ARCHES OF FOOT

FUNCTIONS OF FOOT

- **Support body weight**
- **Serves as a lever to propel the body forward in walking & running**

WHY THERE ARE ARCHES?

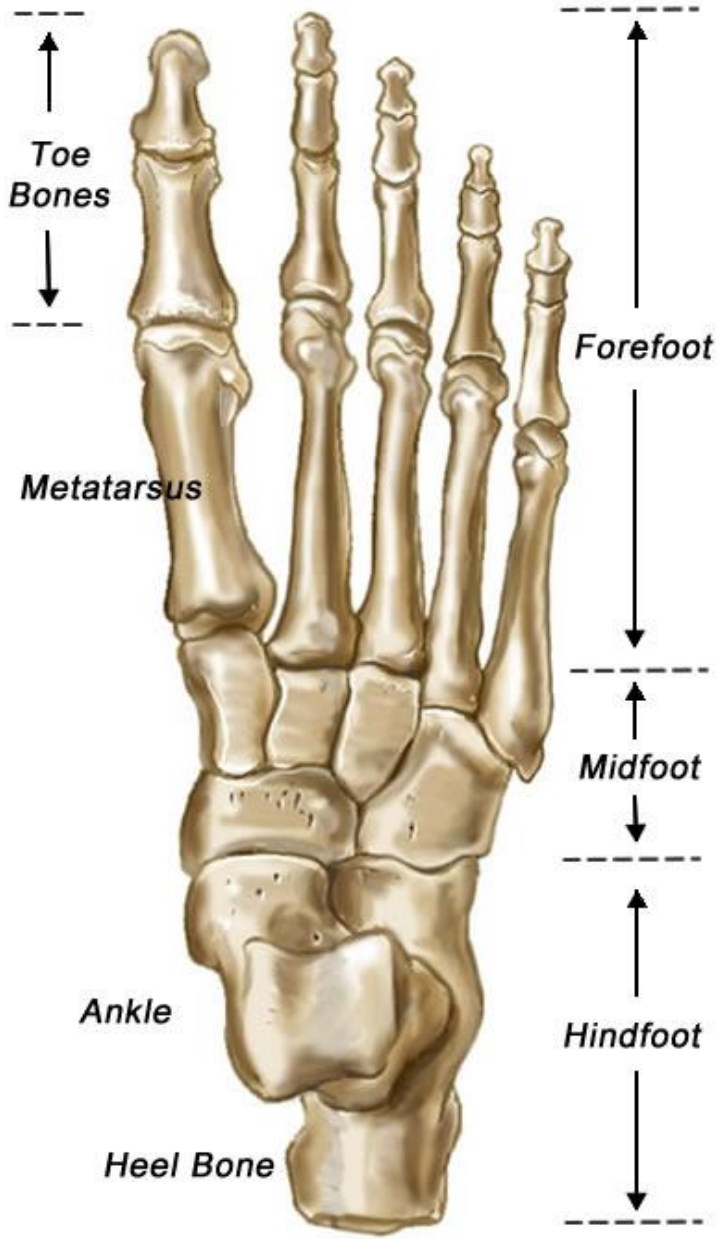
- **A segmented structure can hold up weight only if it is built in the form of arches**
- **Weight will be distributed on: 1) the heel (behind) & 2) heads of metatarsal bones (in front): pressure will be minimized on nerves & vessels in sole**
- **Forward propulsive action will be easier**

Bone Anatomy

- Tarsal Bones
  - Calcaneus
  - Cuboid
  - Navicular
  - 3 Cuneiforms
  - 5 metatarsals
  - 14 phalanges (proximal, middle, distal)

FOOT DIVISION

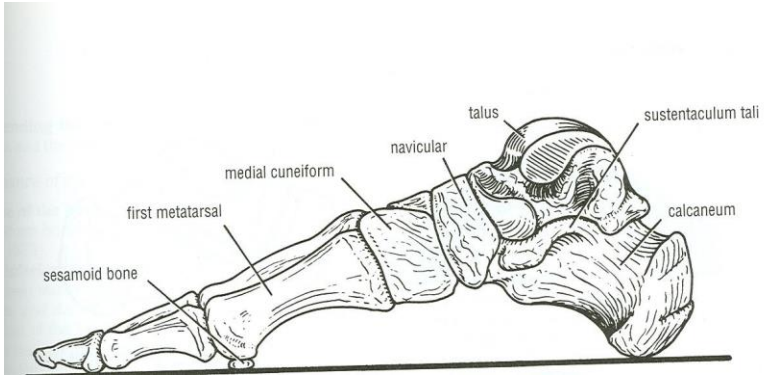
- Hind-foot
- Mid-foot
- forefoot



ARCHES OF FOOT

MEDIAL LONGITUDINAL ARCH:

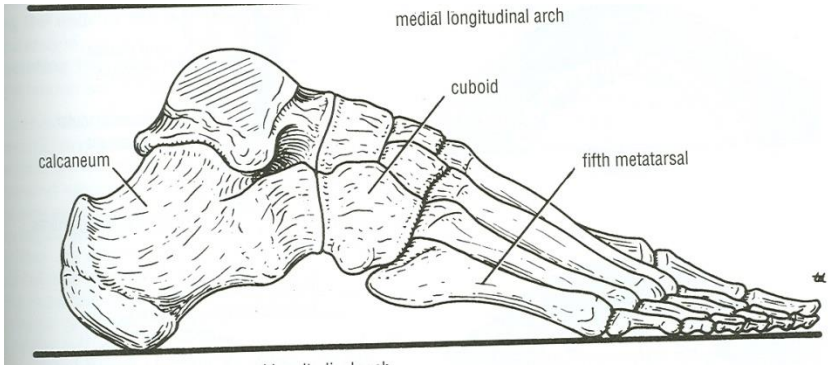
- Higher than lateral arch
- Formed of: calcaneum, talus (key stone), navicular, three cuneiform & first three metatarsal bones



ARCHES OF FOOT

LATERAL LONGITUDINAL ARCH:

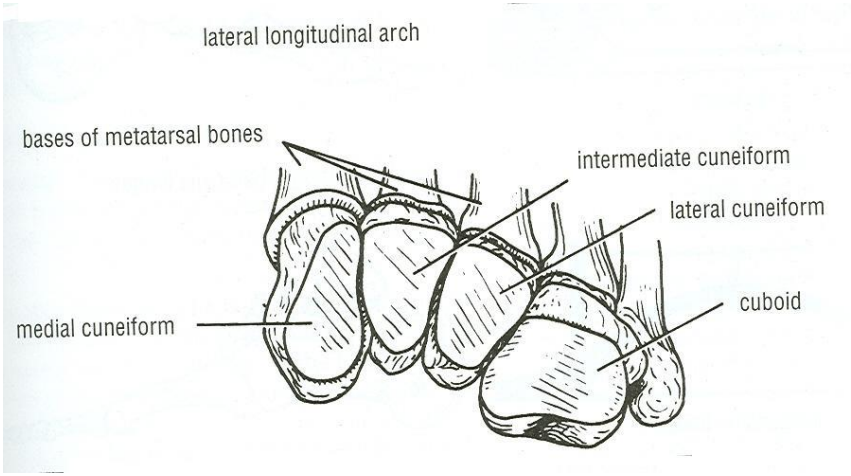
- Lower than medial arch
- Formed of: calcaneum, cuboid (key stone), fourth & fifth metatarsal bones



ARCHES OF FOOT

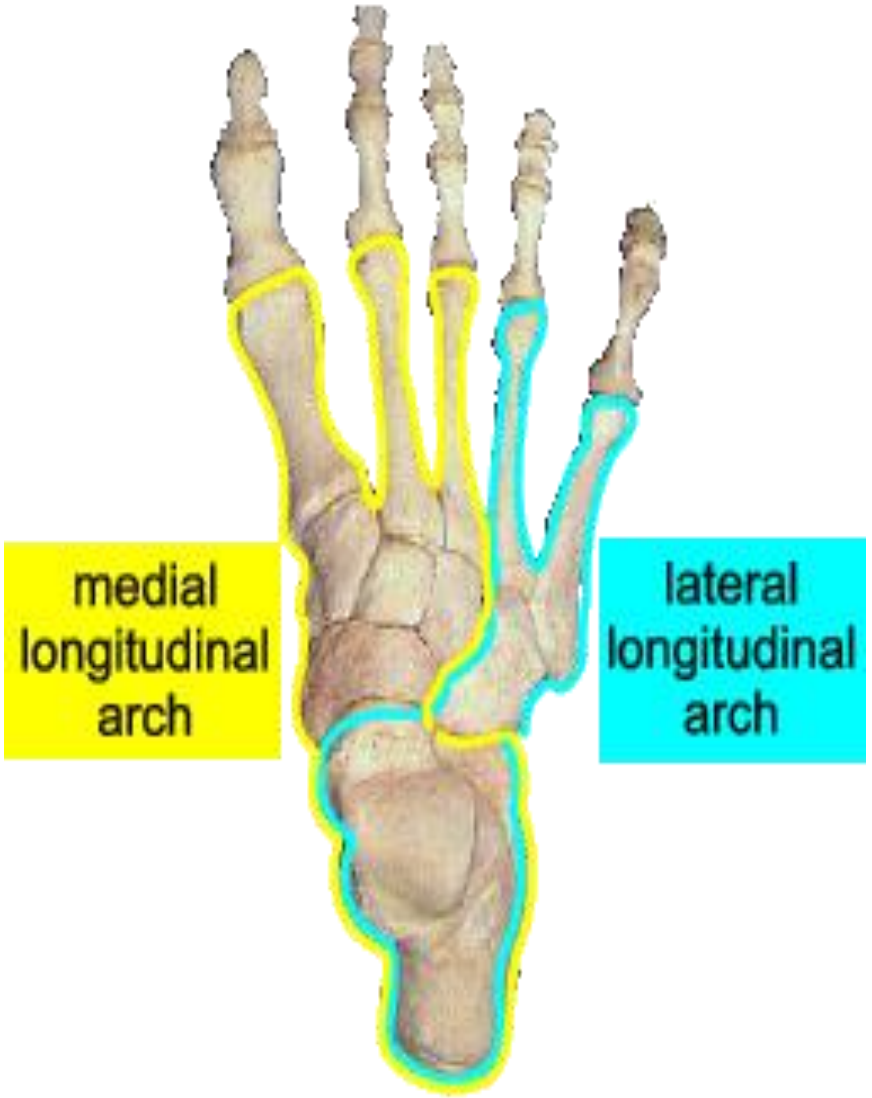
TRANSVERSE ARCH:

- **It is only half an arch**
- **It is formed of: bases of metatarsal bones, cuboid & three cuneiform bones**



CLASSIFICATION OF ARCHES

- A. Longitudinal
  1. medial
  2. lateral
- B. TRANSVERSE
  1. ANTERIOR
  2. POSTERIOR



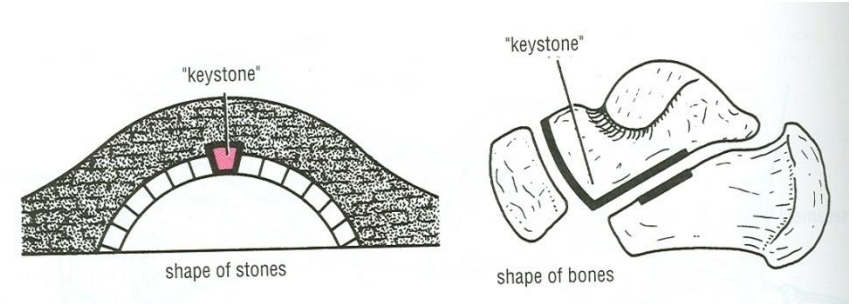
FACTORS MAINTAINING ARCHES OF FOOT

- **Shape of bones**
- **Strength of ligaments**
- **Tone of muscles**

MECHANISM OF ARCH SUPPORT

SHAPE OF BONES

- **Bones are wedge-shaped with the thin edge lying inferiorly**
- **This applies particularly to the bone occupying the center of the arch "keystone"**

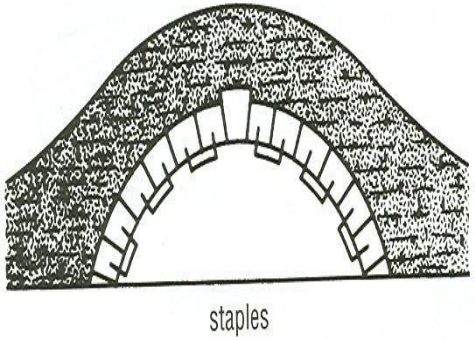


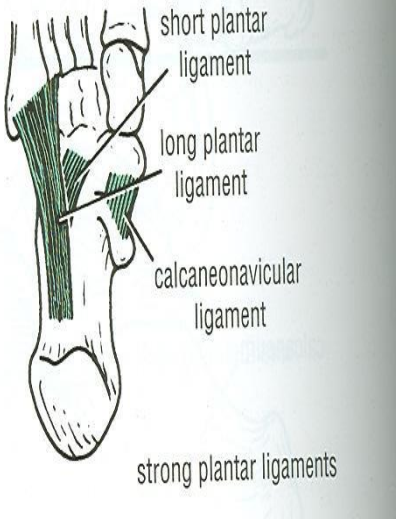
MECHANISM OF ARCH SUPPORT

INFERIOR EDGES OF BONES ARE TIED TOGETHER

like

staples or intersegmental ties

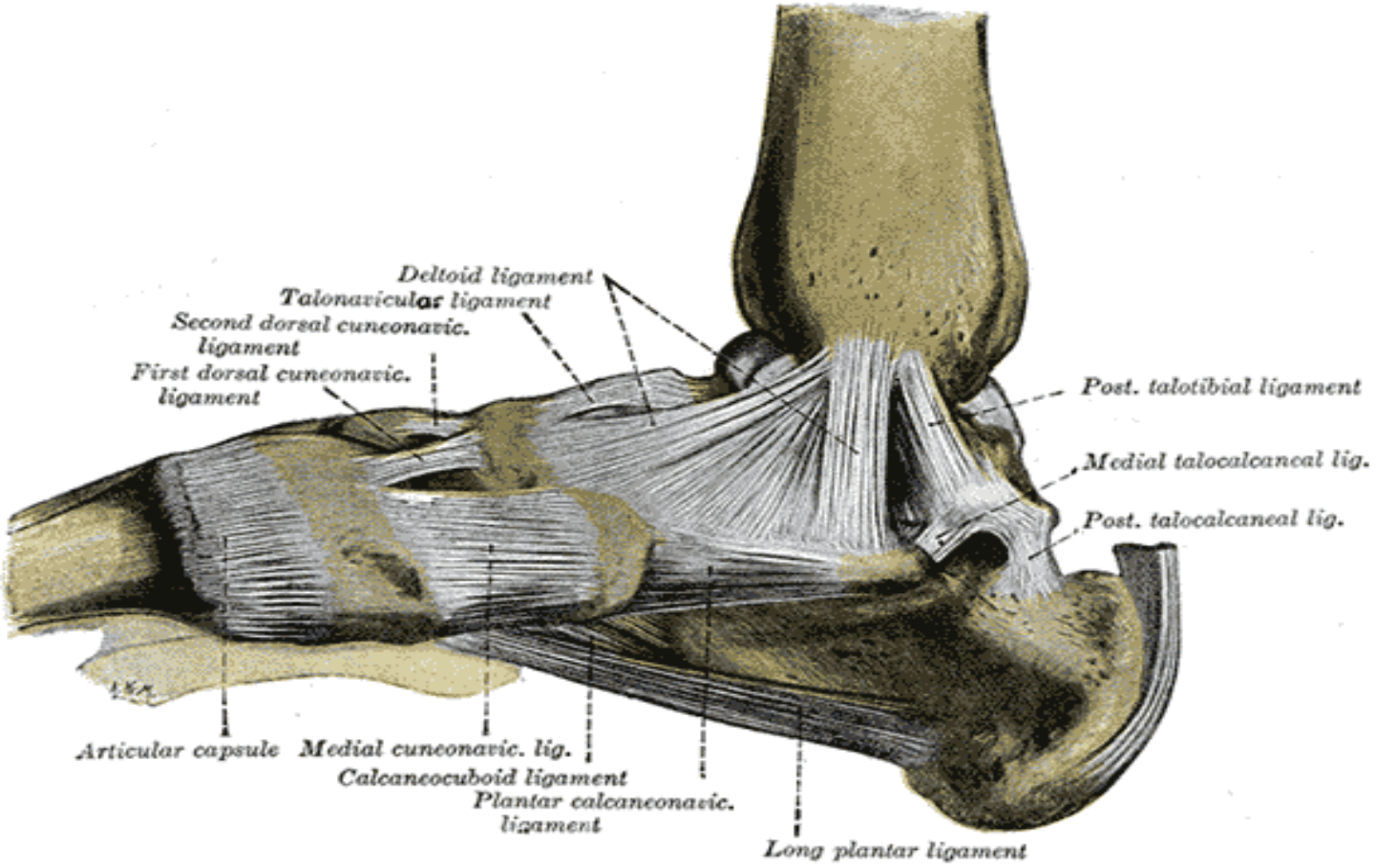


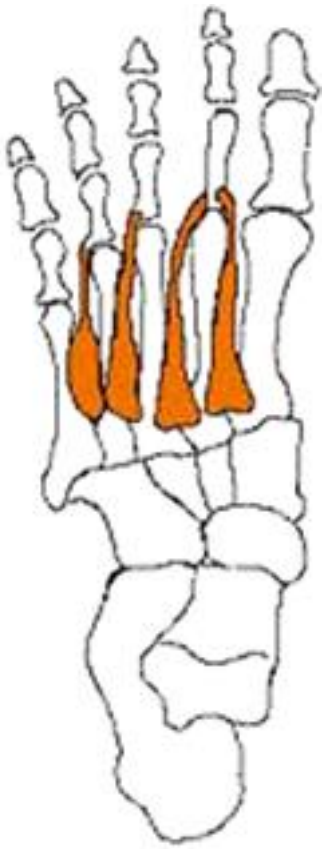


MECHANISM OF ARCH SUPPORT

INFERIOR EDGES OF BONES ARE TIED TOGETHER

- **Medial longtitudinal arch: plantar calcaneonavicular ligament, tibialis posterior**
- **Lateral longtitudinal arch: long & short plantar ligaments**
- **Transverse arch: deep transverse ligaments, transverse head of adductor hallucis, dorsal interossei**


Deltoid ligament
Talonavicular ligament
Second dorsal cuneonavic. ligament
First dorsal cuneonavic. ligament
Post. talotibial ligament
Medial talocalcaneal lig.
Post. talocalcaneal lig.
Articular capsule
Medial cuneonavic. lig.
Calcaneocuboid ligament
Plantar calcaneonavic. ligament
Long plantar ligament



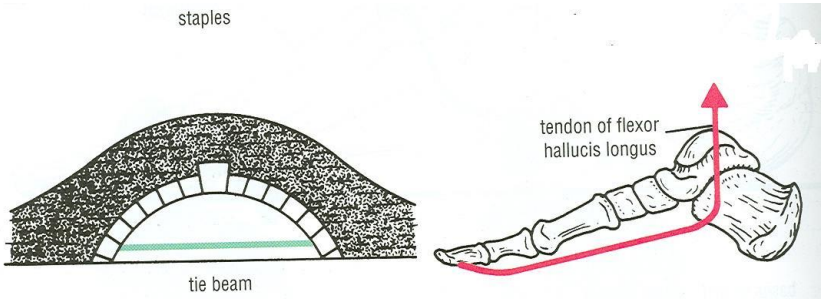
Layer four

MECHANISM OF ARCH SUPPORT

TYING THE ENDS OF THE ARCH TOGETHER

like a

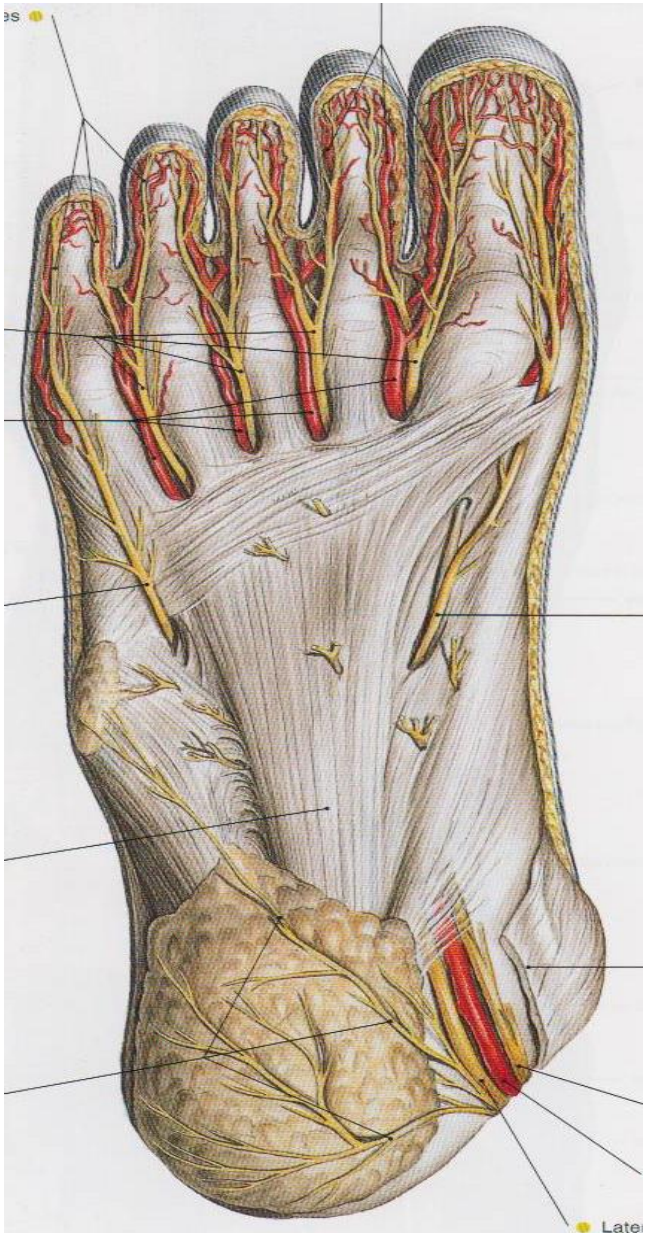
Tiebeam

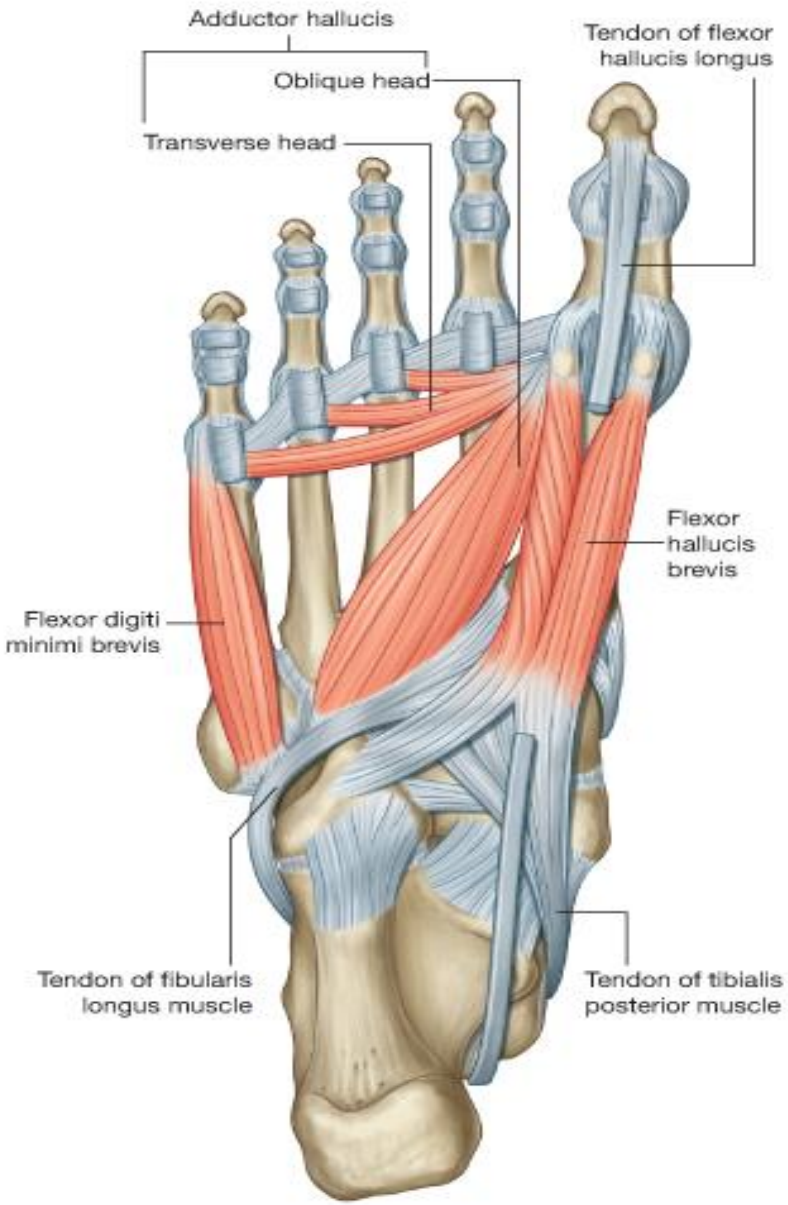


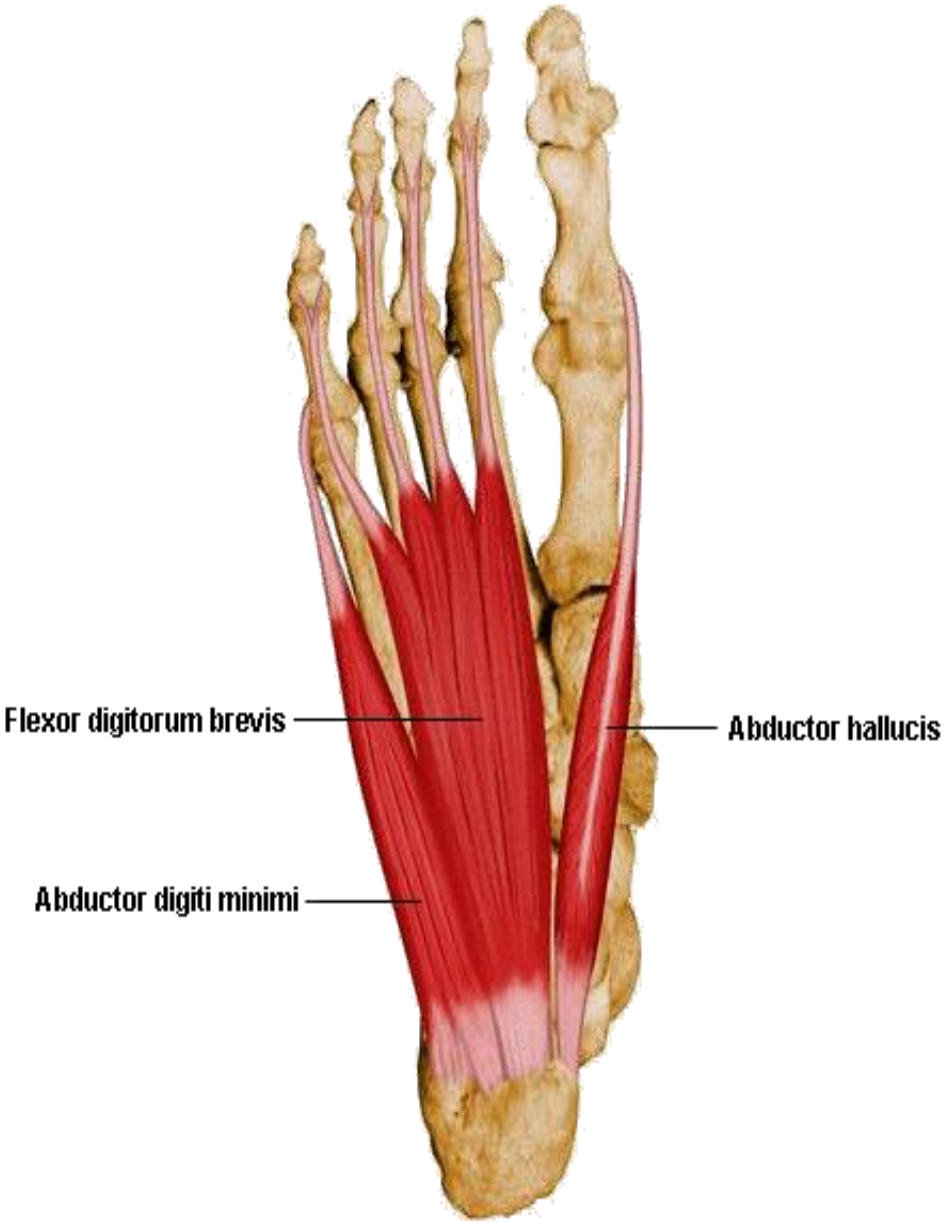
MECHANISM OF ARCH SUPPORT

TYING THE ENDS OF THE ARCH TOGETHER

- **Medial longtitudinal arch: plantar aponeurosis, medial part of flexor digitorum longus & brevis, flexor hallucis longus, flexor hallucis brevis, abductor hallucis**
- **Lateral longtitudinal arch: plantar aponeurosis, lateral part of flexor digitorum longus & brevis, abductor digiti minimi, flexor digiti minimi**
- **Transverse arch: peroneus longus**




Adductor hallucis
Oblique head
Transverse head
Tendon of flexor hallucis longus
Flexor hallucis brevis
Flexor digiti minimi brevis
Tendon of fibularis longus muscle
Tendon of tibialis posterior muscle

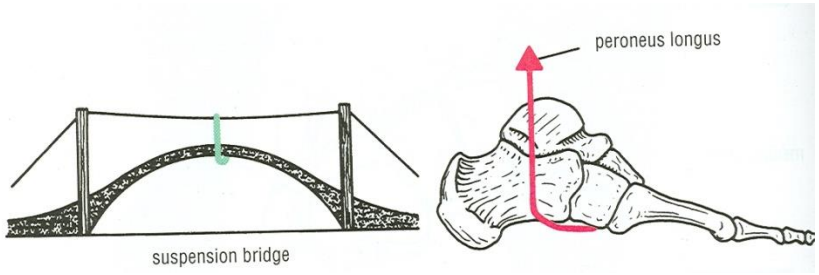

Flexor digitorum brevis
Abductor hallucis
Abductor digiti minimi

MECHANISM OF ARCH SUPPORT

SUSPENDING THE ARCH FROM ABOVE

like a

Sling

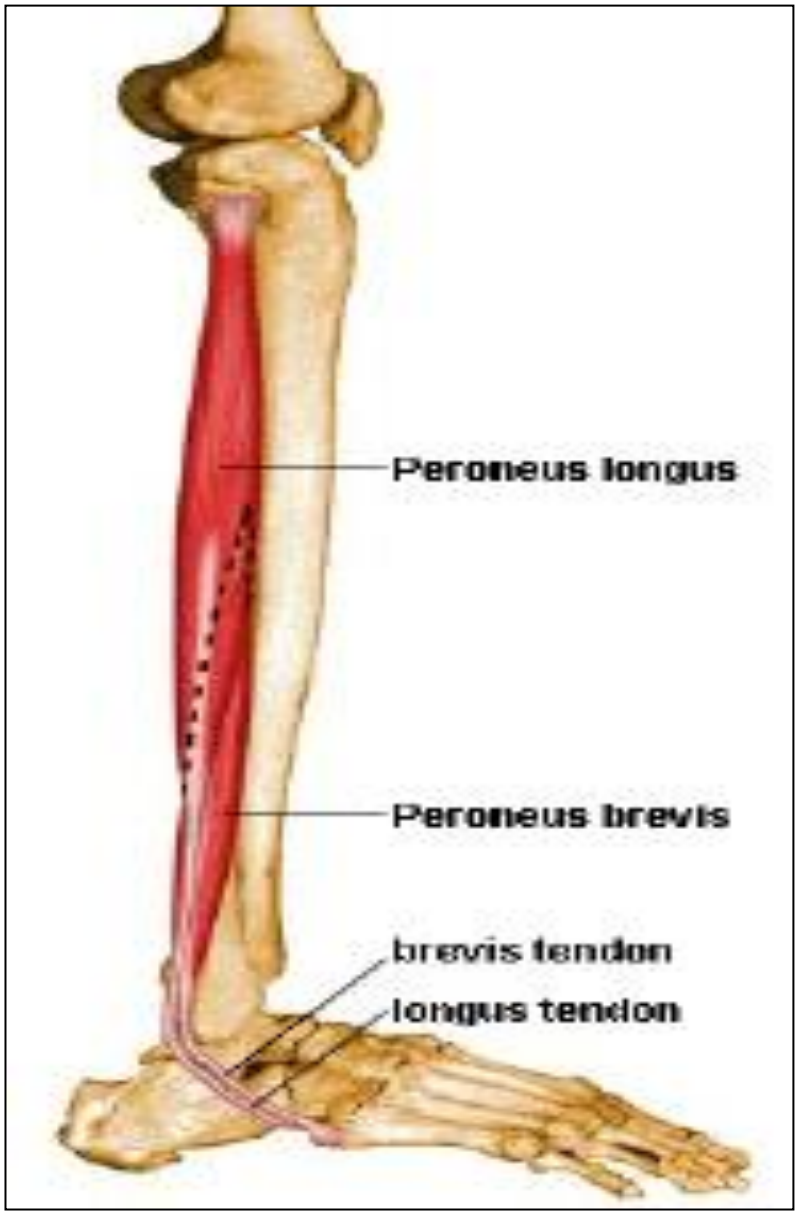


MECHANISM OF ARCH SUPPORT

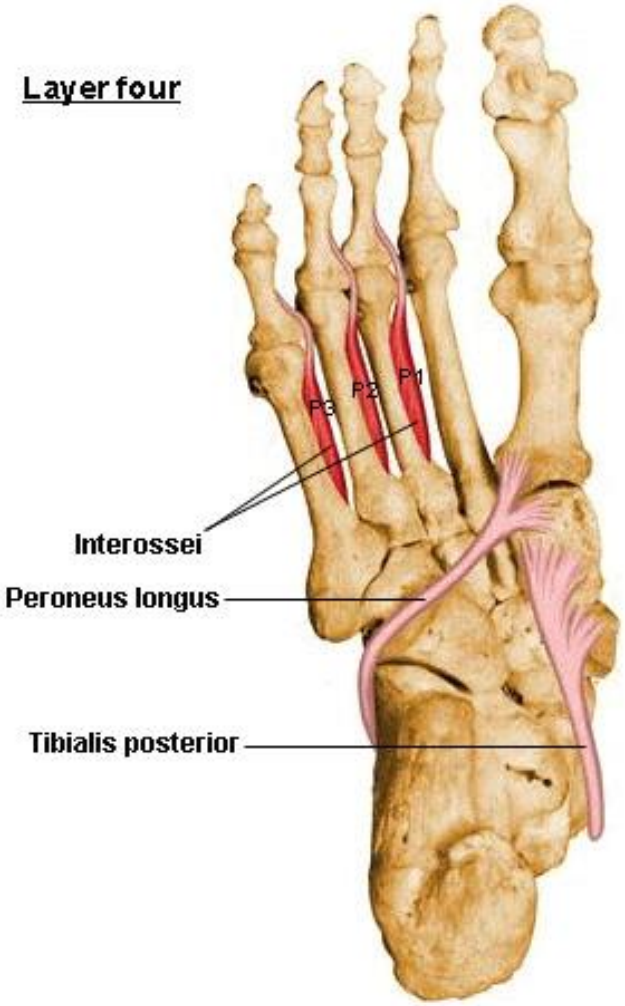
SUSPENDING THE ARCH FROM ABOVE

- **Medial longtitudinal arch: tibialis anterior, tibialis posterior, medial ligament of ankle joint**
- **Lateral longtitudinal arch: peroneus longus, peroneus brevis**
- **Transverse arch: peroneus longus**


"Tom,
Dick &
Harry"
flex
hall
longus
post
tibial
flex
digit
longus

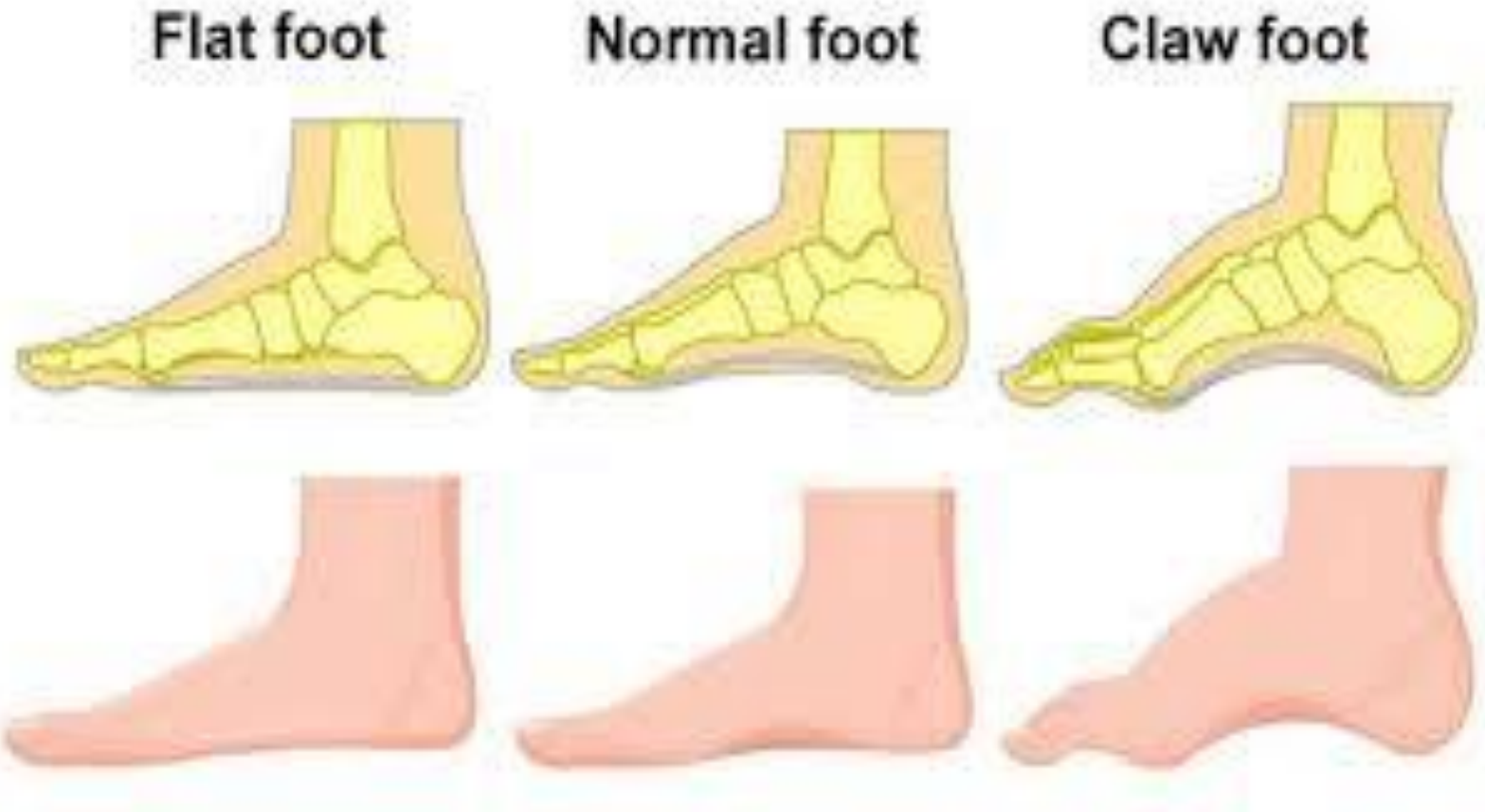

Peroneus longus
Peroneus brevis
brevis tendon
longus tendon

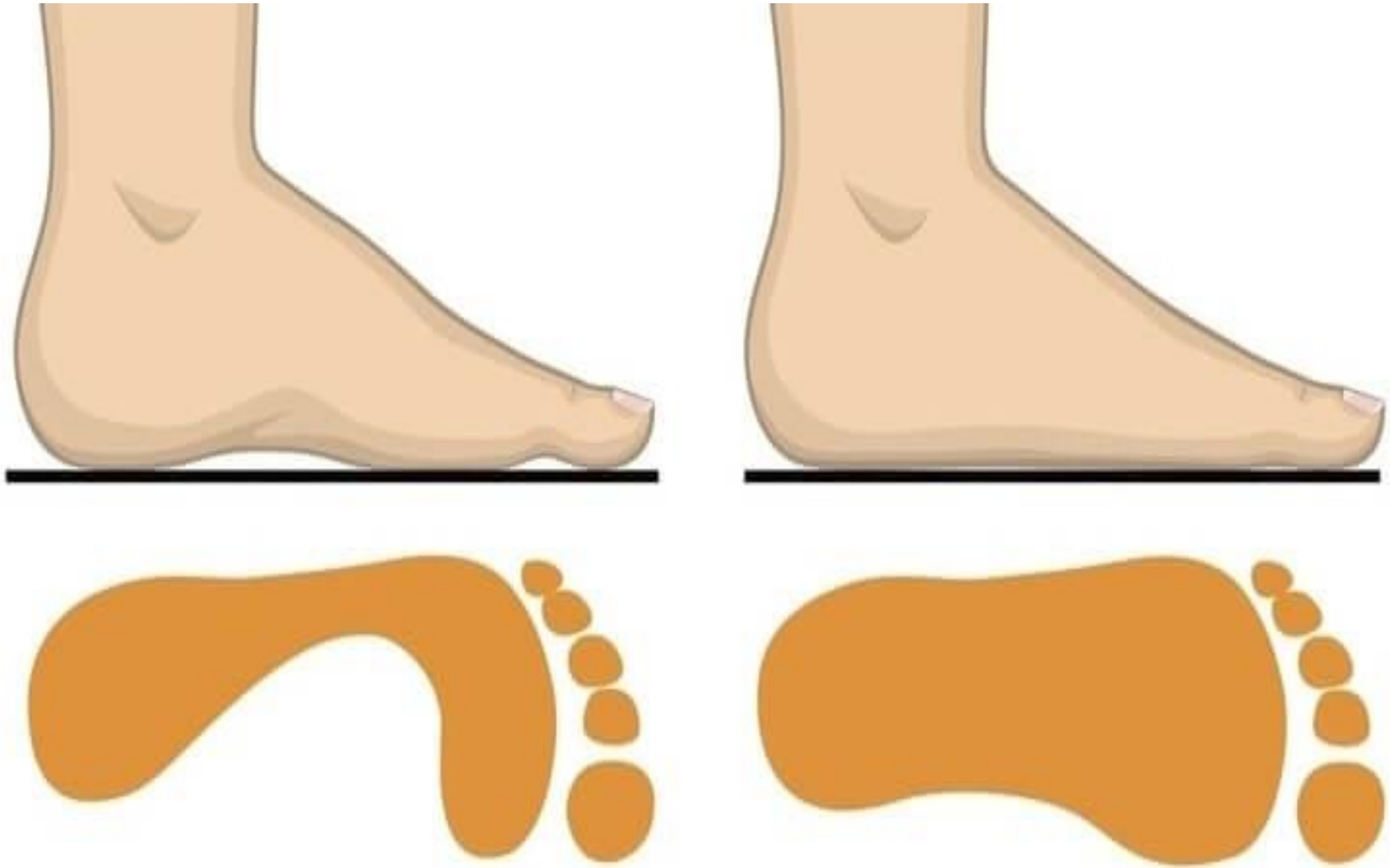
Layer four

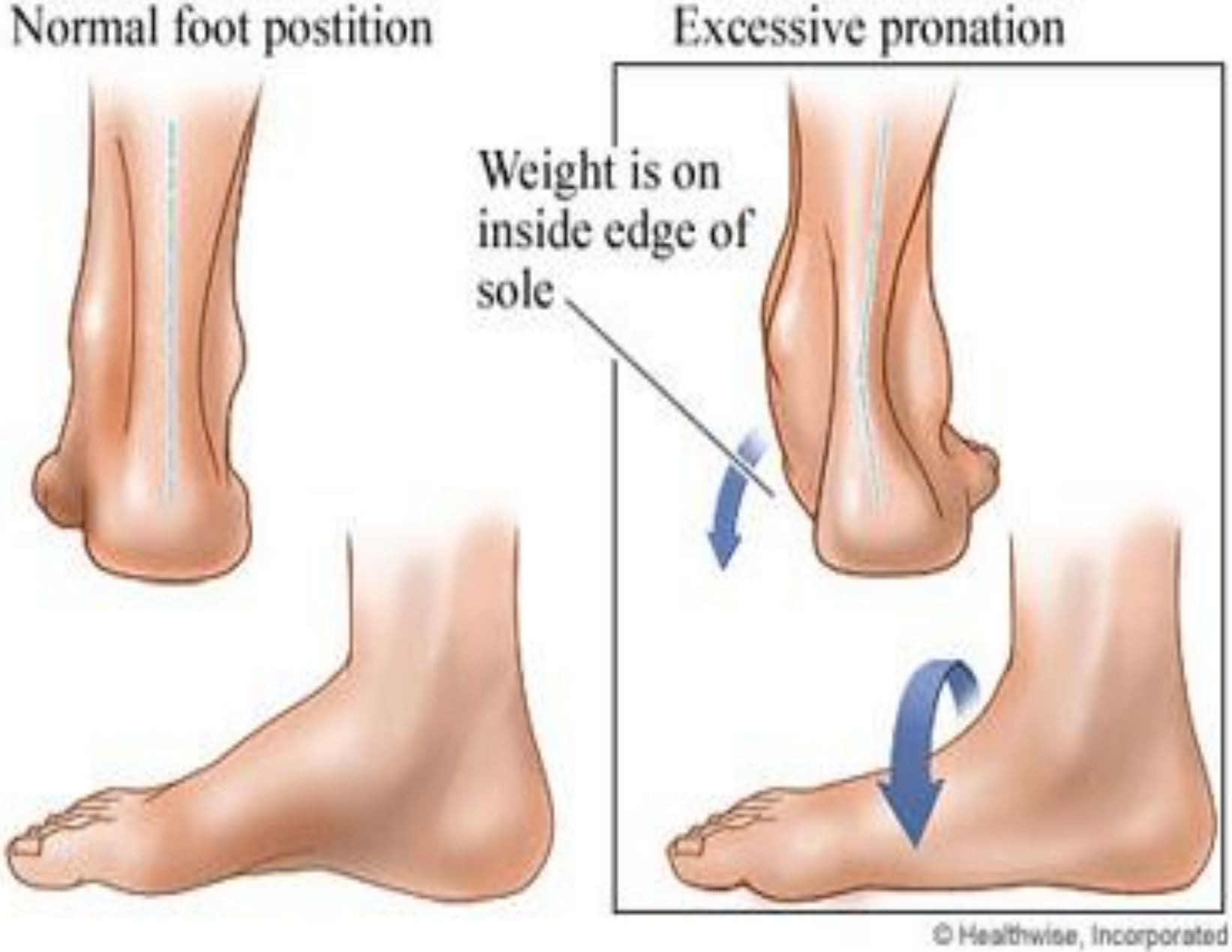


PES PLANUS (FLAT FOOT)

- **A condition in which the medial longitudinal arch is depressed**
- **The forefoot is everted**
- **The head of talus is forced downward & medially**
- **The causes are both congenital and acquired**


Flat foot
Normal foot
Claw foot


Normal Foot
Flat Foot


Normal foot postition
Excessive pronation
Weight is on inside edge of sole
© Healthwise, Incorporated


Clubfoot
Normal foot

What is clubfoot?

- Cavus
- Adductus
- Varus
- Equinus

CTEV (Congenital talipus equino varus)

Deformities