

# Lisfranc

## *fracture- dislocation*

### **Introduction**

The Lisfranc fracture-dislocation is an injury of the midfoot and typically involves a fracture and dislocation of the first and second metatarsals and the cuneiform and an associated displacement of the lateral four metatarsal bones from the tarsal bones (the Lisfranc joint). This represents a disruption of the intermetatarsal ligament that stabilises the joint between the 1st and 2nd metatarsals (predictably named the Lisfranc ligament). (<http://www.surgeons.org.uk/history-of-surgeons/jacques-lisfranc-de-st-martin.html>)

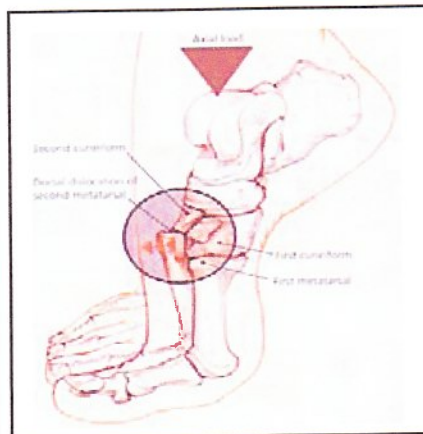
*“The Lisfranc joint actually refers to a number of joints.”*

The Lisfranc joint actually refers to a number of joints which are formed by the junction of the metatarsals and the cuneiforms, and by the junction of the metatarsals and the cuboid bone. A Lisfranc injury indicates an injury to the normal alignment of the cuneiforms and the MT joints with the loss of their normal spatial relationships (The Centre for Orthopaedics & Sports Medicine).

Mechanisms of injury are varied, and include direct crush injury, or an indirect load onto a plantar flexed foot 3. Tarsometatarsal dislocation may also occur in the diabetic neuropathic joint (Charcot's). ([http://radiopaedia.org/articles/lisfranc\\_injury](http://radiopaedia.org/articles/lisfranc_injury)). The mechanism of injury for most athletes is axial loading on a hyperplantarflexed midfoot. (<http://emedicine.medscape.com/article/1236228-overview#a0112>).



<http://www.northcoastfootcareblog.com>



[www.aafp.org](http://www.aafp.org)

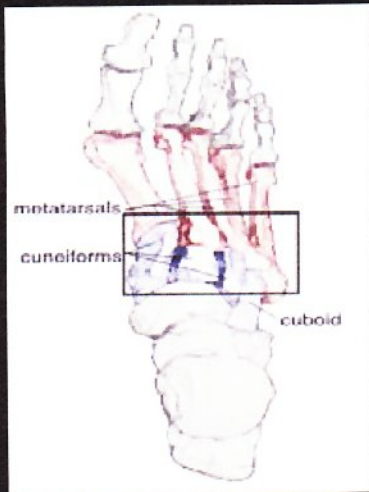


### **Historical Overview**

*Lisfranc is named after the 18th and 19th century surgeon and gynecologist, Jacques Lisfranc de St. Martin (Who Named It? November 2011). He is arguably best known for his description of his self-titled injury, which involves a fracture within the forefoot (as outlined). This was first described by him during his time as a military surgeon in Napoleon's army around 1813 and occurred when riders fell from their horses with their feet caught in their stirrups. This twisting, high-impact injury can also be found with athletes partaking in contact sports such as rugby and American football and with gymnasts, ballet dancers and track and field athletes.*

<http://www.surgeons.org.uk/history-of-surgeons/jacques-lisfranc-de-st-martin.html>.

## The Normal Foot



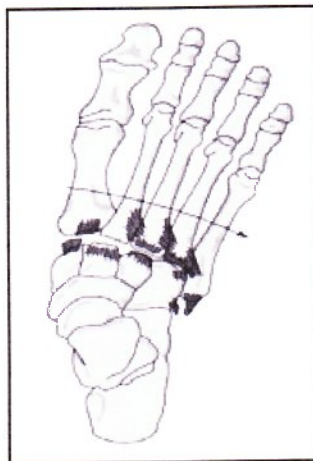
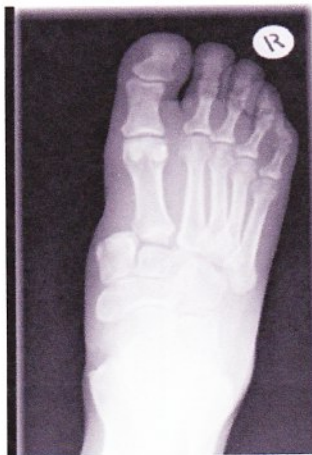
## Classification of Lisfranc Injuries

**Homo-lateral:** Involving displacement (in the same direction) of all five metatarsals.

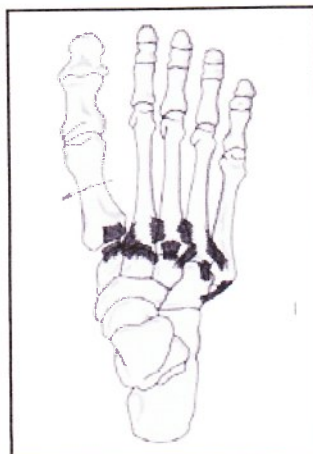
**Isolated:** One or two MT are displaced from the others.

**Divergent:** MT are displaced in sagittal and coronal planes – these fractures can extend to intercuneiform and the navicular (Wheless' Textbook of Orthopaedics). They are considered to be partial or complete fracture-dislocations. There are three types, see illustration on next page.

### Homo-Lateral



### Isolated



## Associated Injuries & Complications

- Longitudinal Stress fractures.
- Fracture of the second M.T.
- Cuboid fracture -results from a compression of cuboid between the calcaneous and the 4th and 5th M.T.
- Navicular compression fracture.
- Rupture of the posterior tibial tendon.
- Compartment Syndrome (CS) – CS can occur in the foot as in other parts of the body. CS in the foot are associated with CS of the 'deep posterior compartment which contains Tibialis posterior, Flexor Digitorum Longus (FDL) and Flexor Hallucis Longus (FHL), (structures involved in the plantar flexion of the foot and toes and the inversion of the foot).
- 2 major arteries, Peroneal artery and Posterior Tibial arteries are present in this compartment.

Wheless Textbook of Orthopaedics.

## Divergent

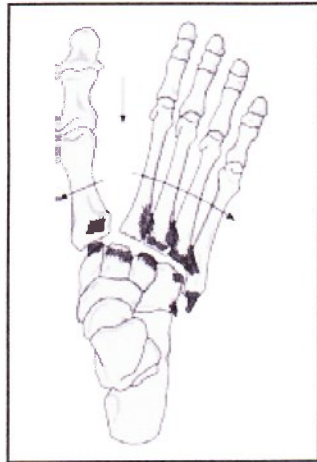


Figure A,B,C illustrate the classification of Lisfranc injuries. It is described by the author using various 'divergent' types.

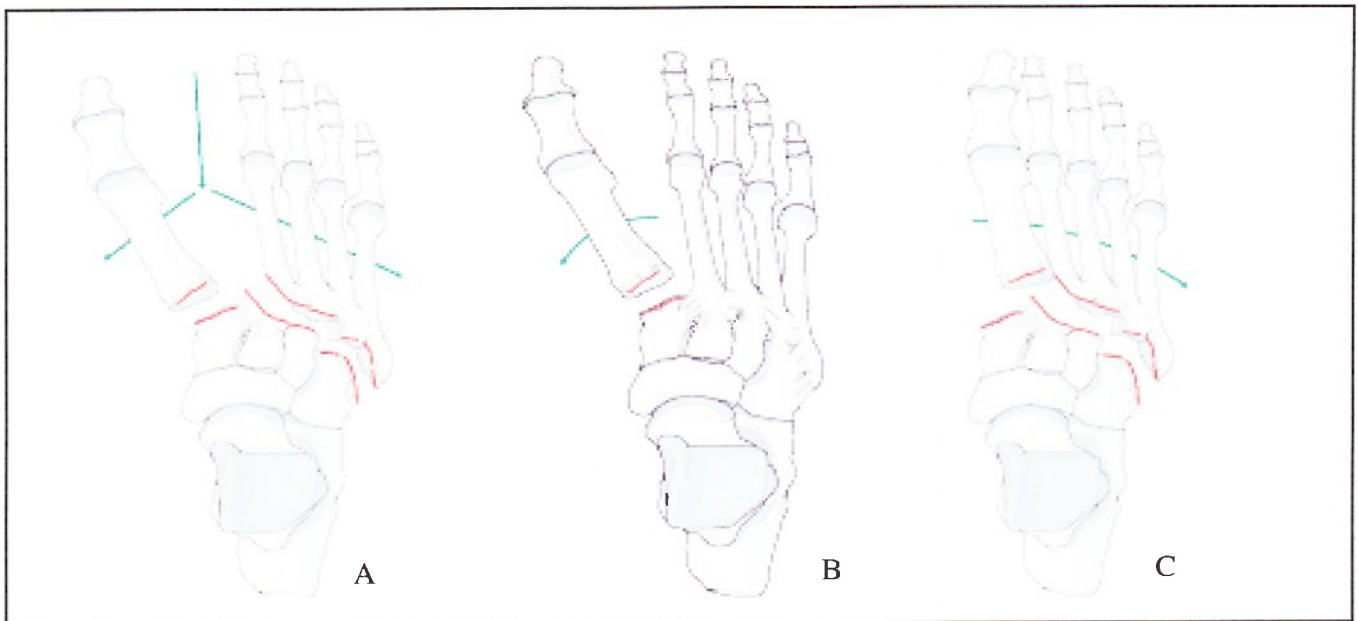
Figure (a) Divergent (complete);

(b) Medial divergent (incomplete)

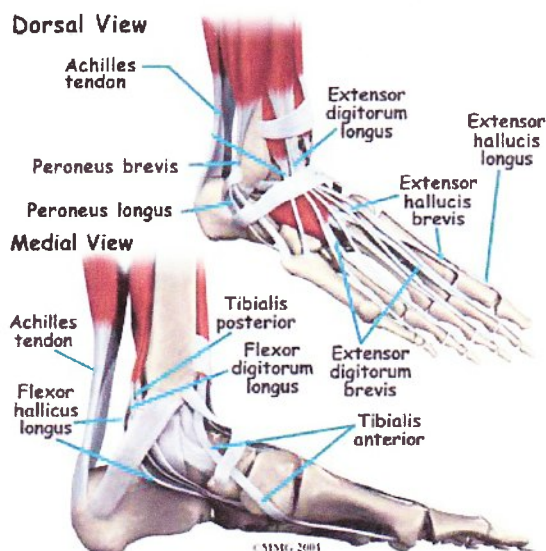
(c) Complete lateral divergent.

[http://www2.aofoundation.org/wps/portal!ut/p/c0/04\\_SB-8K8xLLM9MSSzPy8xBz9CP0os3hng7BARydDRwN39yB-TAyMvLwOLUA93I4MQE](http://www2.aofoundation.org/wps/portal!ut/p/c0/04_SB-8K8xLLM9MSSzPy8xBz9CP0os3hng7BARydDRwN39yB-TAyMvLwOLUA93I4MQE)

## Classification of Divergent fractures

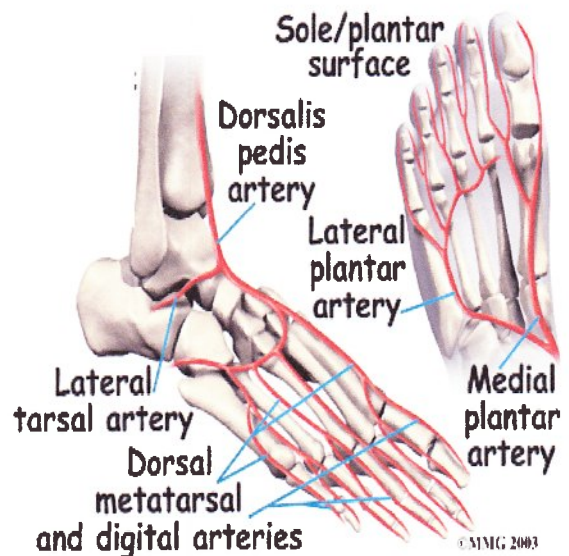


## Tendons of the Foot



<http://tendonitisfoot.org>

## Arteries of the Foot



<http://citysquarephysiotherapy.patientsites.com/Injuries-Conditions/Ankle/Ankle-Anatomy/a~47/article.html>

## Symptoms

The top of the foot may be swollen and painful. If injury is severe the patient may not be able to put any weight on the foot. Lisfranc injuries are often mistaken for sprains and are difficult to see on x-ray. As such, a CT or MRI would be necessary to confirm the diagnosis (American Academy of Orthopaedic surgeons AAOS).

Undiagnosed Lisfranc injuries can have serious complications such as joint degeneration and compartment syndrome (ibid).  
Image Source Page: <http://www.podiatrytoday.com/article/1040>

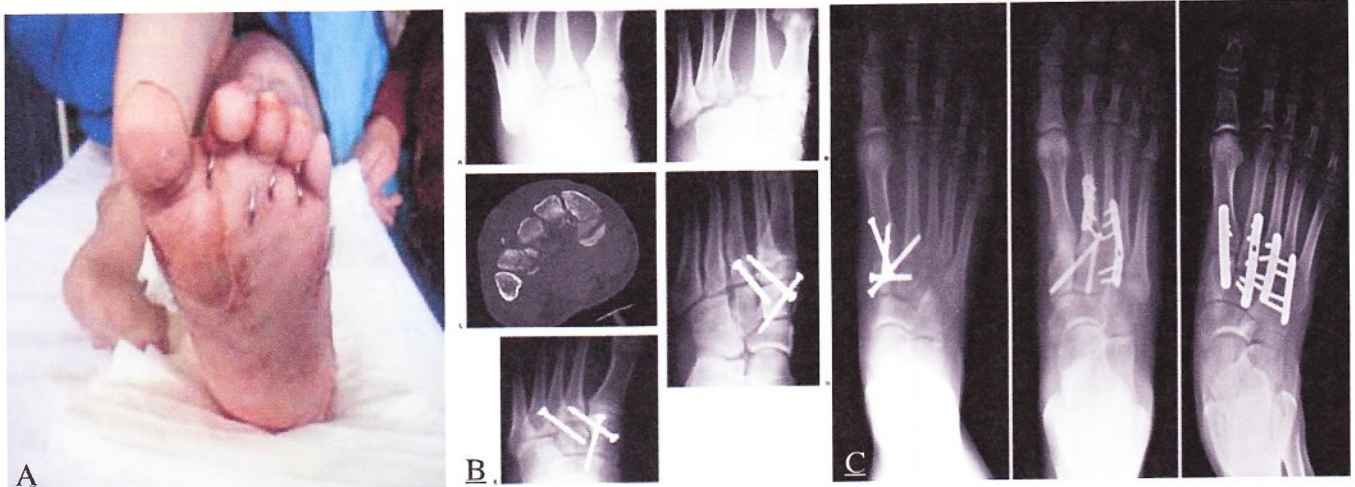
*“Lisfranc injuries are often mistaken for sprains and are difficult to see on x-ray.”*

## Treatment

Treatment depends on the severity of the injury. Minimally displaced fractures are likely to be treated in a backslab in the first week or two, this allows for any increase in swelling (swelling of the extremities are common due their bony makeup). Thereafter the patient is treated in a NWB cast for approximately 6 weeks. Fractures that are significantly displaced, arguably 2mm inter-metatarsal separation, would require internal fixation with pins or screws.



<http://www.podiatrytoday.com/article/1040>



## References:

(a) [http://1.bp.blogspot.com/\\_FHFQmaetgs/Sw1BPlozX5I/AAAAAAAAAHs/SJOQUmSFni/s1600/PICT2868.JPG](http://1.bp.blogspot.com/_FHFQmaetgs/Sw1BPlozX5I/AAAAAAAAAHs/SJOQUmSFni/s1600/PICT2868.JPG)

(b) [www.msdlatinamerica.com/ebooks/RockwoodGreensFracturesinAdults/sid1498494.html](http://www.msdlatinamerica.com/ebooks/RockwoodGreensFracturesinAdults/sid1498494.html)

(c) <http://orthoinfo.aaos.org/topic.cfm?topic=A00162>

## Prognosis

- Susceptibility to late mid foot collapse
- Metatarsalgia
- Post traumatic arthritis and planovalgus\* deformity are common and may occur in up to 50% of patients (Wheeless Textbook of Orthopaedics).