The Foot and Ankle

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BodyTempering.com

Right ankle, lateral view

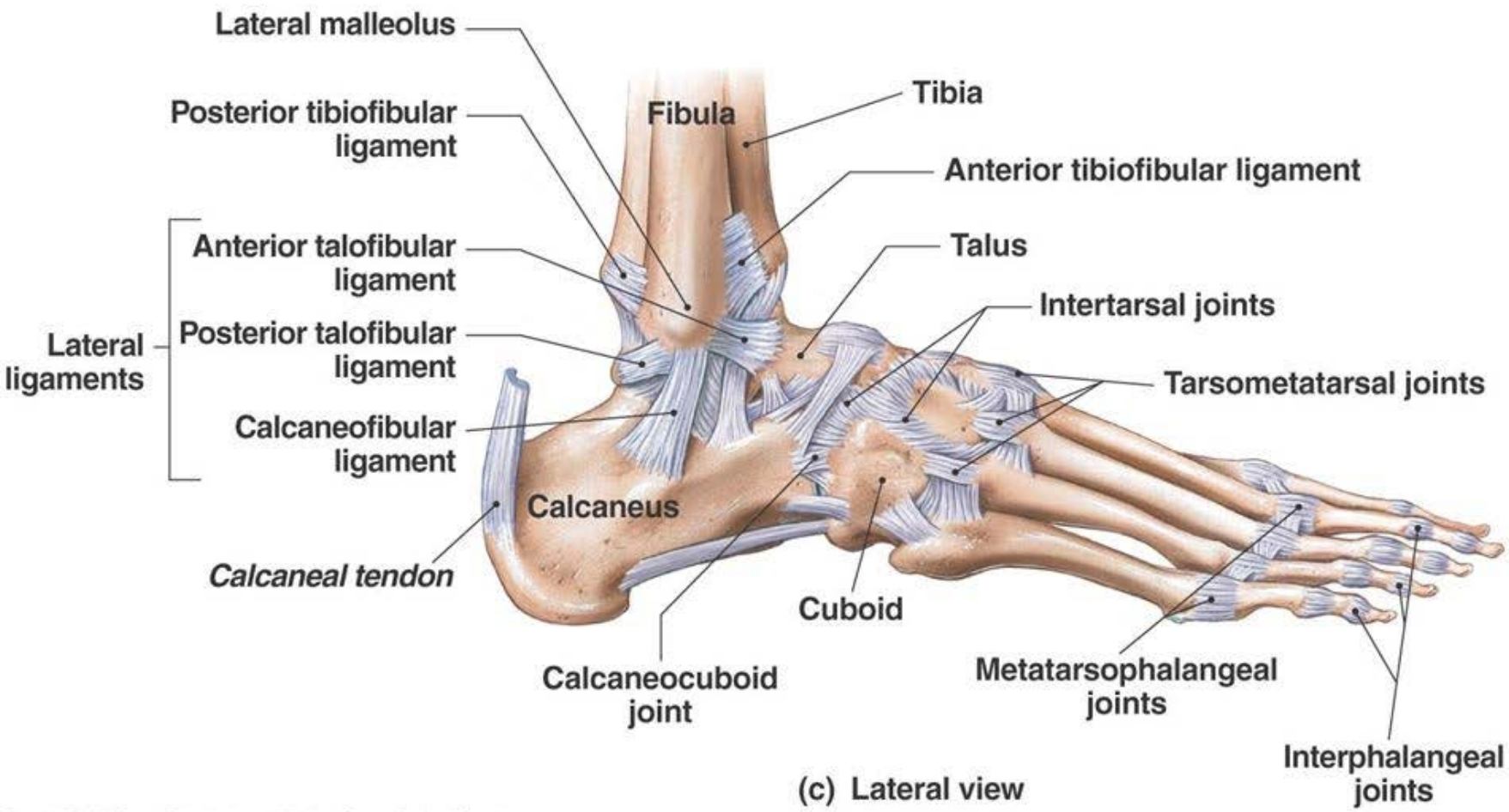
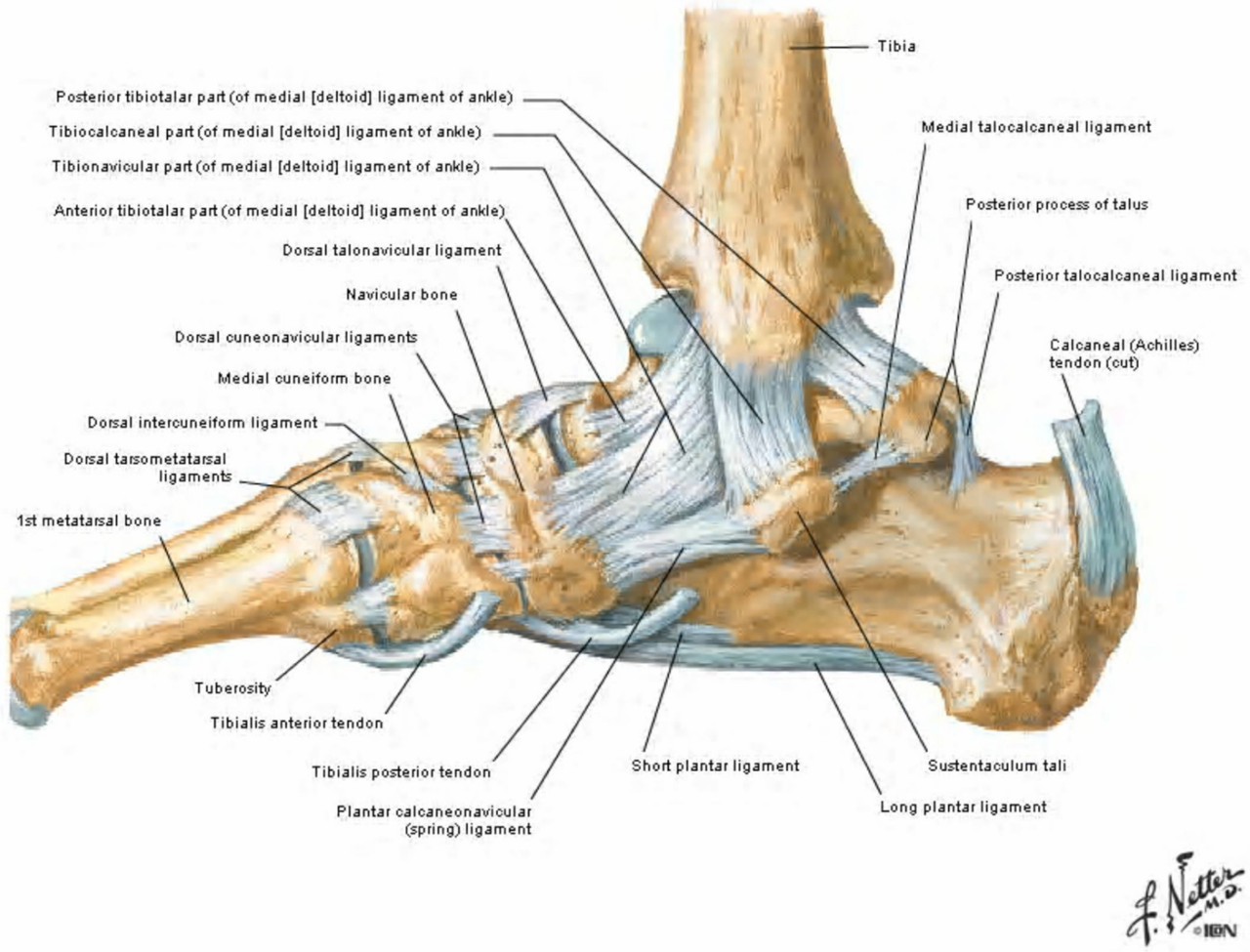


Plate 509B

Ligaments and Tendons of Right Ankle

Medial View

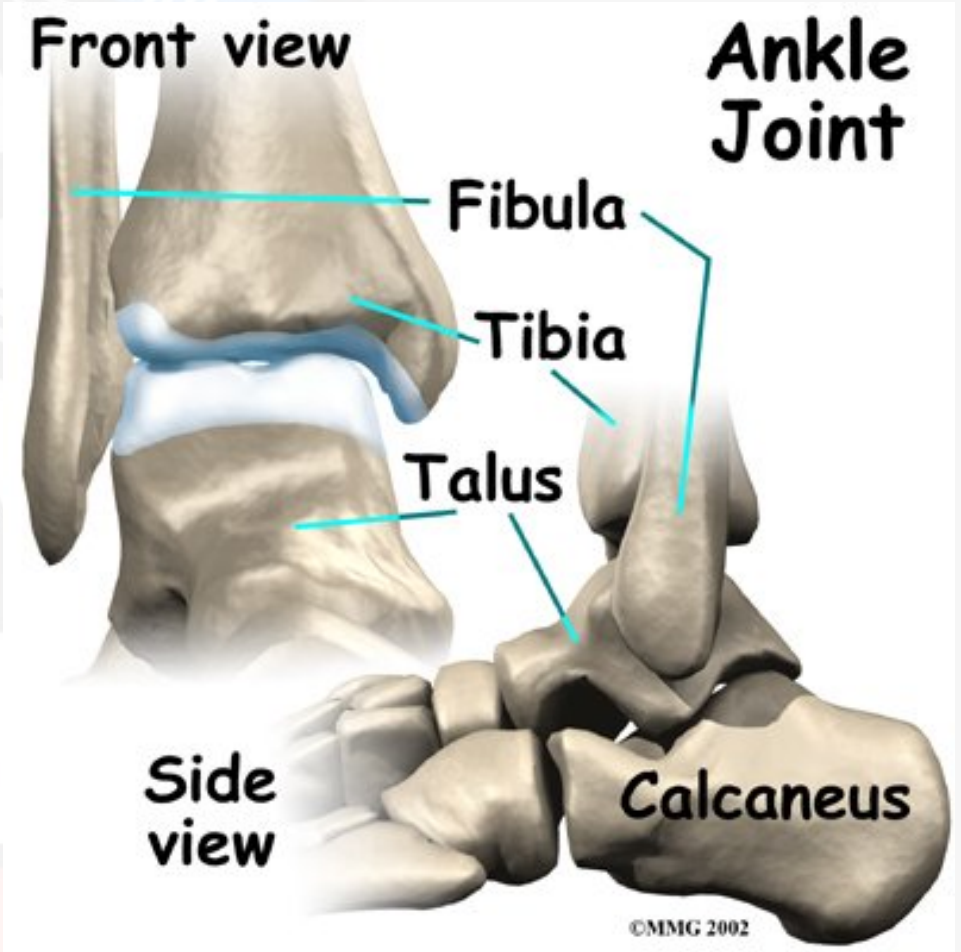


The ankle is the foundation

- The ankle influences the amount of motion needed at the midfoot, knee, hip and low back
- Ankle and hip stability control the forces acting on the knee in the lateral planes
- Most all of forward propulsion comes from the push-off from the great toe and calf muscles

Accessory movements of the ankle

- The ankle is a saddle joint, it doesn't just hinge
- That means there's an anterior/posterior glide and inversion/eversion
- For full dorsiflexion the tibia and fibula also have to move apart to allow the talus to slide up into the ankle joint



Self posterior glide of the talus

- To increase dorsiflexion, the talus must not only roll up but also glide posteriorly

Ankle Stability

- The ankle requires high levels of dynamic stability
  - It is important to train on dynamic/moving surfaces
    - Bosu ball, sanddune, airex pads

- Prevention of ankle injuries is not just in strength and ROM, but also muscle memory and speed of recruitment of ankle stabilizers
  - Don’t just train on dynamic surfaces, but also reaching out into multiple planes of movement

Ankle Sprains

- Most ankle sprains affect the outside/front part of the ankle and result in a sprain of the Anterior Talo Fibular ligament (ATF). The calcaneofibular ligament can also be strained
- We can help prevent ATF sprains by influencing strength and recruitment of the ankle evertors (peroneals).

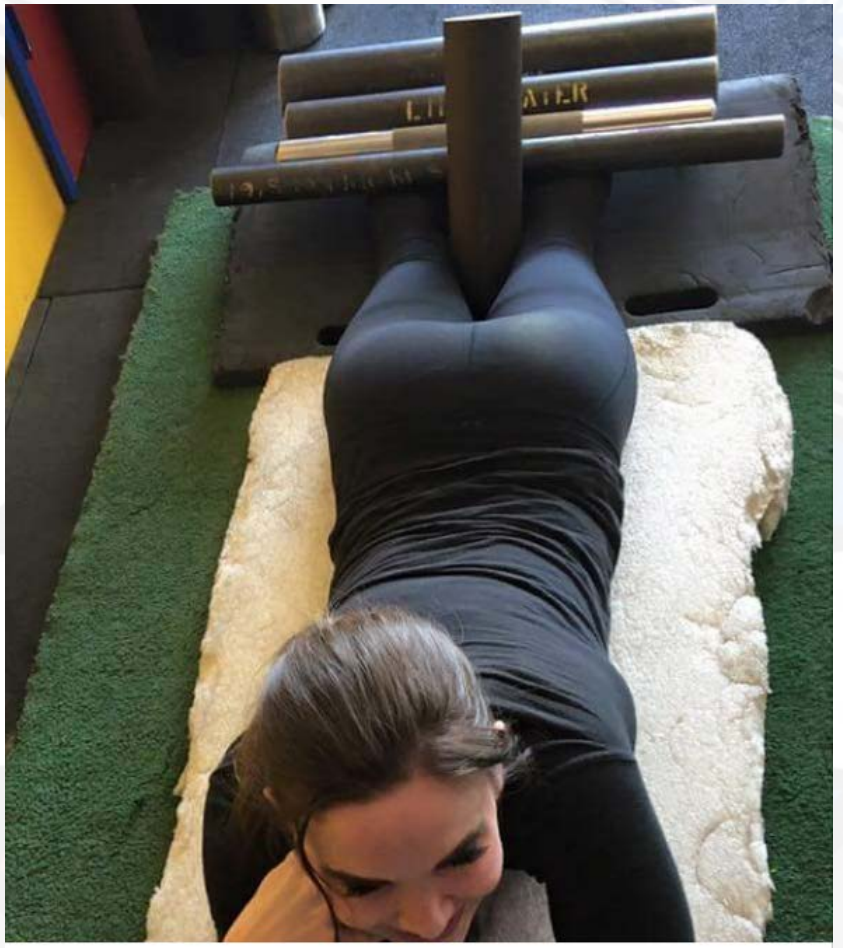
When to order x-ray

- The Ottowa Ankle Rules were established to help determine a criteria for when radiographs should be ordered

- There is any pain in the malleolar zone; and,
- Any one of the following:
  - Bone tenderness along the distal 6 cm of the posterior edge of the tibia or tip of the medial malleolus, OR
  - Bone tenderness along the distal 6 cm of the posterior edge of the fibula or tip of the lateral malleolus, OR
  - An inability to bear weight both immediately and in the emergency department for four steps.

*Stiell IG, Greenberg GH, McKnight RD, Nair RC, McDowell I, Worthington JR (April 1992). "A study to develop clinical decision rules for the use of radiography in acute ankle injuries". Ann Emerg Med. **21** (4): 384–90.*

Static Achilles and Gastroc Tempering



Compression of Calf Study

- compression induced **changes in tissue blood flow and perfusion appear to result in improved oxygenation during short-term exercise.**
- Assuming that increased muscle oxygen availability positively influences performance, compression of muscles **may enhance performance especially in sports that require *repeated short bouts of exercise.***
  - Most run plays are 4-5 seconds
  - Most pass plays are 5-8 seconds

J Strength Cond Res. 2012 Jun;26(6):1631-7. doi: 10.1519/JSC.0b013e318254885b.

Effects of compression on muscle tissue oxygenation at the onset of exercise.

Coza A, Dunn JF, Anderson B, Nigg BM.

Achilles Tendonitis

- If chronic/persistent can lead to a change in tissue structure / fiber types and become a tendonosis
- Best method of treatment is heavy pressure IASTM and eccentric training progressing to eccentric training under load.
- Can encourage the athlete to push into some discomfort and soreness but not pain
- Eccentric exercises at frequency close to 100 reps a day

Alfredson, Håkan, et al. "Heavy-load eccentric calf muscle training for the treatment of chronic Achilles tendinosis." *The American journal of sports medicine* 26.3 (1998): 360-366.

Instrument Assisted Soft Tissue Mobilization

- IASTM has been successfully used in the treatment of chronic tendinitis patients.
- Theory: IASTM technique promotes healing through a controlled application of microtrauma.
- Examples: Body Tempering, Guasha, Cupping, Graston

IASTM Study

- Were able to induce morphologic changes in the rat Achilles tendon after enzyme-induced injury with collagenase (create tendonitis/tendonosis)
- Then study the subsequent pressure variations in IASTM therapy.

IASTM Study

- METHODS: Thirty male white rats were randomly assigned to one of five groups with six animals per group:
- Tendinitis (A),
- Tendinitis plus light ASTM (B),
- Tendinitis plus medium ASTM (C),
- Tendinitis plus extreme ASTM (D),
- Control with surgery only (E).

IASTM Study

- IASTM was performed for 3 min, for a total of six treatment sessions.
- The Achilles tendons of each group were harvested 1 wk after the last ASTM treatment.
- Fibroblast numbers were assessed by light microscopy. An electron microscope was used to observe enlargement of fibroblasts.
  - Fibroblasts are one of the major building blocks of all tissue

IASTM Study

- RESULTS: Statistical analysis of the number of fibroblasts present indicated a significant difference between group D and all other groups.
- CONCLUSION: The morphological evidence indicated that the application of heavy pressure promoted the healing process to a greater degree than light or moderate pressure.
- **ASTM with “extreme” IASTM yielded enlarged fibroblasts in the tendon versus light to medium ASTM.**

The sole of your foot has over 200,000 nerve endings in it, one of the highest concentrations anywhere in the body. Our feet are designed to act as earthward antennae, helping us balance and transmitting information to us about the ground we're walking on. (From "You Walk Wrong," New York Magazine, 28 April 2008)

Tempering the plantar surface of the foot

Plantar Fasciitis

- While not a disorder of the ankle, poor ankle plantar flexion coupled with poor great toe dorsiflexion can lead to increased tensile stress on the plantar fascia
- A good comprehensive plantar fasciitis treatment protocol should include
  - Rolling out the fascia and calf to release any increased tone or trigger points
  - Good arch support to reduce impact at the heel
  - Good cushioned shoes
  - Increasing achilles and great toe range of motion