



# Lisfranc Injuries

## The Role Of Flexible Fixation

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### Introduction:

Tarsometatarsal or the so call Lisfranc joint takes the shape of a roman arch, and with the support of the strong plantar and dorsal ligaments, it is a very stable joint.

Lisfranc injury may result from high or low level of energy. This fact explains a high misdiagnosis index up to 40%. The injury may go from a pure ligamentous injury to the most severe dislocation with comminution. Treatment will depend on the type of injury.

If left untreated, the midfoot collapse will probably result in severe dysfunction, arch collapse and pain.

The diagnosis requires a high suspicious index, based on midfoot pain and plantar hematoma.



Fig: Shows classical plantar hematoma in Lisfranc injury.

### X-rays studies:

It is paramount to obtain bilateral comparative weight bearing X-rays to be able to observe mild displacements. A fleck sign may be evident with avulsion of the Lisfranc ligament going from the first cuneiform to the second metatarsal.



Fig: Left foot X-ray shows a "Fleck sign" and mild displacement of the second metatarsal base from the medial cuneiform.



Fig: Same situation is more evident with magnification.

Some other useful imagenological studies are CT, weight bearing CT and MRI. The last one is particularly useful to detect pure ligamentous injuries.

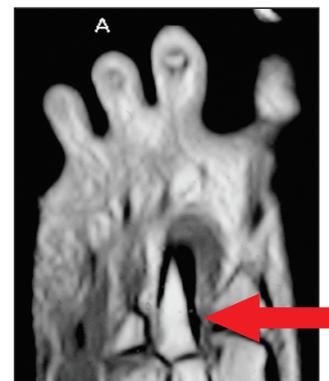


Fig: MRI showing Lisfranc pure ligamentous injuries.



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**Treatment:**

Conservative treatment is only recommended for those injuries that prove they do not displace under full weight bearing. This treatment may be indicated for pure ligamentous injuries or those with minor fracture but with no tendency to displacement. Be aware that some patients may not be able to put full weight in that foot. It is useful to consider taking weekly weight bearing X-rays until there is no doubt about future displacement.

All the rest should be treated surgically.

Surgery may include:

- 1- Percutaneous reduction and fixation with screws or flexible fixation;
- 2- Open reduction and fixation with screws or plates; and
- 3- Primary fusion.

Primary fusion was recommended for every Lisfranc injury by Coetzee in 2006, but later it became evident that primary arthrodesis is the best choice for high energy injury in which cartilage is lost since the moment of the injury.

For cases when length of the column is lost without significant damage to the joint, then bridging the lesion with some configuration with plates is probably the best choice. Patients need to be advised that plate removal may be required.



*Figs: Showing plate fixation of Lisfranc injury with plate.*

For any open reduction and internal fixation an open approach is necessary. The most frequent options are two incisions, right on the second and the fourth metatarsals or a midfoot longitudinal incision depending on surgeon's preferences.

Since soft tissue injuries are most of the time significant, you need to wait one to three weeks to have a "wrinkle test sign" before performing surgery to avoid skin complications.



*Fig: Wrinkle test sign.*



*Fig: Incision on the second metatarsal to get access to the Lisfranc ligament area to perform debridement, reduction and fixation.*



*Fig: Show incision on the second and fourth metatarsal with evident infection.*

To prevent this complication, we recommend close reduction with a clamp and percutaneous fixation. If anatomical reduction is not fully achieved, then open surgery is recommended.



Fig: Shows anatomical reduction of the Lisfranc joint with a clamp.



Figs: Show percutaneous reduction and fixation with screws obtaining good anatomical reduction.

## Flexible fixation:

Once anatomical reduction has been obtained flexible fixation can be used to prevent displacement instead of rigid fixation like screws and plates. The rationale under this type of fixation is similar to syndesmosis. It is a joint that has motion, so you want to preserve some of that motion and avoid the need of implant removal without compromising reduction quality or final functional results.

Several clinical and biomechanical studies have proved that flexible fixation is stable as the classical screws and or plates fixation.



Fig: show setting to put the fixation from the medial cuneiform to the second metatarsal (screw or flexible fixation).



Figs: X-rays show pre and post op result of a Lisfranc injury of a 10 years old gymnast treated with flexible fixation. This case is a very good example in which most surgeons would like to perform a closed reduction and a flexible fixation.



*Figs: X-rays show anatomical reduction using GMReis Mini Expert fixing the Lisfranc Ligament (from the medial cuneiform to the second metatarsal) and another between the first and second metatarsal.*



*Fig: Intraop picture showing open reduction and flexible fixation of Lisfranc injury.*



*Fig: GMReis Mini Expert flexible fixation of Lisfranc injury.*

The most common low level injury involves cuneiform, second metatarsal and intercuneiform injury.



*Fig: GMReis Mini Expert combined with GMReis Fastlock knotless tape loaded anchor to provide a zero profile flexible fixation of Lisfranc injury with ILA – Internal Ligament Augmentation.*

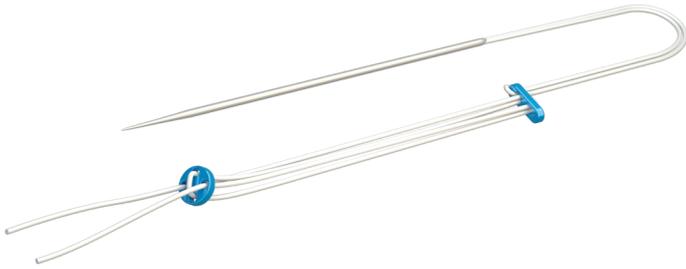
## Summary:

Lisfranc injuries need a high suspicious index. After meticulous evaluation surgical decision is decided for most cases.

Surgery may need primary fusion or plate bridging techniques for high energy injuries.

Low energy injuries may be reduced by an open approach or with a clamp with minimal invasive surgery.

For this last type of injuries we recommend flexible fixation to maintain some motion and decrease the rate of implant removal or complications.



MINI EXPERT – IMPLANT

Code	Description
311-2000	Mini Expert – Flexible Fixation

MINI EXPERT – INSTRUMENTS

Code	Description
310-01-10	Expert Double Drill Guide
310-01-11	Ø1.0 / 3.8 mm K wire cannula
311-01-06	Ø2.7 x 180.0 mm Cannulated Drill Bit
310-01-07	Ø1.0 x 250.0 mm K wire
172-17	Ø2.0 x 150.0 mm K wire



Ø3,5 mm



Ø4,75 mm

FASTLOCK IMPLANTS

Code	Description
320-351580-PE1	Fastlock Knotless Tape Loaded PEEK Anchor Ø3.5 x 10.1/15.8 mm
320-475191-PE5	Fastlock Knotless Tape Loaded PEEK Anchor Ø4.75 x 15.0/19.1 mm

Ø3.5 mm FASTLOCK INSTRUMENTS

Code	Description
320-110	Fastlock Drill Guide
320-135	Ø1.3 mm K Wire
320-110-27-C	Ø2.7 x 110 mm Cannulated Drill Bit
320-110-27	Ø2.7 x 110 mm Drill Bit
320-FL-35	Ø3.5 mm Fastlock Tap

Ø4.75 mm FASTLOCK INSTRUMENTS

Code	Description
320-110	Fastlock Drill Guide
320-110-34	Ø3.4 x 110 mm Drill Bit
320-FL-475	Ø4.75 mm Fastlock Tap

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