



**Heritage College  
of Osteopathic Medicine**

# THINKING OSTEOPATHY ON ANKLE SPRAINS

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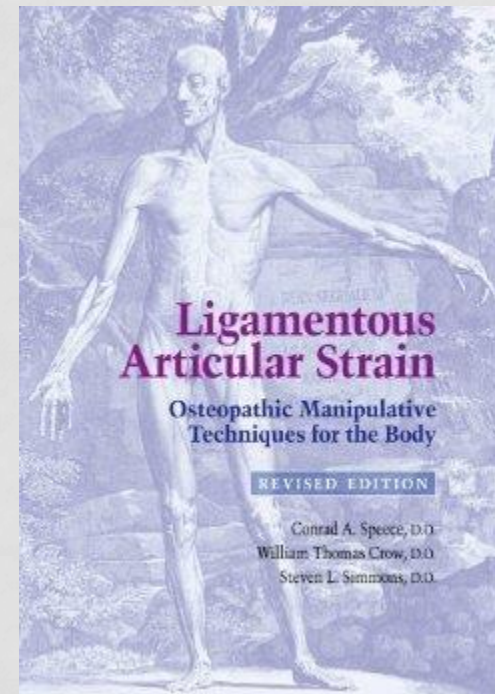
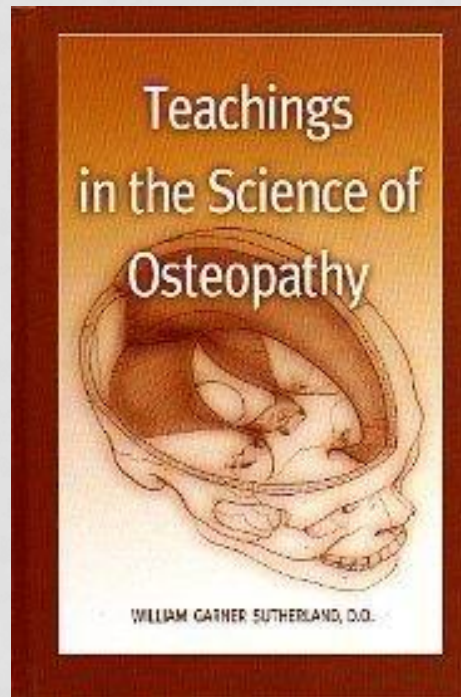
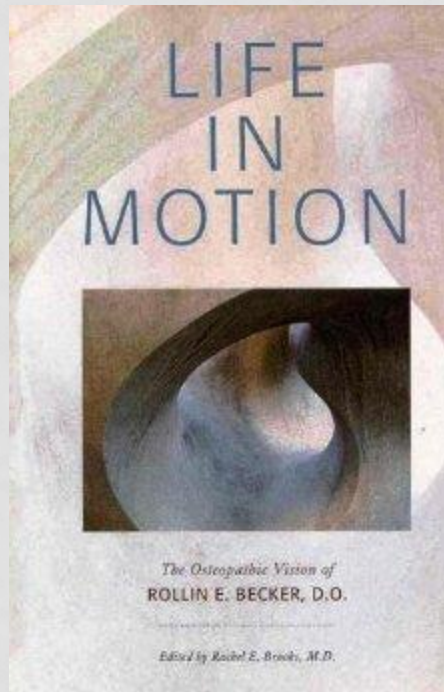
# DISCLOSURES

- Simeon J Hain, DO, and members of the planning committee do not have a conflict of interest in this topic.

# OBJECTIVES

- Ankle sprain epidemiology and risk factors
- **Thinking vs. tinkering**
- Anatomic basis of 'technique' and principles of treatment

# PRIMARY REFERENCES



# WHO GETS ANKLE SPRAINS?

- **Everyone...**
  - One of the most common reasons for primary care office and emergency department visits in the US. (AFP Vol 85, No. 12, 6/15/12)
- **Risk factors:** athletic activity, prior ankle sprain

\*note – *prior* ankle sprain, often the ankle sprain you are needing to ‘treat’ is the one that happened in the past many years ago and is not a current cc.

# WHY ANKLE SPRAIN?

- **COMMON** and **TREATABLE**
- The lower extremities are (very) often overlooked and are incredibly **commonly dysfunctional** and directly involved in many difficult to treat complaints, ie – low back pain! Inactive folks take around 3,000 steps per day and we are told for health 10,000 steps is optimal. That is around  $\frac{1}{4}$  **billion steps in an average lifetime!** The effects of dysfunction unlevel the sacropelvis and can create a scoliosis that overtime may effect distant structures such as the low back, head and neck region, etc... It is helpful to remember that 2 of the major transverse fascial planes of the body are in the extremity (knee and ankle)...think **baffles/choke points**. This obviates the critical importance of examining the extremities as part of EVERY screen in the osteopathic context.

# WHAT IS AN *OSTEOPATHIC* DIAGNOSIS?

- The osteopathic lesion is an **effect only**. We must try to figure out what influence a lesion/lesions would have on a given area and consider the anatomy and physiology it represents. Think back to what could have produced the lesion. Use the lesion itself as a 'tool' not as the 'cause...'

Paraphrased from "knowing to Treating," Rollin Becker, DO in *Stillness of Life* which was an edited transcription from a Dallas Osteopathic Study Group session in 1967.

# GAIT & ENERGY

- “Abnormal gait may increase cardiac work by up to **300%\*** and this may surpass the patient’s energy reserves...”

excerpted from: Kuchera & Kuchera, *Osteopathic Considerations in Systemic Dysfunction*, 1994.

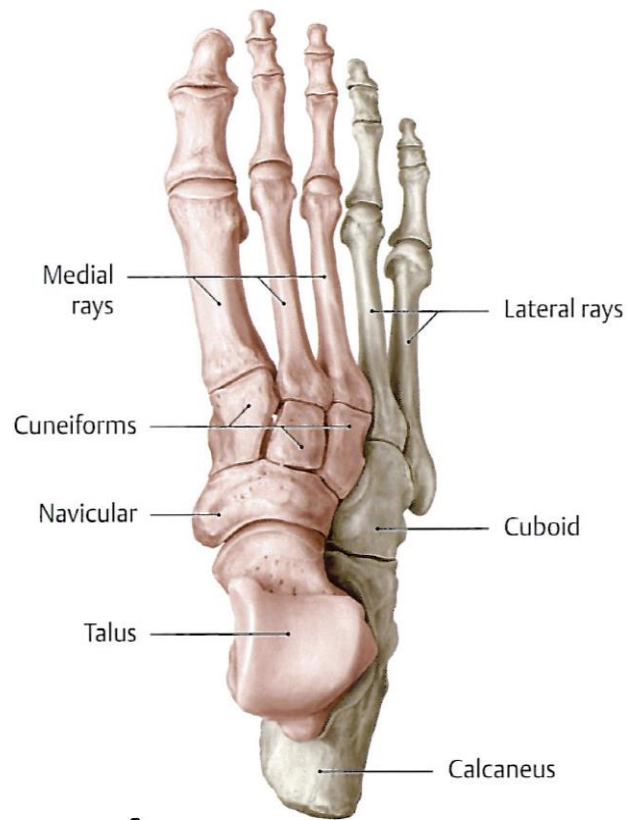
\*Saunders JB: The major determinants in normal and pathological gait. *The Journal of Bone and Joint Surgery*, Jul 1953; 35-A(3): 543-558.



# LAB OBJECTIVES

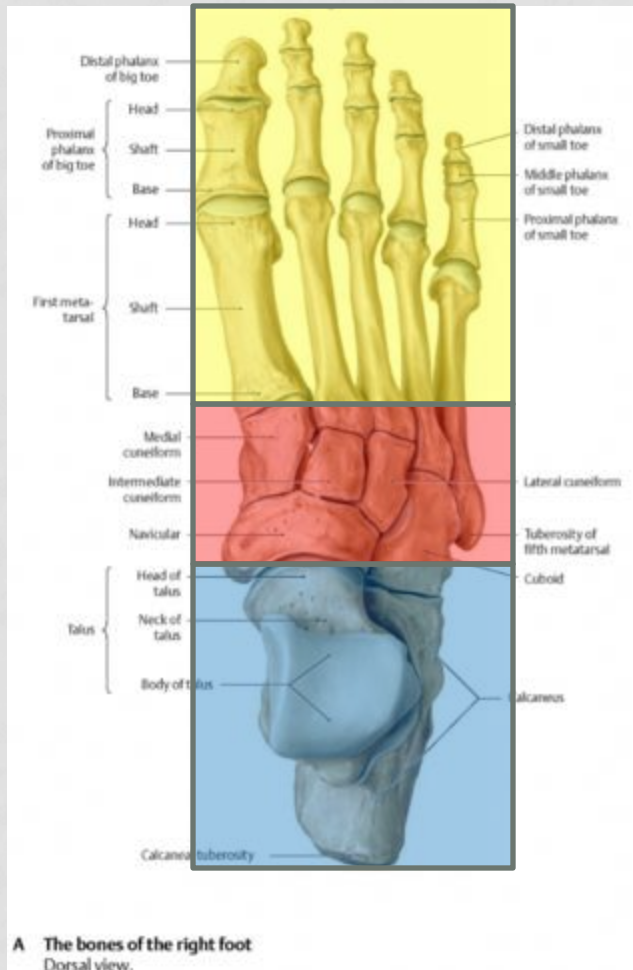
- Understand **functional anatomy** of the lower extremity and APPLY it to diagnosis and treatment of an ankle sprain, ie, the thought process behind ***thinking osteopathy***
- Learn **applied principles** of LAR

# “TWO” FEET IN ONE



Thieme, *Atlas of Anatomy*, p412

# ORGANIZATION OF FOOT



- **Forefoot**

Metatarsals and phalanges

- **Midfoot**

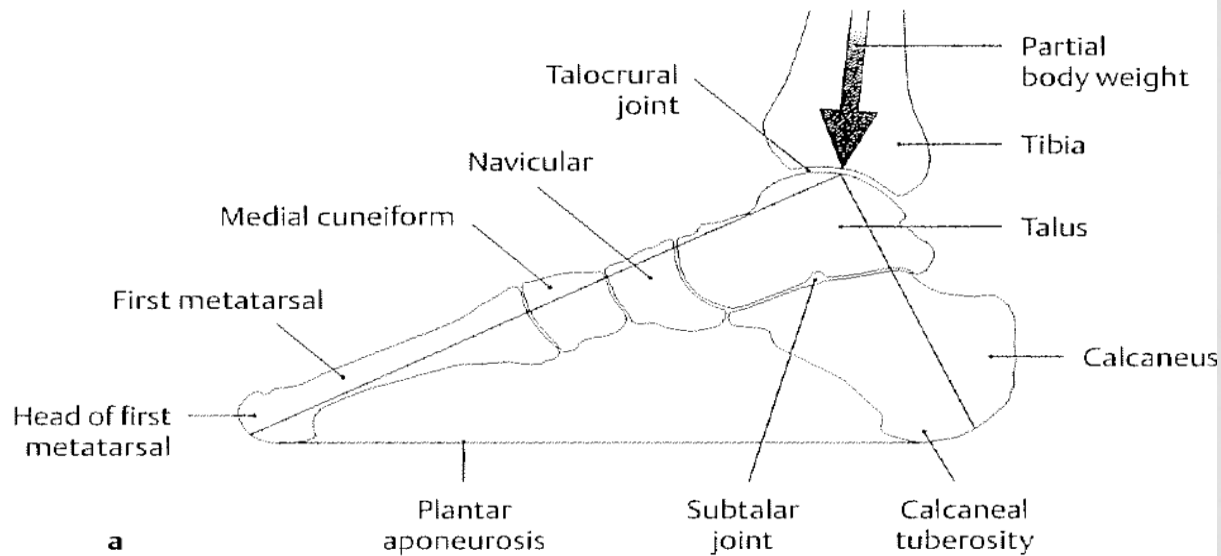
Cuneiforms, cuboid, and navicular

- **Hindfoot**

Talus and Calcaneus

\*adapted from Thieme, *Atlas of Anatomy*, p374

# POSTURAL FORCE VECTORS



**C Transfer of compressive stresses in the weight-bearing foot**  
Schematic sagittal section at the level of the first ray, medial view.

**a** During stance, the partial body weight on the talocrural joint is transferred across the talus to the forefoot and hindfoot.

# ORGANIZE YOUR THINKING...

- Define the problem in the foot, ankle, or knee, etc...  
**ie diagnosis:**
  - Tibio-talar (talo-crural)
  - Talo-calcaneal
  - Midfoot (cuboid/navicular/cuneiforms)
  - Metatarsal/phalanges
- What about interosseous/fibula, knee, hip and pelvic area?

# KEEP IT SIMPLE!

“It is our ***intention***,  
through proper ***tension***,  
to get the ***attention*** of the  
central nervous system.”

-Herb Miller, DO, FAAO, FCA

# TIBIO-TALAR

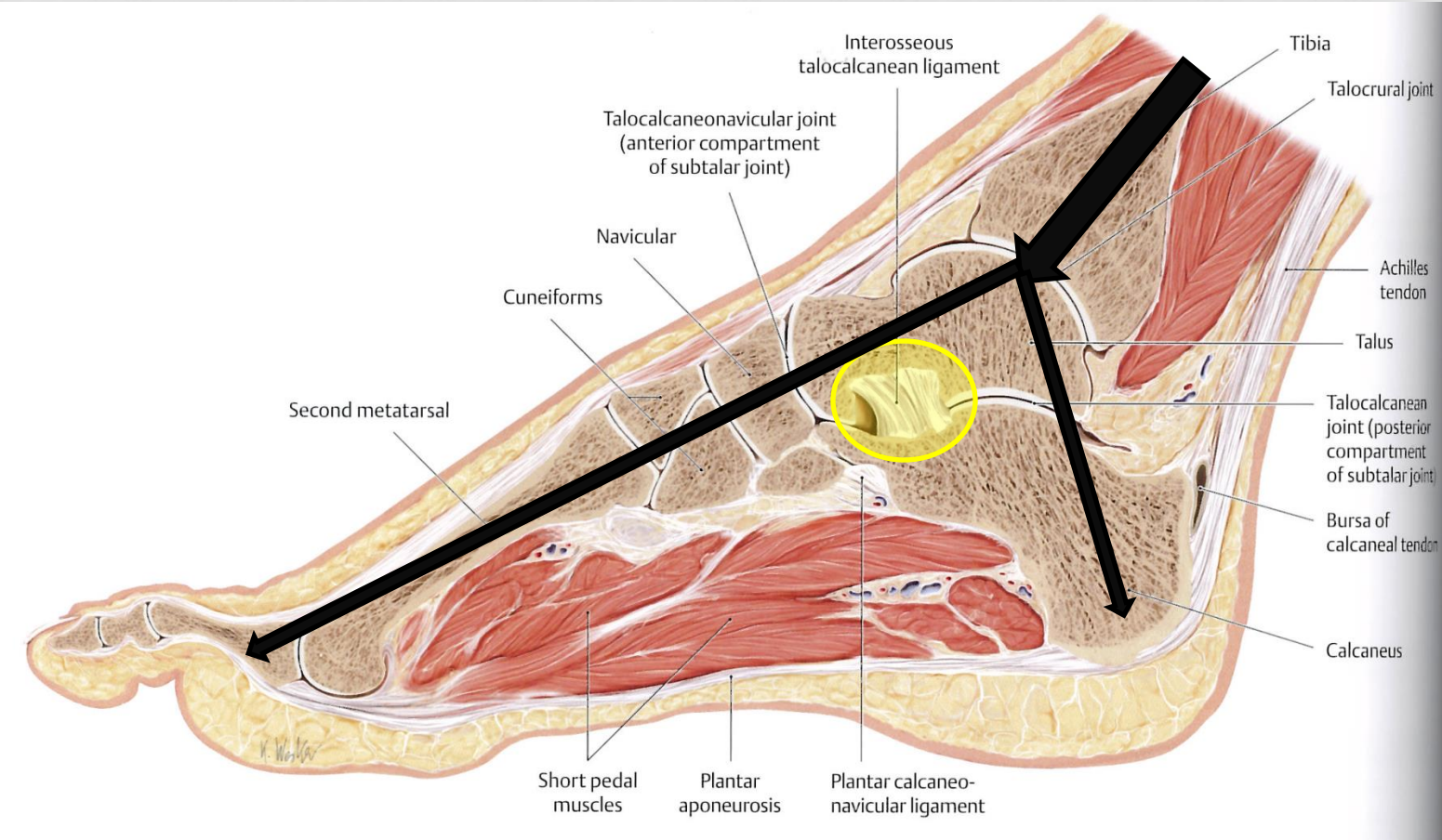
- **Diagnosis:**
  - Anterior or posterior *talus*
- **Method:**
  - Plantarflex (anterior talus) and
  - dorsiflex (posterior talus) foot
- **Considerations:**
  - Think of vectors of injury, postural habits or job related situations that would cause this strain.

# TALO-CALCANEAL (SUB-TALAR)

- **Diagnosis:**
  - inversion/eversion of *calcaneus*
- **Method:**
  - Compression of sub-talar:  
horizontal plane and ~30 degrees
  - Rudder action of *calcaneus*
- **Considerations:**
  - Think of vectors of injury (ankle sprain!), fashion (shoes), postural strain (short leg), etc...



# TALOCALCANEAN LIGAMENT



# MIDFOOT AND FOREFOOT

- **Diagnosis:**

- Int/Ext rotation of navicular/cuboid/cuneiforms, flex/ext of metatarsals/phalanges

- **Method:**

- MIDFOOT**

- Int/ext rotation of midfoot with 3 planes of glides as in functional methods

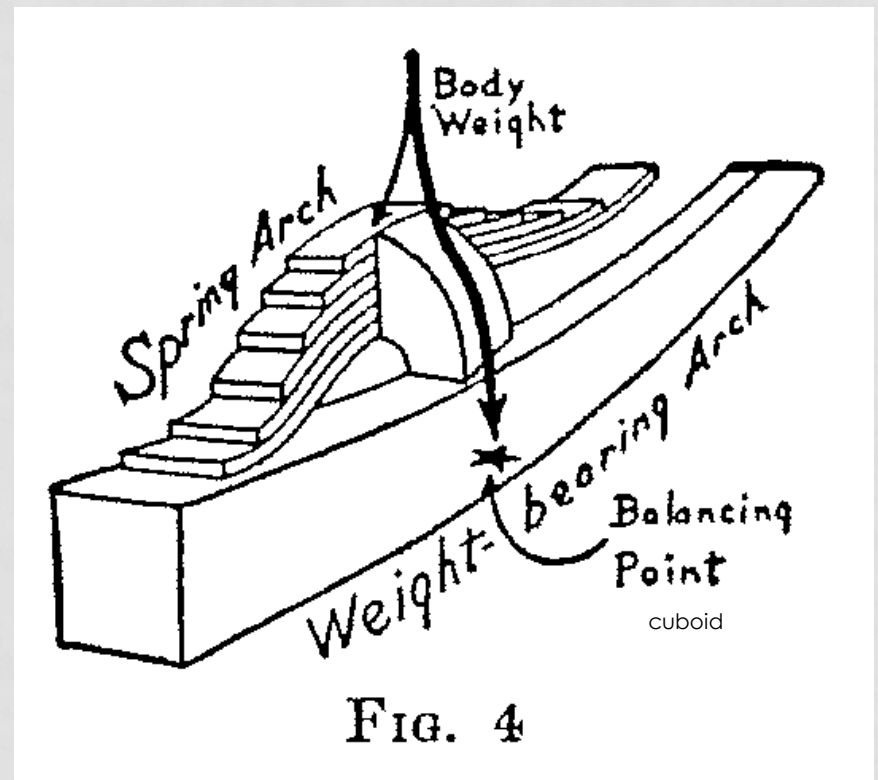
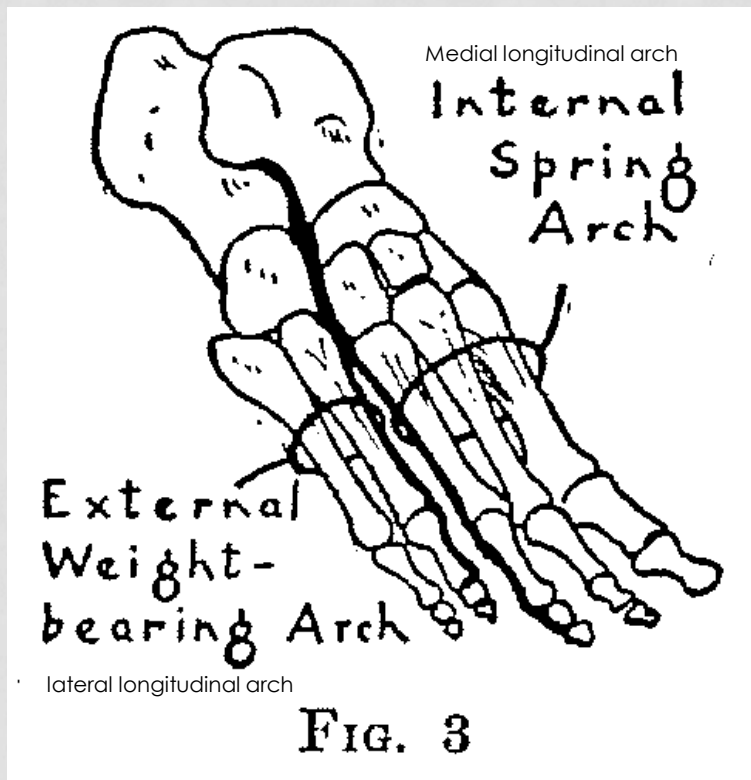
- METATARSALS**

- Individually flex/extend, int/ext rotation, glides

- **Considerations:**

- Think of vectors of injury ankle sprain, fracture/stubbing a toe, bunions, dropped something on foot, etc...

# ARCHES & MIDFOOT



# METATARSAL MOTION

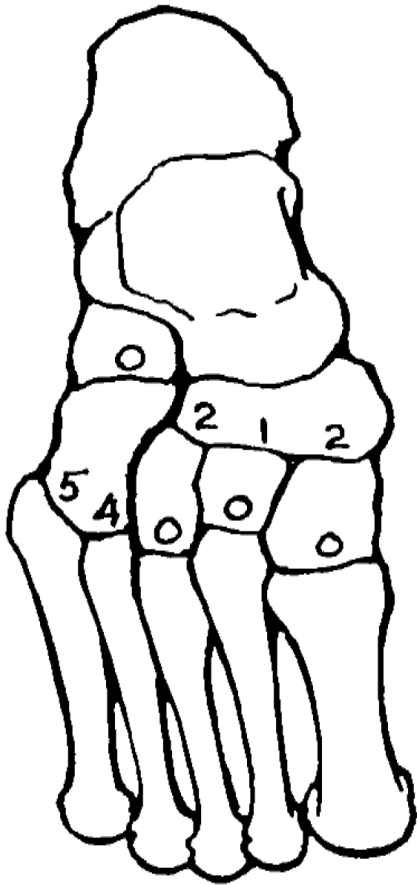
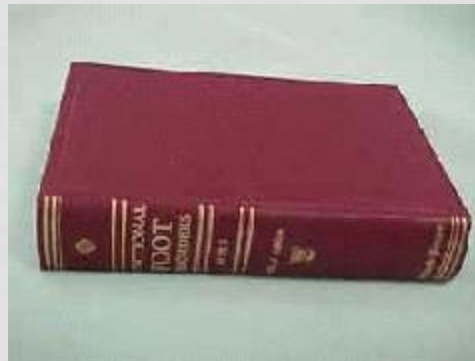


Figure 100. Hiss, p232



John Martin Hiss, DO

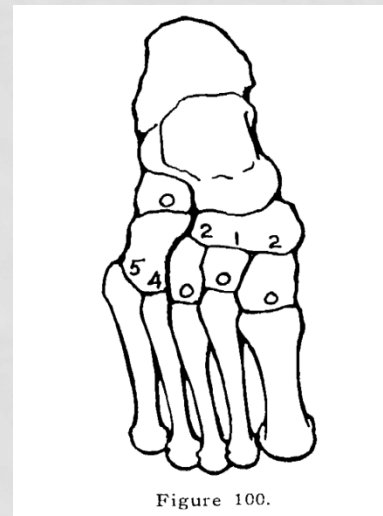


Dr. Hiss's 800+ page tome "Functional Foot Disorders, 3<sup>rd</sup> Ed." published 1949

# METATARSAL MOTION

- What is NORMAL? Dictated by anatomy...
  - Metatarsal motion is primarily through tarsal relationship via the cuneiform-navicular relationship, and cuboid.
  - 2<sup>nd</sup> metatarsal has least permitted motion
  - 1<sup>st</sup> & 3<sup>rd</sup> have about twice as much motion as 2<sup>nd</sup>
  - 4<sup>th</sup> & 5<sup>th</sup> have most motion, with 4<sup>th</sup> 4x's, 5<sup>th</sup> 5x's the motion of the 2<sup>nd</sup> metatarsal.

Hiss designed this “tarsal segmental model” (Figure 100) of metatarsal motion to help understand the normal permitted motions of the metatarsals using an arbitrary standard of “1” for the least motion. “5” therefore implies 5x's the amount of motion of the standard.



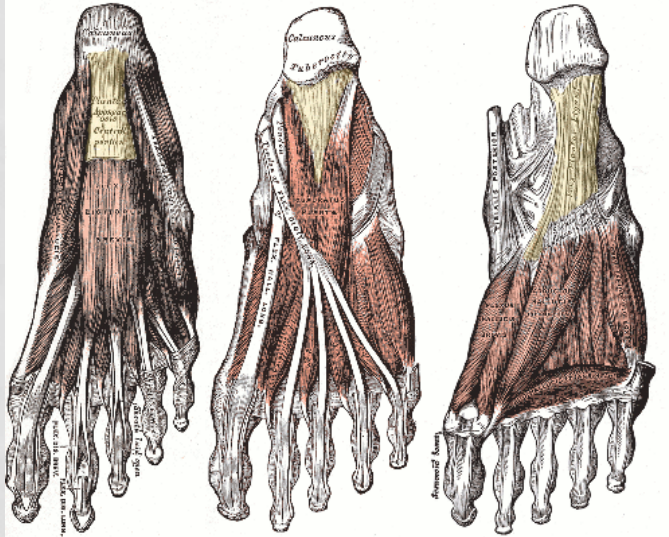
Hiss, p232



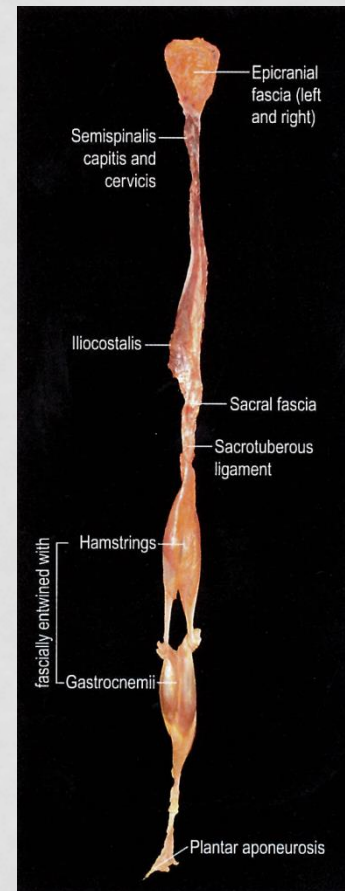
Thieme, p412

# PLANTAR FASCIA

- 3 layers (Kapandji, Vol. 2, p.216-217)
  - Deep
  - Intermediate
  - Superficial



Gray's Anatomy, 20<sup>th</sup> US Edition, 1918



Myers, p7



Myers, p8

# REVIEW

- Ankle sprains are common
- Rational approach focuses on whole patient via local, regional, systemic anatomy
- Gather the Info first (history/exam), then *begin* process of interpretation...which is ongoing

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