A 40-year-old male sustains a right foot injury after a head-on motor vehicle collision. He is unable to place weight on the foot to ambulate due to pain along the medial aspect of the foot. The pain is exacerbated with abduction of the midfoot. The patient denies pain along the lateral border of the midfoot. He is neurovascularly intact in the foot. An injury radiograph is shown below , while a clinical image of the foot is attached as well.

Describe this injury ?

- Xrav shows an AP view of the foot in which there is widening of the interval between the 1st and 2nd ray.

- While the clinical photo shows planter echemosis

What is the most probable Dx ?

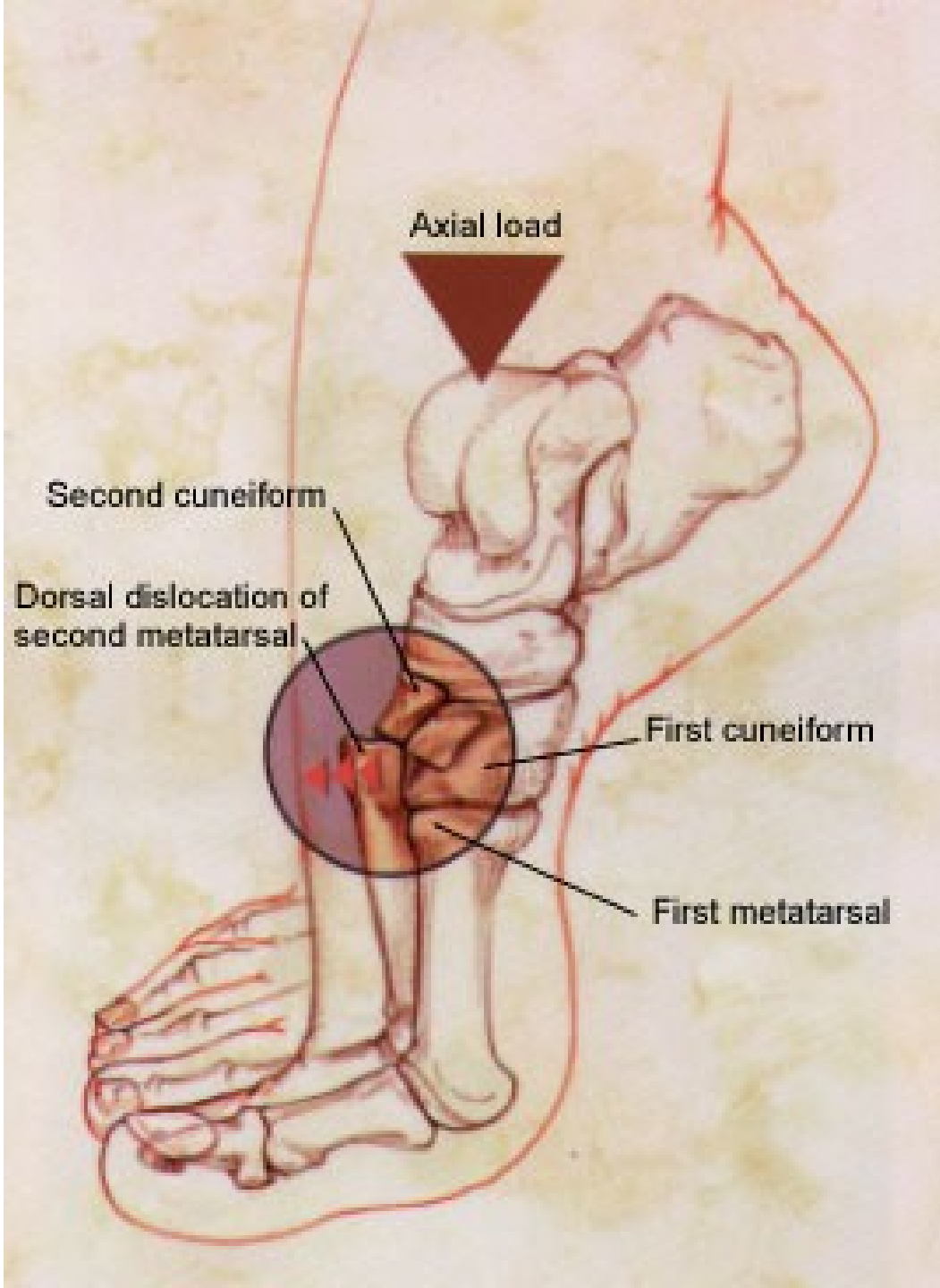
- This a case of Lisfranc injury

Describe Lisfranc injury

- Tarsometatarsal fracture dislocation characterized by traumatic disruption between the articulation of the medial cuneiform and base of the second metatarsal.

What is the mechanism of injury ?

- Indirect **rotational forces** and **axial load** through **hyper-plantarflexed forefoot**
- Hyperflexion/compression/abduction moment exerted on forefoot and transmitted to the TMT articulation
- Metatarsals displaced in **dorsal/lateral** direction


Axial load
Second cuneiform
Dorsal dislocation of second metatarsal
First cuneiform
First metatarsal

Describe the clinical anatomy related to Lisfranc injury

- **Bony Anatomy** :
- Three articulations including

1- tarsometatarsal articulation

2- intermetatarsal articulation

3- intertarsal or intercuneiform articulations

- columns of the midfoot

1. medial column : first tarsometatarsal joint
2. middle column : second and third tarsometatarsal joints
3. lateral column : fourth and fifth tarsometatarsal joints (most mobile)

- Ligamentous anatomy

A. Lisfranc ligament : from medial cuneiform to base of 2nd metatarsal on plantar surface

- plantar tarsometatarsal ligaments Its injury is necessary to give **transverse instability.**

B. dorsal tarsometatarsal ligaments : weaker and therefore bony displacement with injury is often ***dorsal***

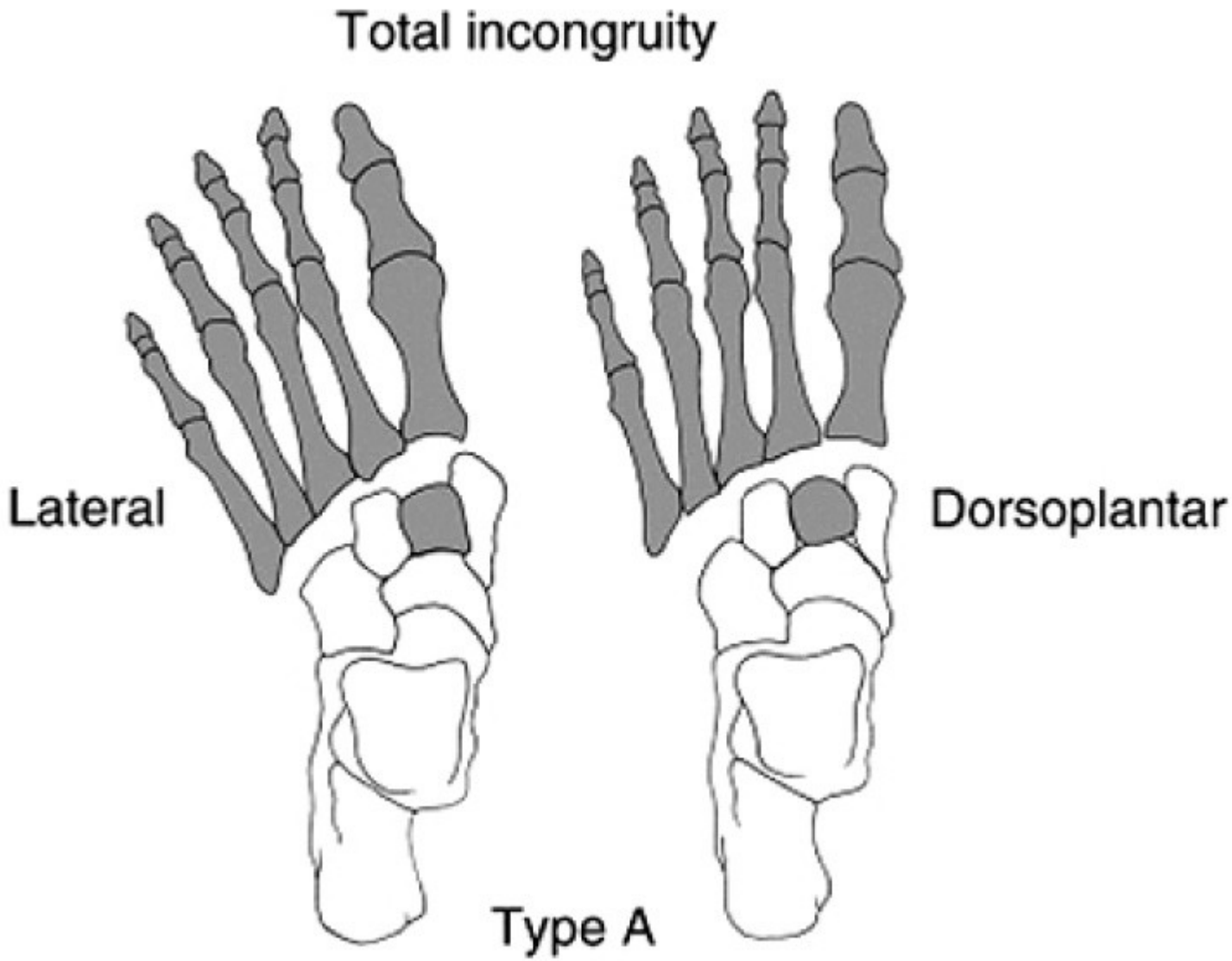
C. intermetatarsal ligaments between second-fifth metatarsal bases

Describe Hardcastle & Myerson Classification

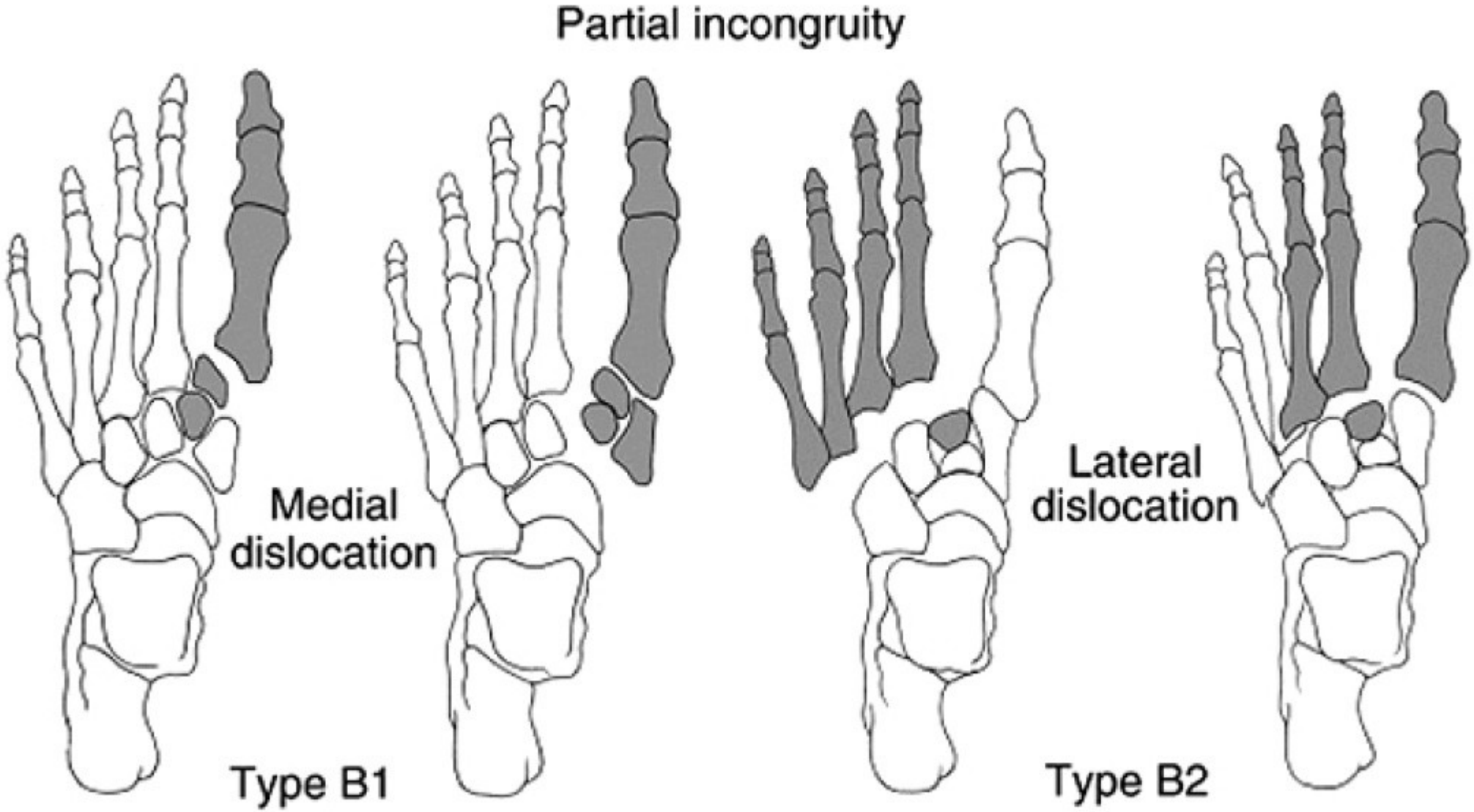
CLASSIFICATION

Hardcastle & Myerson Classification		
Type A	Complete homolateral dislocation	
Type B1	Partial injury, medial column dislocation	
Type B2	Partial injury, lateral column dislocation	
Type C1	Partial injury, divergent dislocation	
Type C2	Complete injury, divergent dislocation	

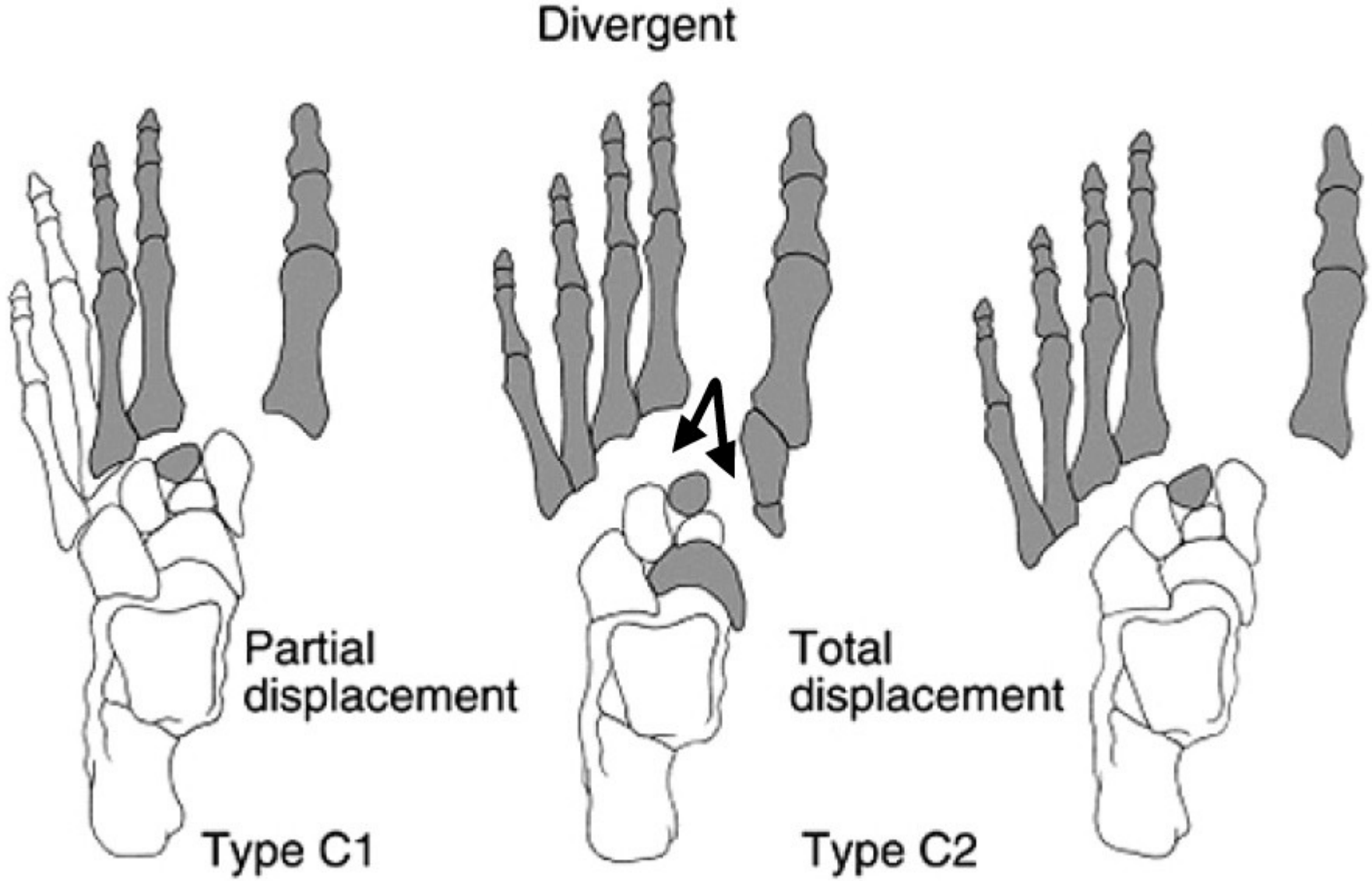
A



B


Partial incongruity
Medial dislocation
Type B1
Lateral dislocation
Type B2

C


Divergent
Partial displacement
Type C1
Total displacement
Type C2

Recommended radiological views

- AP
- lateral
- oblique
- weight-bearing with comparison view : to confirm diagnosis

Radiological findings

- Five critical radiographic signs that indicate presence of midfoot instability

1

1. Discontinuitv of a line drawn from the medial base of the 2nd metatarsal to the medial side of the middle cuneiform

- seen on AP view
- diagnostic of Lisfranc injury

2

2. widening of the interval between the 1st and 2nd ray

- seen on AP view
- may see bony fragment (fleck sign) in 1st intermetatarsal space
- represents avulsion of Lisfranc ligament from base of 2nd metatarsal
- diagnostic of Lisfranc injury

3

3. dorsal displacement of the proximal base of the 1st or 2nd metatarsal

- seen on lateral view

4. medial side of the base of the 4th metatarsal does not line up with medial side of cuboid

- seen on oblique view

5. disruption of the medial column line (line tangential to the medial aspect of the navicular and the medial cuneiform)

- seen on oblique view

Treatment options

- Nonoperative
- **cast immobilization for 8 weeks**
- indications
- certain non-displaced injuries that are stable with weight bearing
- nonoperative candidates
- nonambulatory patients

Operative options
(Discuss indications for each option)

1. temporary percutaneous pinning and delayed ORIF or arthrodesis
2. open reduction and rigid internal fixation
3. primary arthrodesis of the first, second and third tarsometatarsal joints
4. midfoot arthrodesis