Ankle Fractures

Phong Tran
Orthopaedic Surgeon
Western Health

Ankle fractures

Western Health

- Most common fracture treated by orthopaedic surgeon
- Low energy injuries
- Twisting mechanism (similar to ankle sprains)

History and Examination

Western Health

- Mechanism of Injury – high vs low
- PMHx
  - Diabetes, smoker, neuropathy
- Examination
  - Soft tissue
    - swelling,
    - blisters,
    - Bruising
    - Wounds
  - Special Tests
    - Areas of tenderness
    - Squeeze test
    - Ottawa

Maisonneuve Fracture

Western Health

Ottawa Ankle Rules:

Western Health

Order ankle x-rays if acute trauma to ankle and one or more of

- Age 55 or older
- Inability to weight bear both immediately and in ER (4 steps)
- Bony tenderness over posterior distal 6 cm of lateral or medial malleoli

- Sensitivity ~100%
- Specificity ~40%

"Walk it off, Billy! It's just a turned ankle!"

Investigations

Western Health

AP

Mortise

Lateral

15° IR

Reading Xrays

Western Health

- Lateral malleolus
- Medial malleolus
- Syndesmosis
- Mortice / Talar shift
- Posterior malleolus

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Mortise X-Ray

- ankle in 15-25˚ of IR

Mortise X-Ray

- Medial clear space
  - Between lateral border of medial malleous and medial talus
  - <4mm is normal
  - >4mm suggests lateral shift of talus

Mortise X-Ray

Mortise x-ray:

Mortise x-ray:

Classification

Western Health

- Lauge-Hansen (1949)
- Weber (1972) - AO

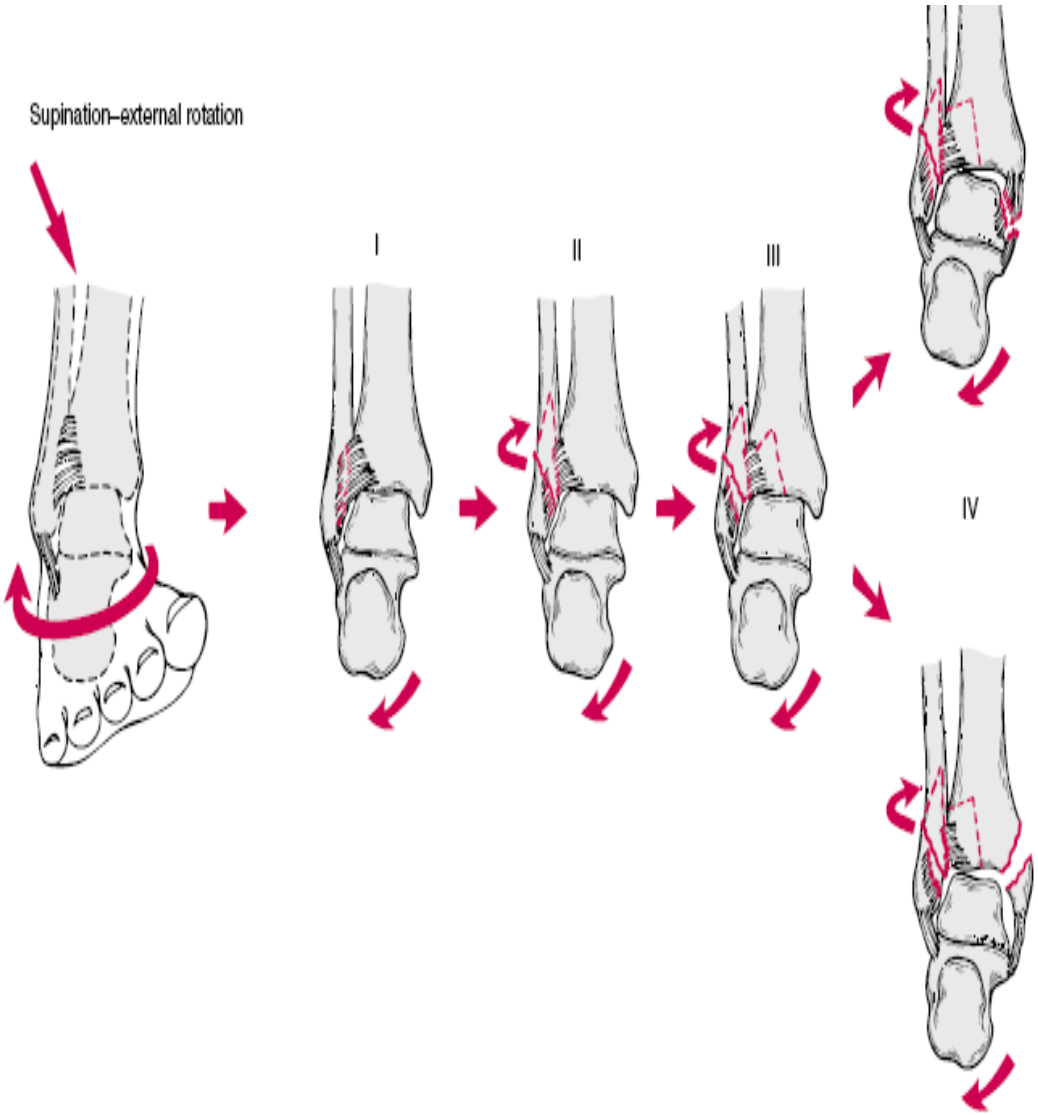
Lauge - Hansen classification

Western Health

- Mechanism of injury
  - Supination Adduction
  - Supination External rotation
  - Pronation Adduction
  - Pronation External rotation

- Complicated / Hard to Remember

Supination External Rotation



Weber classification

Western Health

Advantages:

- **easy to use**
- **provides information about fibular**

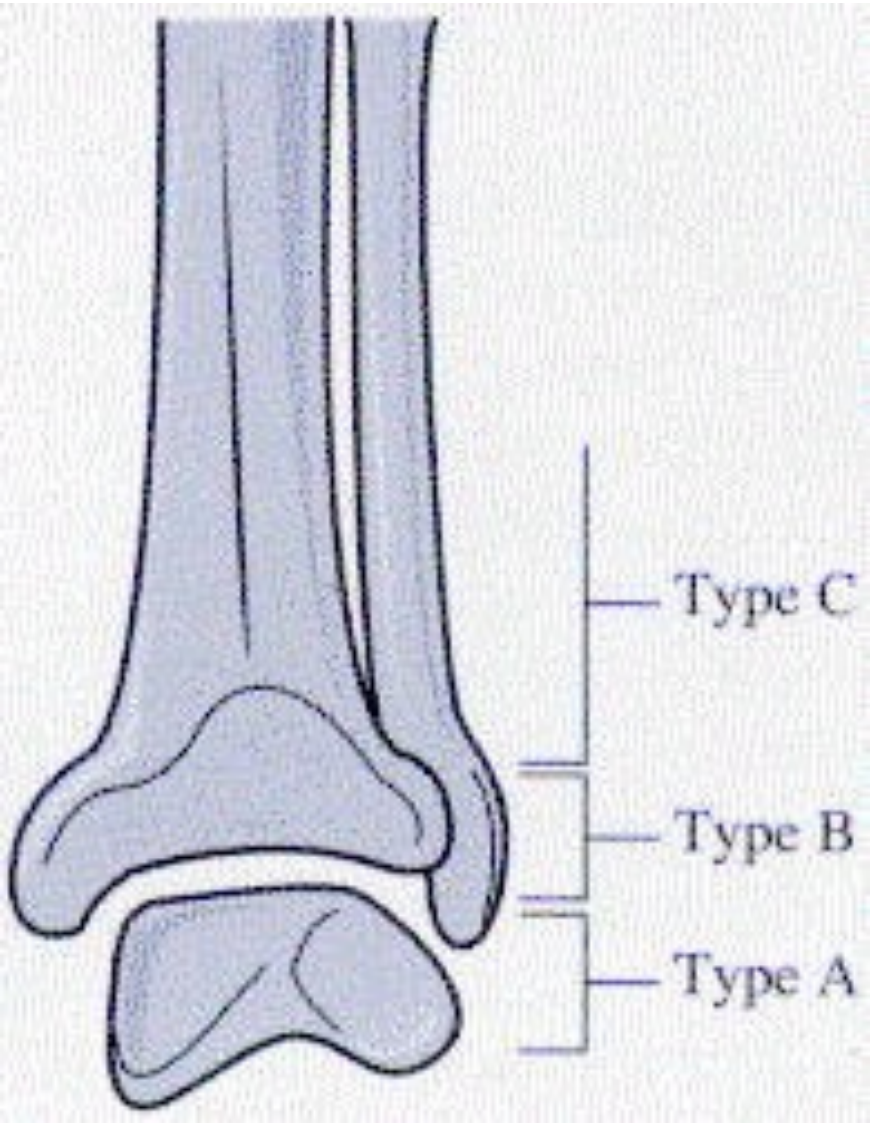
Disadvantages:

- **ignores the medial injury**

The AO classification system

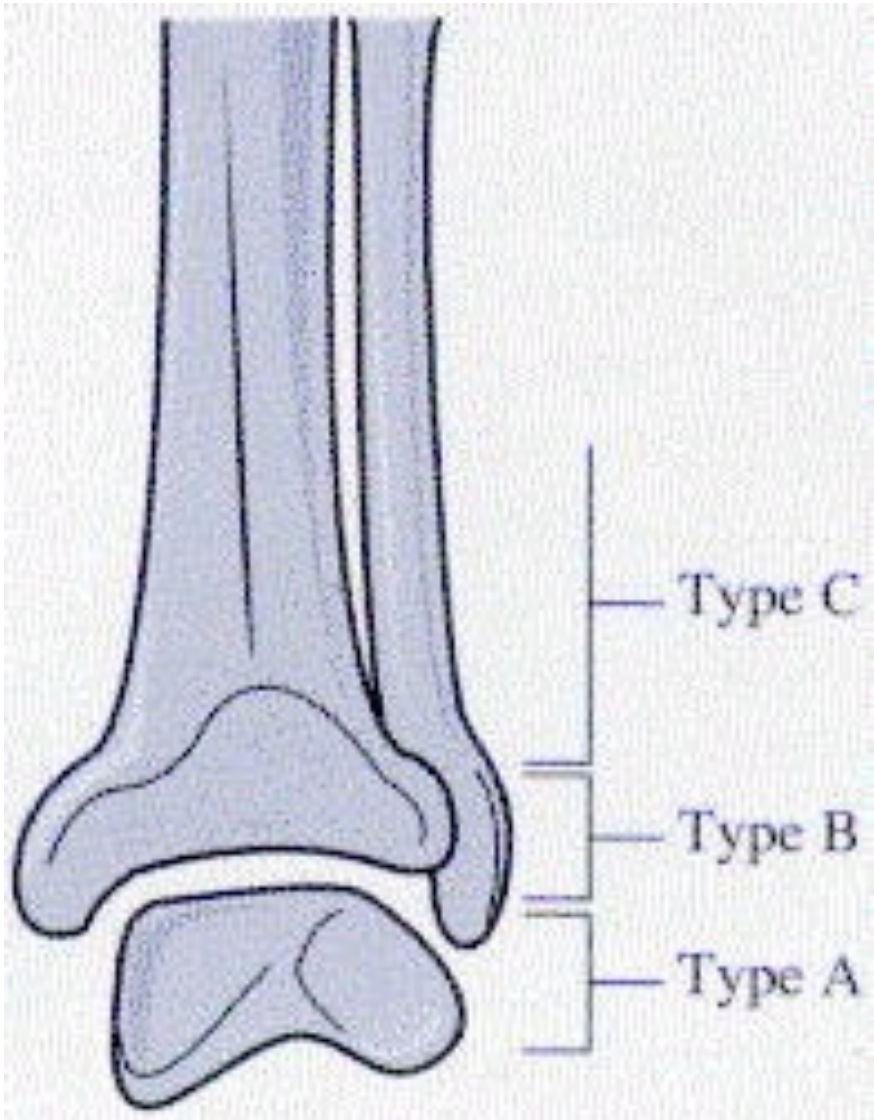
- **Modification of the Weber system**
- **subdivided on the basis**

  medial or posterior injury



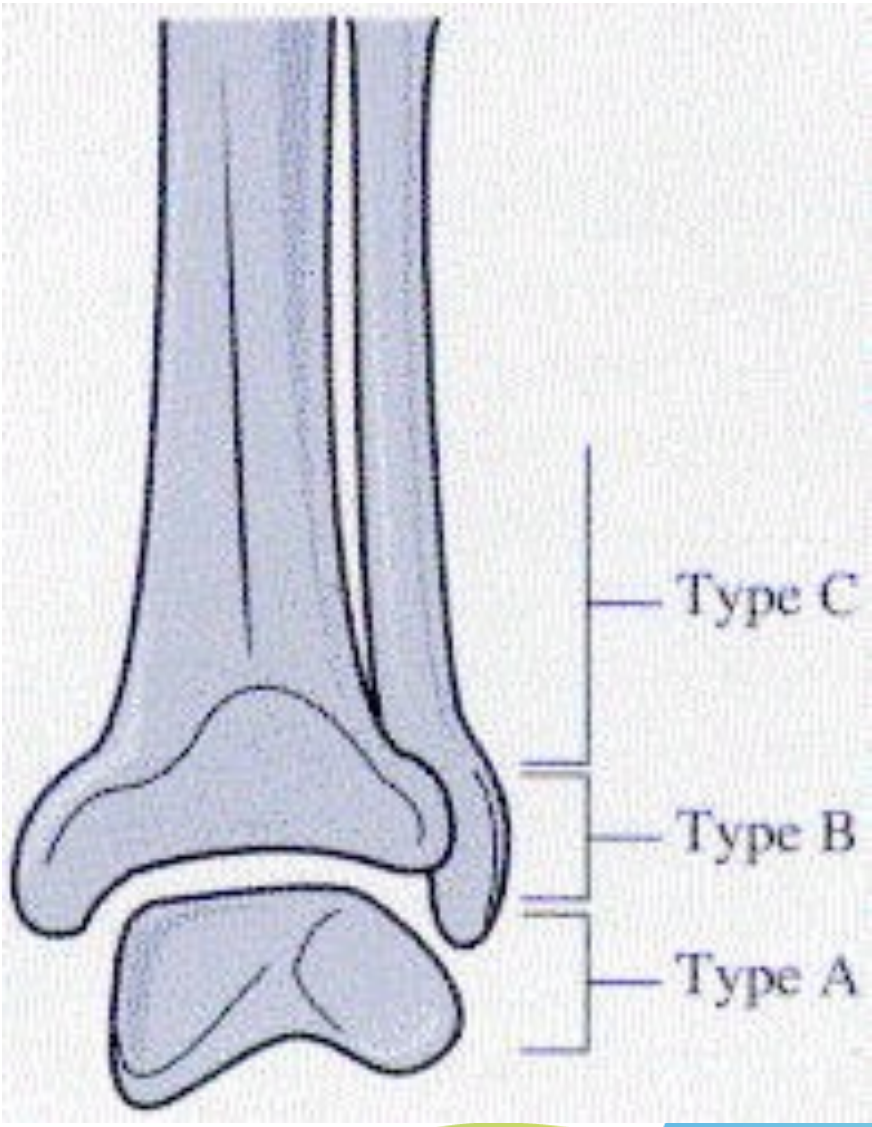
Weber classification

Western Health



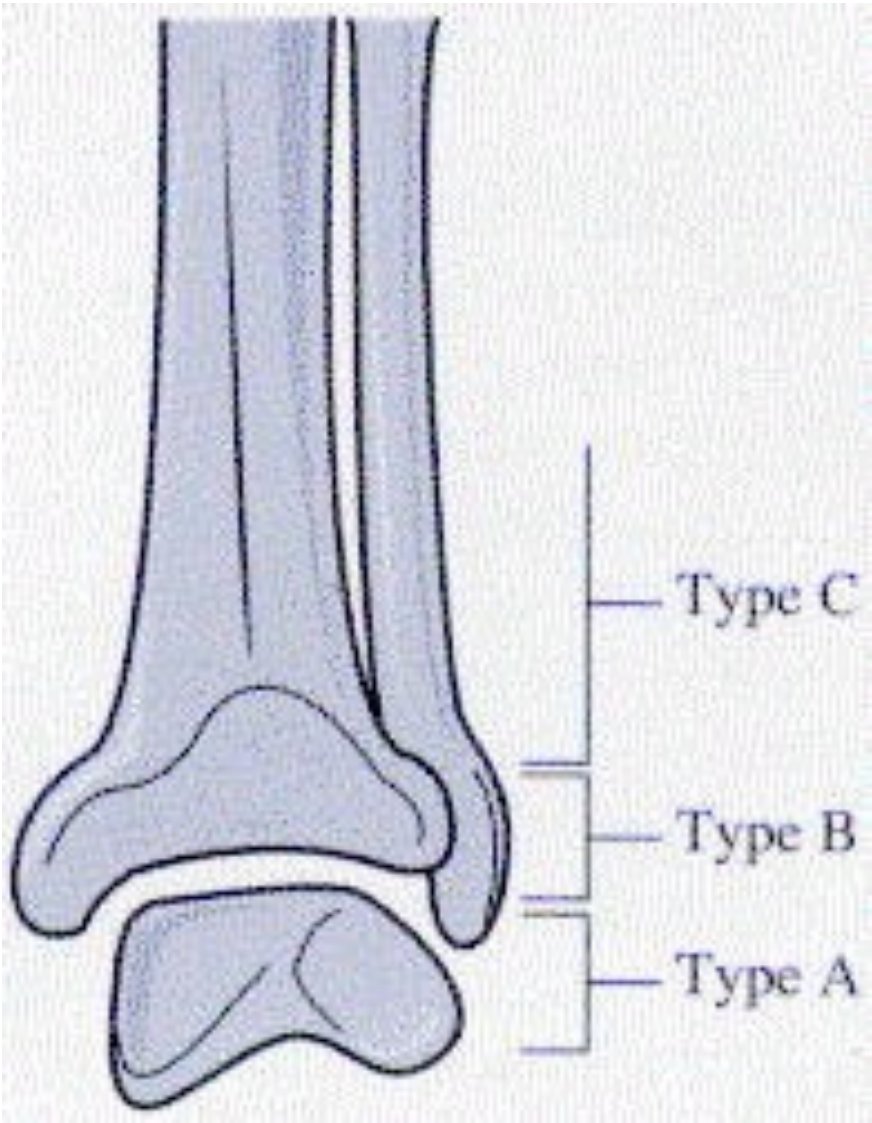
Weber classification

Western Health



Weber classification

Western Health



Management priorities

Western Health

1. Reduce
   - Provisional reduction
   - Care of open fracture
   - Soft tissues
2. Hold
   - Precise definitive reduction
   - Cast
   - ORIF
3. Move
   - Rehabilitation

Goals of Treatment

Western Health

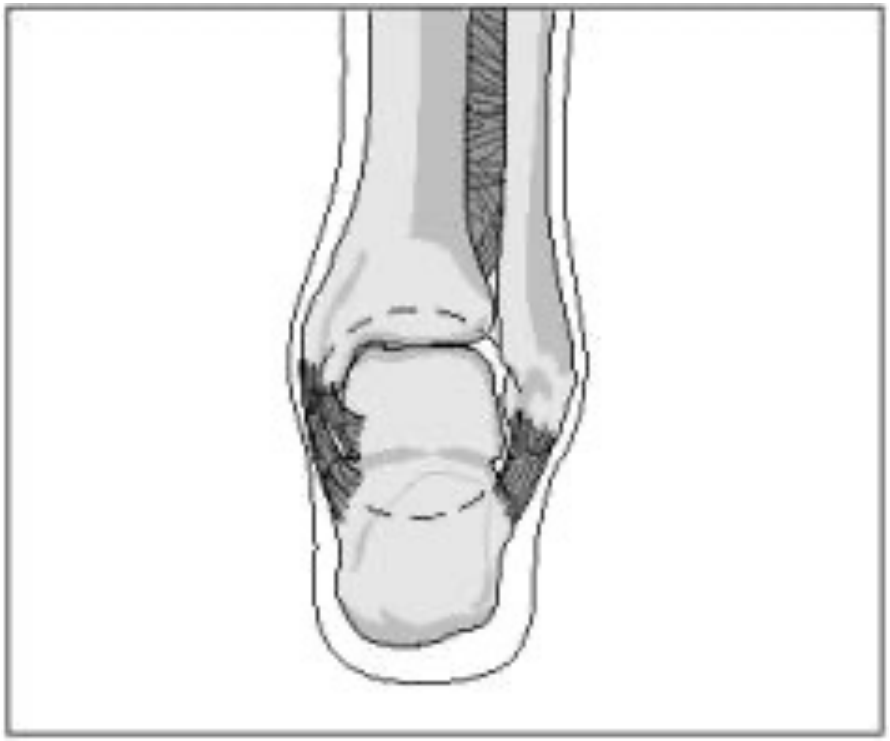
- Healed fracture
- Ankle that moves and functions normally without pain

Cast vs Internal Fixation

Western Health

- What is broken?
  - Medial Malleolus
  - Lateral Malleolus
  - Posterior Malleolus
  - Syndesmosis
- Does it need to be reduced?
- Stable vs Unstable

Stable vs Unstable

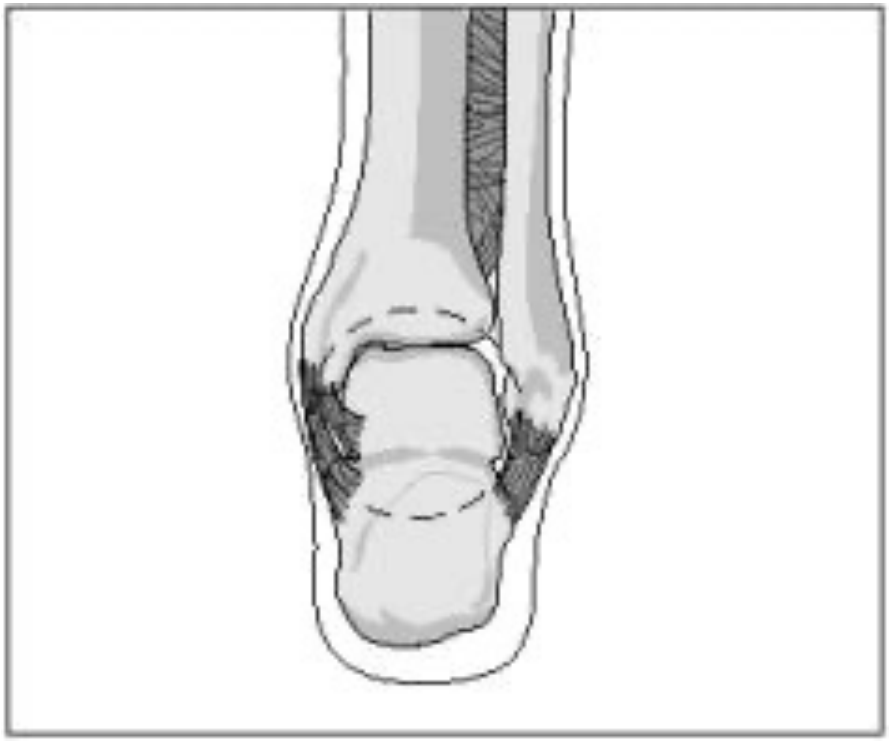


The ankle is a ring

- Tibial plafond
- Medial malleolus
- Deltoid ligaments
- calcaneous
- Lateral collateral ligaments
- Lateral malleolus
- Syndesmosis

Source: Rosen

Stable vs Unstable



Fracture 1 part = usually stable

Fracture > 1 part = unstable

Unstable fractures

Western Health

- Lateral talar shift
- Bimalleolar
- Lateral fractures + medial tenderness
- Syndemosis Injuries
- Maisonneuve

Unstable fractures

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Lateral Shift of Talus

Western Health

1-mm lateral shift

=

decreased contact area by 42%

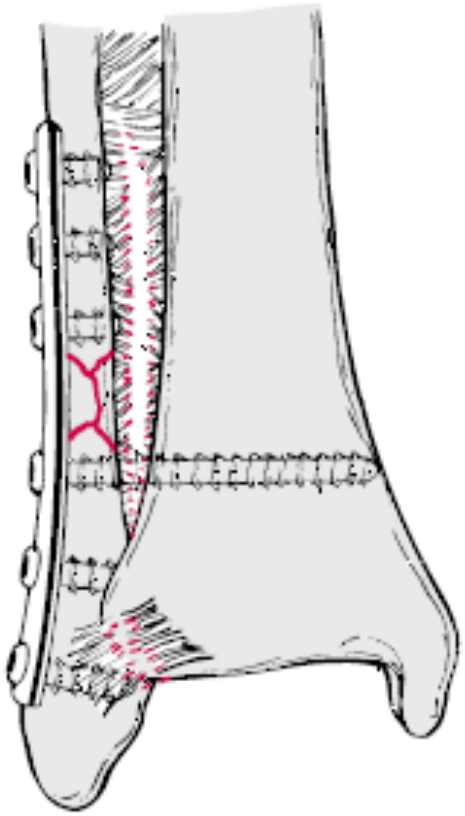
3 mm of lateral shift,

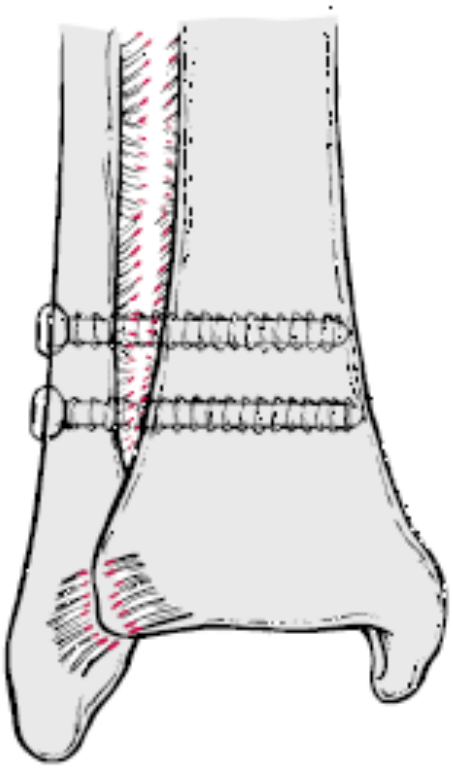
=

decreased contact area by 60%

Lateral Shift of Talus

Western Health





Pilon / Plafond fractures

Western Health

Pilon / Plafond fractures

Western Health

- Fracture of distal tibial metaphysis
  - Often comminuted
  - Often significant other injuries
- Mechanism
  - Axial load
  - Position of foot determines injury
- Treatment
  - Unstable
  - X-ray tib/fib & ankle
  - Orthopedic consultation

Tillaux Fracture

Western Health

Tillaux Fracture

Western Health

- Occurs in 12-14 year olds

  18 month period when epiphysis is closing

- Salter-Harris 3 injury

- Mechanism

  External rotation

  Strenth of tibiofibular ligament > unfused epiphysis

Tillaux Fracture

Western Health

- Management

Articular injury

Gap >2mm in articular surface

= ORIF

Non-displaced

- NWB below knee cast

Displaced

- surgery

Thank you