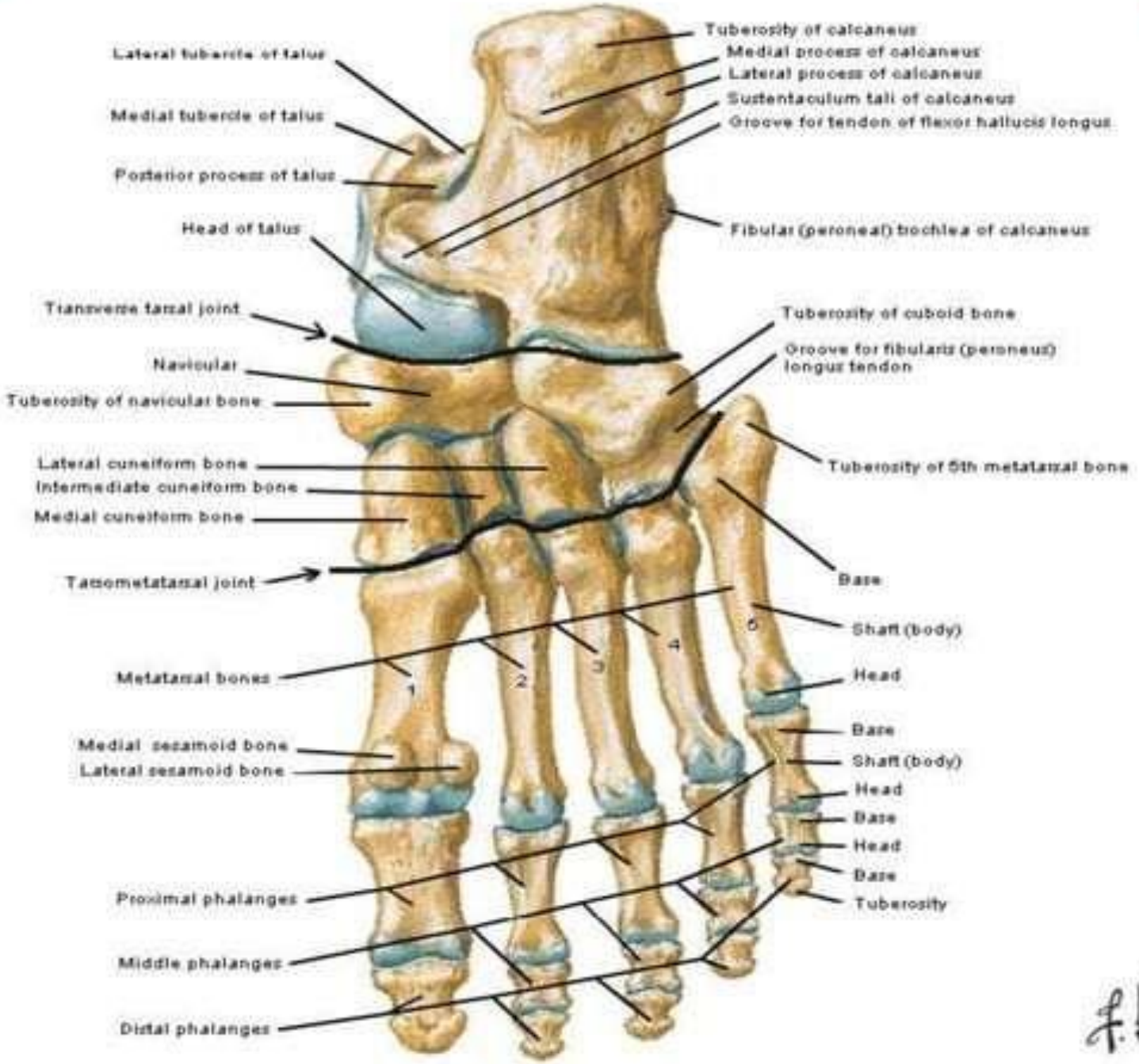
Arches of foot

Bones of Foot
Plantar View



INTRODUCTION

- Arches of foot act as:
  - Pliable platform to support the body weight in upright posture.
  - Lever to propel the body forwards in walking, running and jumping.

To meet these requirement, the human foot is designed in the form of elastic arches or springs.

Arches are supported by intrinsic and extrinsic muscles of the sole in addition to ligaments, aponeurosis and shape of the bones.

FORMATION

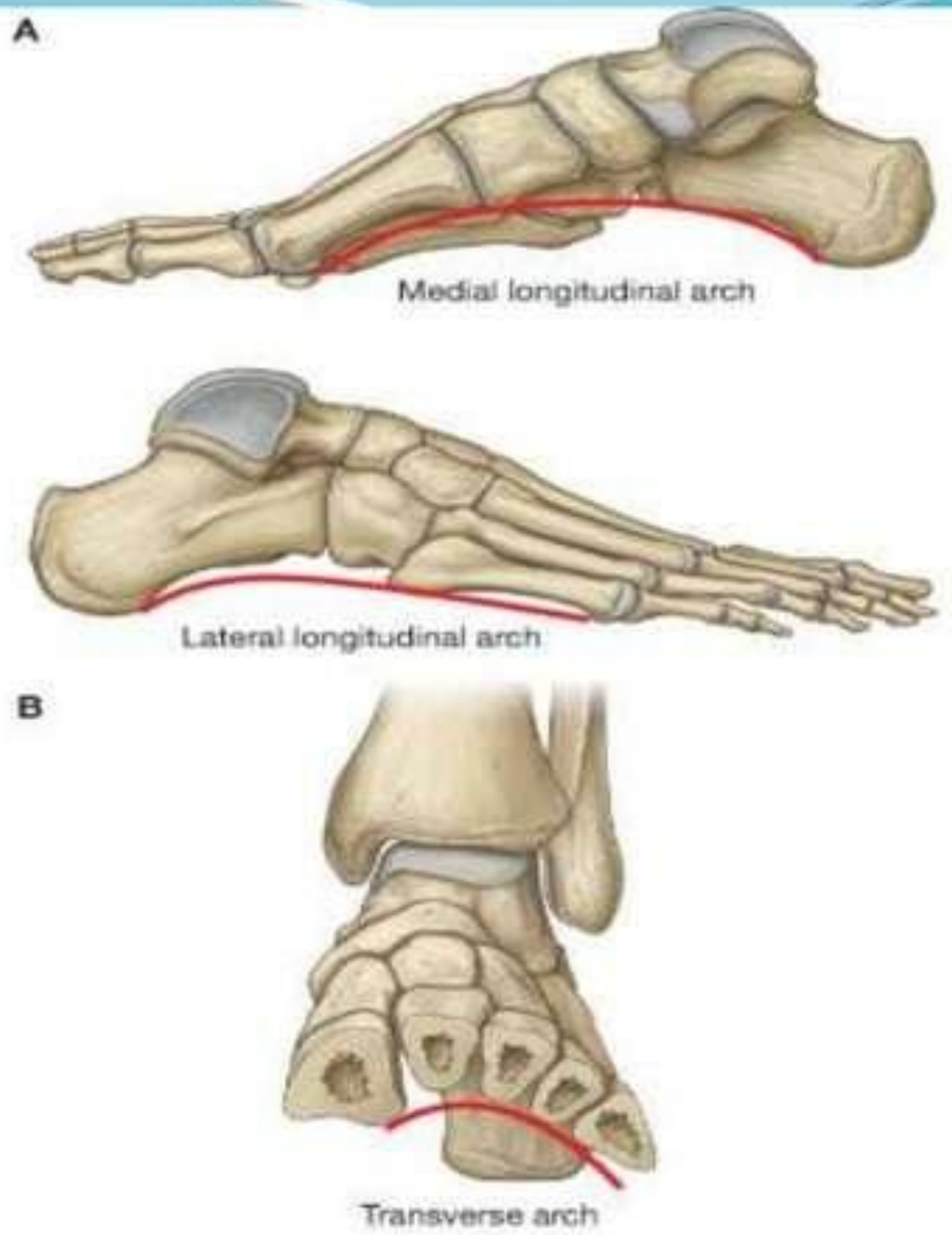
Arches are formed by the tarsal and metatarsal bones and are strengthened by ligaments, muscles, tendon and aponeurosis.

CLASSIFICATION

- 2 longitudinal arches
  - -Medial
  - -Lateral

- Transverse arch

Arches of foot



FORMATION OF ARCHES

MEDIAL LONGITUDINAL ARCHES:

- **Summit:** superior articular surface of talus.
- **Ends:**
  - Ant.end- by the heads of the 1st , 2nd & 3rd metatarsals.
  - Post.end- by the medial tubercle of calcaneum.
- **Pillars:**
  - Ant.pillar- by navicular, 3 cuneiforms and 1st 3 metatarsals..
  - Post. pillar- by medial half of calcaneum.

The main joint-talocalcaneonavicular joint.

Most vulnerable part- head of talus

Posterior Pillar

Calcaneus

Talus

Navicular

3 Cuneiforms

1st,2nd & 3rd Metatarsals

Medial Longitudinal Arch

LATERAL LONGITUDINAL ARCHES:

- **Summit:** articular facet on superior surface of calcaneum.
- **Ends:**
  - Ant.end- by the heads of the 4^{th} & 5^{th} metatarsals.
  - Post.end- by the lateral tubercle of calcaneum.
- **Pillars:**
  - Ant.pillar- by cuboid and 4^{th} & 5^{th} metatarsals..
  - Post. pillar- by lateral half of calcaneum.

The main joint-calcaneocuboid joint.

Most vulnerable part- calcaneocuboid joint

Lateral Longitudinal Arch

Summit

Posterior Pillar

Calcaneus

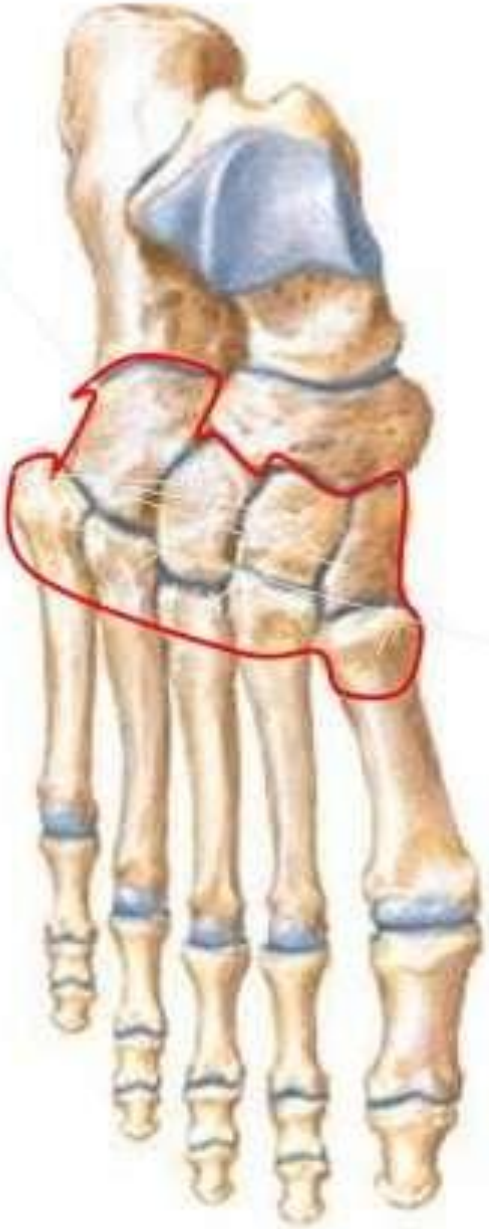
Cuboid

4th & 5th Metatarsals

Transverse arch

Cuboid

Cuneiforms



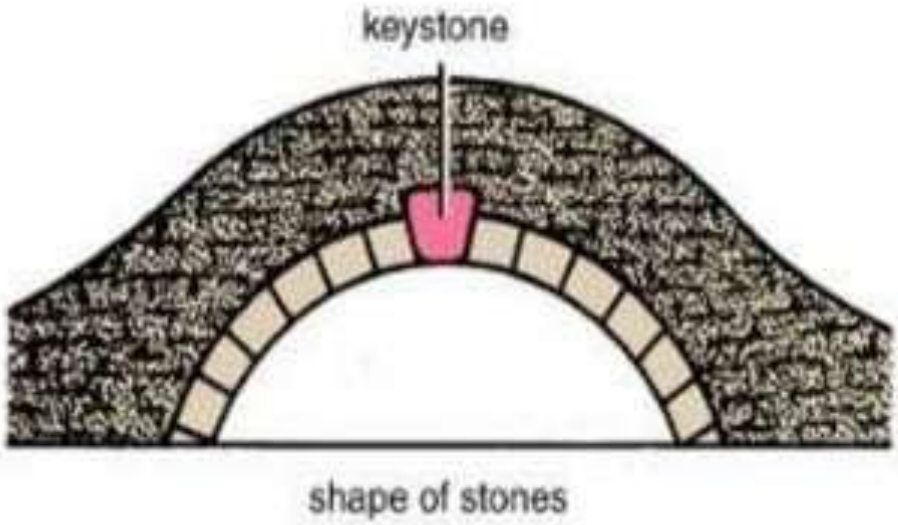
Bases of Metatarsals

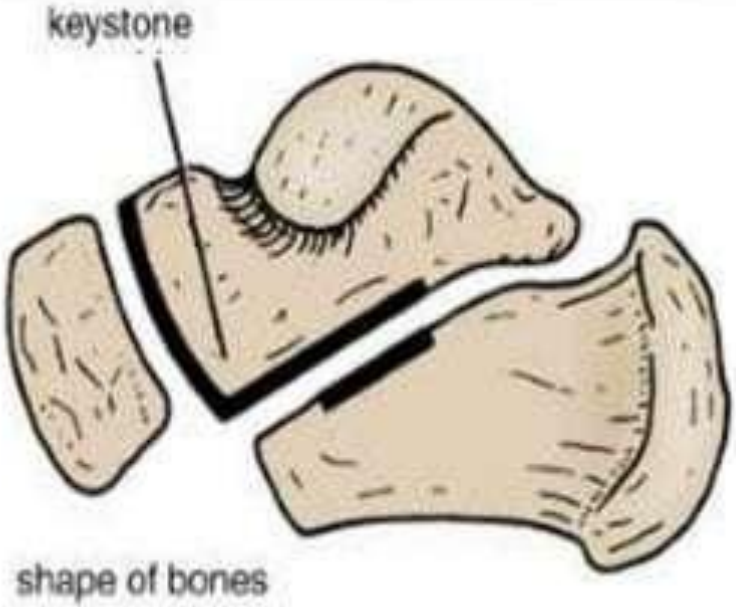
TRANSVERSE ARCH

- Formed by the greater part parts tarsus and metatarsus.
- Incomplete because only the lateral end comes in contact with the ground. The arch forming half dome which is completed by a similar half dome of the opposite foot.

Factors maintaining arch

- Shape of the bones
- Intersegmental ties
- Tie beams
- Sling



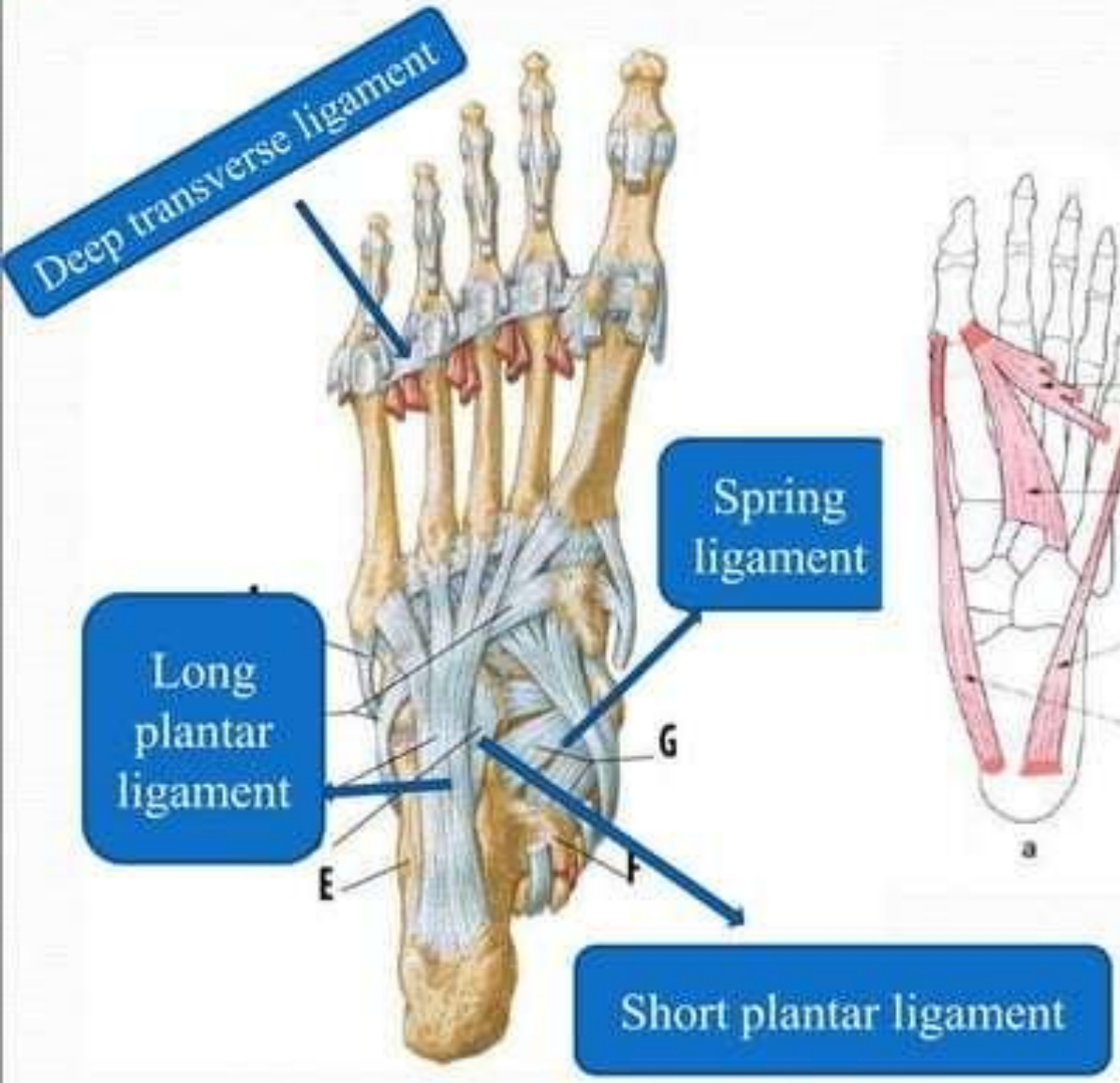


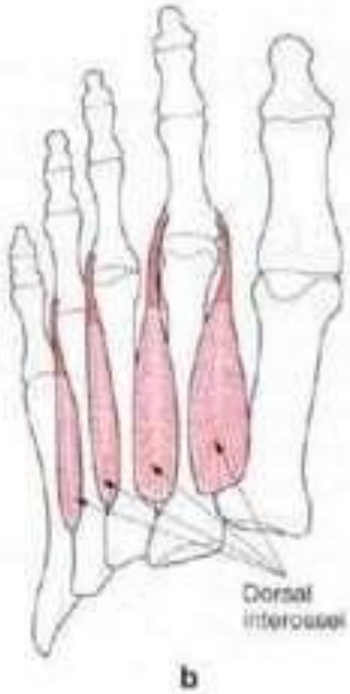
MAINTENANCE OF OF ARCHES

MEDIAL LONGITUDINAL ARCHES

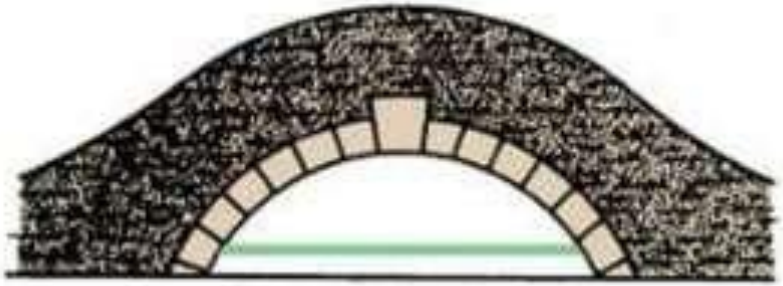
- Summit is pulled upwards by tendons passing from post.compartment of leg.
- Bony configuration
- Plantar ligament
- Plantar aponeurosis
- Spring ligament
- Tibialis posterior

Intersegmental ties





Tie Beams for longitudinal arches



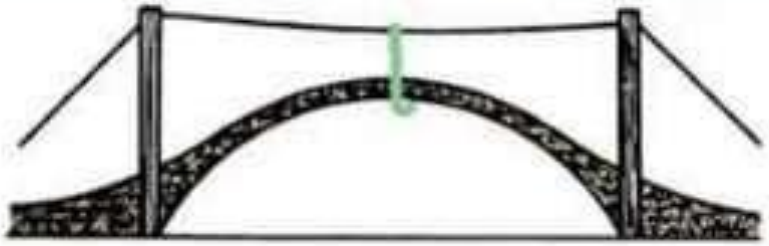
Shape of the bones

Medial Longitudinal Arch

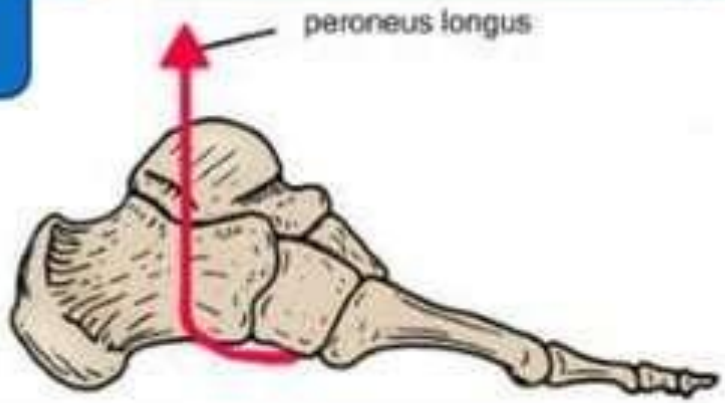
Head of talus

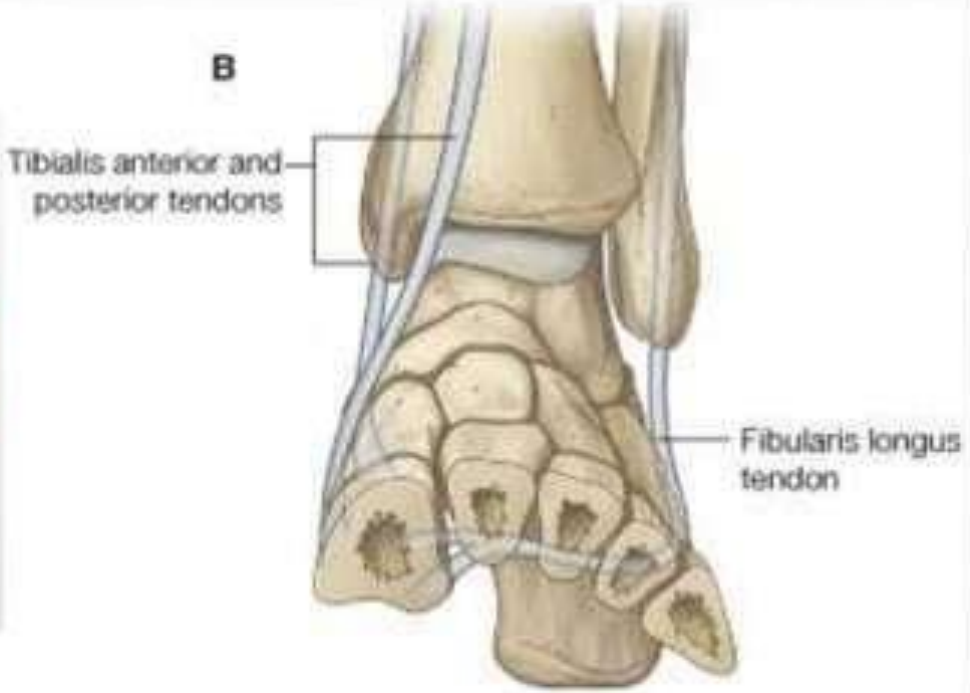
Transverse Arch

Acting as a sling for medial longitudinal arch



suspension bridge

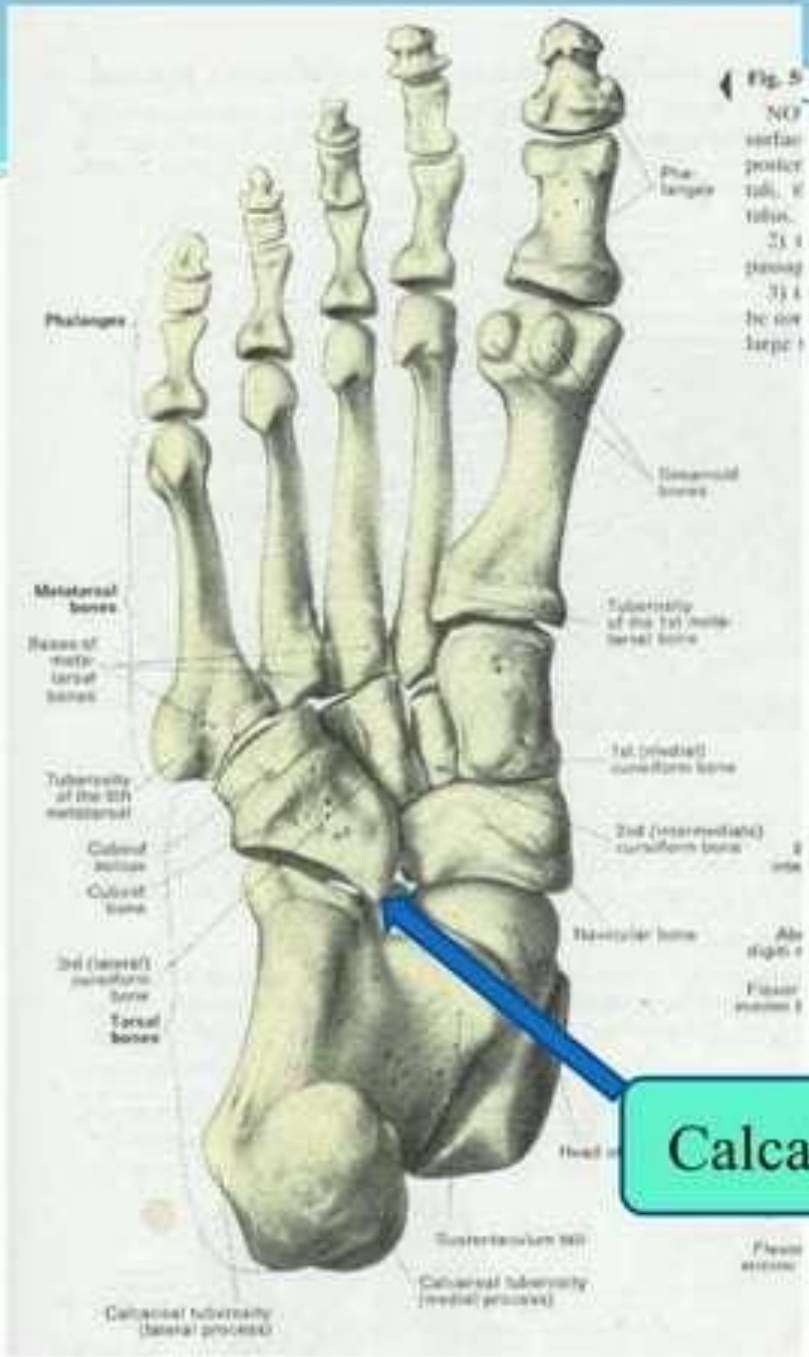


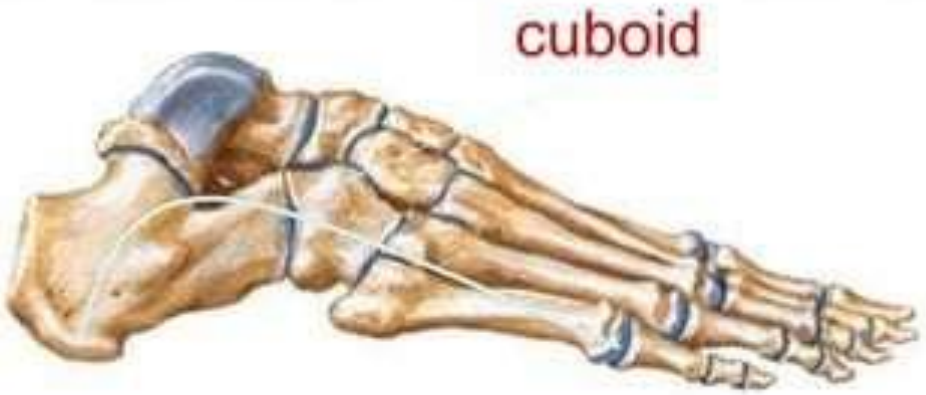


LATERAL LONGITUDINAL ARCHES

- Summit is pulled upwards by the peroneus longus and peroneus brevis.
- Bony configuration
- Long & short plantar ligament
- Plantar calcaneo-cuboid ligament
- Peroneus longus
- Short muscles of little toe

Shape of the bones

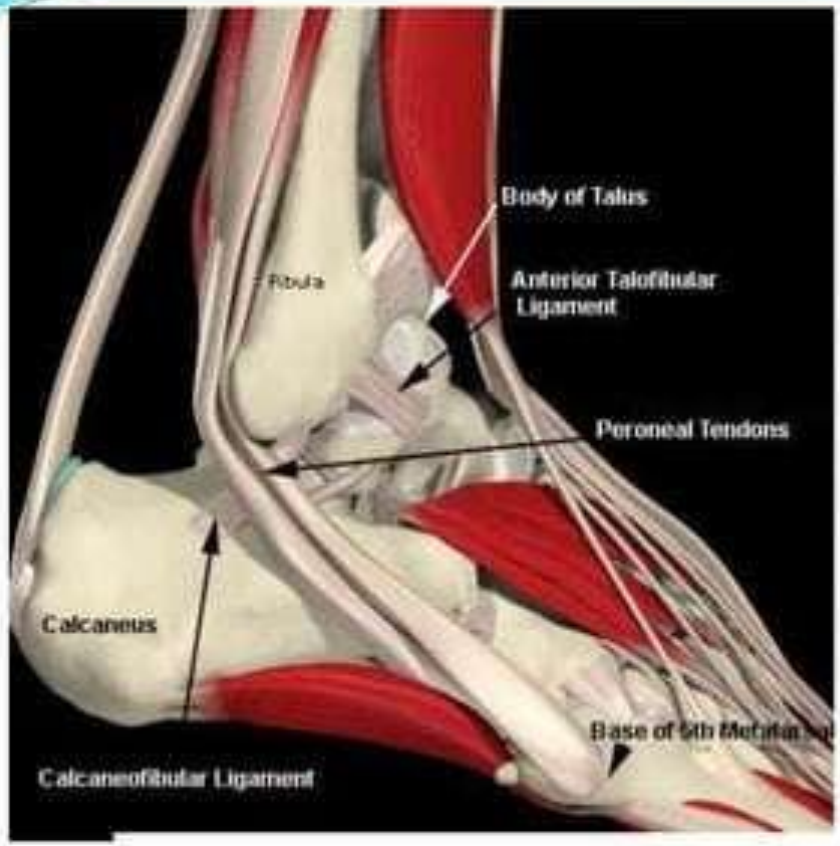




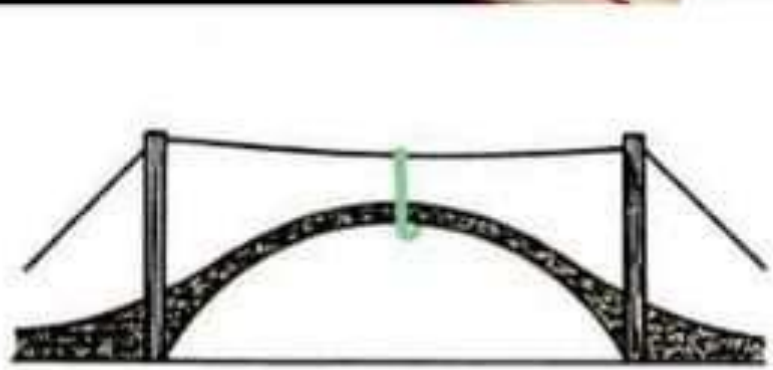
Lateral Longitudinal Arch

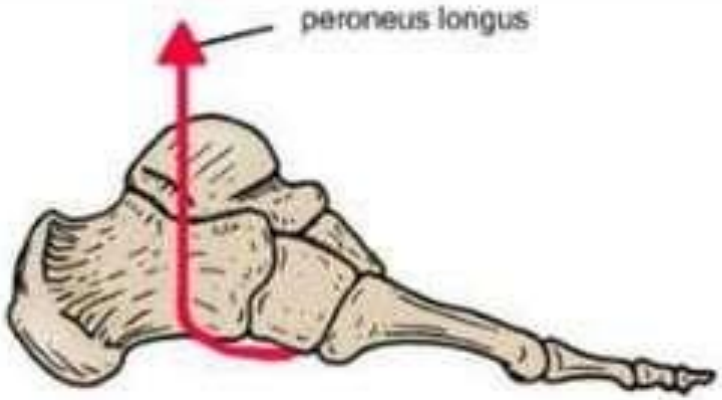
Calcaneal process of cuboid

Acting as a sling for lateral longitudinal arch



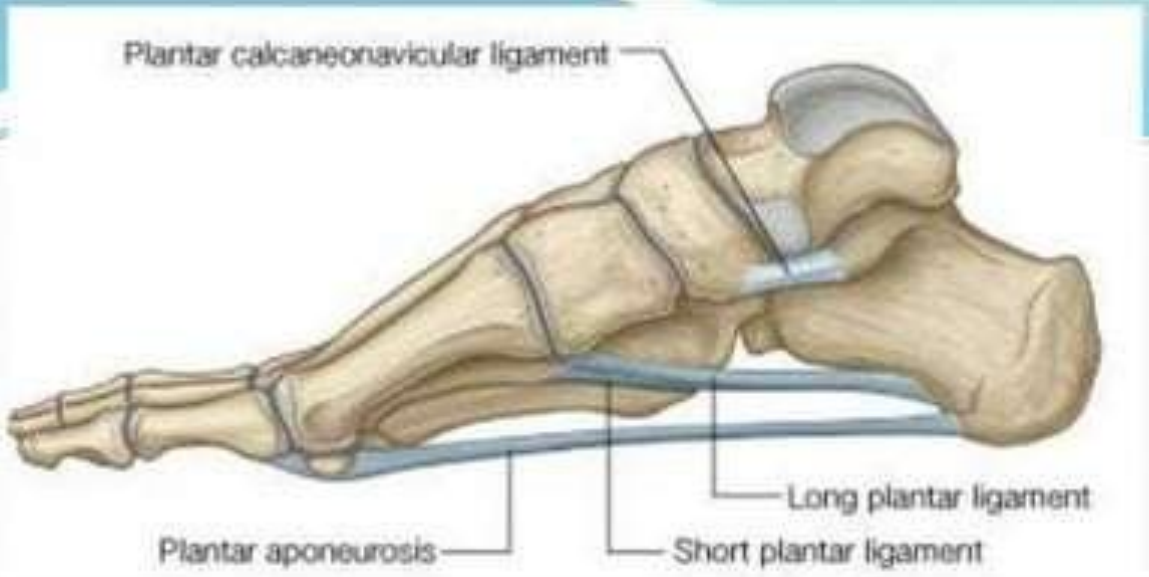
Acting as a sling for transverse arch on medial side



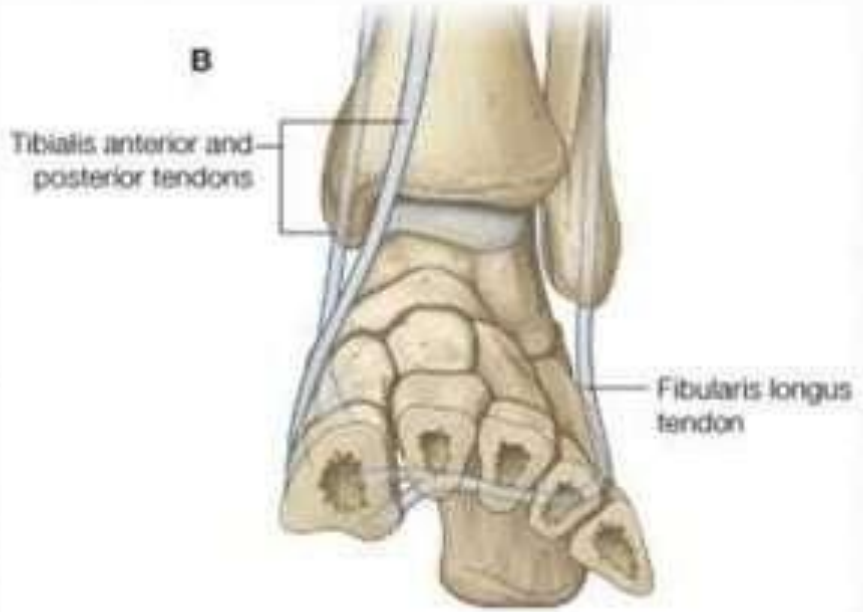


TRANSVERSE ARCHES

- Bony configuration
- Plantar ligaments
- Tibialis posterior
- Peroneus longus



Tie Beams for transverse arch



Functions of the arches of the foot

- Help in proportional distribution of body weight to the ground
- Act as spring and helps in propulsion during running and walking
- Act as shock absorbers in stepping particularly in jumping
- Protect the soft tissues of the sole (like vessels and nerves) against pressure

WEIGHT BEARING POINTS

The heel- 80%

Ball of big toe-15%

Ball of little toe-5%

APPLIED ANATOMY

- Flat foot (pes planus)- commonest of all foot troubles associated with loss of arches of foot.
- Pes cavus- exaggeration of longitudinal arches.
- Club foot
  - Talipes equinus
  - Talipes calcaneus
  - Talipes varus
  - Talipes valgus
  - TALIPES EQUINO-VARUS (commonest)
- March foot
- Hallux valgus
- Hammar toe

Deformities of Foot

Pes Cavus

CLAW FoOT

Dorsiflexion of metatarsophalangeal joint & planter flexion of interphalangeal joints due to atrophy of lumbricals and interossei is known as 'claw foot'


Thank You