

# Foot Pain

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## Lisfranc Joint Injuries

The Lisfranc 'joint' refers to the mid-foot connection between the bases of the five metatarsal bones, and the three cuneiforms & cuboid. It is named after French surgeon Jacques Lisfranc. Dr Lisfranc recognised how problematic these injuries were during the Napoleonic Wars - he simply amputated the patient's foot at the level of the tarsometatarsal joints, so the soldiers could continue marching.



The main ligament stabilising this complex is the intracapsular interosseous ligament ("Lisfranc ligament"), between the 1<sup>st</sup> cuneiform & 2<sup>nd</sup> metatarsal. There is no ligament between the 1<sup>st</sup> & 2<sup>nd</sup> metatarsal, so the Lisfranc

ligament is crucial. It also plays a key role in maintaining the transverse & longitudinal arches. The base of 2<sup>nd</sup> metatarsal is wedged between the 1<sup>st</sup> & 3<sup>rd</sup> cuneiforms. Similar to the ACL, the Lisfranc ligament has a poor scope for healing when torn, so moderate to severe tears require surgery. These injuries are rare in the general population, accounting for approximately 1 in 50,000. However there is a 4% incidence in NFL, generally due to



direct downward force of one player's foot on another, or an opponent's body weight landing on the planted foot. It is the second most common foot injury in sportspeople. Any

medial mid-foot sprain should raise suspicion of a Lisfranc injury. A missed diagnosis can have dire

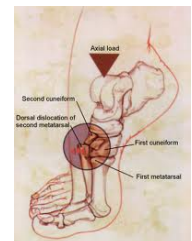
consequences. If not treated early there will likely be a poor outcome, prolonged absence from sport, and chronic disability. Failure to stabilise the region leads to early arthritis & severe dysfunction.

There are two recognized **mechanisms of injury**:

1. Direct 'crush' injury. This occurs with dropping an object on the foot, having it stomped on, or during a kicking action. The 2<sup>nd</sup> metatarsal is 'punched down', resulting in tearing of the inferior capsule.



2. Indirect. A longitudinal force is directed from the forefoot to the mid-foot. This can occur with pressure through the toes on landing or twisting, or during a backward fall with the foot trapped. The 2<sup>nd</sup> metatarsal is pushed anteriorly, rupturing the dorsal ligament. This is the mechanism common to dance, with the foot in demi-pointe.



Injuries at this joint are graded:

- Grade I: Sprain of the Lisfranc ligament between the medial cuneiform & base of the 2<sup>nd</sup> metatarsal. There is no diastasis (separation at the joint).
- Grade II: Rupture of the ligament & up to 5mm diastasis.
- Grade III: Rupture of the ligament, greater



than 5mm diastasis, and possible fracture. Fractures are usually at the plantar aspect of the metatarsal base. There may be displacement of the metatarsal dorsally or medially.

**Clinical Features:** Pain on weight-bearing, particularly on the ball of the foot. This affects running. There will be dorsal tenderness over the joint, with or without swelling. Sometimes there will be localised plantar ecchymosis. Mid-foot eversion combined with abduction will often be painful.



**Investigations:** Weight-bearing X-rays, showing greater than 2mm diastasis, or greater than 1mm difference side to side on comparative views. However this is often unreliable, as pain may preclude adequate weight-bearing through the injured side. Other possible X-ray findings are a



fleck fracture at the base of the 2<sup>nd</sup> metatarsal or medial cuneiform – “fleck sign”, dorsal displacement of the metatarsals relative to the tarsus or flattening of the longitudinal arch.

MRI scans are sensitive for detecting injuries to the Lisfranc ligaments, and should be performed if there is suspicion of this injury and a normal X-ray. Bone scan and CT are also useful for localizing the injury. CT will show a fracture if present.

#### **Treatment:**

- Grade I: These are generally stable. There will be a normal XRay & positive bone scan. NWB in cast or Aircast 6 weeks. If pain is still present, WB cast for a further 4 weeks. This is followed by joint mobilisation, calf strengthening and gradual return to sport. Orthotics may be required.
- Grade II – III: Surgical reduction & fixation. The options are a percutaneous screw or wire.



#### **References:**

1. Matthew Stewart, (2011) - Course notes “The Essential Foot & Ankle”. Matthew is a foot / ankle specialist sports physiotherapist at Parramatta.
2. Brukner, P & Khan, K (2012). Clinical Sports Medicine, (4<sup>th</sup> ed). McGraw Hill, Syd.

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