



# The Foot & Ankle

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# Objectives

- Anatomy of Foot and Ankle
  - Standard x ray views
  - Common pathologies
  - Recognise common adult fracture patterns
  - General comments on interpretation of the Xrays
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- UCC / ED Mx strategies
  - Referral criteria

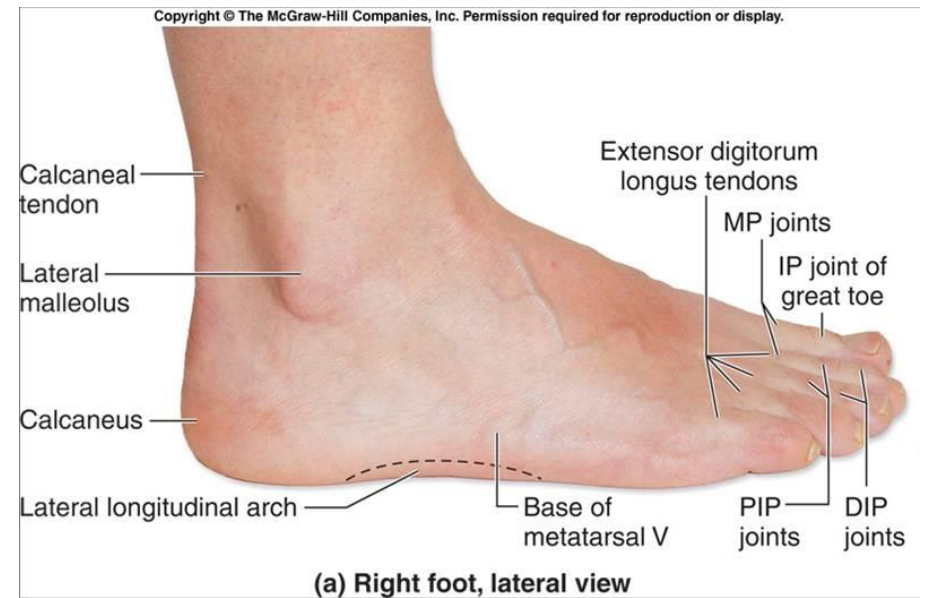
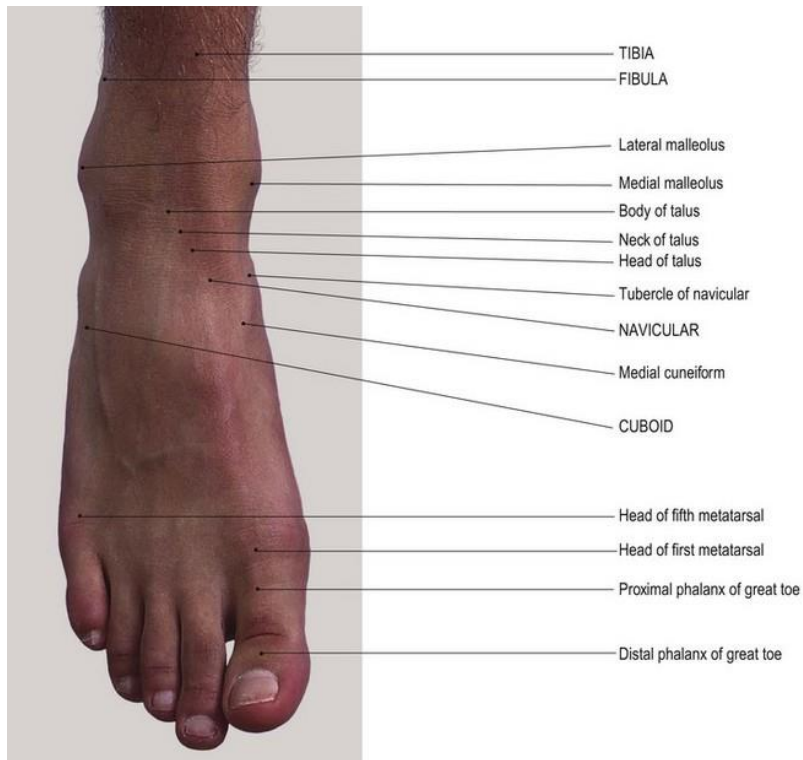
# A systematic approach

- A: ADEQUACY
  - Name & date
  - Whole bone visualised
  - Correct views
- B: BONES
  - Trace cortices
  - Scan whole bone: lucent or sclerotic areas or lines
- C: CARTILAGE & SOFT TISSUE
  - Joint spaces
  - Haemarthroses
  - Muscles and soft tissues: swelling, defects, foreign bodies, air

# Ankle

- The commonest UCC attendance?
- The commonest UCC x-ray?
- Usually a twisting mechanism (inversion/eversion)

# Surface Anatomy



# Ankle – clinical signs

## Ottawa Ankle Rules

An ankle x-ray is only required if there is pain in the malleolar area and any of:

- Tenderness in the posterior distal 6cm of either malleolus
- Inability to bear weight both immediately and in the ED

A foot x-ray is required if there is pain in the midfoot area and any of:

- Tenderness over the Navicular *or* base of 5<sup>th</sup> MT
- Inability to bear weight both immediately and in the ED

# Ankle - normal

- Adequacy: AP & lateral ideally to include from 5<sup>th</sup> MT to top distal 1/3 tibia
- B: Outline and rest of bone of tibia, fibula & talus and review rest of bones visible
- C: Mortice joint



# Ankle Fractures – Weber Classification



C: Above the mortise (almost) always unstable

B: Spiral starting at level of mortise: need to assess whether mortise disrupted

A: Below the level of the mortise: stable



# Ankle Fractures – Weber Classification

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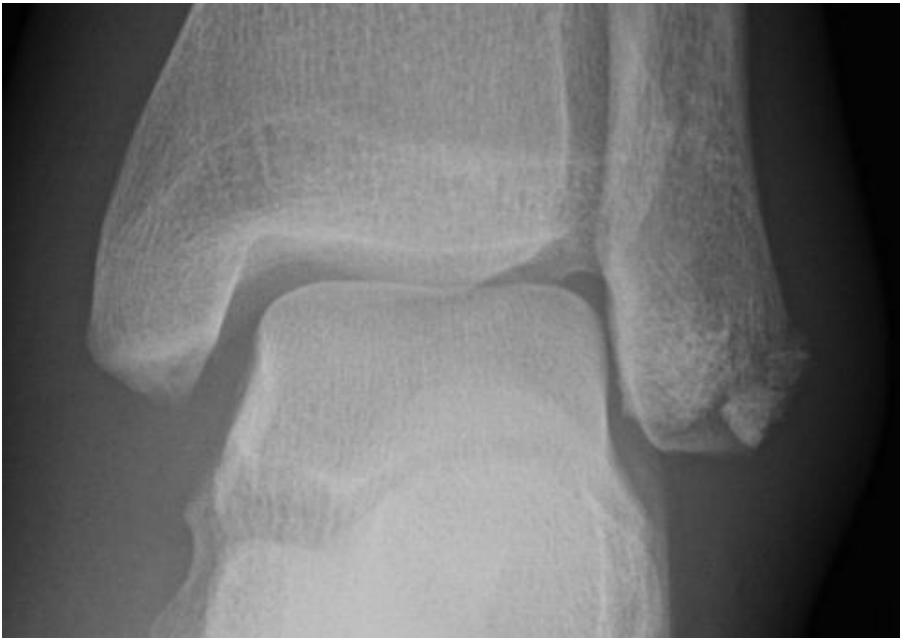
B: Spiral starting  
at level of  
mortice: need to  
assess whether  
mortice disrupted

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A: Below the level  
of the mortice:  
stable



## Ankle – 25 ♂ Slipped and twisted ankle



Ankle – 25  
♂ Slipped  
and  
twisted  
ankle



Ankle – 25  
♂ Slipped  
and  
twisted  
ankle



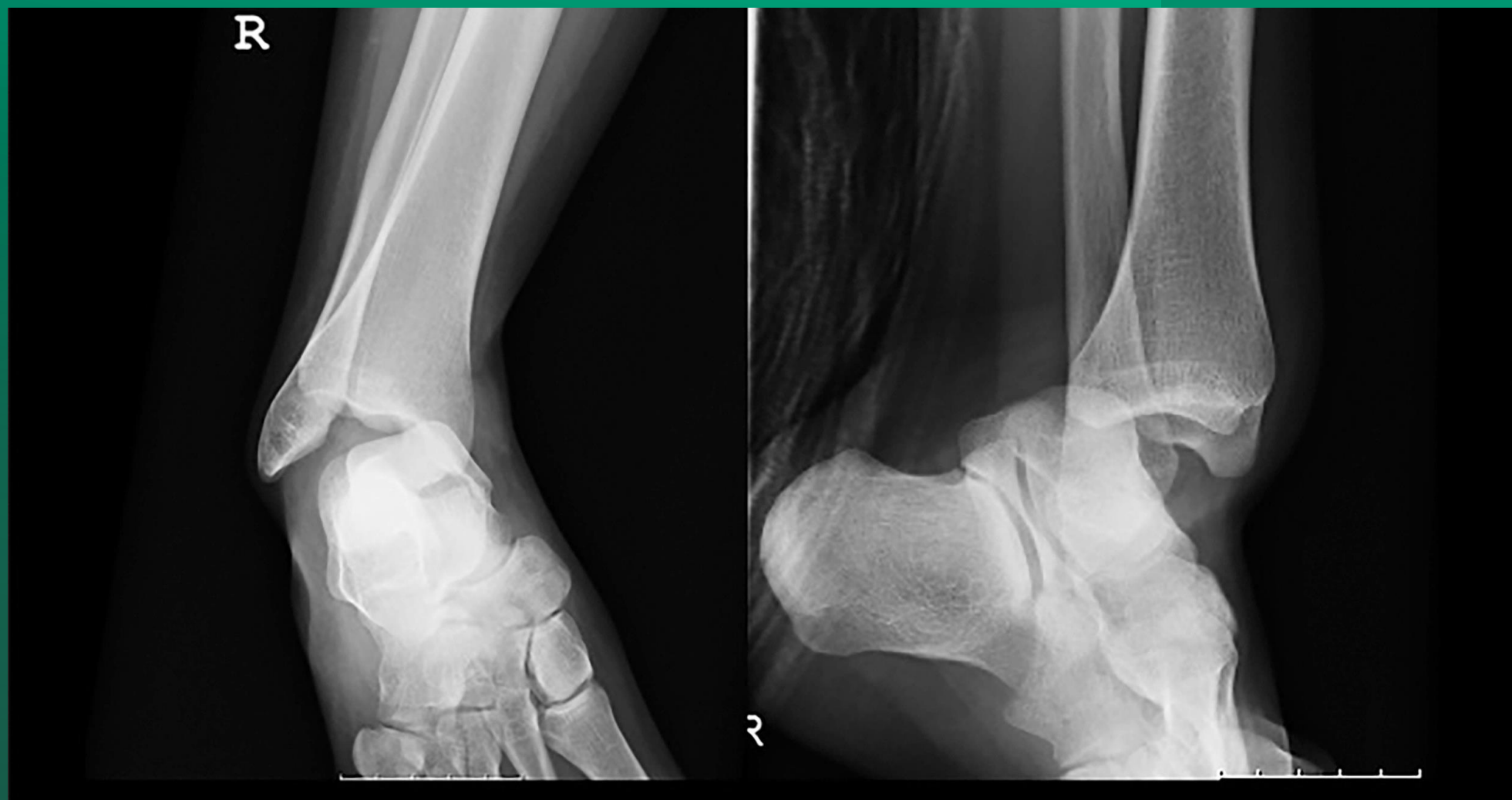
Ankle – 36  
♀ Slipped  
and twisted  
ankle





# 21 Yr old male running from police





Ankle  
Run over  
by car  
tyre





**BRITISH ORTHOPAEDIC ASSOCIATION & BRITISH ASSOCIATION OF PLASTIC,  
RECONSTRUCTIVE & AESTHETIC SURGEONS AUDIT STANDARDS for TRAUMA**

## Open Fractures

### Background and justification

Open fractures may require timely multidisciplinary management. The consequences of infection, can be great both for the individual patient and the community. Trauma networks and hospitals require the appropriate pathways and infrastructure, to manage these patients, to enable optimum recovery and to minimise the risk of infection.

### Inclusions:

All patients with open fractures of long bones, hind foot or midfoot (excluding hand, wrist, forefoot or digit).

### Standards for Practice

1. Patients with open fractures of long bones, hind foot or midfoot should be taken directly or transferred to a specialist centre that can provide Orthopaedic\* care. Patients with hand, wrist, forefoot or digit injuries may be managed locally following similar principles.
2. Intravenous prophylactic antibiotics should be administered as soon as possible, ideally within 1 hour of injury.
3. There should be a readily accessible published network guideline for the use of antibiotics in open fractures.
4. The examination of the injured limb should include assessment and documentation of the vascular and neurological status. This should be repeated systematically, particularly after reduction manoeuvres or the application of splints. Management of suspected compartment syndrome should follow [BOAST guidelines](#).
5. The limb should be re-aligned and splinted.
6. Patients presenting with arterial injuries in association with their fracture should be treated in accordance with the [BOAST for arterial injuries](#).
7. In patients where an initial "Trauma CT" is indicated there should be protocols to maximise the useful information and minimise delay:
  - The initial sequence should include a head to toes scanogram. This should be used with clinical correlation to direct further specific limb sequences during that initial CT examination.
  - There should be a local policy on the inclusion of angiography in any extremity CT related to open fractures.
8. Prior to formal debridement the wound should be handled only to remove gross contamination and to allow photography, then dressed with a saline-soaked gauze and covered with an occlusive film. 'Mini-washouts' outside the operating theatre environment are not indicated.
9. All trauma networks must have information governance policies in place that enable staff to take, use and store photographs of open fracture wounds for clinical decision-making 24 hours a day.
10. Photographs of open fracture wounds should be taken when they are first exposed for clinical care, before debridement and at other key stages of management. These should be kept in the patient's records.
11. The formation of the management plan for fixation and coverage of open fractures and surgery for initial debridement should be undertaken concurrently by consultants in orthopaedic and plastic surgery (a combined orthopaedic approach).
12. Debridement should be performed using fasciotomy lines for wound extension where possible (see overleaf for recommended incisions for fasciotomies of the leg)
  - Immediately for highly contaminated wounds (agricultural, aquatic, sewage) or when there is an associated vascular compromise (compartment syndrome or arterial disruption producing ischaemia).
  - within 12 hours of injury for other solitary high energy open fractures
  - within 24 hours of injury for all other low energy open fractures.
13. Once debridement is complete any further procedures carried out at that same sitting should be regarded as clean surgery; i.e. there should be fresh instruments and a re-prep and drape of the limb before proceeding.
14. Definitive soft tissue closure or coverage should be achieved within 72 hours of injury if it cannot be performed at the time of debridement.
15. Definitive internal stabilisation should only be carried out when it can be immediately followed with definitive soft tissue cover.
16. When a decision whether to perform limb salvage or delayed primary amputation is indicated, this should be based on a multidisciplinary assessment involving an orthopaedic surgeon, a plastic surgeon, a rehabilitation specialist, the patient and their family or carers.
17. When indicated, a delayed primary amputation should be performed within 72 hours of injury.
18. Each trauma network should submit appropriate data to the TARN, monitor its performance against national standards and audit its outcomes.
19. All patients should receive information regarding expected functional recovery and rehabilitation, including advice about return to normal activities such as work and driving.

# Foot

- Can be injured by twisting ankle or by direct trauma
- Significant injuries can be hard to pick up

# Foot – clinical signs

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# Foot – Normal XR



# Foot - normal

Phalanges

Metatarsals

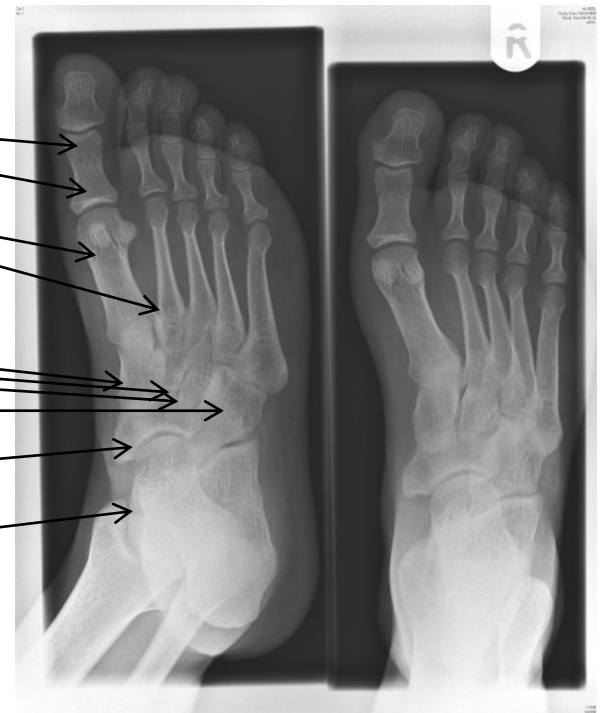
Cuneiforms:

Lateral/intermediate/medial

Cuboid

Navicular

Talus



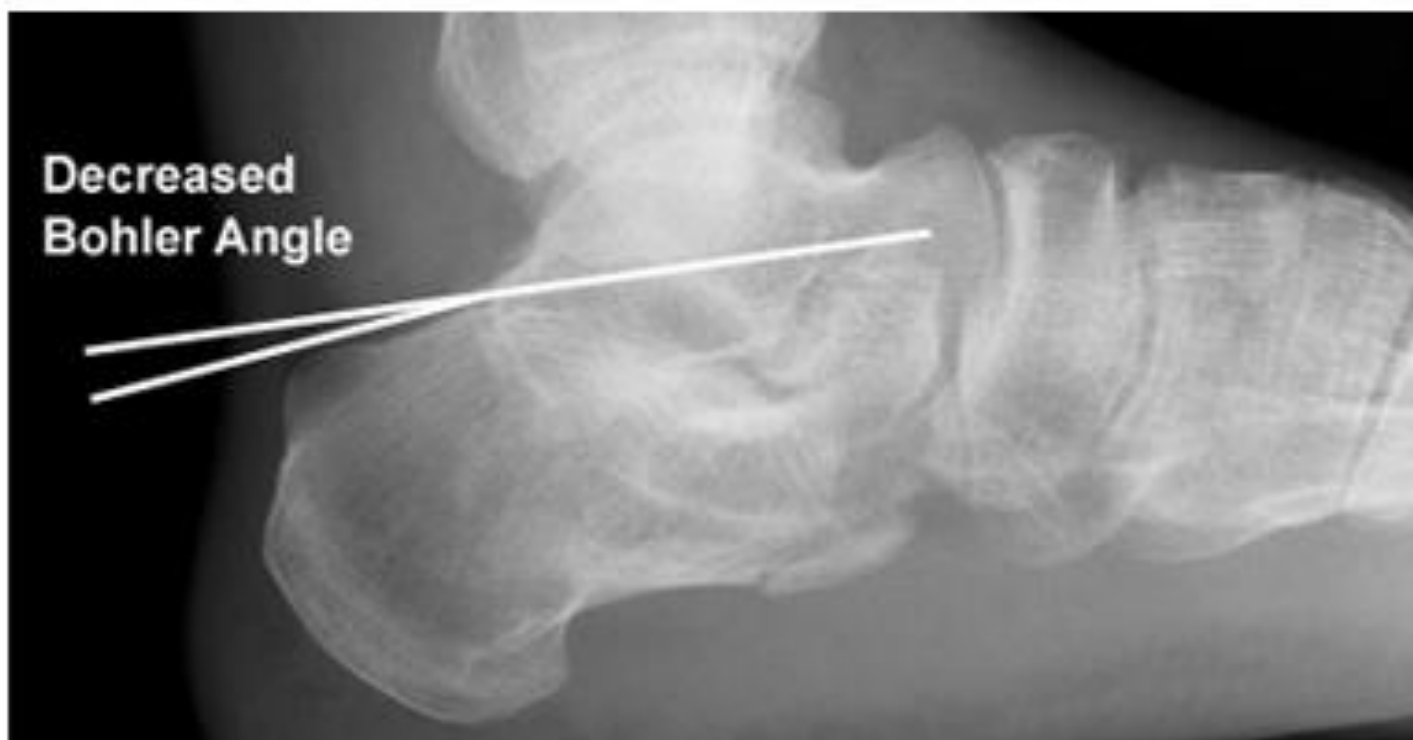
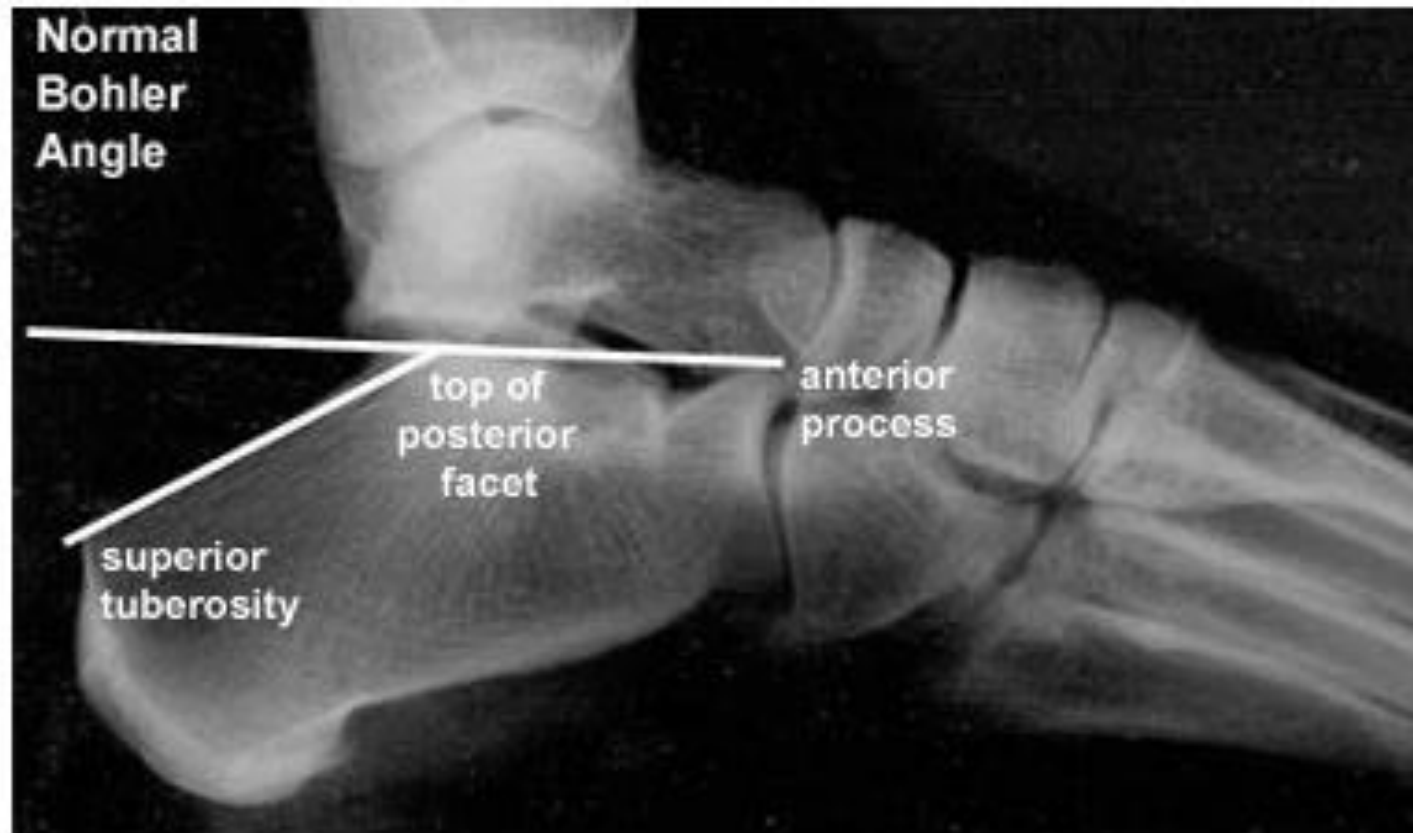
28 yr old  
jumped  
out  
window





Normal  
25-45 degrees

Abnormal  
<20 degrees



38 yr old  
slipped off  
kerb 2/7  
ago

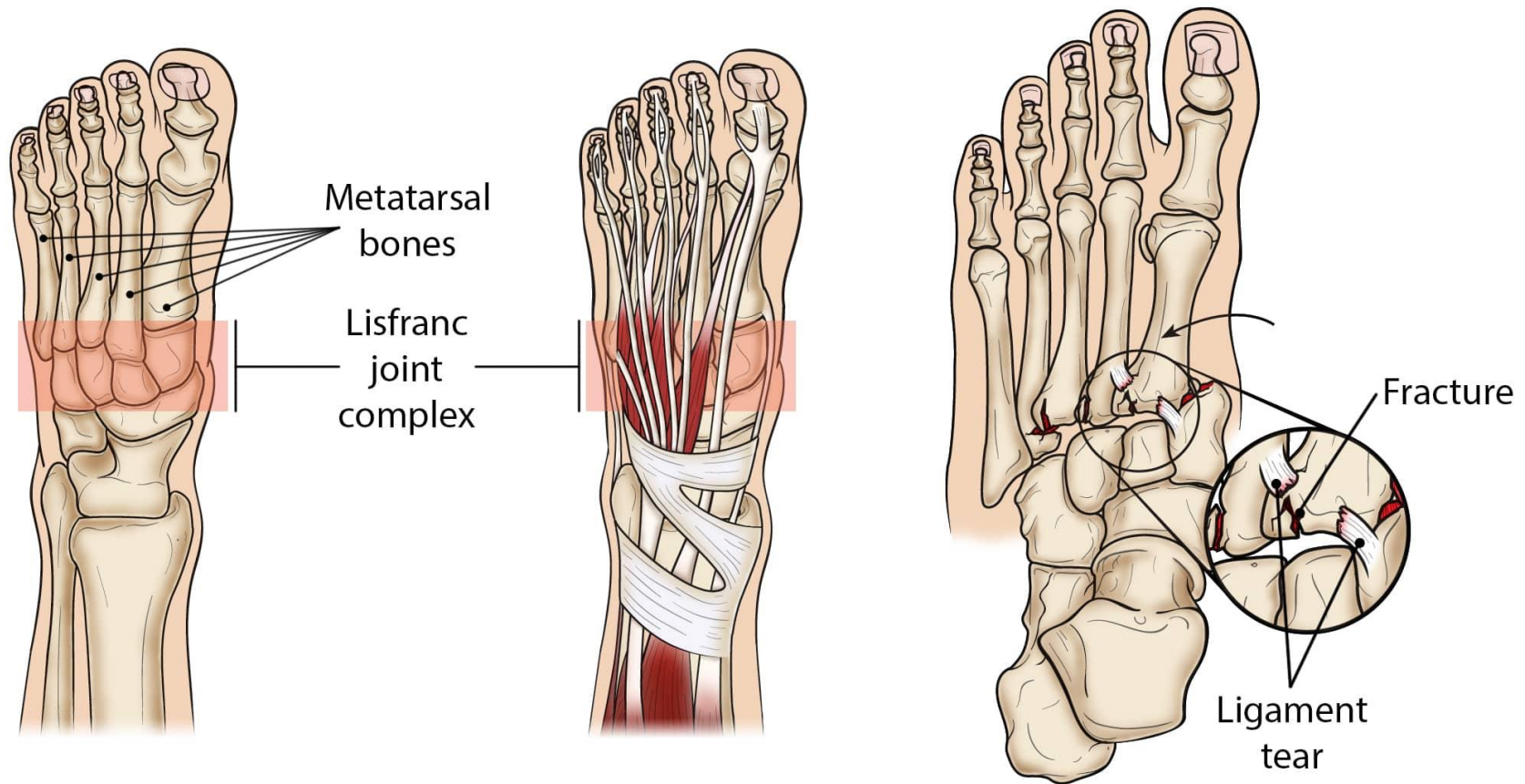




38 yr old  
slipped off  
kerb 2/7  
ago



# LisFranc injury



Foot – 30  
♂ dropped  
dumbbell  
on foot





Foot – 16  
♂ kicked  
wall in  
anger



Foot – 25  
♂ Slipped  
and  
twisted  
ankle



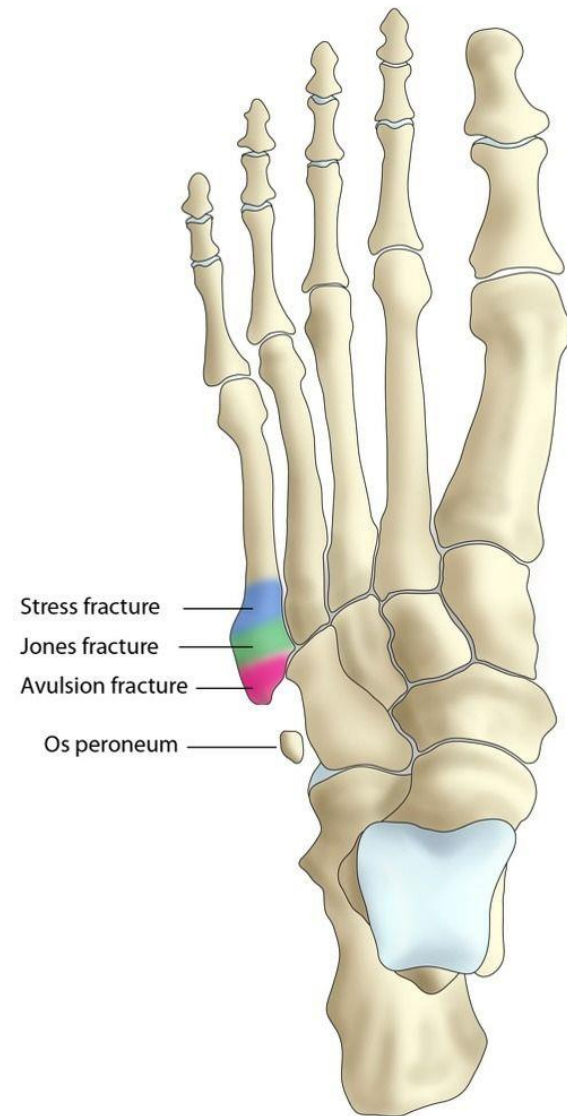


21 yr old fell slipped whilst belly dancing

Foot – 25  
♂ dancer  
twisted  
ankle



# Fracture patterns





25 yr  
footballer  
stubbed  
bigtoe



50 yr  
ballerina  
stubbed  
bigtoe



Any  
Questions?



# Summary

- Knee fractures check for subtle anomalies check the patient be aware of soft tissue damage.
- Relate mechanism to possible fracture pattern
- Obvious # early escalation and resuscitate and seek expert help
- If clinically suspicious treat as knee # and re image according to local policy
- If you do see an abnormality in this region think of the potential soft tissues affected.