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Ankle Fractures

Outline

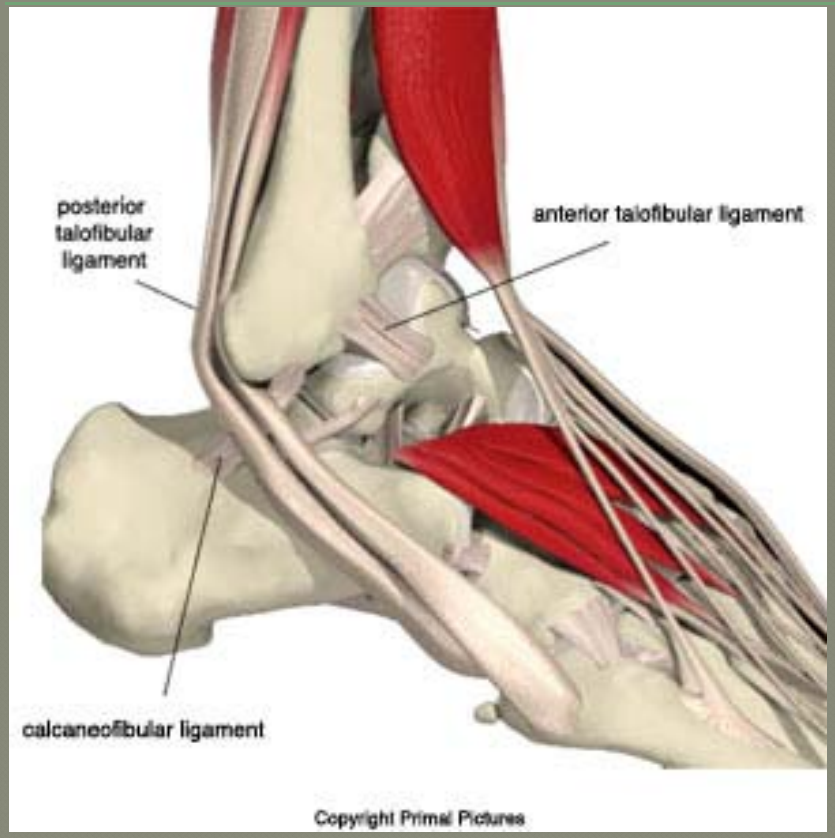
- Anatomy and common ankle views
- Ottawa Ankle Rules
- Classifications (Weber, Lauge-Hansen)
- Biomechanics
- Named fractures

LATERAL VIEW

AP VIEW

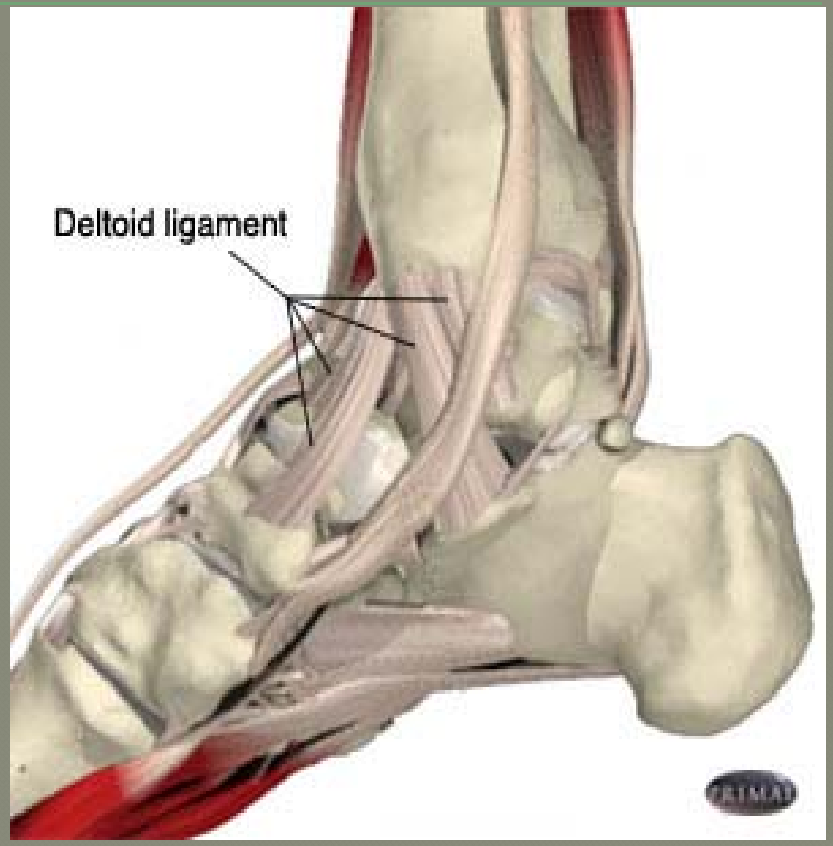
MORTISE VIEW

Lateral Ankle Ligaments



CFL = Calcaneofibular ligament
PTFL = Posterior talofibular ligament
ATFL = Anterior talofibular ligament

Medial Ankle Ligaments



Deltoid Ligament

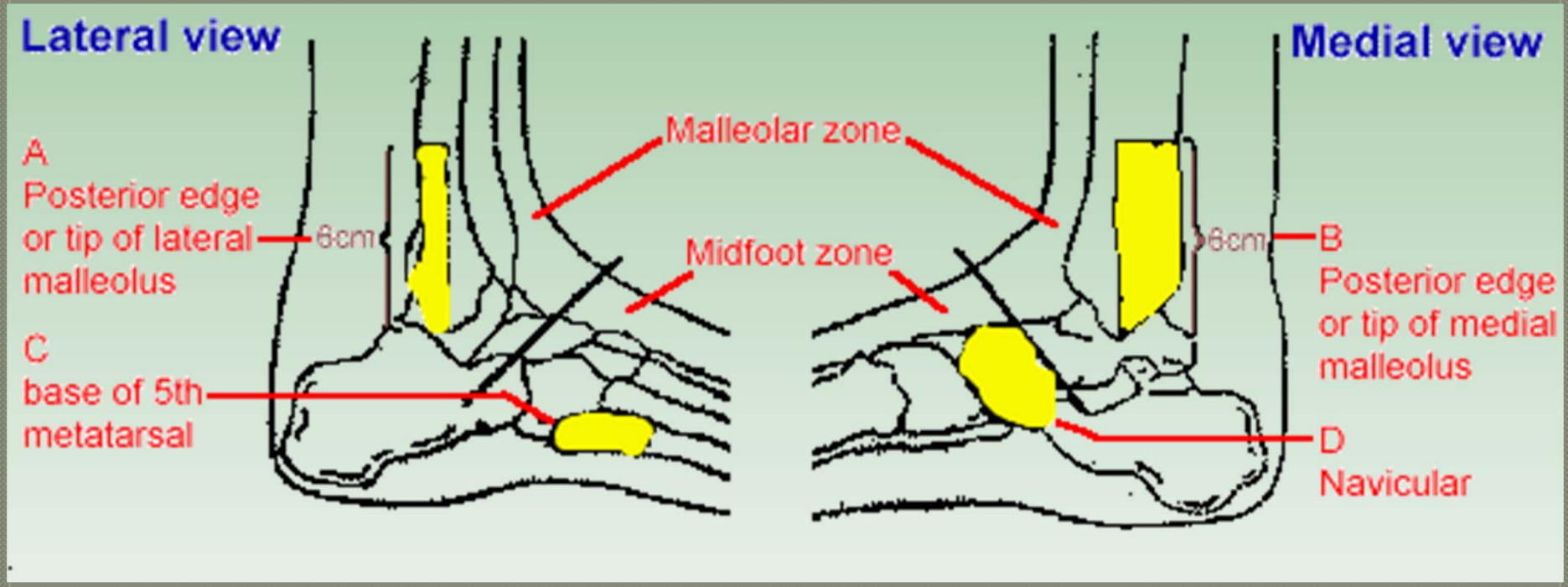
Ottawa Ankle Rules

- Before introduction of the rules, all injured ankles were X-rayed but only 15% were positive for fracture
- The ankle is the most commonly injured weight bearing joint
- Unnecessary X-rays: costly, time consuming, and possible health risk

Ottawa Ankle Rules

- X-rays are only required if there is bony pain in the malleolar zone AND any one of the following:
  - 1 – Tenderness along the distal 6cm of the posterior edge of the tibia
  - 2 – Tenderness along the distal 6cm of the posterior edge of the fibula
  - 3 – Inability to bear weight immediately after injury and in the ER

Ottawa Ankle Rules

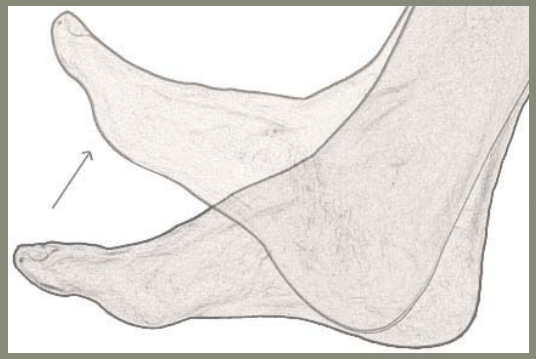


Classification Schemes

- Danis-Weber system
  - Level of the fibular fracture in relationship to the ankle joint (A, B, C)
  - Ideal for the primary care setting – allows you to classify the injury easily and guides treatment
- Lauge-Hansen system
  - 2-word descriptors detailing position and motion of the foot each with 2-4 stages specifying exact locations of fractures
  - More descriptive but very complicated
  - i.e. pronation-abduction-stage 2

Biomechanics

Dorsiflexion



Eversion

Adduction

Plantarflexion

Inversion

Abduction

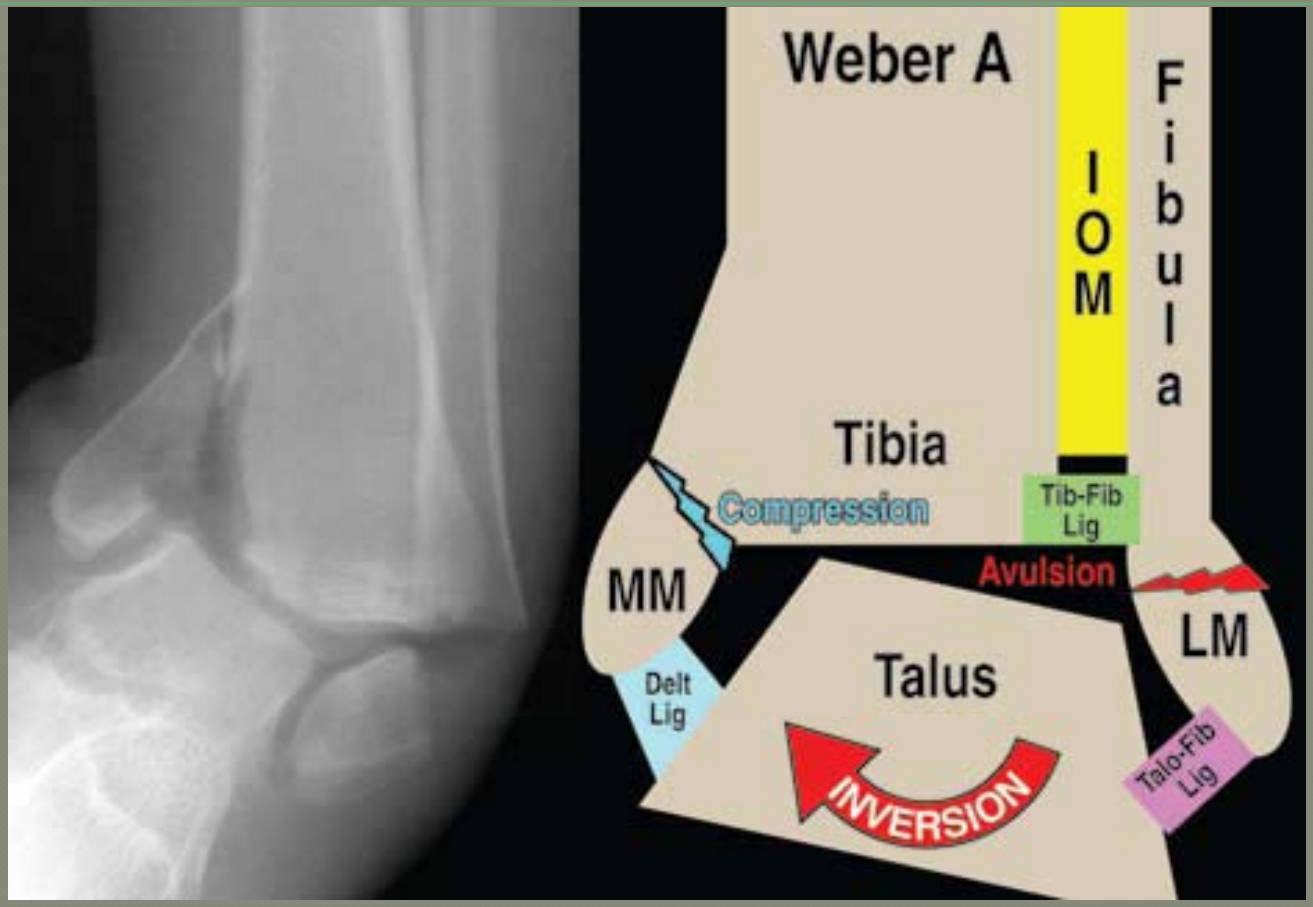
Biomechanics

- Simple unidirectional forces can be involved in an ankle injury resulting in ligamentous damage and isolated fractures
- Multidirectional forces are usually involved making diagnosis a challenge

Biomechanics

- Lateral Complex
  - Distal fibula
  - Lateral facet of the talus
  - Lateral ligaments of the ankle
  - Subtalar joints
- Lateral complex injuries typically occur with inversion and supination
- The most common ankle injury

Biomechanics

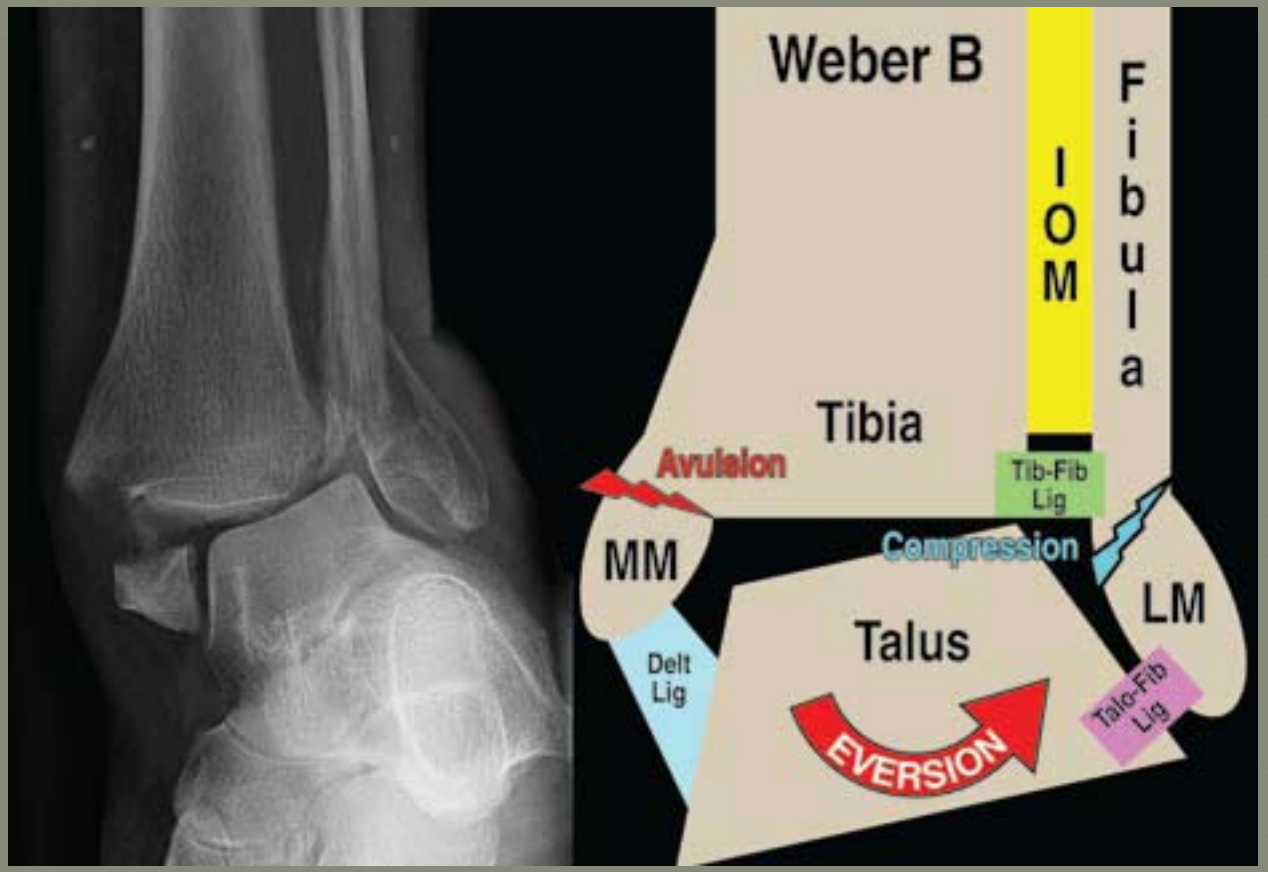


Inversion force avulses the lateral malleolus and continued force causes oblique fracture of the distal tibia

Biomechanics

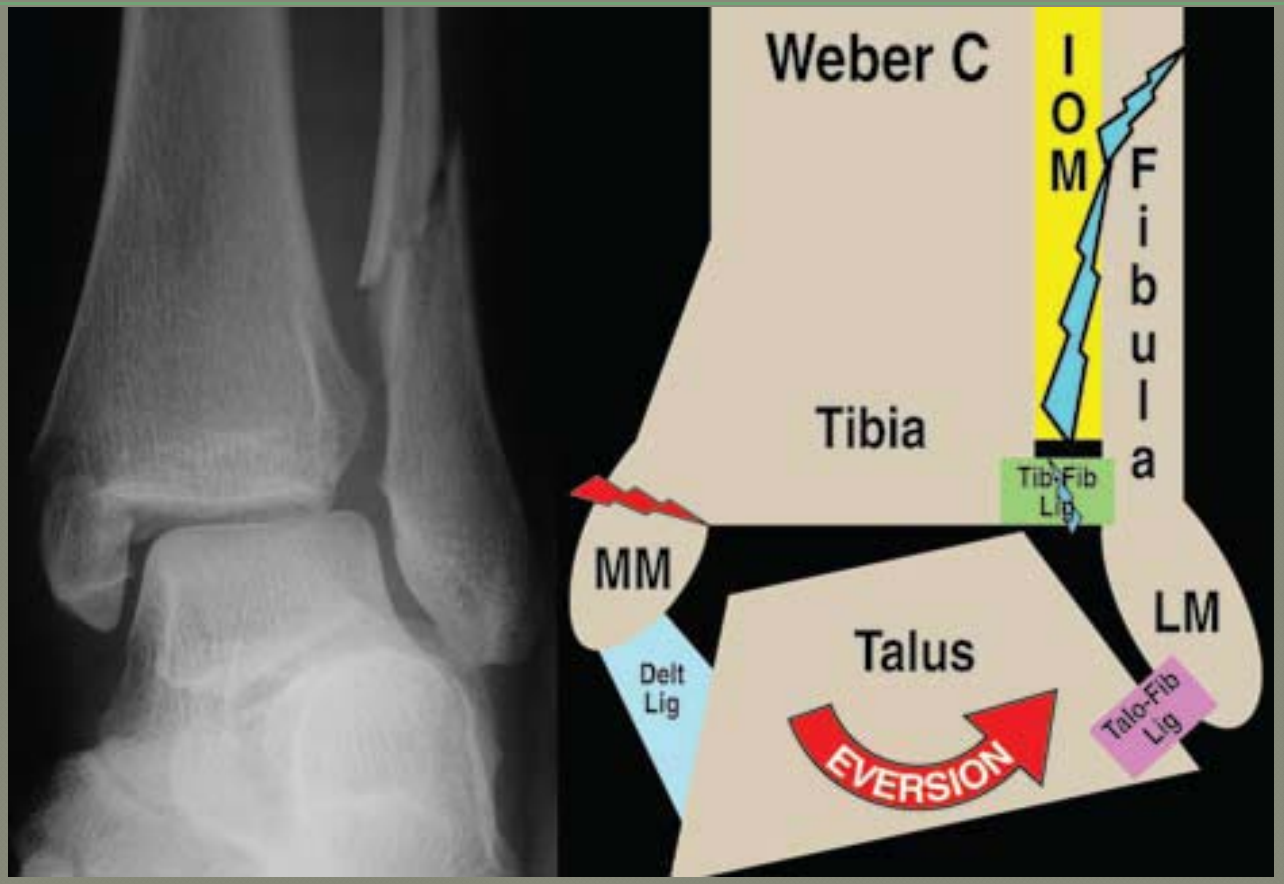
- Medial Complex
  - Medial malleolus
  - Medial facet of the talus
  - Superficial/deep deltoid ligament
- Medial complex injuries typically occur from eversion and abduction

Biomechanics



Eversion force avulses the distal medial malleolus (young/elderly) and continued force results in rupture of the syndesmosis or transverse fracture of the distal fibula

Biomechanics



Horizontal avulsion fracture through the medial malleolus and oblique-vertically oriented compression fracture through the distal fibula. The syndesmosis is disrupted and abnormally widened, with no overlap between tibia and fibula

MAISONNEUVE FRACTURE

-Proximal half of fibula

-Strong eversion

-The more proximal the fracture, the more unstable the joint

TILLAUX FRACTURE

Lateral margin avulsion of the distal tibia

Abduction
+
External Rotation

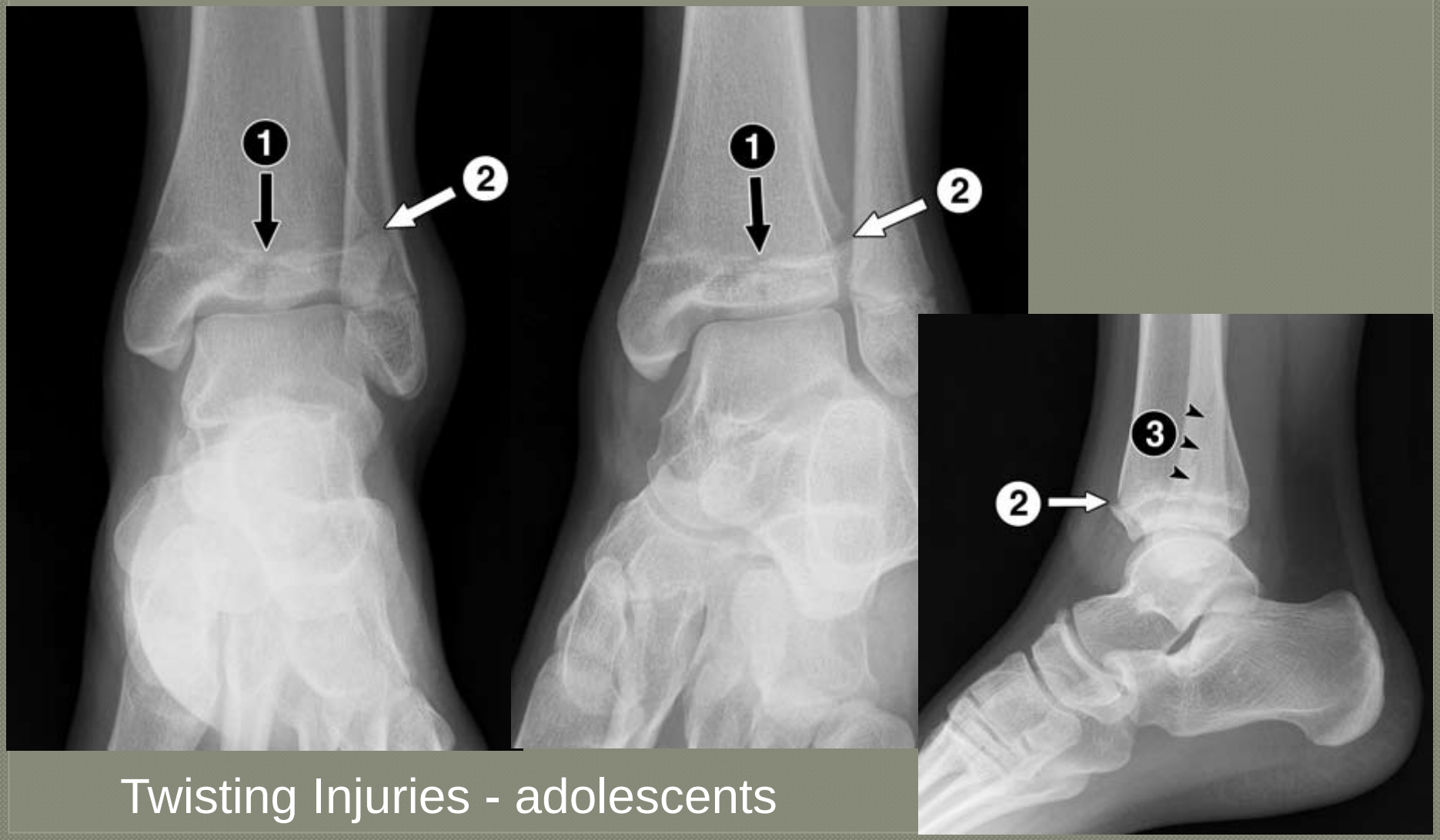
Typically occurs in adolescents after medial epiphyseal plate closes but before the lateral (18 month window)

TRIPLANE FRACTURE

1 = vertical frxr thru the epiphysis

2 = horizontal frxr thru the physis

3 = oblique frxr thru the metaphysis



Twisting Injuries - adolescents

PILON FRACTURE

TRAUMA!!

TRIMALLEOLAR FRACTURE

- Can be caused by talar eversion and posterior displacement
- Also known as a Henderson fracture