The LEG

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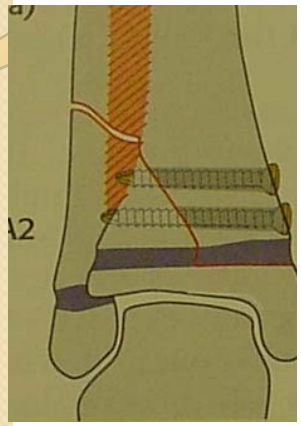
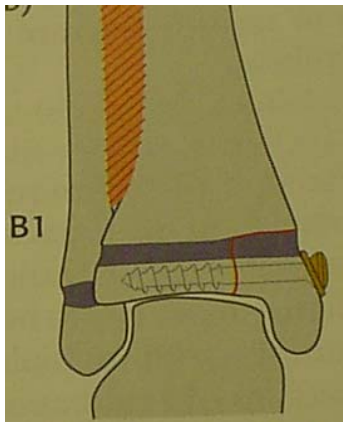
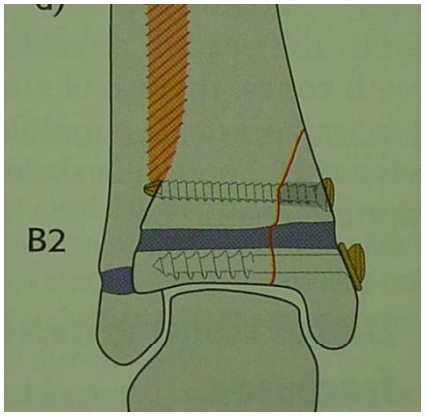
Fracture in Children [Salter And Harris]



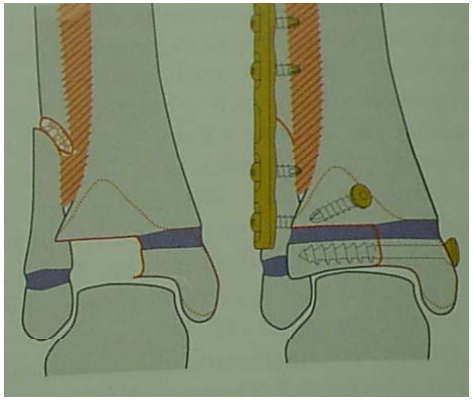
Type II



Type III



Type IV

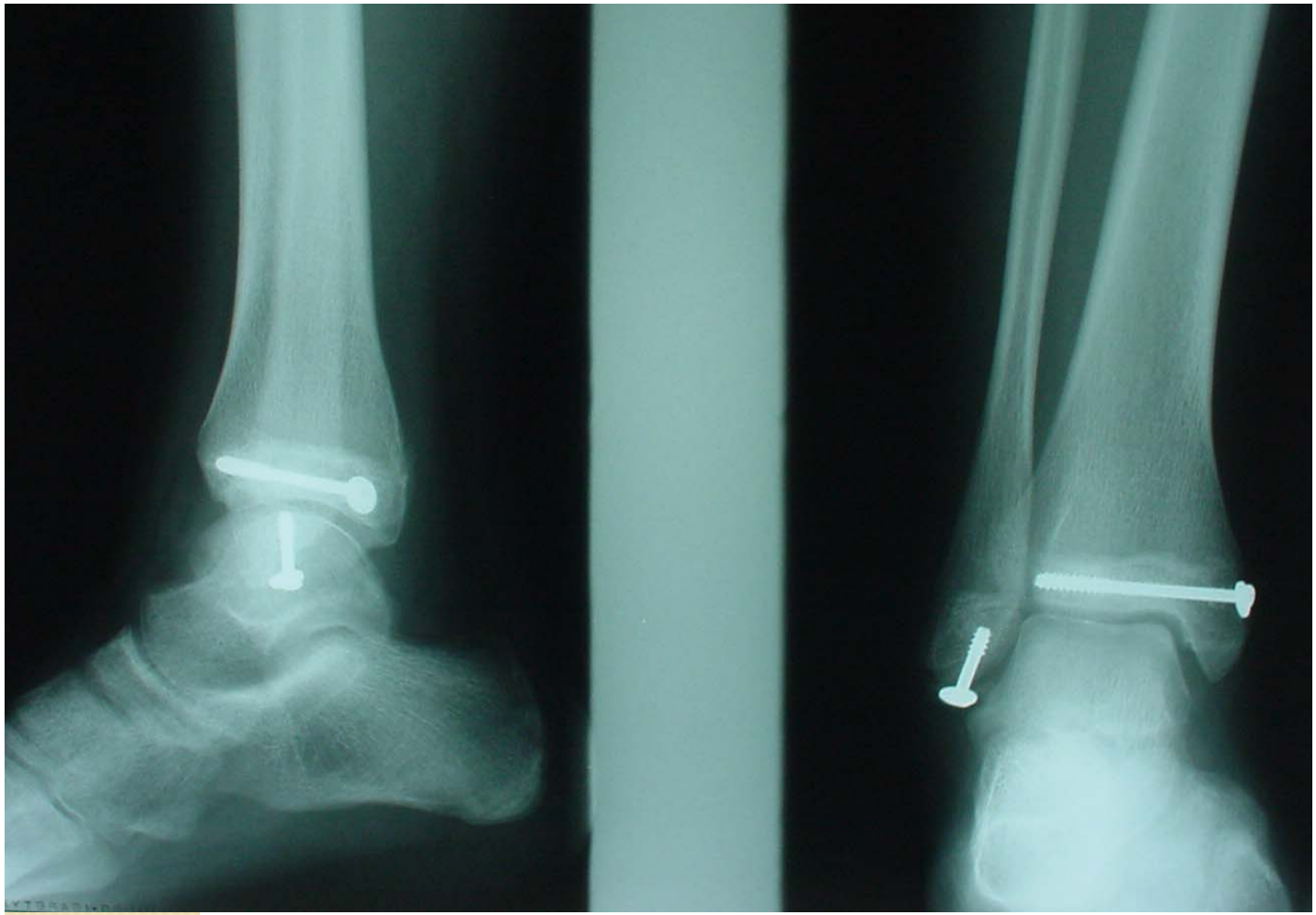


Triplane

Surgical Rx III and IV

- **Type II, V** **Non-operative treatment**
- **Type I, II When not reduced** **ORIF**
- **Type III** **ORIF**

- **Informed consent: about growth arrest and angulation**
- Use of image intensifier
- .
- Tranepiphyseal screw

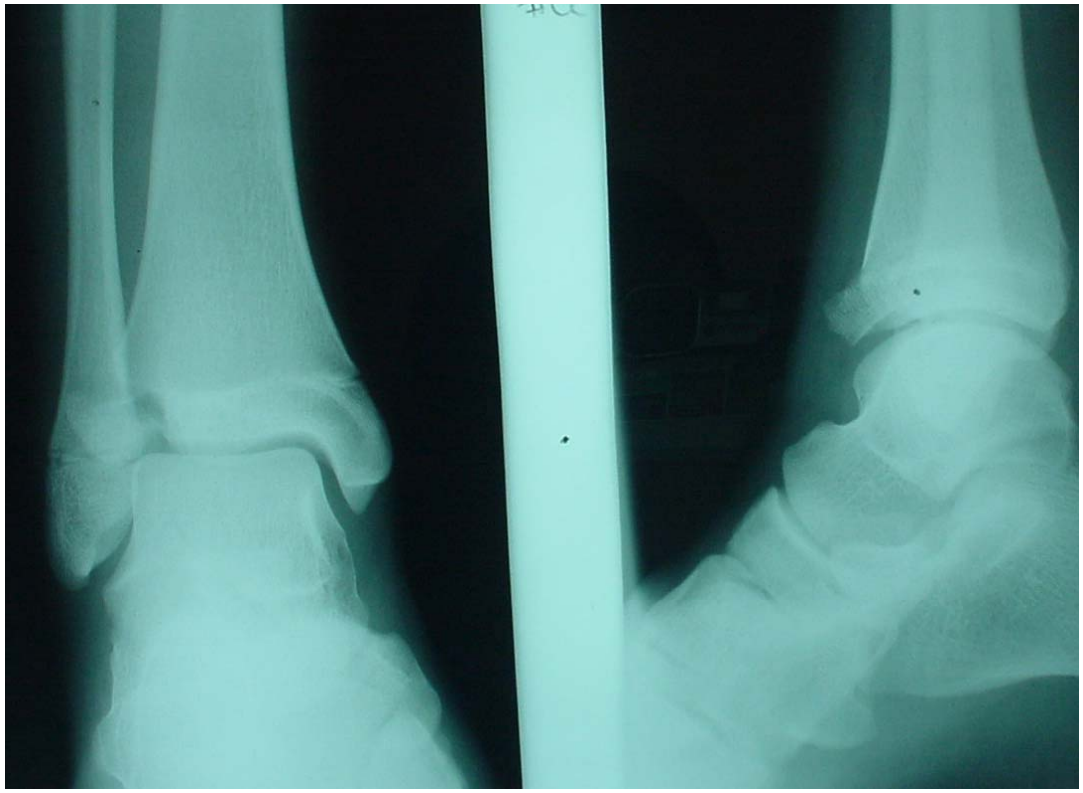


Type III and IV: Needs anatomic reduction and fixation

Fixation should be removed after healing

Kay: ORIF Vs CR, Malunion is 5% Vs 60%

Tillaux fracture



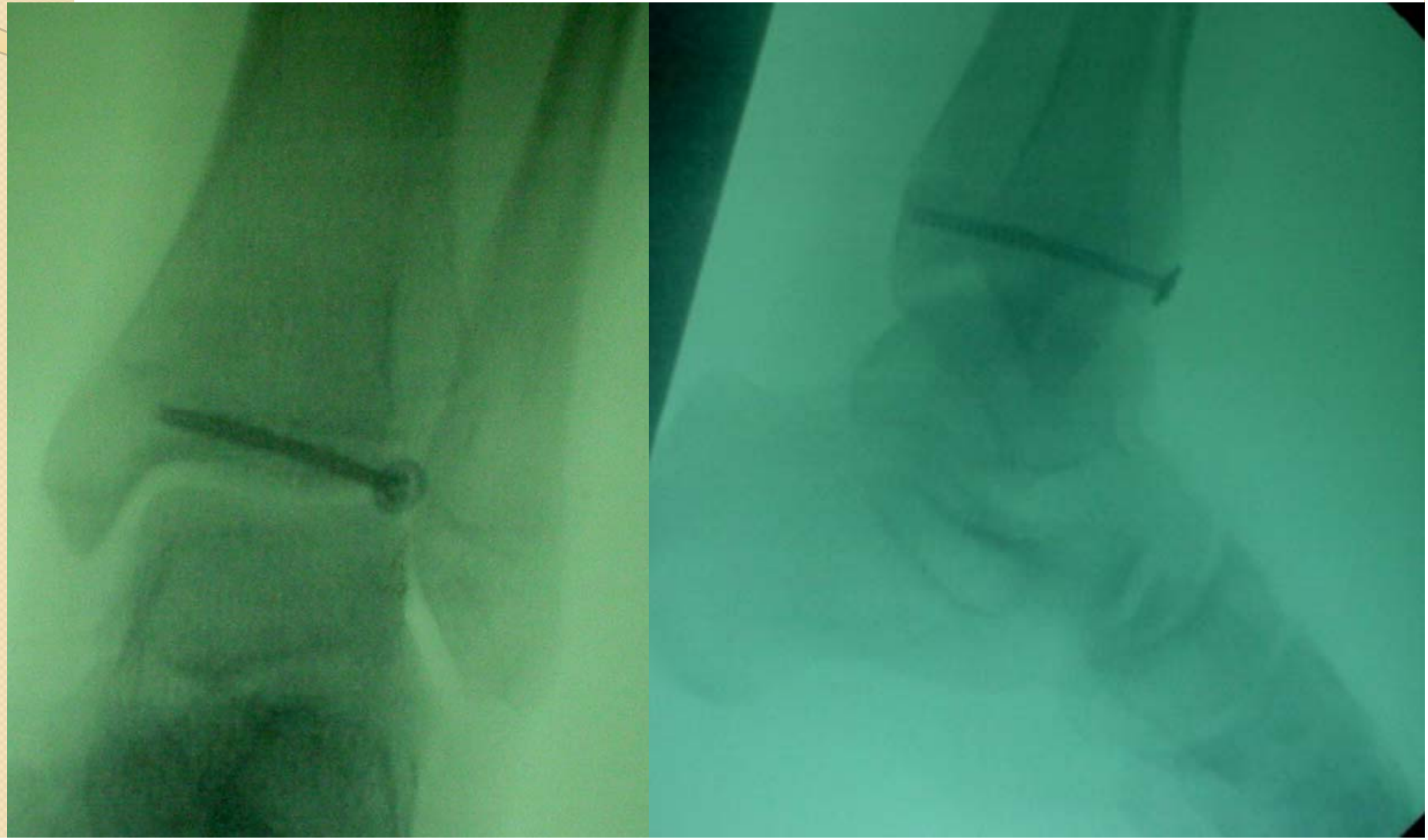
Attachment of ATFL

Type III

Usually seen in adolescent:

ER injury

Fixation of Tillaux fracture

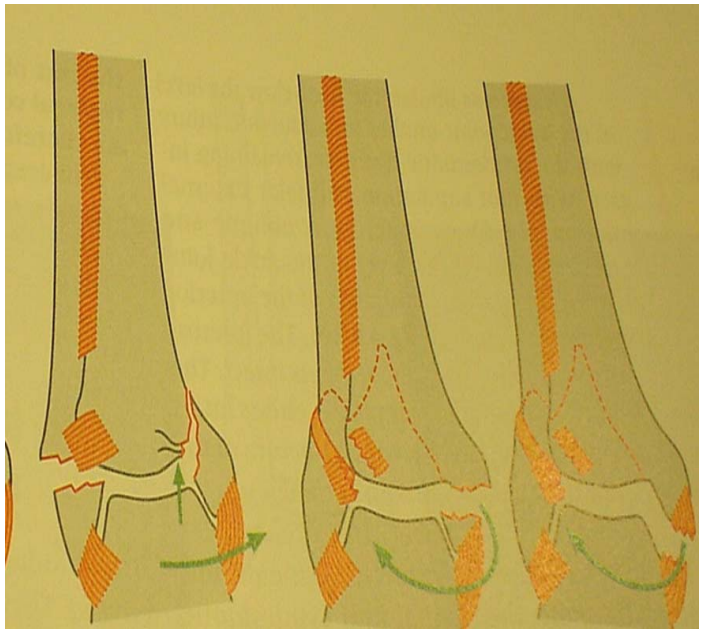


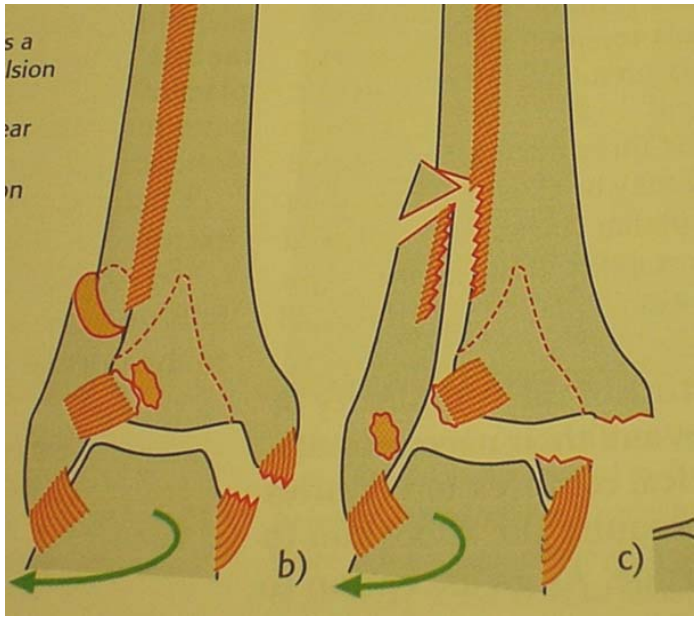
Triplane fracture

Triplane

Deformity due growth plate damage

ADULT ANKLE FRACTURE

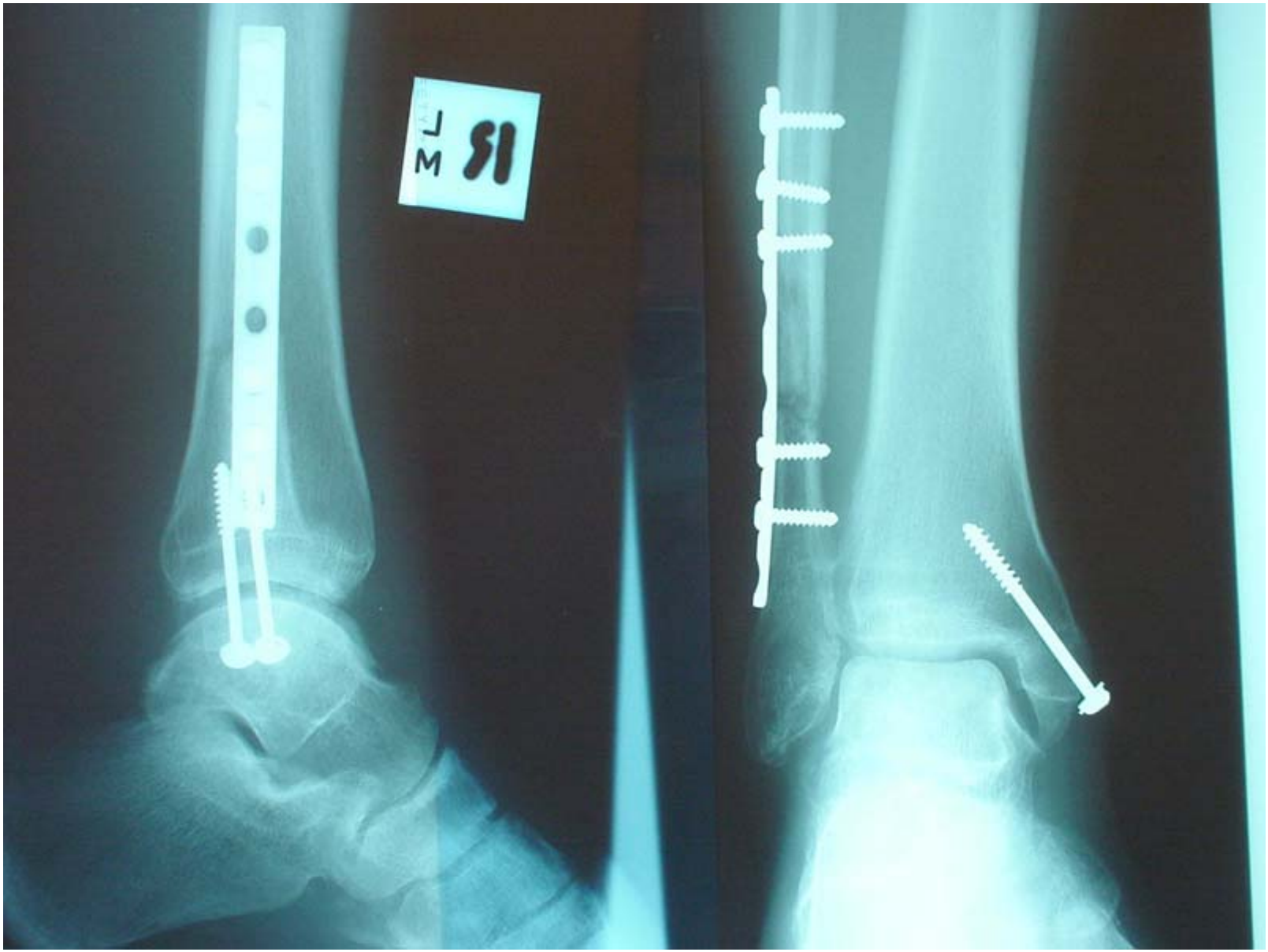




Type A Type B Type C [Unstable]

Type B is common 80% and contains heterogenous group may give different results with treatment

AO type C; Bimalleolar with complete diastasis Pronation ER injury



Bimalleolar fixation without syndesmotic screw

Stabilization of Tibia

Skin incision

Tunnel is created

Plate is passed

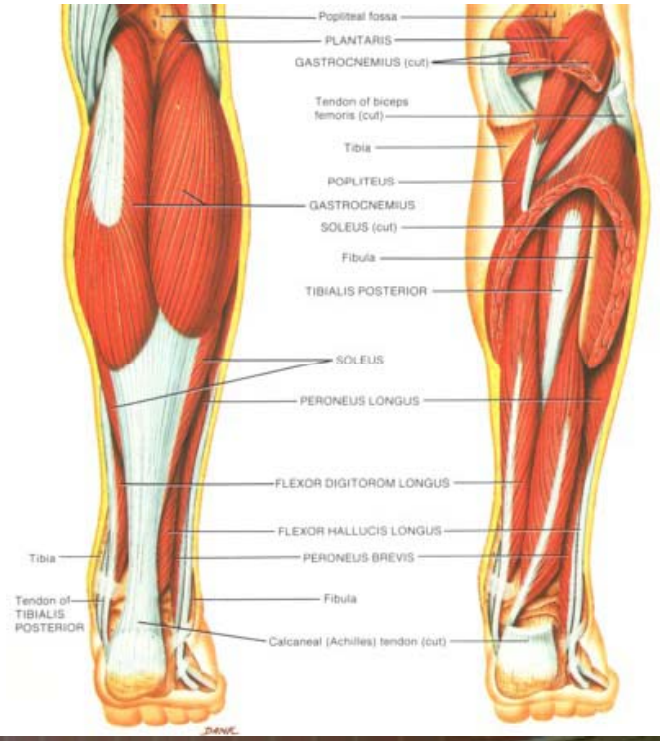
Open fracture dislocation

Typical Achilles rupture

5 cm above the insertion

- Related to a sporting event.
-
- Net ball/badminton
- More in women

- Middle aged person



DIAGNOSIS

- Attitude of the foot
- Palpable tendon defect

Thompsons or Simmond's test

Simmonds squeeze test (= Thompson test in USA)

Plantarflexion at the ankle on squeezing calf means tendon is intact

NON OP

- Non-op Rx is not equal to cast treatment
- **Cast immobilization X 8 wks**
- Is extremely detrimental to healing
- Early controlled movement is important for tendon healing/strength.
- Causes: Permanent muscle atrophy
  Joint stiffness
  Increases the re-rupture rate.

Functional treatment

- Acute ruptures < 48hrs old
- Sedentary patient
- Patient with anesthetic problem
- Steroid induced
- Equinus POP (below knee) 4 wks ➔ Moon boot with wedges

Non-op

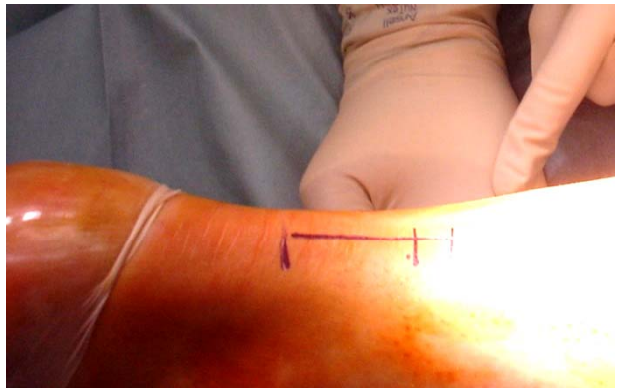
- 2 week — Equinus below knee cast
- 2-6 week — Thermoplastic material with a stirrup for heel; Foot in 20deg. plantarflexion.
- 6 weeks — Remove cast & walk with 1cm heel raise (on both sides).
- 8 weeks — Normal walking without heel raise.
- 10 weeks — Resistance exercises begin.
- 4 months — Jogging
- 6 months — Sports
-

Operative

- **Active sports: Operative**
- **Complications in more modern articles these are much less frequent**
- **Timing**
- **Same day or at one week. Meyerson wait about 7 days.**
- **Personal : same day**
- **The repair is done using a locking stitches [Krackow]**
- **4 strand is better. Type of suture material or type suture not important**
- **The correct setting of the tension on the tendon**
- **The dynamic resting tension of the normal limb.**

Operative Techniques: Direct Repair

- Prone position

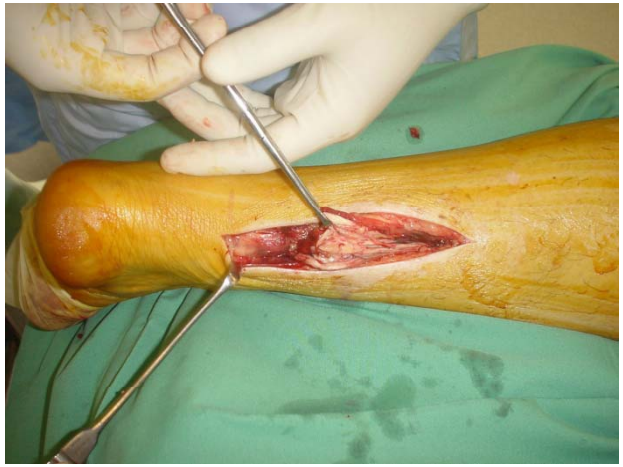


- Posteromedial longitudinal incision
- 10 to 15 cm long

- Carry the incision sharply: skin ➔ SC ➔ tendon sheath. [one flap]
-
-

Neglected rupture: 3 months

- > **3 months** old
- Treatment depends on the
  Physiologic age,
  Activity level,
  Amount of functional impairment
  Medical comorbdity.
- Some times possible to repair end to end after mobilizing the tendon



Sports medicine

Exercise induced leg pain

- Chronic Exertion syndrome 40%
- Entrapment syndromes 5%
- Stress fractures 5%
- Medial tibial stress syndrome 40%
- Popliteal artery entrapment syndrome
- Excluded: Neurogenic or vascular claudications

Problems

Symptoms often overlap

- – – Diagnosis is difficult.
- – It typically appears nonspecific in nature
- – Clinical examination may be negative
- – X rays usually normal
- – Can be missed: radiographs, bone scans, MRI, Angiography, Pressure studies.
- – Am J Sports Med. 2005 Aug;33(8):1241-9.

Case Report

- 18 year Male Panel beater
- Referred to me : Tibial shin syndrome
- 6 months.
- History: Pain
- Anterolateral aspect of leg
- Bilateral

- Disability
- No rest pain
- No night pain
- No problem with work
- Could walk but need to rest at every 10 minutes
- Could not sprint [>50 mts]

Tissue Pressure

Tissue pressure:

- High resting pressure
- >15 mmHg

- High post exercise [10mnts]
- .>25 mmHg

- All 4 compartment involved

The technique for anterior compartment

Double, 4-cm incision between shin and fibula.

The fascia over the anterior and lateral compartments

- was split longitudinally over its entire length.

Protect superficial peroneal nerves

1 Chronic Exertional Syndrome (CECS)

- Usually diagnosed as *shin splints syndrome.*
- It is a known reversible entity in adults
- Mainly among the sports. Skaters and Runners.
- Incidence is 15% and 5% of recreational runners
- Often presents in bilateral form

Adolescent Chronic Exertional syndrome

- Site 80% Anterior/lateral or both
- 15% All compartment
- 5% Isolated deep posterior
- Age 16 (range, 14–18) years.
- Sex Equal incidence
- Duration Surgery 7 months [may be delayed by 4 years]

Diagnosis

Accurate history: Is important

- Exercise and pain.
- Time from exercise The pain
- 6 minutes (range, 3–10)
- Pain usually resolves after 20 minutes
- Paraesthesia of the compartment nerve

Examination

- Totally normal
- 1/3rd may show evidence of muscle herneation
- Examine: Post exercise may reveal neurology
- X rays Normal
- Bone scan: rules out tibial shin and stress fracture

Tissue pressure study

- Normal pressure < 0-8 mmHg
- Pre ex >15 mm Hg
- Post ex >30 mm Hg at 1 Min
- **> 20 mm at 5 minutes**
- Always confirmed with the measurement of ICP using a Stryker Transducer [side port]
- Needles were inserted under local anaesthesia

Outcome

- Anterior (65%) and posterior (75%): Good-Excellent
- Star ship experience: >80% G-E results
- Outcome was more likely with the posterior compartment
- In anterior compartment outcome is better if the symptom duration had been less than 12 months.
- The surgical procedure resulted in a significant reduction in pain both at 6 months after the operation and at follow-up.

II Medial Tibial Stress Syndrome [Shin splints]

- The highest incidence of MTSS occurs in runners
- Usually occurs late in a sport season
- Some occur during pre-season training
- Pain, palpable tenderness, in rare cases swelling.
- Pain associated with MTSS frequently presents as a
- recurring dull ache over the distal one-third posteromedial cortex of the tibia.

- Pain at the beginning of a workout [relieved with continued activity]
- MTSS usually is alleviated with rest
- Typically does not occur at night.
- Tenderness along the posteromedial edge of the distal one third of the tibia
- Radiographs Negative

Bone Scan

- Bone scan: A
- longitudinal uptake
- pattern along the distal
- one third of the tibia

- Bone scan in Stress
- fracture is a focal
- uptake

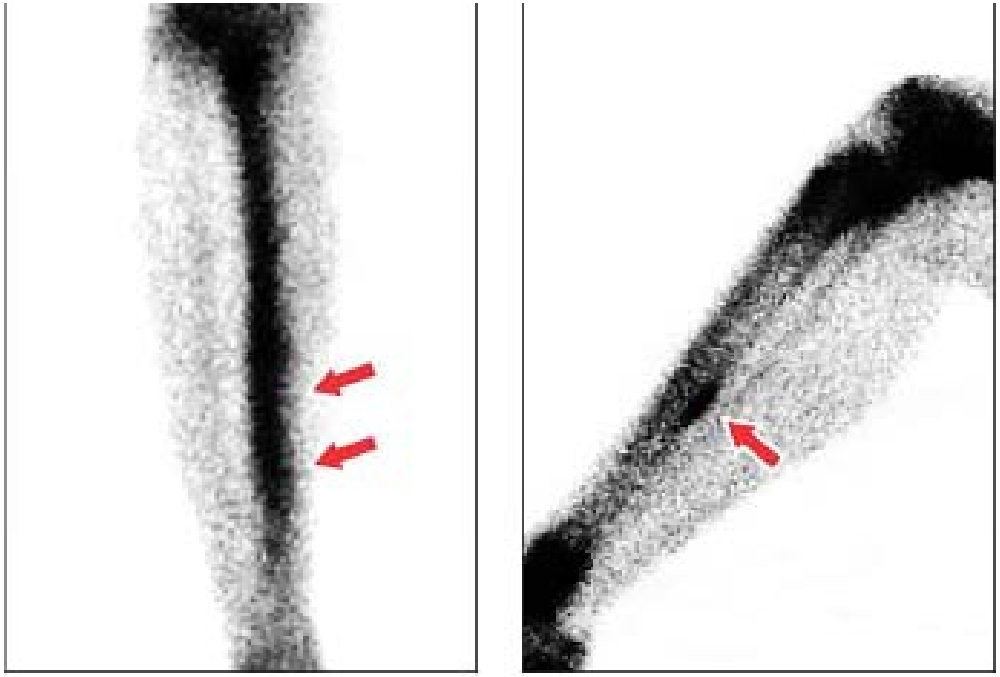


FIGURE 2. In triple-phase bone scans, the anteroposterior view (A) shows the classic longitudinally oriented, diffuse tracer uptake (arrows) that is visible only on delayed-phase images and virtually ensures the diagnosis of medial tibial stress syndrome. A lateral view of a tibial stress fracture (B) appears as a focally intense, fusiform area of tracer uptake (arrow).

- Treatment
- Rest, Ice
- Nonsteroidal anti-inflammatory drugs (NSAIDS)
- Low-impact activities, including biking, swimming
- Gradual return to training
- Stretching during warm-up.
- Training may progress in increments of 10% to 25%
- Rare. A fasciotomy + Removal of a strip of periosteum

III. Stress fracture

- Repetitive loading
- Tibial Stress fractures account for 50% of all stress fractures
- The midshaft or distal one third of the tibia [Runners]
-

Training and activity should be evaluated

- to assess the risk of stress fracture.
- “Female athlete triad : Disordered eating, • Amenorrhea, • Osteoporosis.

Treatment

Rest with weight bearing restriction

Bracing or casting may be warranted for 3 to 12 weeks
X 4 weeks. Mild analgesics or NSAIDS

Ice

Cross training.: cycling, swimming

Anterior tibial stress fracture

Particular attention : Mid anterior cortex because a small lucency, commonly referred to as the "dreaded black line,“

More problematic

Develop a characteristic V-shaped defect in the anterior cortex, with the open end of the "V" . Callus is absent

Histopath: consistent with pseudarthrosis

- Treatment
- • Initial treatment : like other stress fracture.
- • Surgical intervention becomes necessary.
- • Intramedullary fixation has become the choice
- ••

Stress fracture: Psedarthrosis

MTSS VS Stress fracture

MTSS	Stress fracture
• Site Lower 1/3rd	Upper third
• Pain disappears When rested	Pain that does not go away with rest.
• Night pain Absent	May present
•	
• One-leg hop test Can hop at least 10 times	Cannot hop

High risk stress fracture

- • V metatarsal,
- • Navicular,
- • Anterior tibial,
- • Patella, superior neck □

- high risk □ need surgery

IV Nerve entrapment

The common peroneal nerve repetitive

- exercises involving inversion and eversion,
- such as running and cycling

The superficial peroneal nerve observed in

- dancers and athletes involved in bodybuilding,
- horse racing, running, soccer, and tennis

The Saphenous nerves

- The most common nerves at risk for
- entrapment

V. Popliteal artery entrapment

An abnormal course of the popliteal artery in the popliteal

- fossa.

Anomalous migration of the medial head of the gastro

- • In males under the age of 30.
- • After high-intensity exercise with excessive dorsiflexion and
- plantar flexion
- Typically **presents unilaterally**

SUMMARY

- Ankle injury is common
- Rule out fractures [special consideration for children]
- Sports injuries are misleading
- The most common causes of chronic leg pain in athletes
- MTSS, stress fractures, chronic ECS, nerve entrapment, and PAES.
- An accurate diagnosis: A thorough patient history,
- Performing a comprehensive examination and The appropriate diagnostic studies
- •

Beware

- Malignant conditions.
- Over diagnosis is better
- Referral to ortho, when pain persists >6 wks or presence of night pain or pain at rest

Diagnosis

Diagnosis