anaesthetic, are treated with a below knee walking boot for six weeks.

Any Lisfranc injury demonstrating instability or subluxation is treated with an open reduction and internal fixation. The goal of open surgery is to ensure an anatomic reduction. Internal fixation with screws and plates are used to provide stability until the ligaments scar and heal. (Figure 4) Hardware is removed at six months to allow some flexibility to the joints.

Figure 4: Reduction and Fixation of a Lisfranc Injury



In patients with missed or late Lisfranc injuries with pain, initial treatment with a rigid arch support orthotic can help to reduce pain. Patients with persistent pain or who develop arthritis of the midfoot are successfully treated with a midfoot fusion.

In summary:

1. A proper vigilance should be held for patients with ankle or foot sprains, so that a Lisfranc sprain is not missed
2. Prompt work-up with weight bearing radiographs and opposite comparison views is essential to rule out a Lisfranc sprain.
3. If Instability is present or there is high suspicion, examination under anaesthesia is essential, with open reduction internal fixation for an unstable injury.

Dr Todd Gothelf