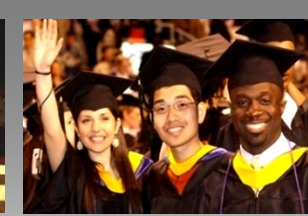
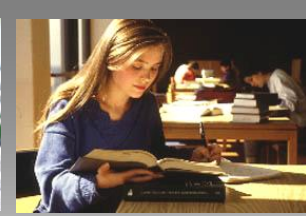




Ankle and Foot Orthopaedic Tests Orthopedics and Neurology DX 612

James J. Lehman, DC, MBA, DABCO
University of Bridgeport College of Chiropractic

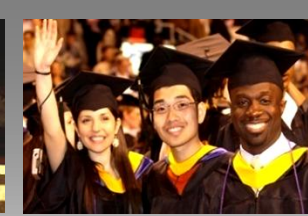
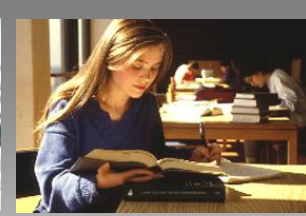


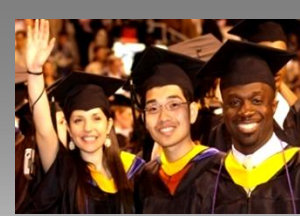
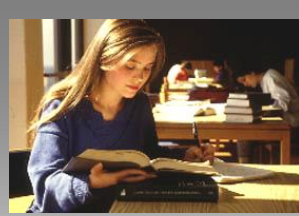


Ankle & Foot Anatomy



- Stability of the ankle is dependent upon functional placement of the talus.

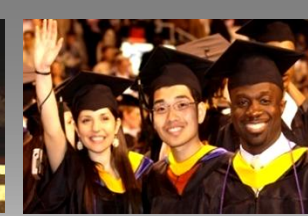
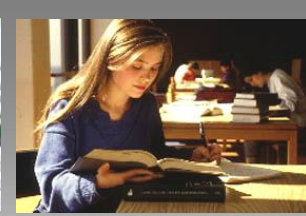




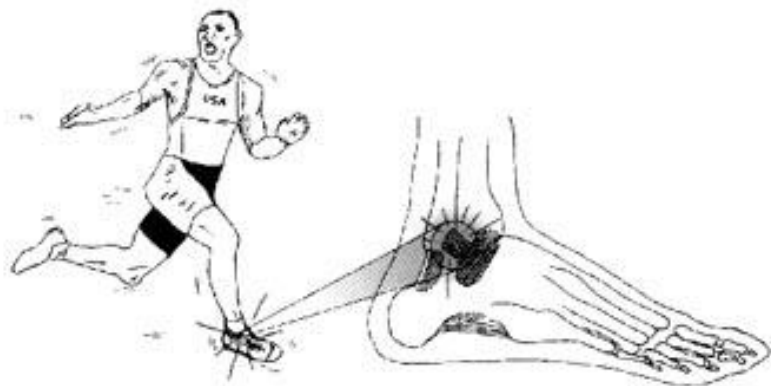
Ankle Sprain



- Please describe the grades of an ankle sprain...



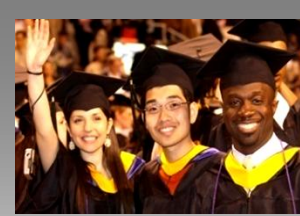
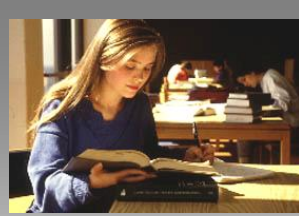
Ankle Sprain



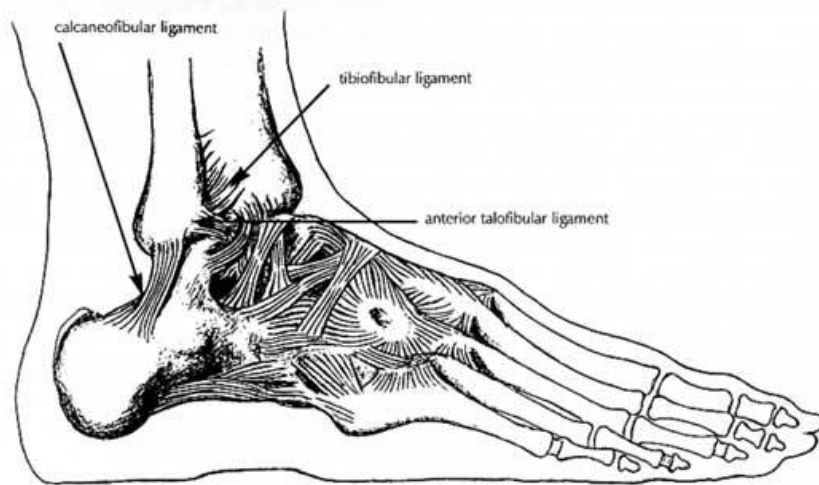
Lateral Ankle Sprain

Because most sports involve running, lateral ankle sprain is the most common sports ligament injury.

- Lateral ankle sprain is most common



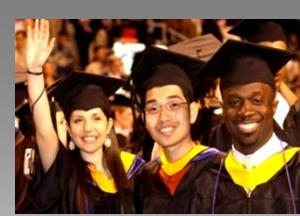
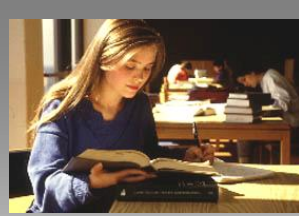
Lateral Ankle Sprain



Ligament Anatomy of the Foot

Inversion or turning in of the foot causes the most common sprain of any ligament by injuring the anterior talofibular ligament.

- Anterior talofibular ligament is most often sprained

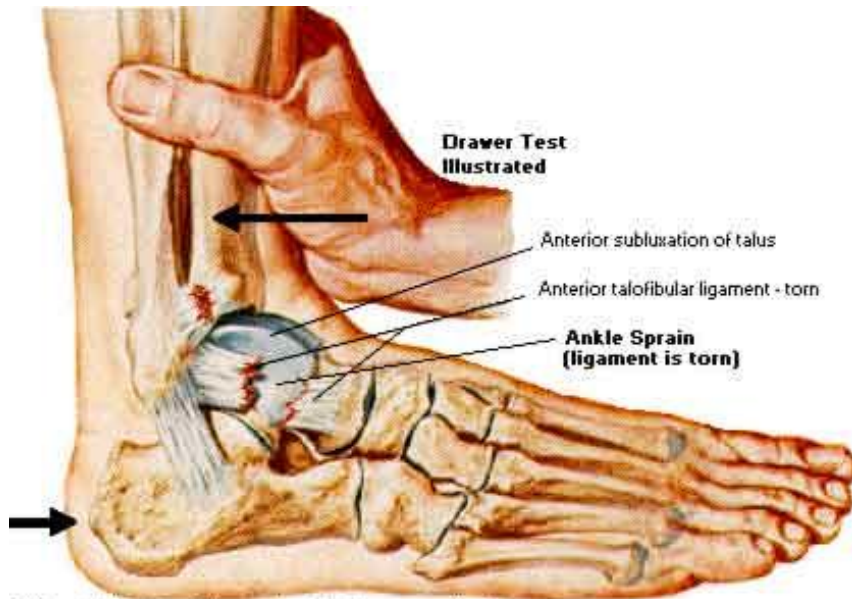


Drawer's Foot Sign



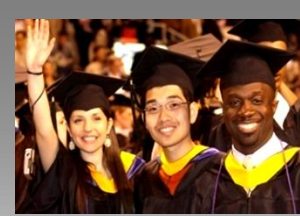
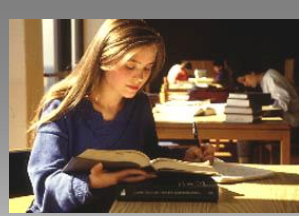
- Anterior drawer will be positive with gapping secondary to trauma

Anterior Drawer's Test



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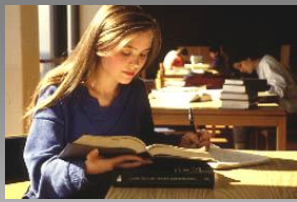
- Indicates sprain of anterior talofibular ligament



Posterior Drawer Test

- Posterior drawer employs just the opposite forces to challenge the posterior talofibular ligament.



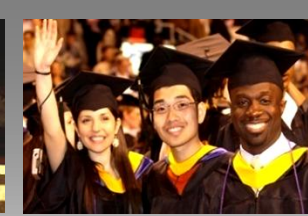
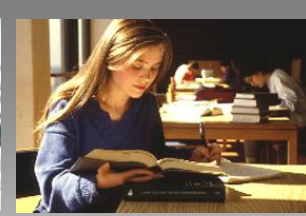


Lateral Stability Test

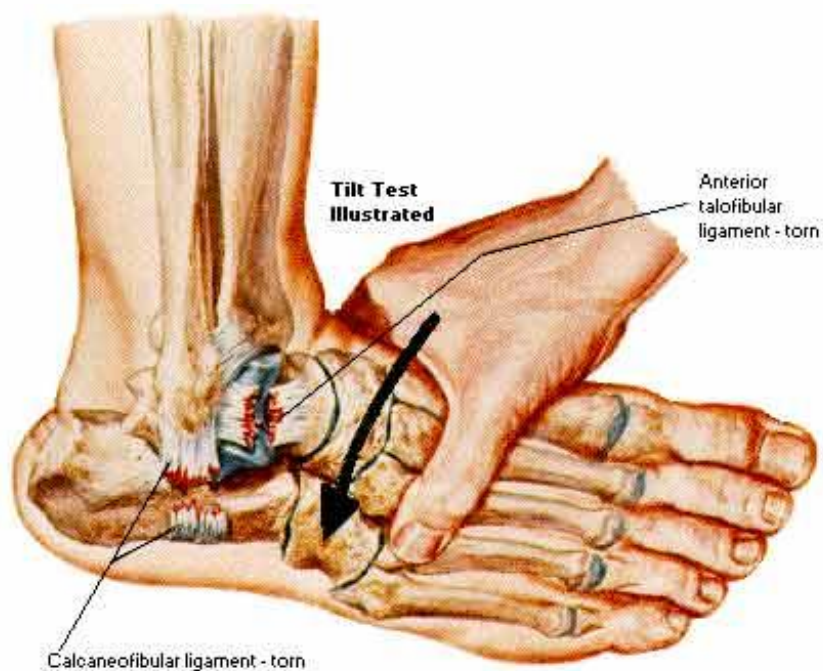
Talar Tilt Test



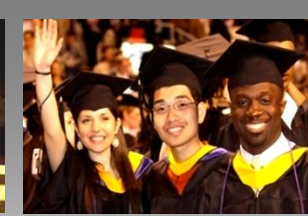
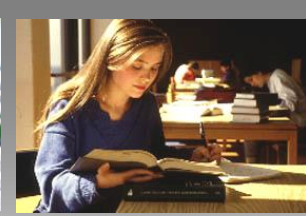
- Sprain injury to calcaneofibular and/or anterior talofibular ligaments



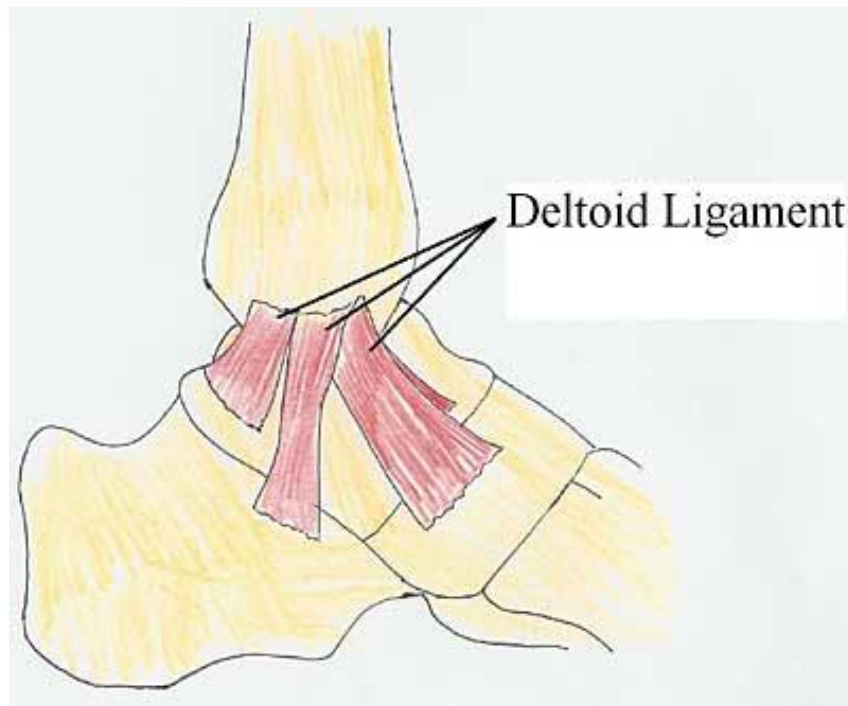
Talar Tilt Test



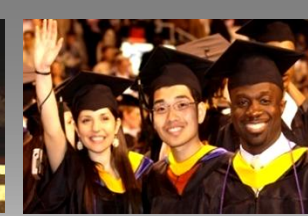
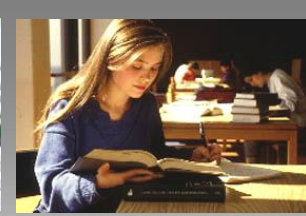
- What is your diagnosis or assessment of this condition?
- What is your plan?



Medial Ankle Sprain

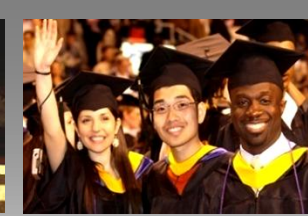
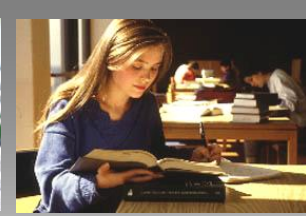


- Medial stability test secondary to trauma with gapping indicates potential deltoid ligament sprain



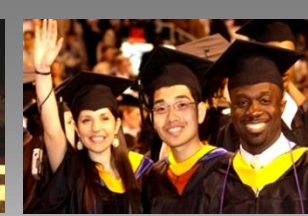
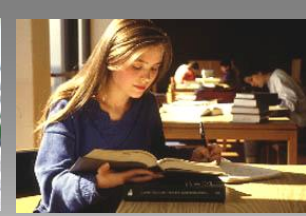
Ankle Examination





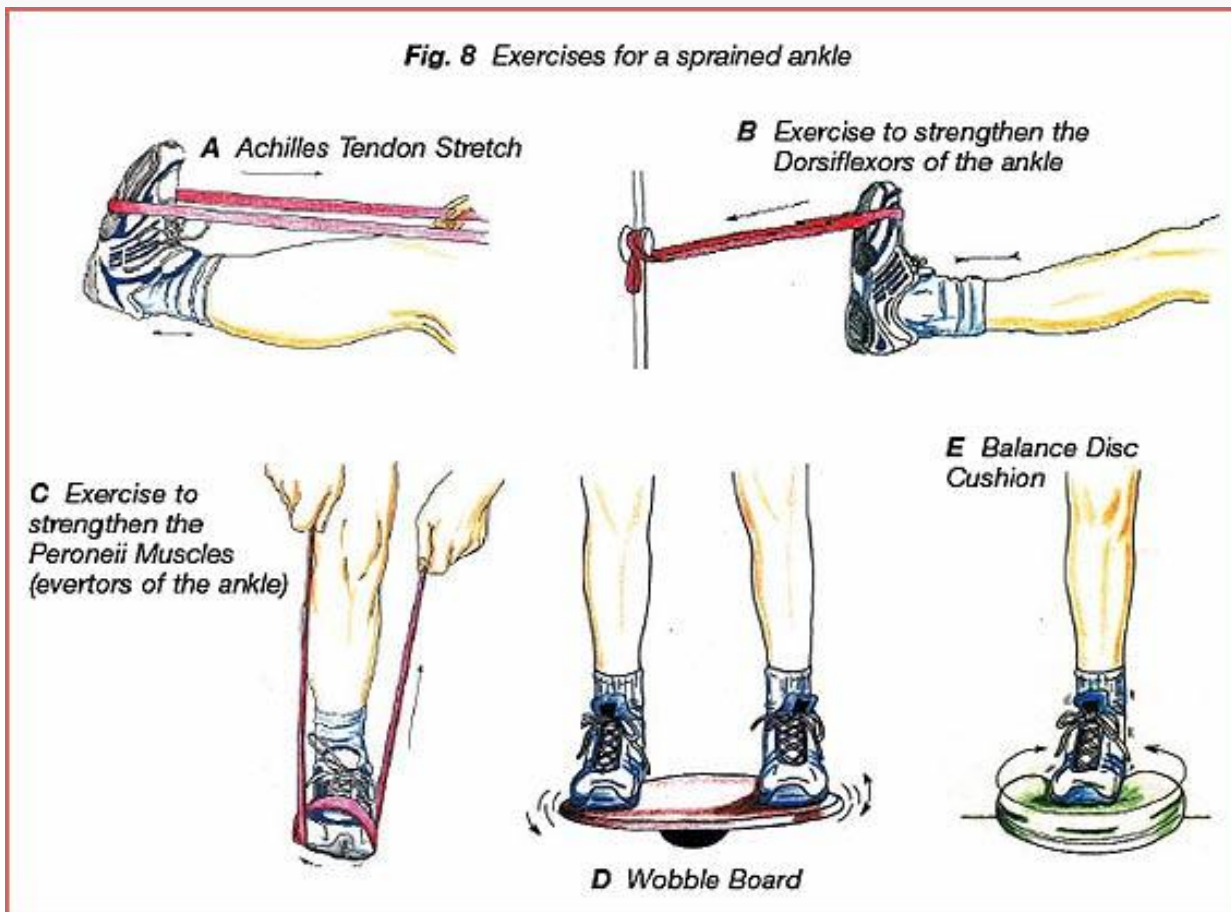
Subtalar Examination



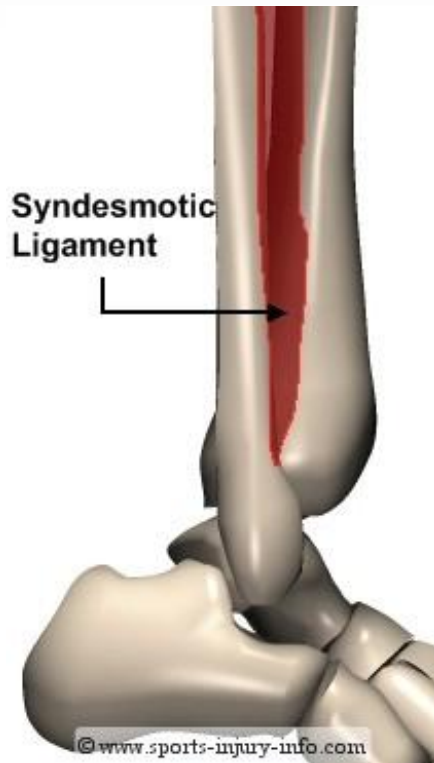


Ankle Rehabilitation

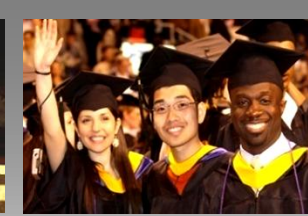
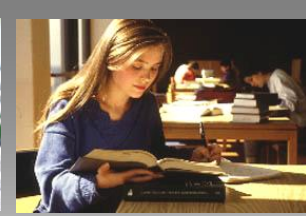
Fig. 8 Exercises for a sprained ankle



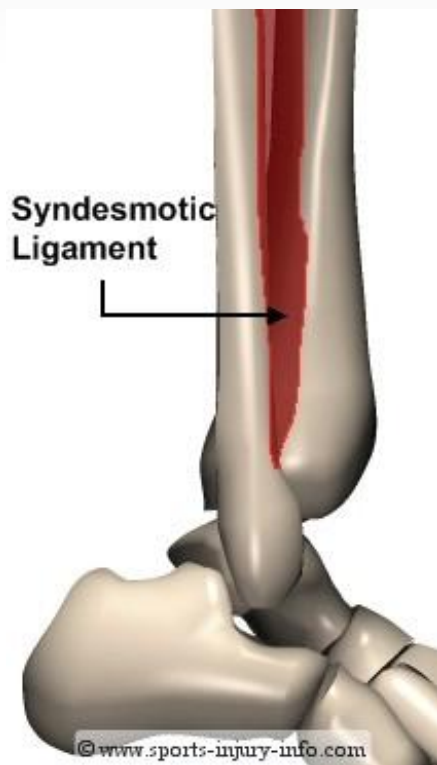
High Ankle Sprain Syndesmotic Ligament Sprain



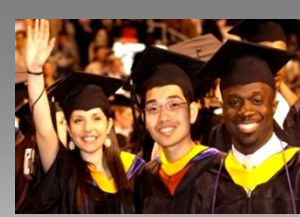
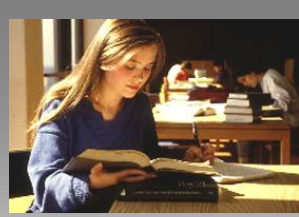
- Stabilize the mortise by opposing the fibula in the fibular notch (incisura fibularis tibiae)



Syndesmosis



- Four ligaments
- anterior-inferior tibiofibular
- interosseous
- posterior- inferior fibular
- inferior transverse tibiofibular
- interosseous

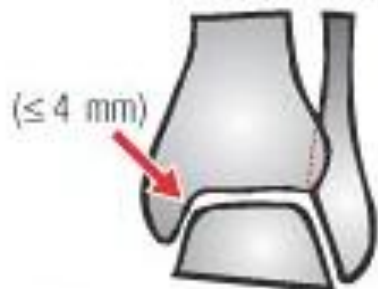


Potts Compression or Squeeze Test

- Squeeze test

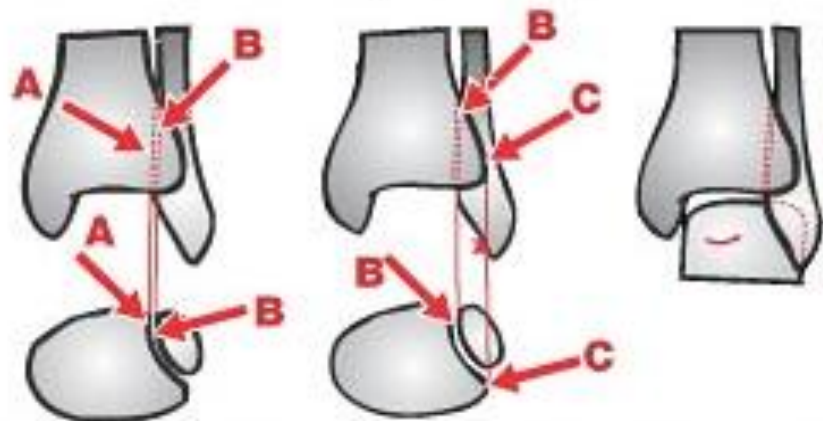


Morrise View



Medial clear space ($\le 4\text{ mm}$)

Anteroposterior View



Clear space between fibula and peroneal incisura of the tibia ($\le 5.2\text{ mm}$ in women, $\le 6.5\text{ mm}$ in men)

Tibiotalar overlap ($\ge 2.1\text{ mm}$ in women, $\ge 5.7\text{ mm}$ in men)

Talar subluxation

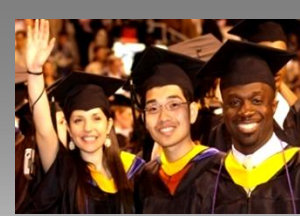
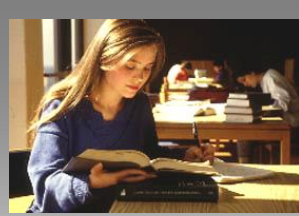
A = Lateral border of posterior tibial malleolus
 B = Medial border of tibia
 C = Lateral border of anterior tibial tubercle



FIGURE 5. Radiograph of a grade 3 sprain in a 24-year-old semiprofessional football player. Multiple radiographic signs of syndesmosis injury are present. The medial clear space is greater than 4 mm (arrow), the fibula is widely displaced from the incisural notch of the tibia (arrowhead), and the talus is displaced laterally and is no longer congruent with the distal tibia (open arrow).

FIGURE 4. Syndesmosis radiographic criteria. A finding outside any of these criteria indicates a syndesmosis injury.

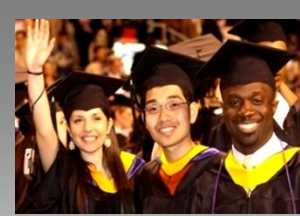
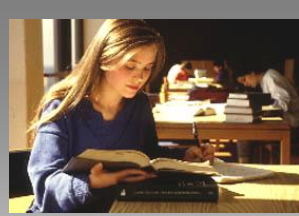
Reproduced with permission from Stiehl JB: Complex ankle fracture dislocations with syndesmosis diastasis. *Orthop Rev* 1990;19(6):501.



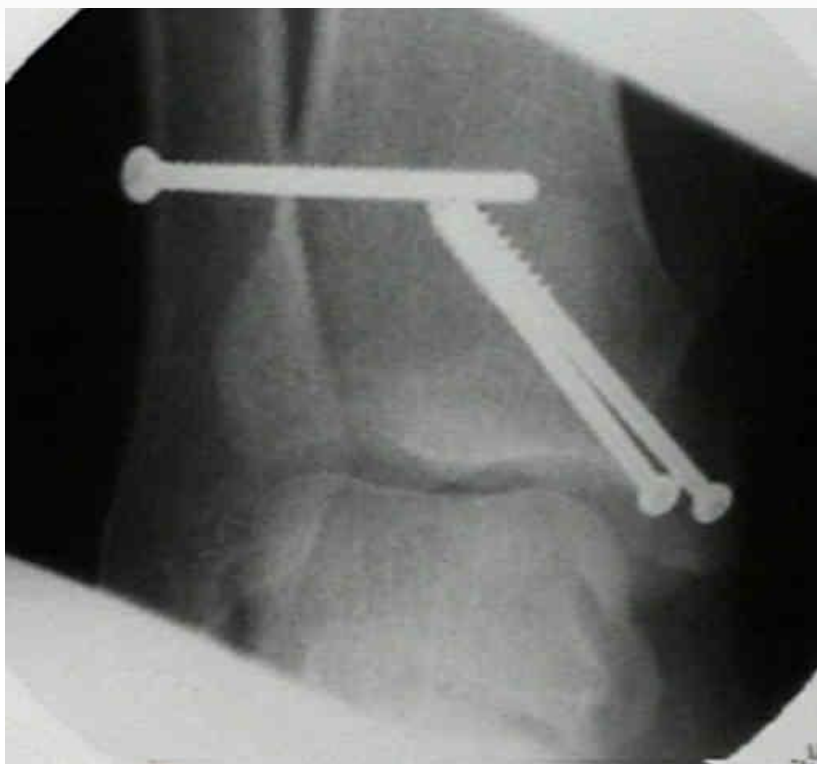
High Ankle Sprain

- Stress radiographs

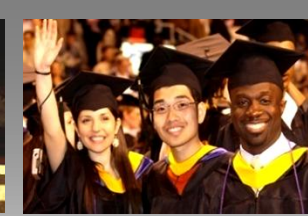
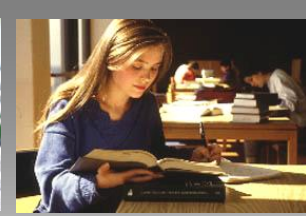




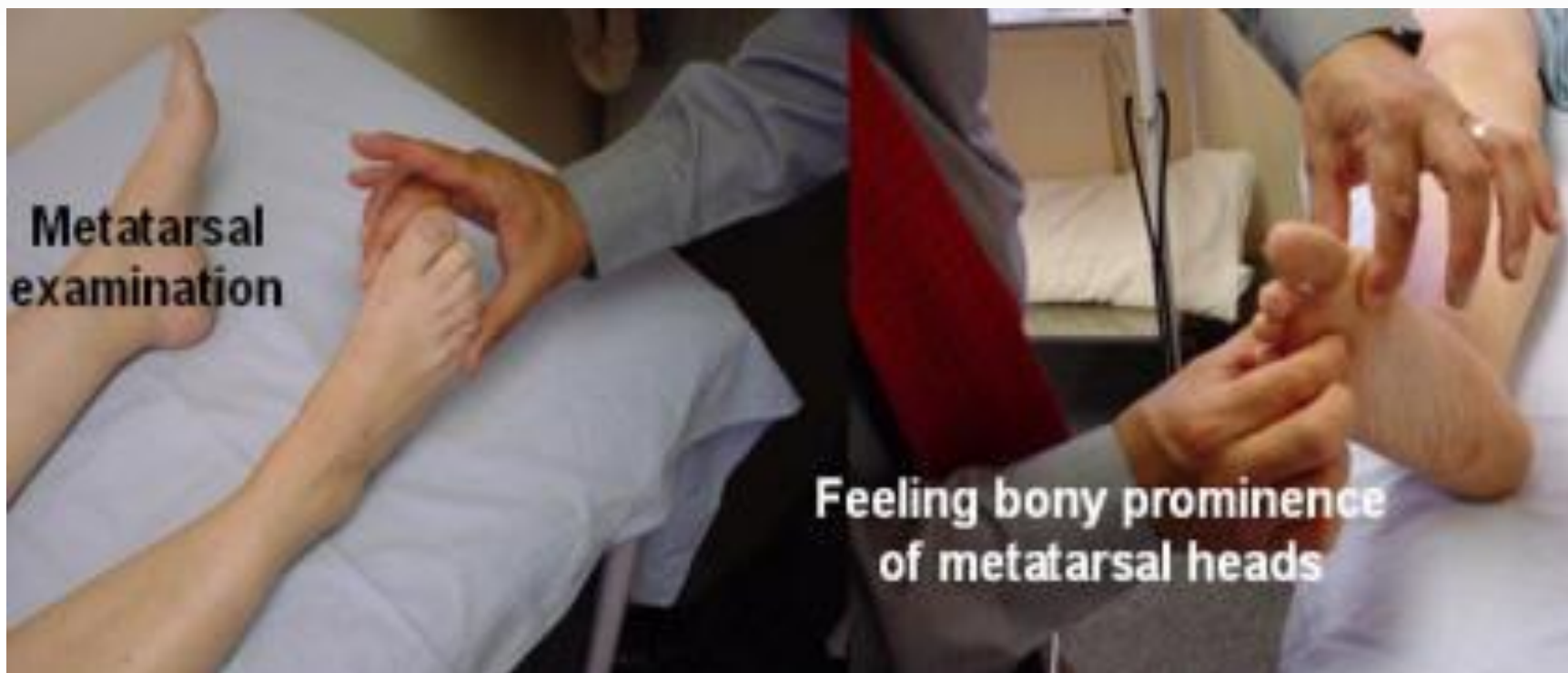
Syndesmotic Fixation Technique

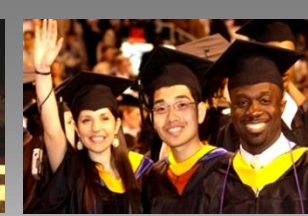
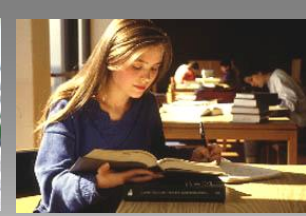


- Syndesmotic screws



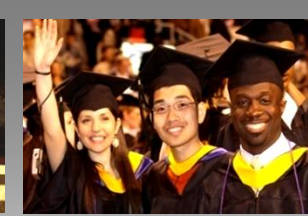
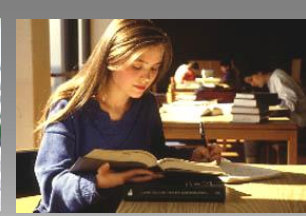
Metatarsal Examination





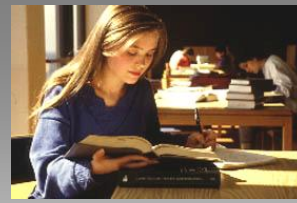
Plantar and Achilles Examination





Tarsal Examination



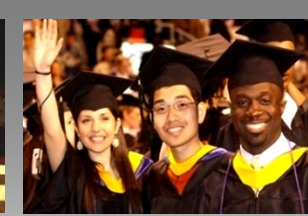
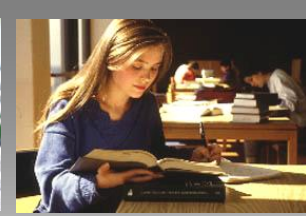


Homan's Test

Deep Vein Thrombophlebitis

- Supine with knee flexed
- Abrupt forcible dorsiflexion of foot
- Positive test produces pain in calf or popliteal region

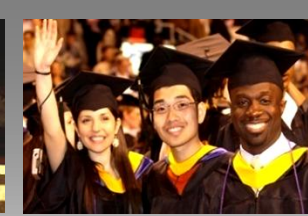
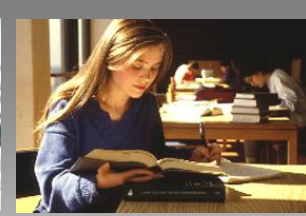




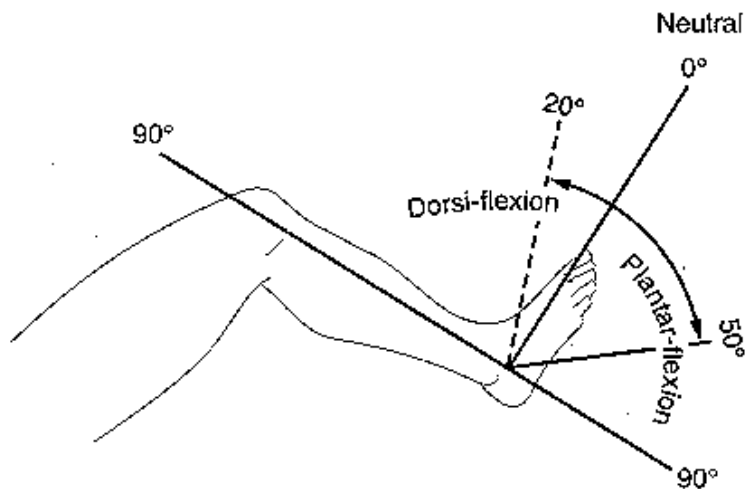
Homan's



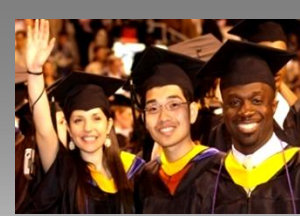
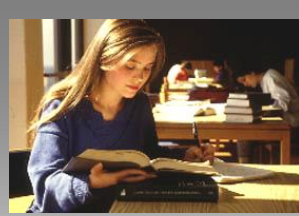
- Incorrect position for performance of Homan's test
- Clinically unreliable and insensitive for DVT
- Positive test possible with DVT



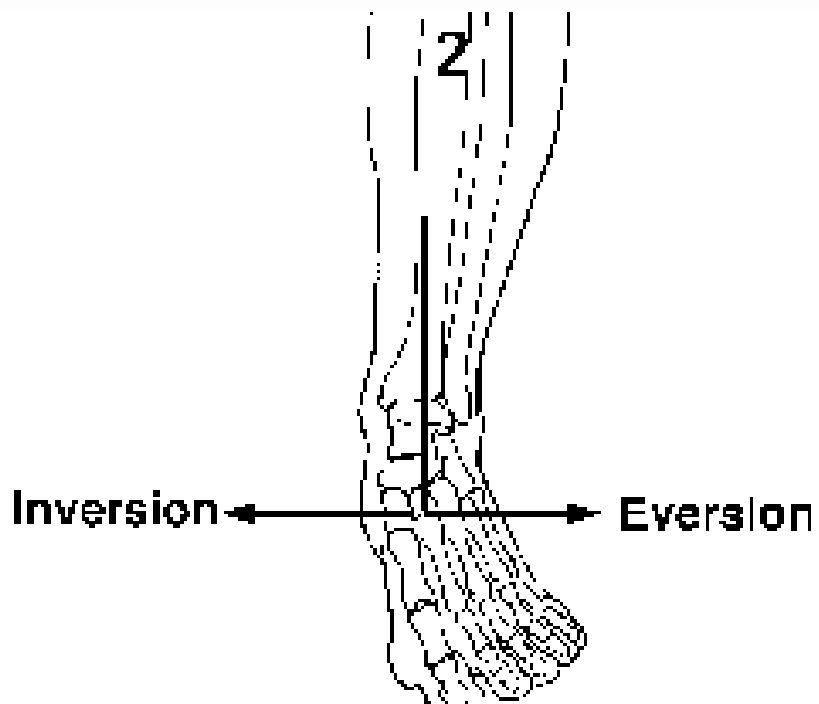
Ankle ROM



- Plantar flexion
- Dorsiflexion



Ankle ROM



- Inversion
- Eversion

**Medial
foot**

**Tibial nerve
(called the
plantar nerve
in the sole
of the foot)**

**Flexor
hallucis
longus**

**Tibialis
posterior**

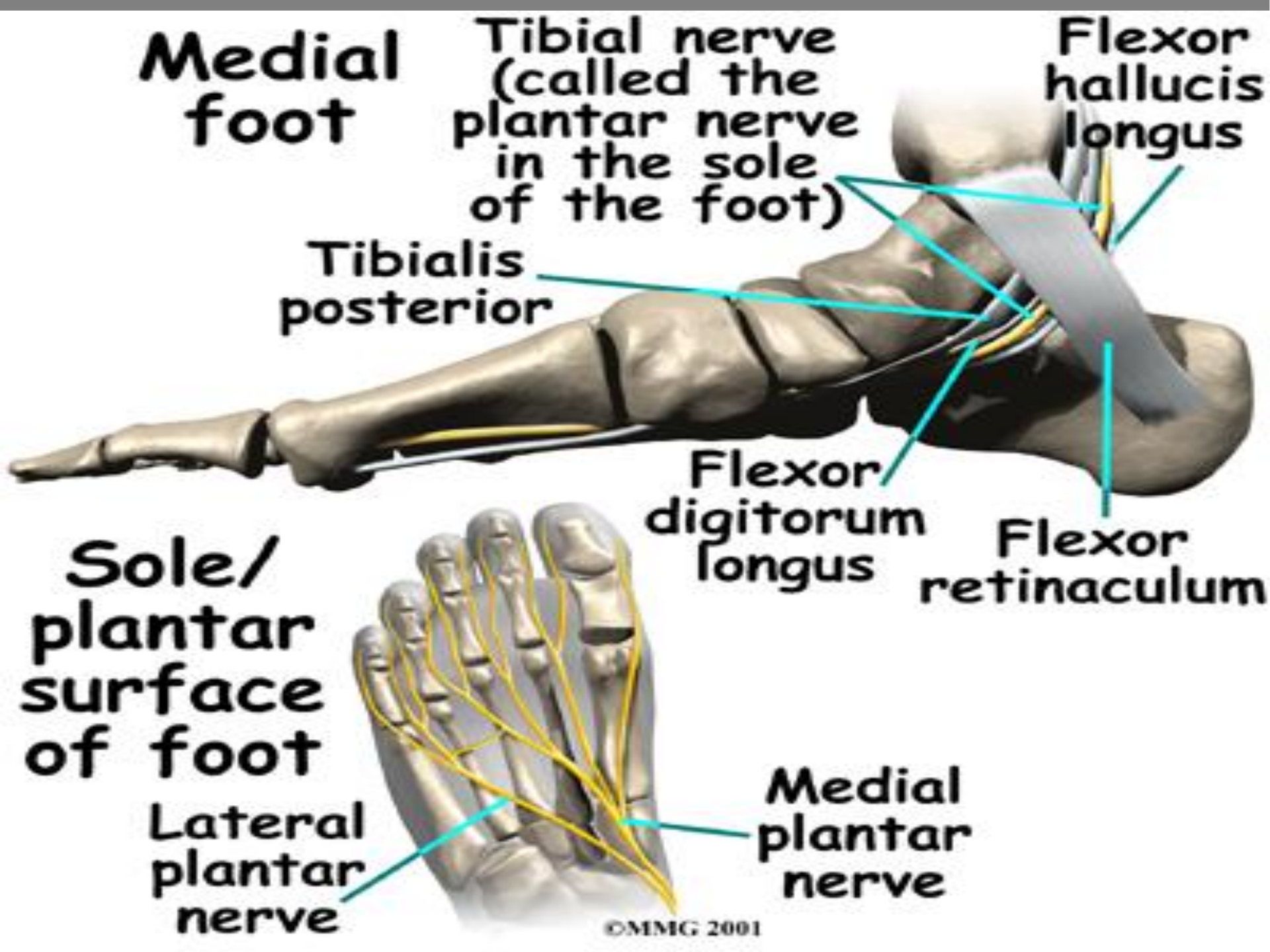
**Flexor
digitorum
longus**

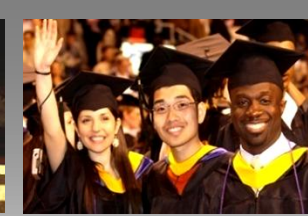
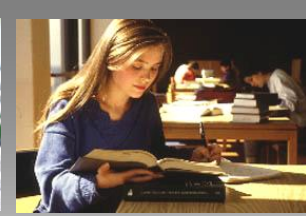
**Flexor
retinaculum**

**Sole/
plantar
surface
of foot**

**Lateral
plantar
nerve**

**Medial
plantar
nerve**





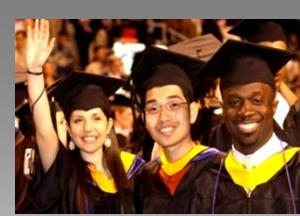
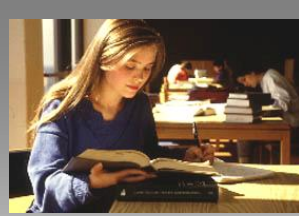
Tarsal Tunnel Syndrome

Tarsal Tunnel Syndrome



©MMG 2001

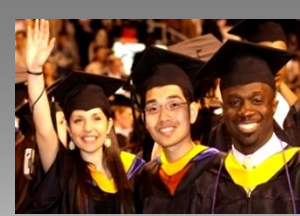
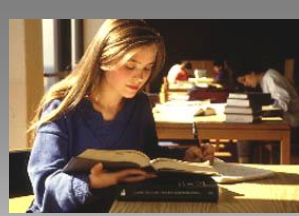
- Analogous to carpal tunnel syndrome in the wrist...



Scratch Collapse Test



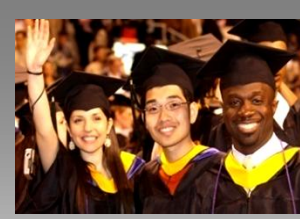
- Scratch along tibial nerve
- Collapse of arms indicates a positive test for compression of the tibial nerve
- <http://medicine.wustl.edu/~wumpa/outlook/fa112006/backOnYourFeetAgain.htm>



Tinel's Sign



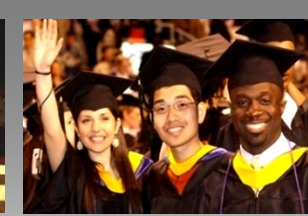
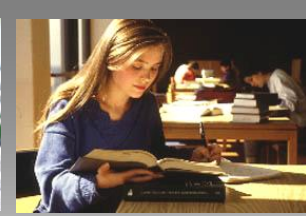
- Tap tibial nerve at medial aspect of ankle
- Sign is present if paresthesias are produced in foot



Tourniquet Test

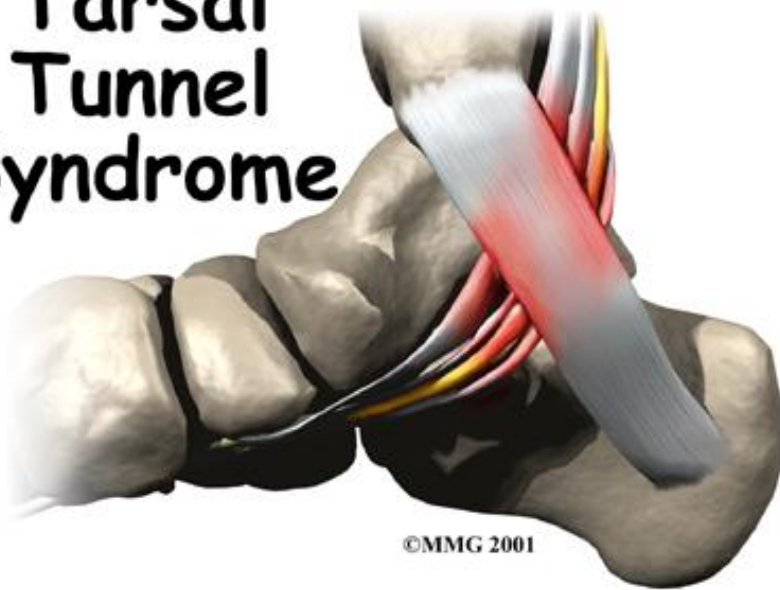


- Apply sphygmomanometer to affected ankle and inflate to pressure 10 mm of Hg above systolic for 1-2 minutes

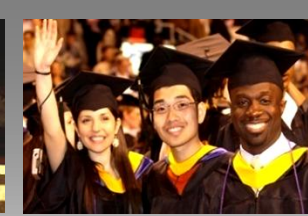
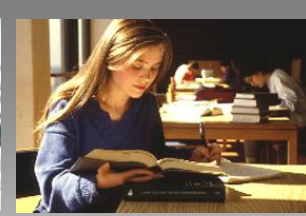


Tourniquet Test

Tarsal Tunnel Syndrome



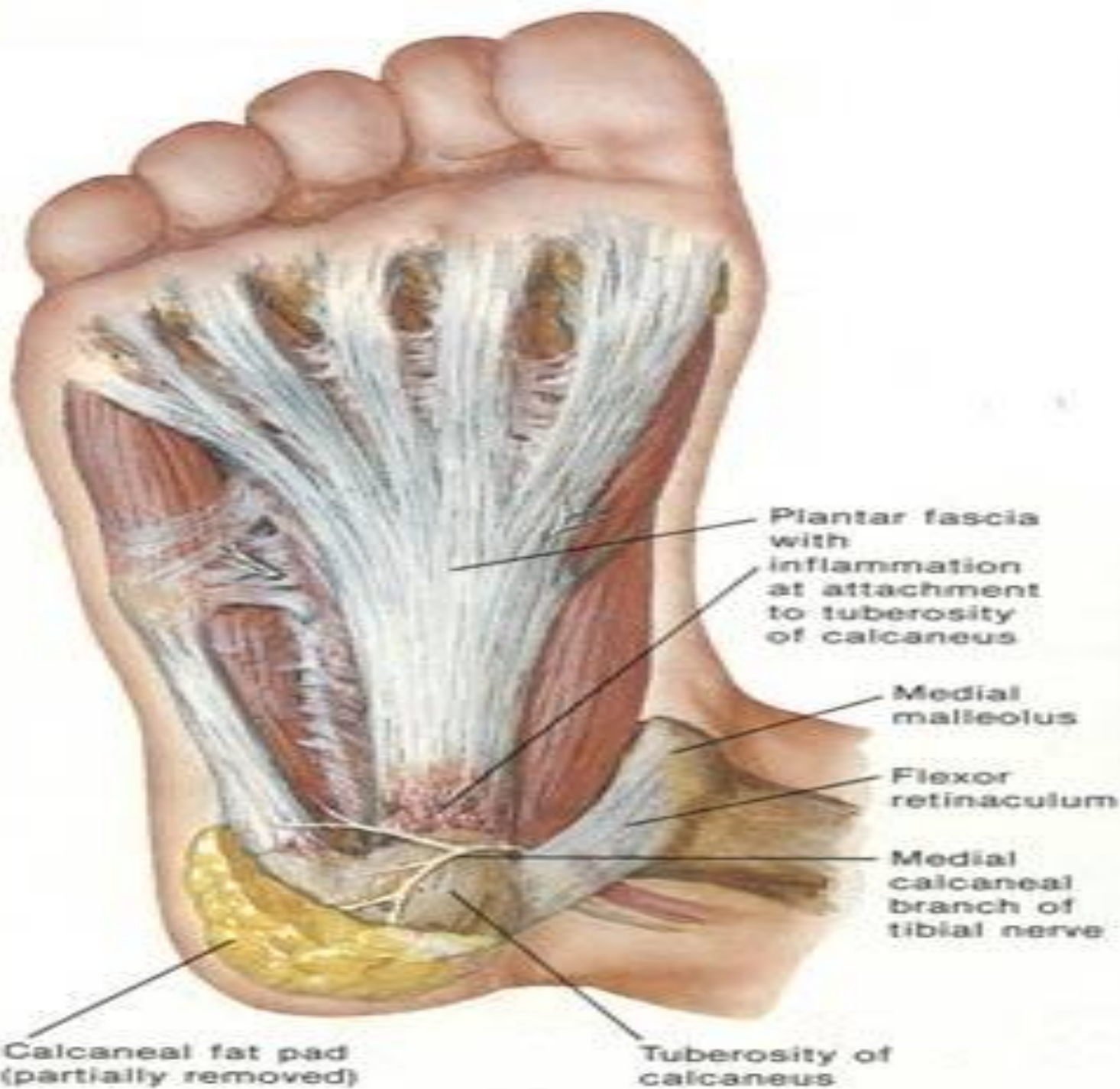
- Suspect tibial compression if pain is elicited or exacerbated with test.

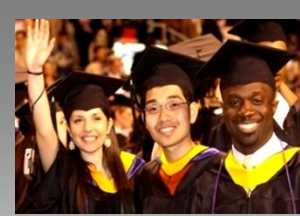
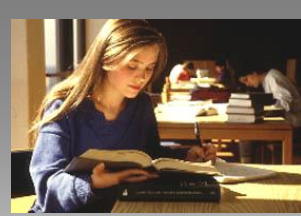


Strain of Plantar Fascia



- Related to tight achilles tendon and gastrocnemius muscles
- Common in runners and dancers
- May lead to plantar fasciitis

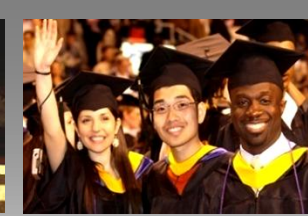
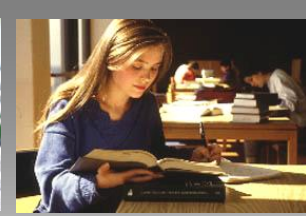




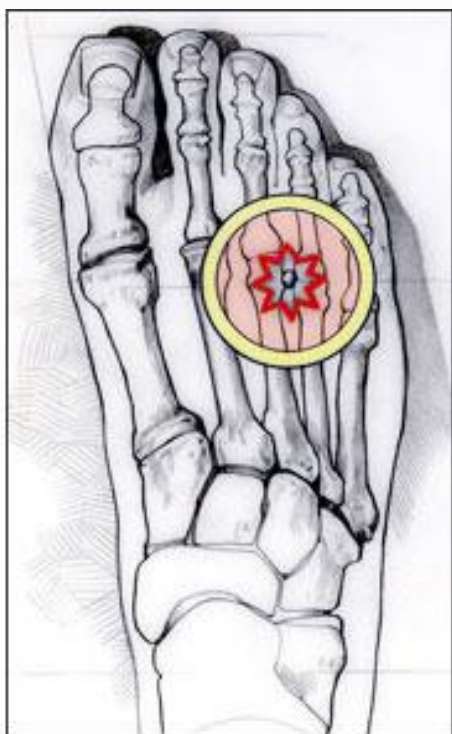
Metatarsalgia



- Sharp or shooting pain in toes
- Lack of shock absorption
- Resolved with foot orthotics
- Exercise

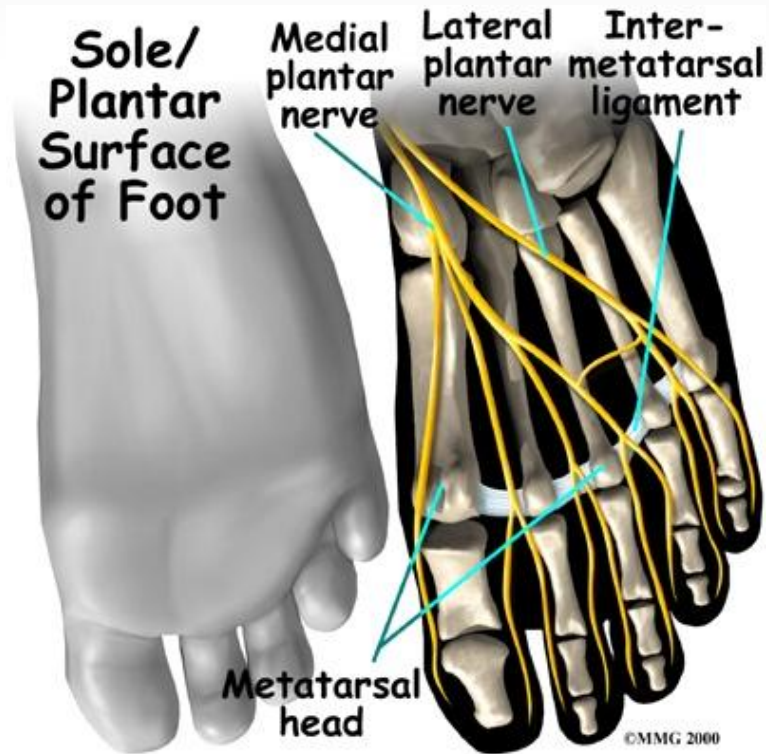


Morton's Neuroma

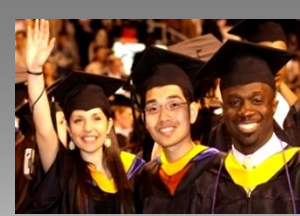
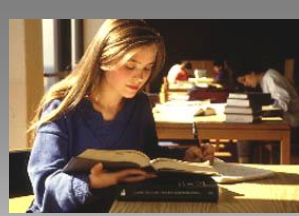


- Pain and paresthesias
- Poorly fitting shoes increase pain
- PRICE
- Change shoes
- Orthotics

Morton's Neuroma



- Medial plantar neuroma
- Thickening of medial plantar nerve, usually between the third and fourth digits



Morton's Neuroma

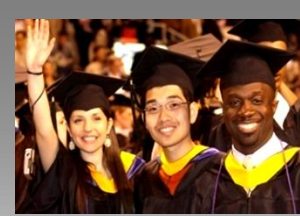
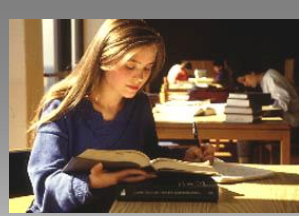
Morton's Neuroma



Neuroma

Diana Vashisva

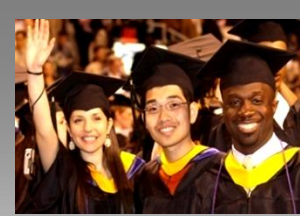
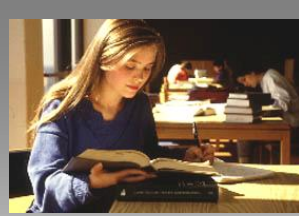
- Palpable pain and clicking
- Reproduce symptoms with manipulation
- Radiographic study indicated



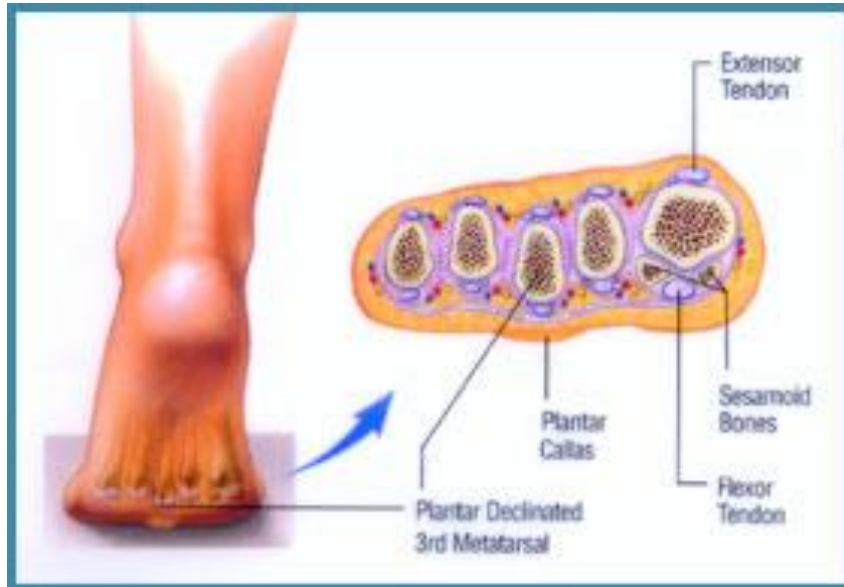
Metatarsalgia



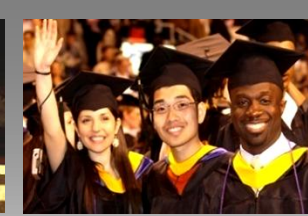
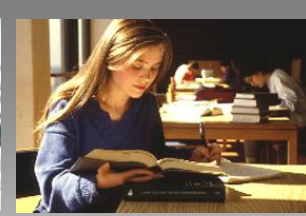
- Patient complains of pain on the dorsum of the foot.
- Palpate both dorsal and plantar aspects of foot.



Metatarsalgia



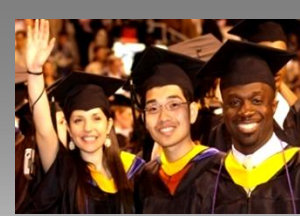
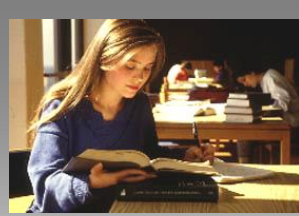
- Pain typically is aggravated during the midstance and propulsion phases of walking or running.



Metatarsalgia Treatment



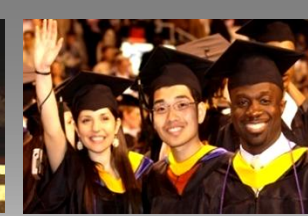
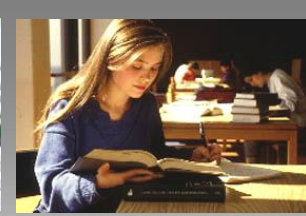
- PRICE
- Inexpensive orthotics are very effective.



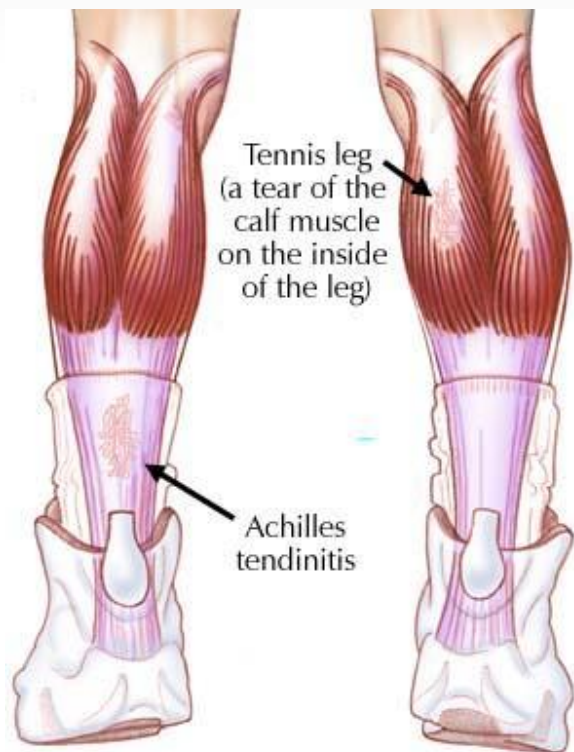
Achilles Tendon



- Strongest tendon in the body
- Provides the power in the push off phase of the gait cycle

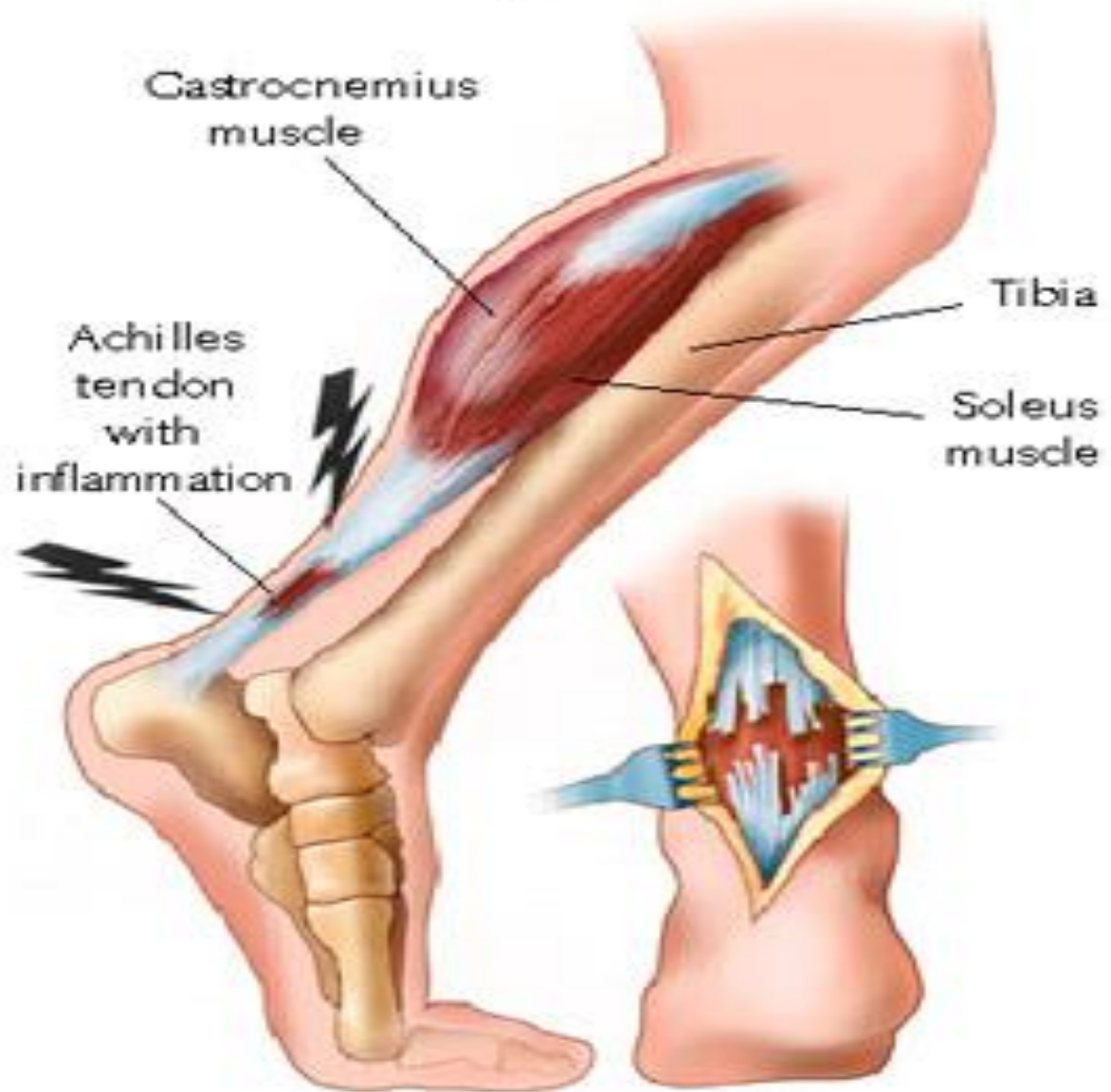


Achilles Tendonitis

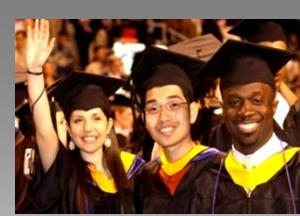
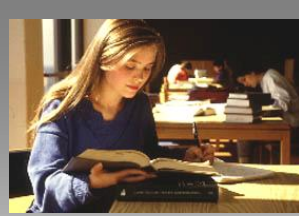


- Over-training
- Lack of stretching
- Poor sleeping posture
- Ill fitting shoes
- Worn shoes
- Lack of shock absorption

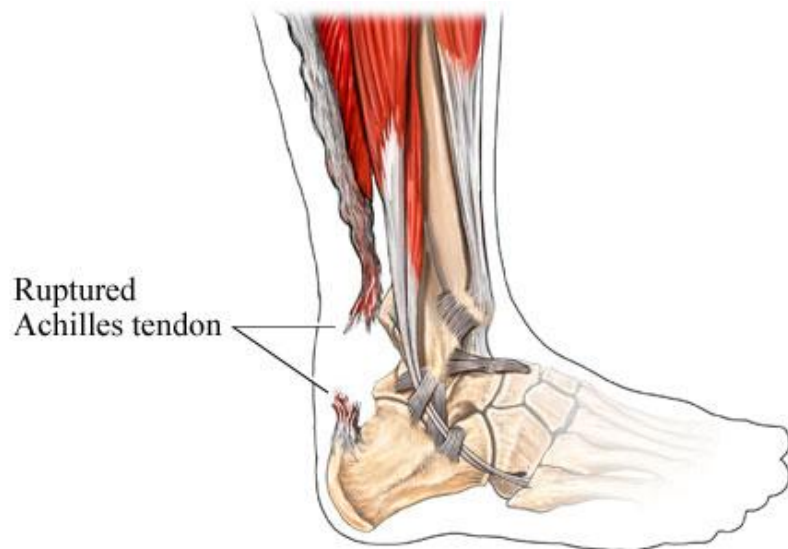
Side view of lower leg



R. S. S. S.
Surgical view of torn achilles tendon



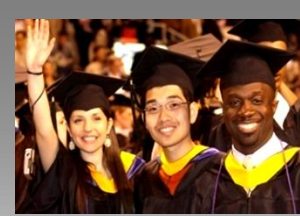
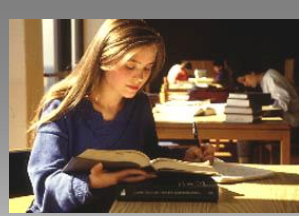
Achilles Rupture



- Pop or snap
- Feels like a gunshot or kick
- Inability to ambulate

Observation of Ruptured Achilles

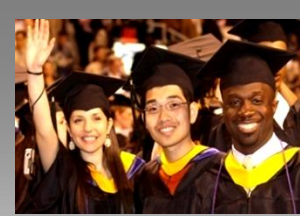
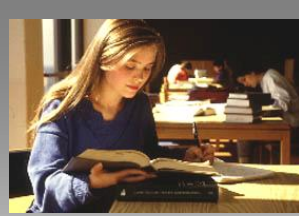




Thompson's Test



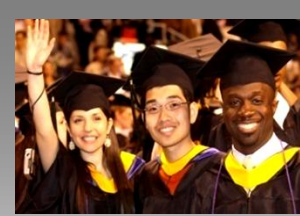
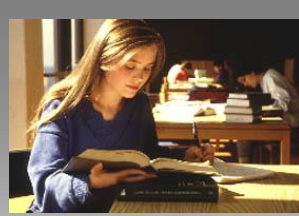
- Flex knee
- Squeeze calf
- Mechanical contraction of gastrocnemius and soleus will not plantar-flex the foot



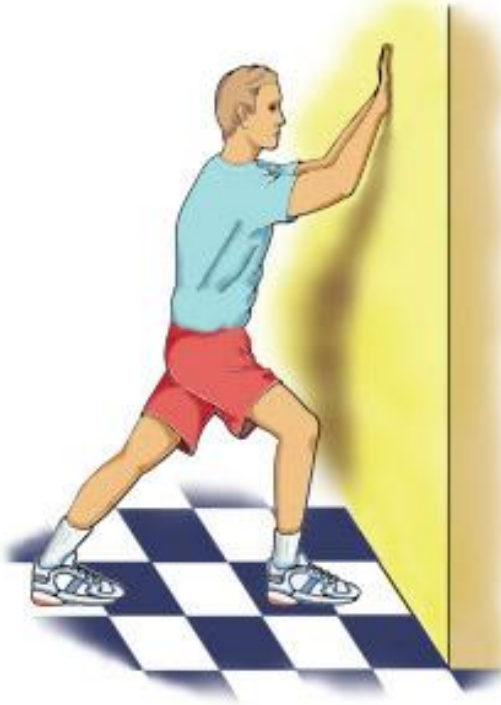
Achilles Tap Test



- Tap affected achilles tendon
- Exacerbation of pain indicates strain
- Inability to plantarflex foot indicates rupture
- Neurologically intact



Treatment and Prevention of Pedal Problems



- Stretching
- Rest and massage
- Sleeping posture
- Hydration
- Properly fitting shoes
- Shock absorption orthotics