Arches of foot

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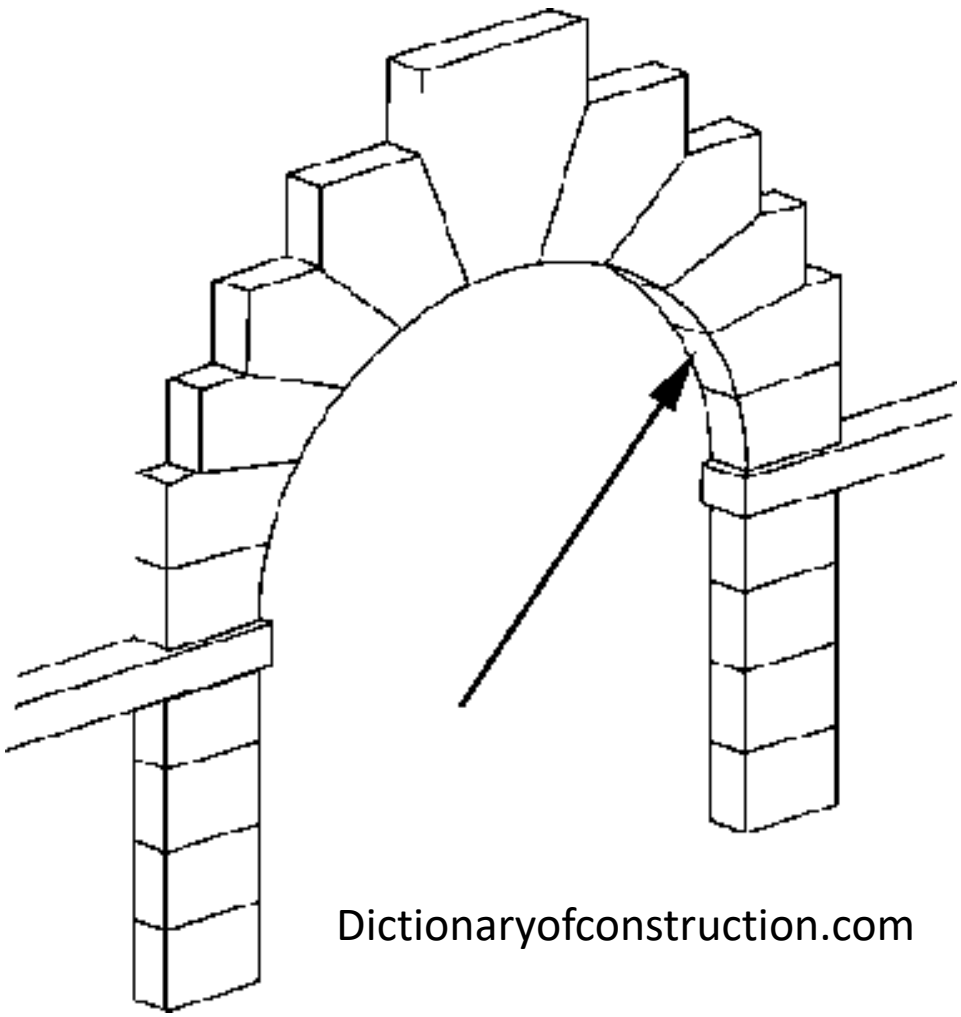
Arches

1. Pillars
2. Keystone
3. Summit
4. Segments



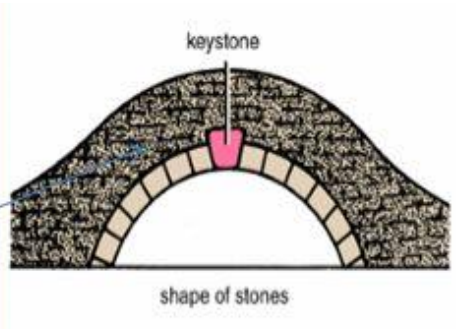
Factors maintaining the arches of foot

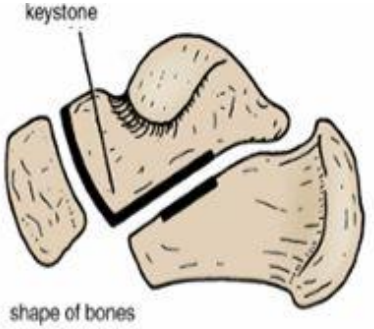
- Shape: the shapes of the bones
- Intersegmental Ties - ligaments or muscles
- Bowstrings (or tiebeams) – muscles, tendons
- Slings - tendons

Mechanisms of Arch Support

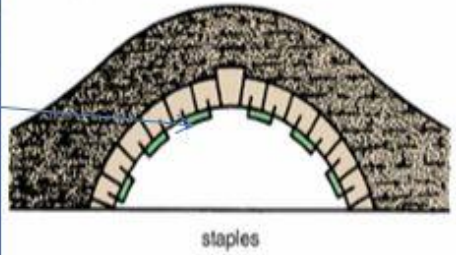
Examination of the design of any stone bridge reveals the following engineering methods used for its support

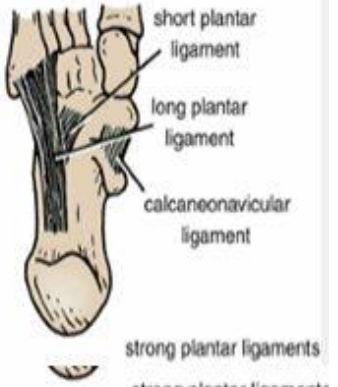
The shape of the stones: the stones are wedge shaped





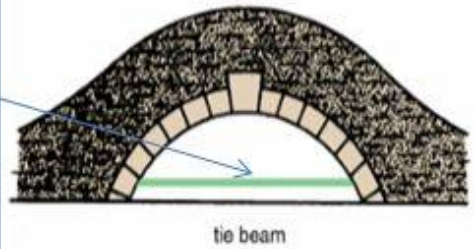
The inferior edges of the stones are tied together: This is accomplished by binding their lower edges together with metal staples

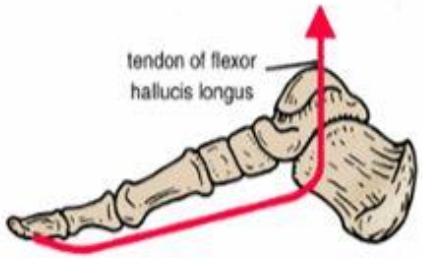




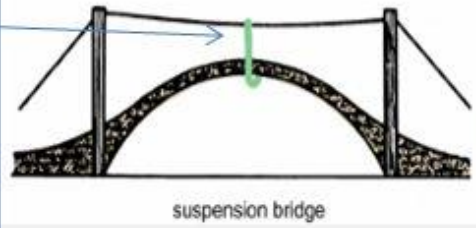
slideplayer

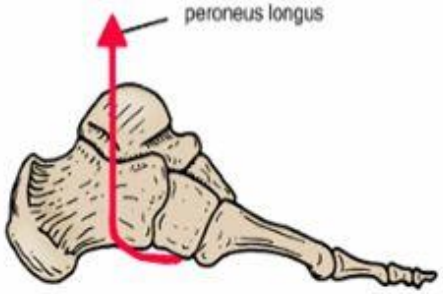
The use of the tie beams: a tie beam connecting the ends effectively prevents separation of the pillars and consequent sagging of the arch





A suspension bridge: multiple supports suspending the arch from a cable above the level of the bridge





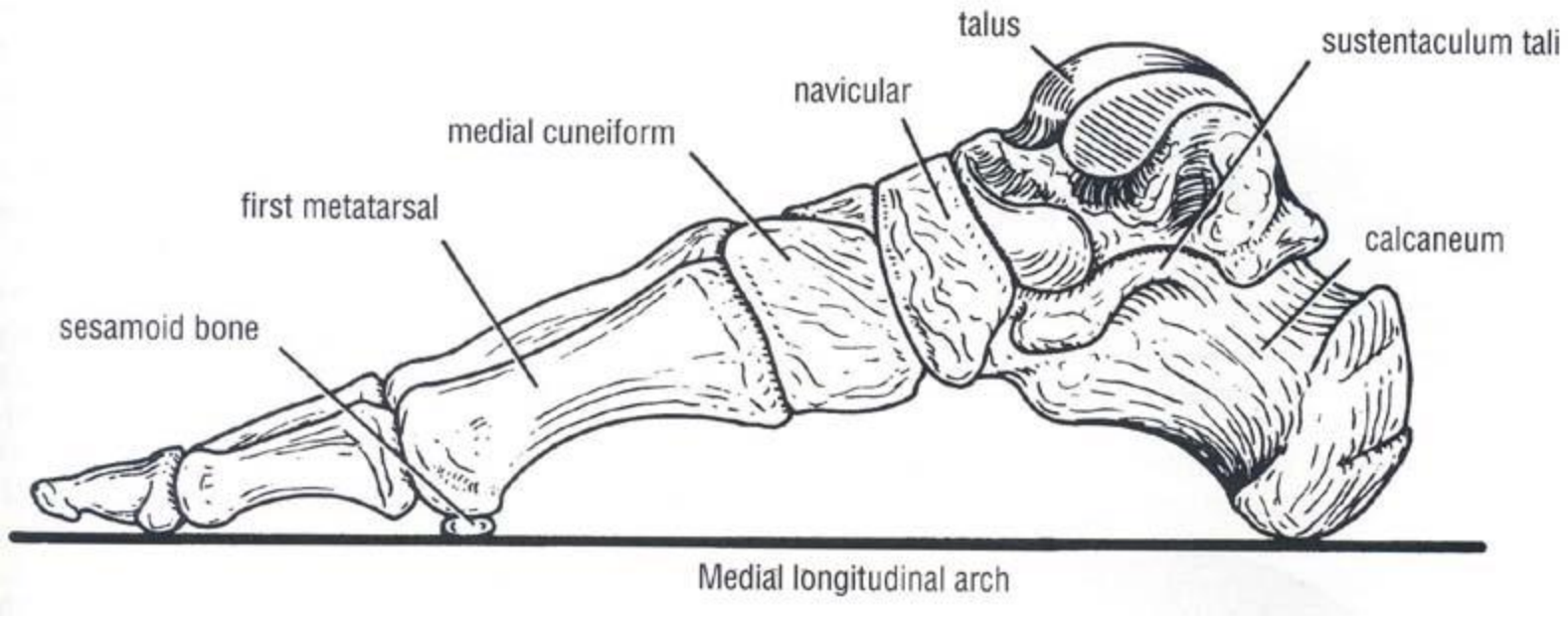
Functions

- Stable support
- Shock absorber
- Make the foot flexible, so it can adapt to uneven surfaces
- Segmented effective lever
- Protection

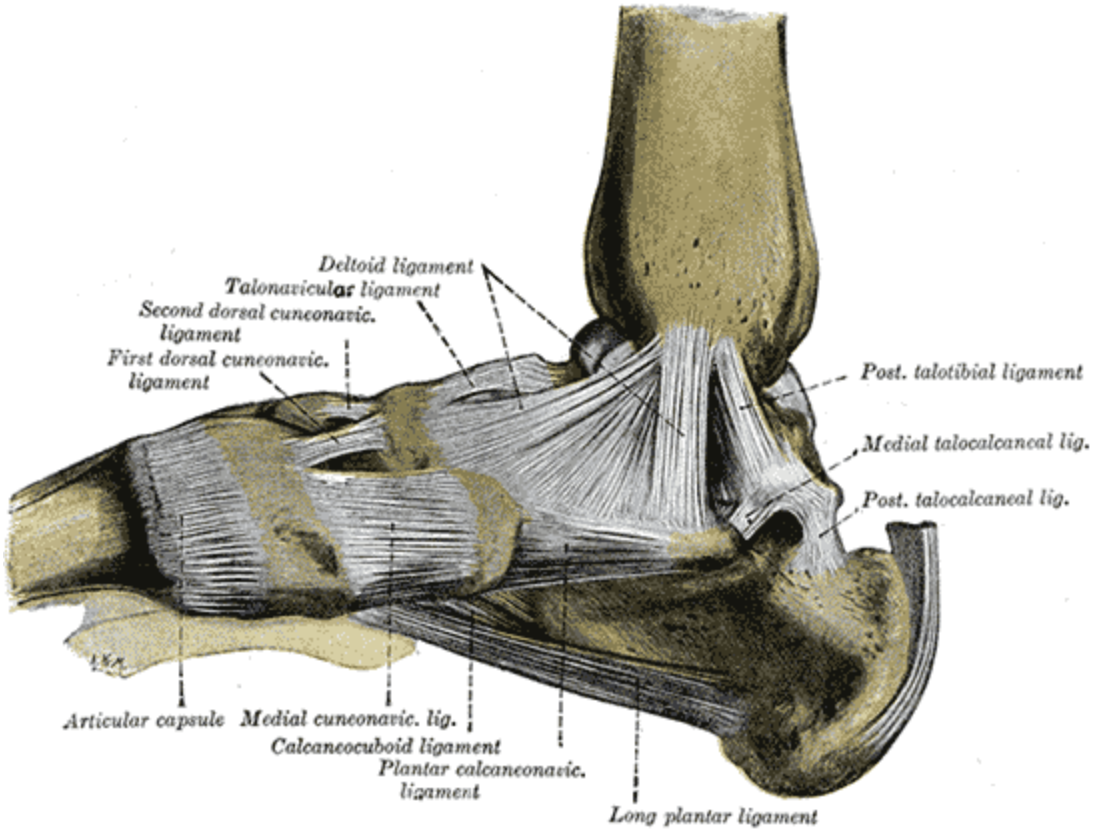
Arches of foot

- Medial longitudinal arch
- Lateral longitudinal arch
- Transverse arch

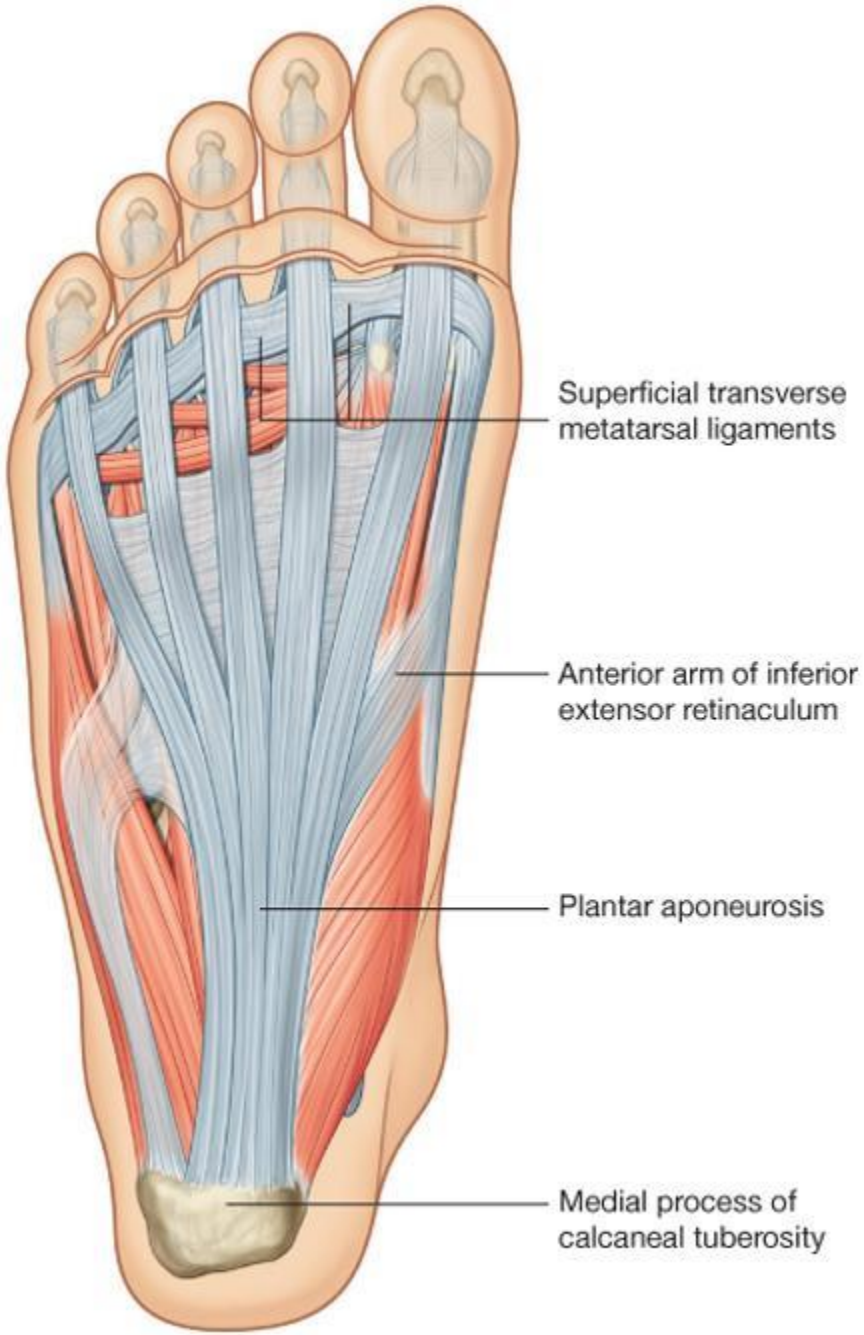
Medial longitudinal arch



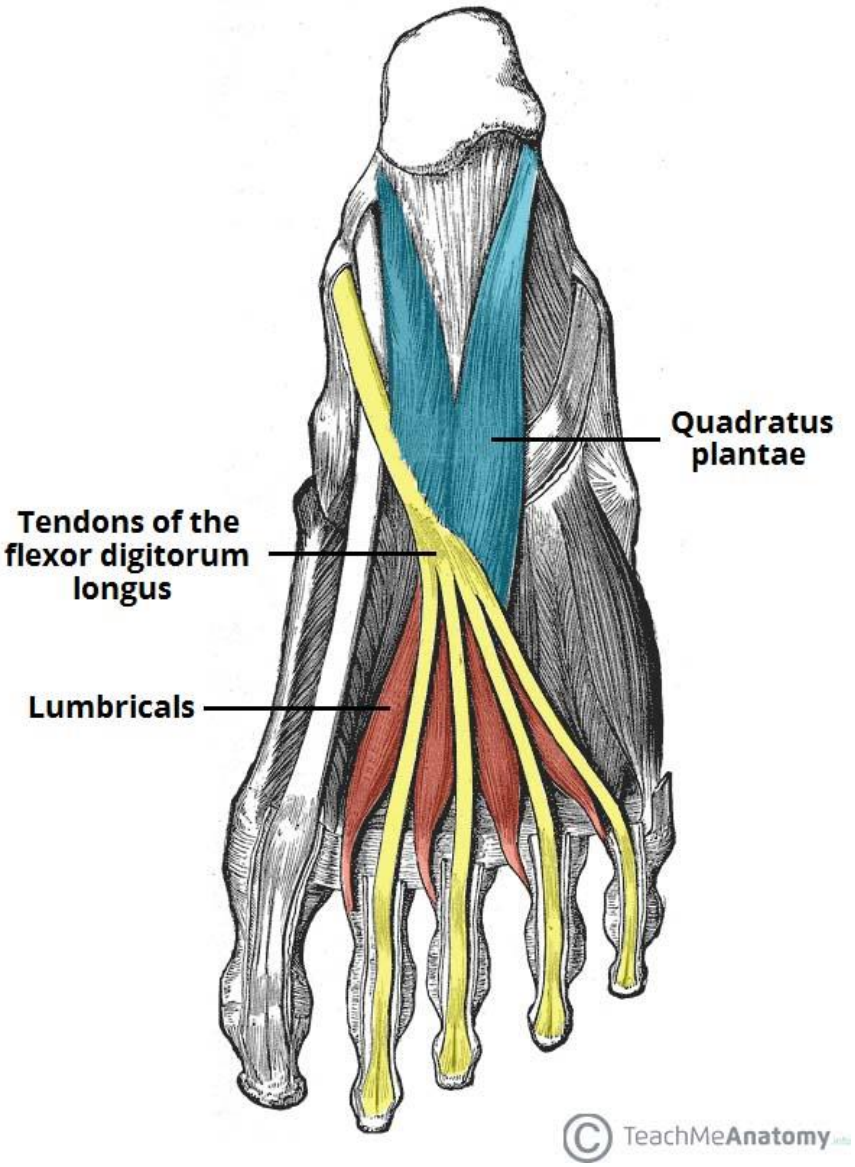
AMC Academic Systems


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

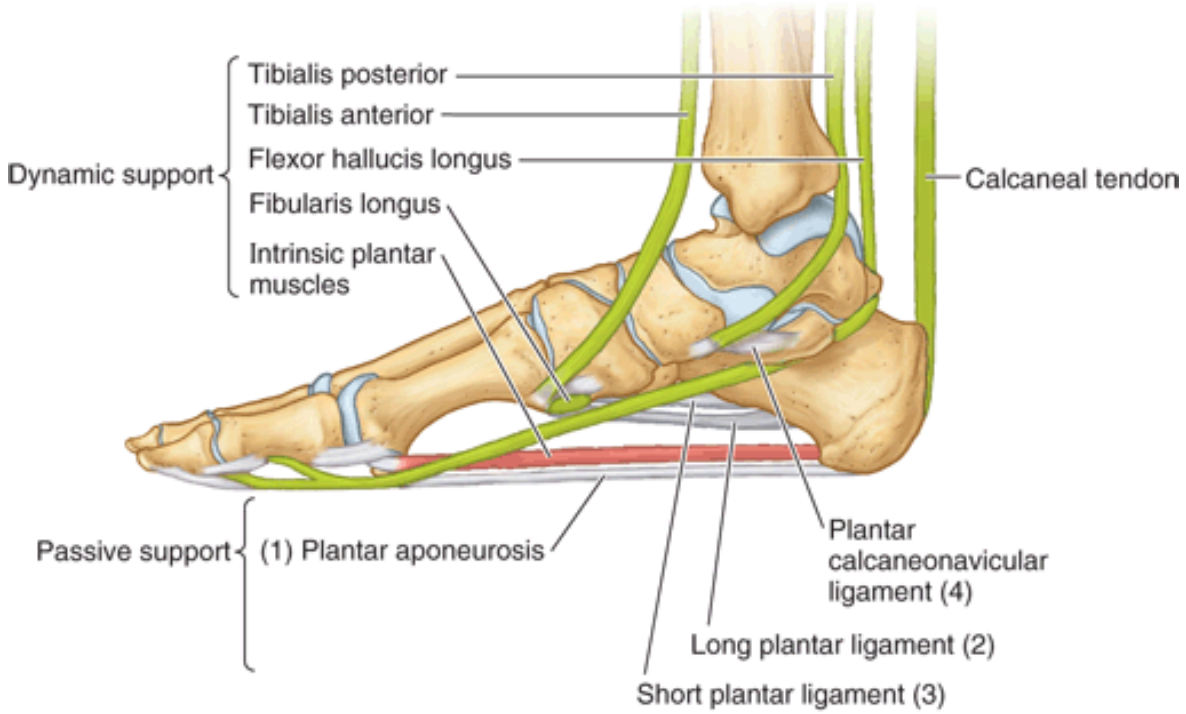
Wikipedia



(d) Plantar view, superficial layer



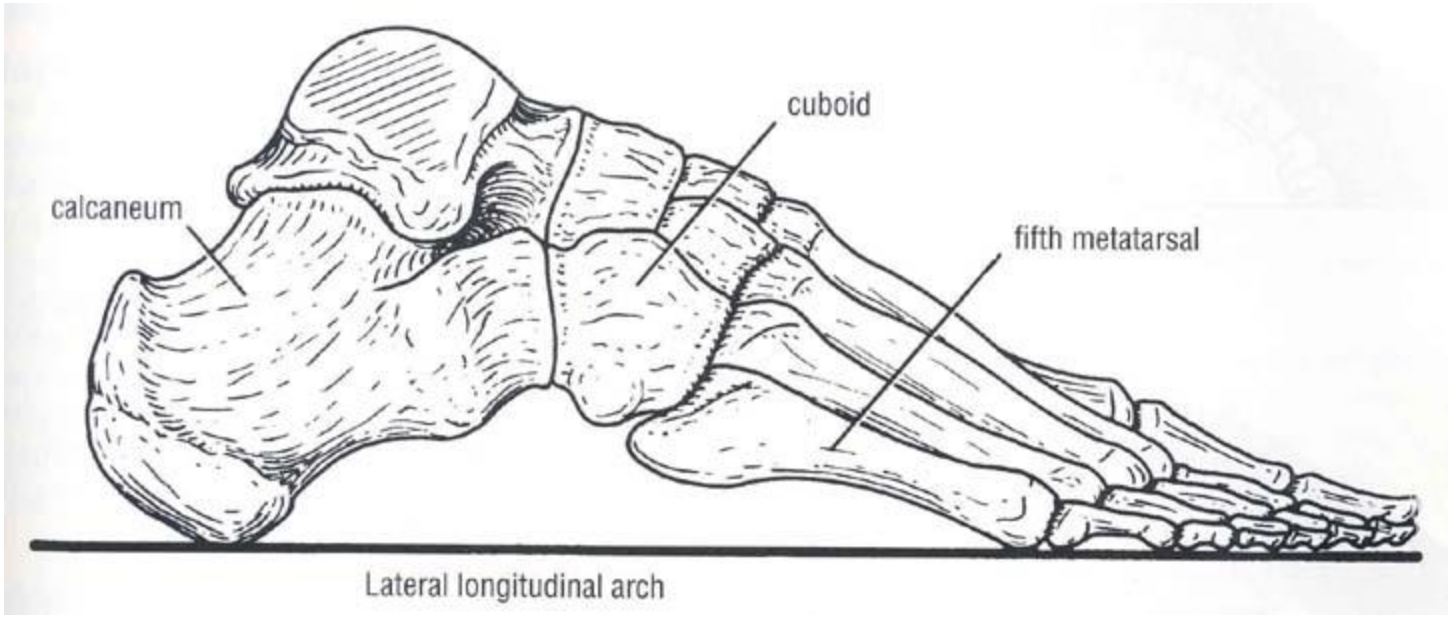
StudyDroid



(E) Medial longitudinal arch (medial view)

Anatomy-blogger

Lateral longitudinal arch



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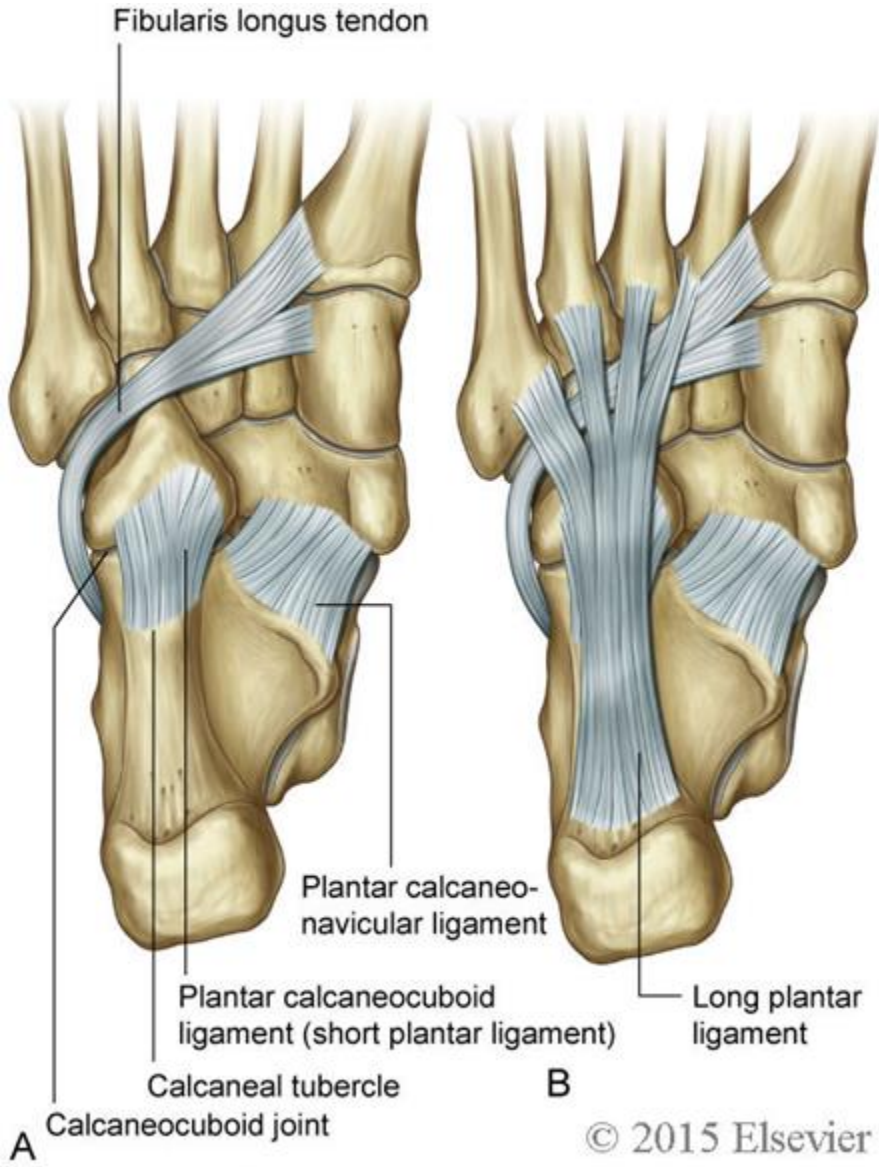
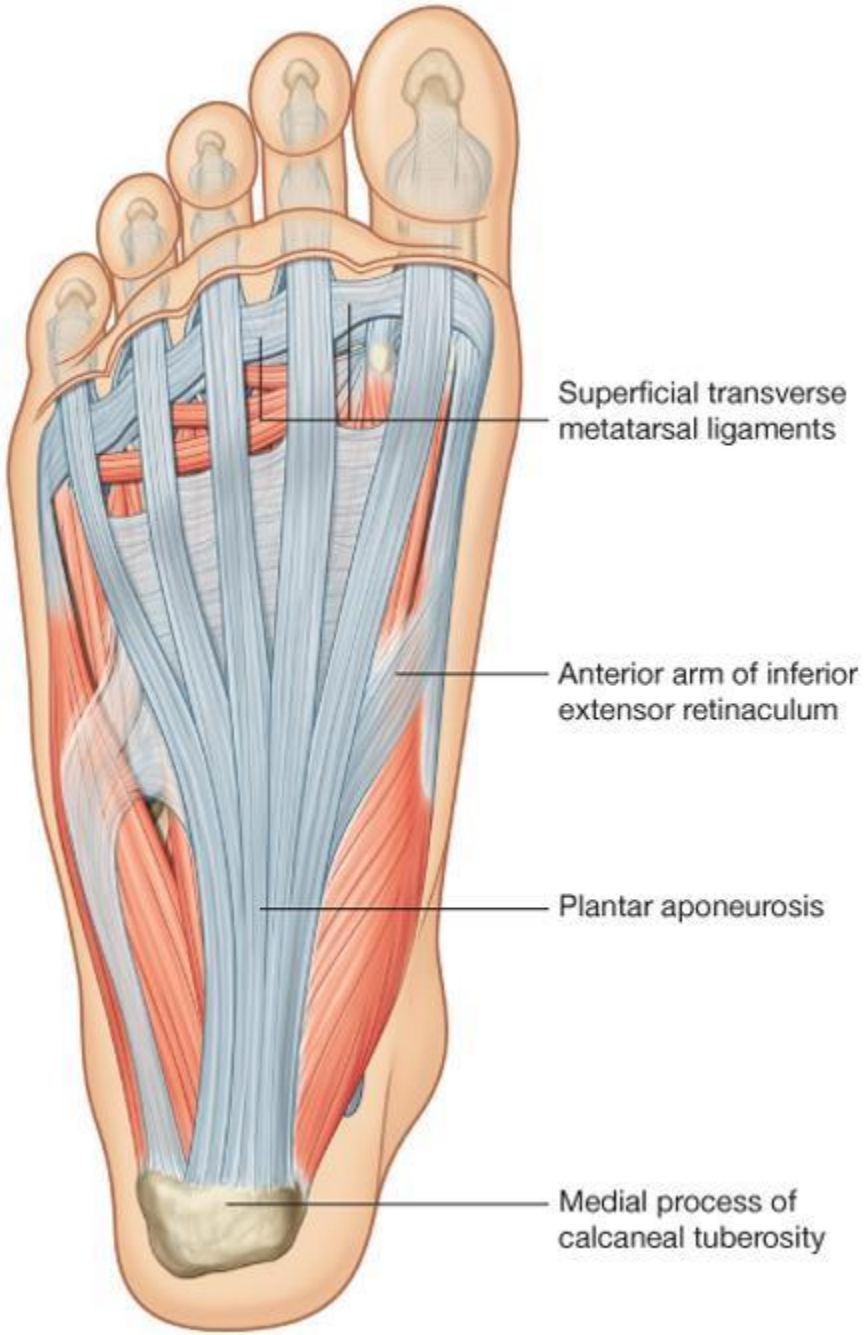
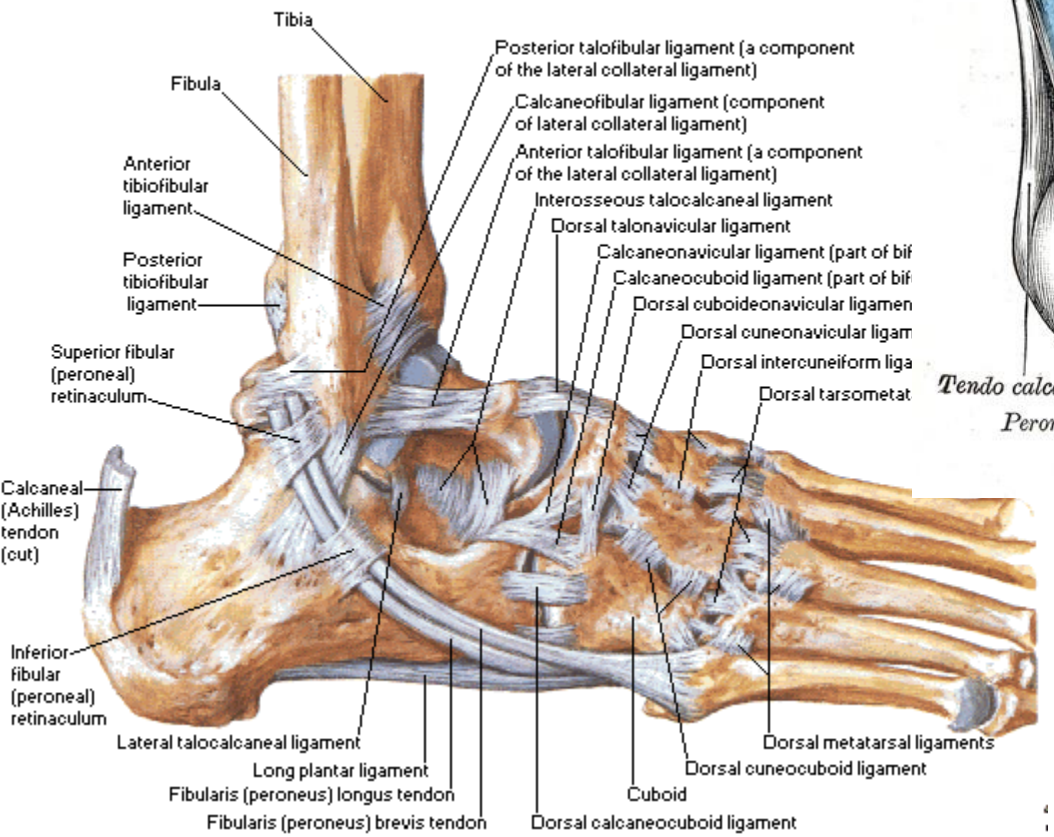


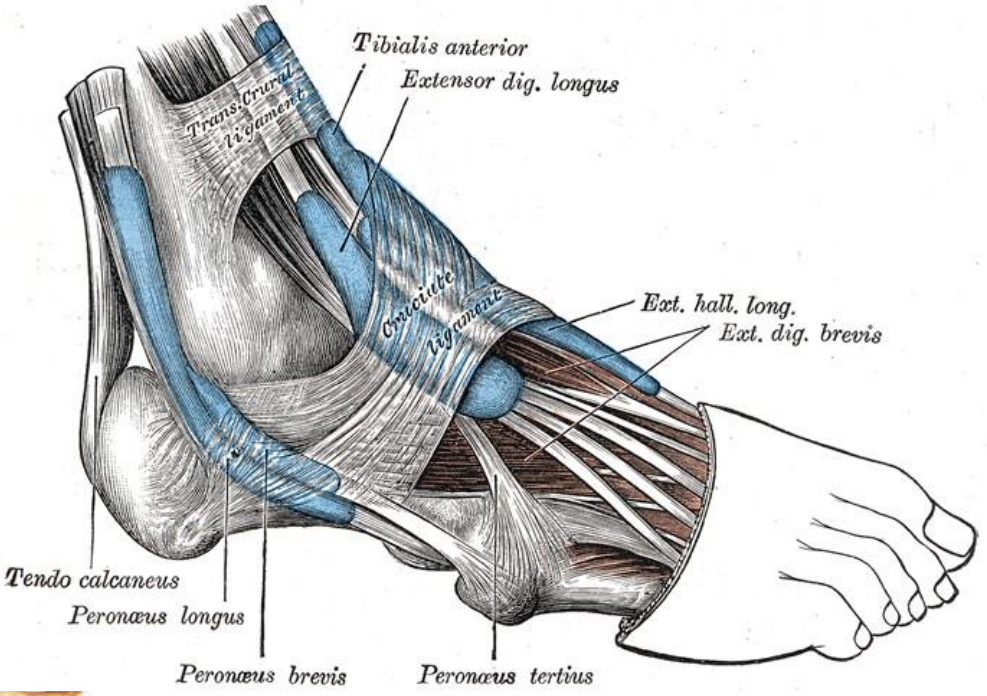


(d) Plantar view, superficial layer

StudyDroid

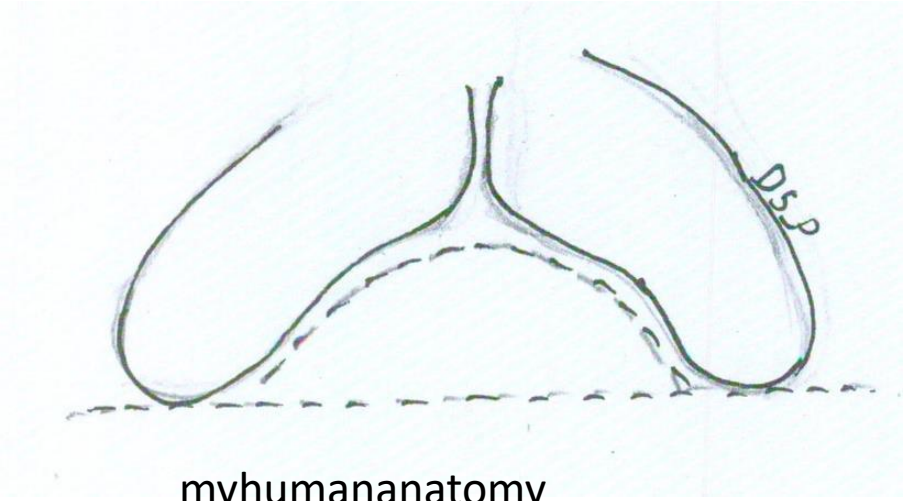


Human Anatomy-blogger

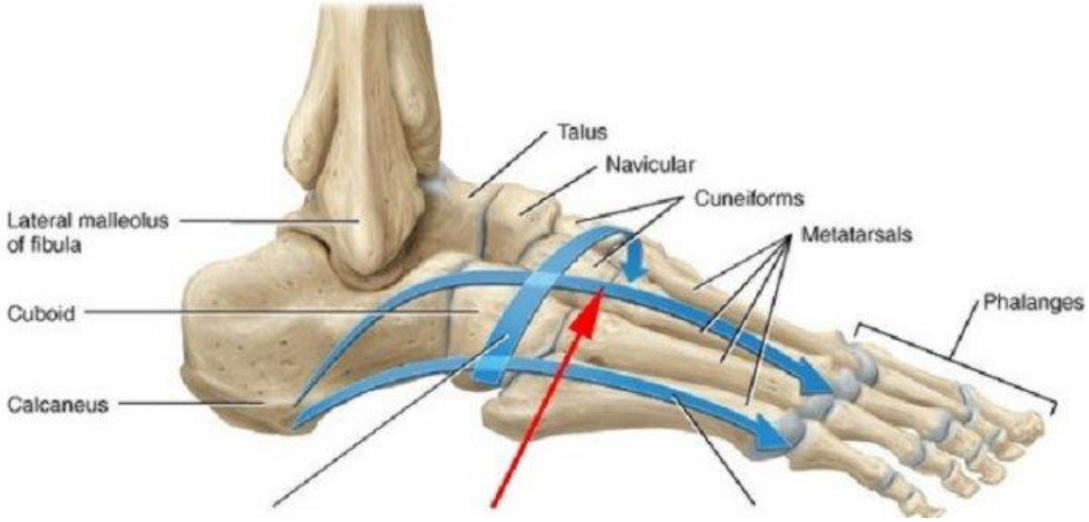


Foot Centers Of Maryland

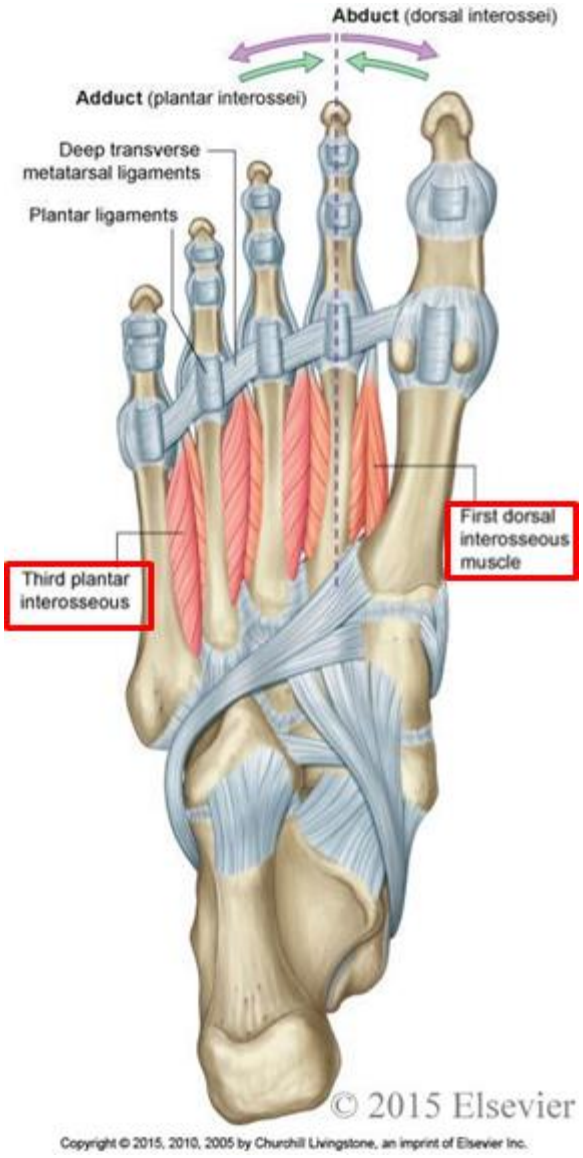
Transverse arch

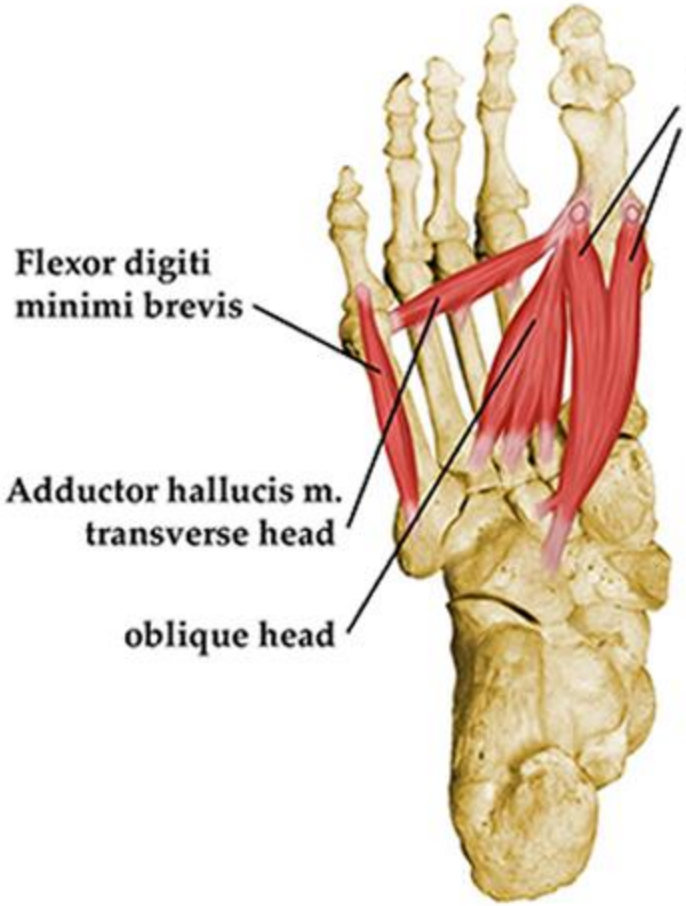


myhumananatomy



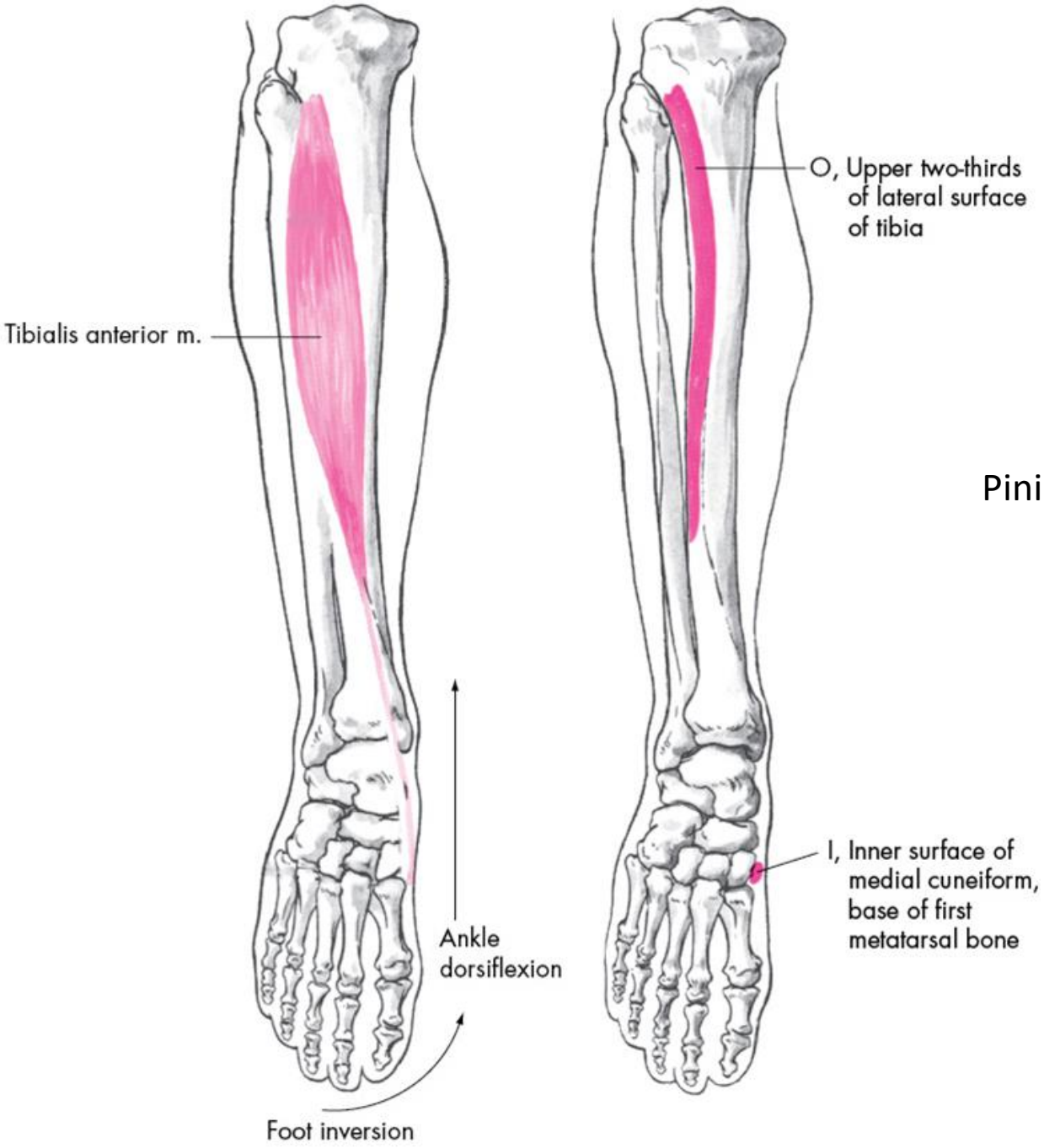
Linkedin





Layer 3

Orthobullets.com



Pininterest

Medial longitudinal arch	
Summit	Trochlear surface of Talus
Anterior Pillar	1st, 2nd & 3rd metatarsals
Posterior pillar	Calcaneum
Main joint involved	Talo-calcaneonavicular joint
Tiebeams	Plantar aponeurosis*,abductor hallucis & flexor digitorum brevis*, flexor hallucis longus, Flexor hallucis brevis
Ties	Spring ligament, talo-calcaneal ligaments, deltoid ligament (ant fibres)
Slings	Tibilis anterior, tibialis posterior
Vulnerable spot (keystone)	Head of Talus

Lateral longitudinal arch	
Summit	Subtalar joint
Anterior Pillar	Cuboid, 4th and 5th metatarsals
Posterior pillar	Calcaneum
Main joint involved	Calcaneo-cuboid joint
Tiebeams	Plantar aponeurosis*,abductor & flexor digiti minimi& flexor digitorum brevis and longus*
Ties	Short and long plantar ligaments, bifurcated ligament
Slings	Peroneus muscles
Vulnerable spot (keystone)	Calcaneo-cuboid joint

Transverse arch	
Shape of the bones	
Pillars	Base of metatarsals,cuboid and cuneiforms
Main joint involved	Intertarsal joints
Tiebeams	Peroneus longus and tibialis posterior
Ties	Interosseus ligaments and muscles, adductor hallucis
Slings	Peroneus longus and tibialis anterior

Flat Foot

FixFlatFeet

High arch foot

eorthopod.com

References

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- Regional anatomy by Snell's-9th edition
- Clinically oriented anatomy by Keith L. Moore-7th edition