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TOPIC- GULPHA SANDHI (ANKLE JOINT)

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GULPHA SANDHI

Gulpha Sandhi is one of the important *Sandhi* of the lower extremity

पादजङ्घयोः सन्धाने गुल्फो…….(सु.शा.6/25)

Sushruta has mentioned that it is a joint which is situated between or at the union of *Pada* and *Jangha*

गल्फसन्धि पादसंन्धिर्वा नाम जंघास्थ्नोरधःप्रान्तयोः कुर्चशिरसा संधिः खल्ल्कोराख्याः (प्रत्यक्षशारीर द्वि.अ.पृ. 144)

Gulpha is the *Sandhi* situated below the *Jangha Sandhi* and above the *Kurchashira Marma*.

The importance of *Gulpha Sandhi* is further elicited by adding it into *Sandhi Marma*, *Asthi Sangatha*.

ANKLE (TALOCRURAL) JOINT

Introduction

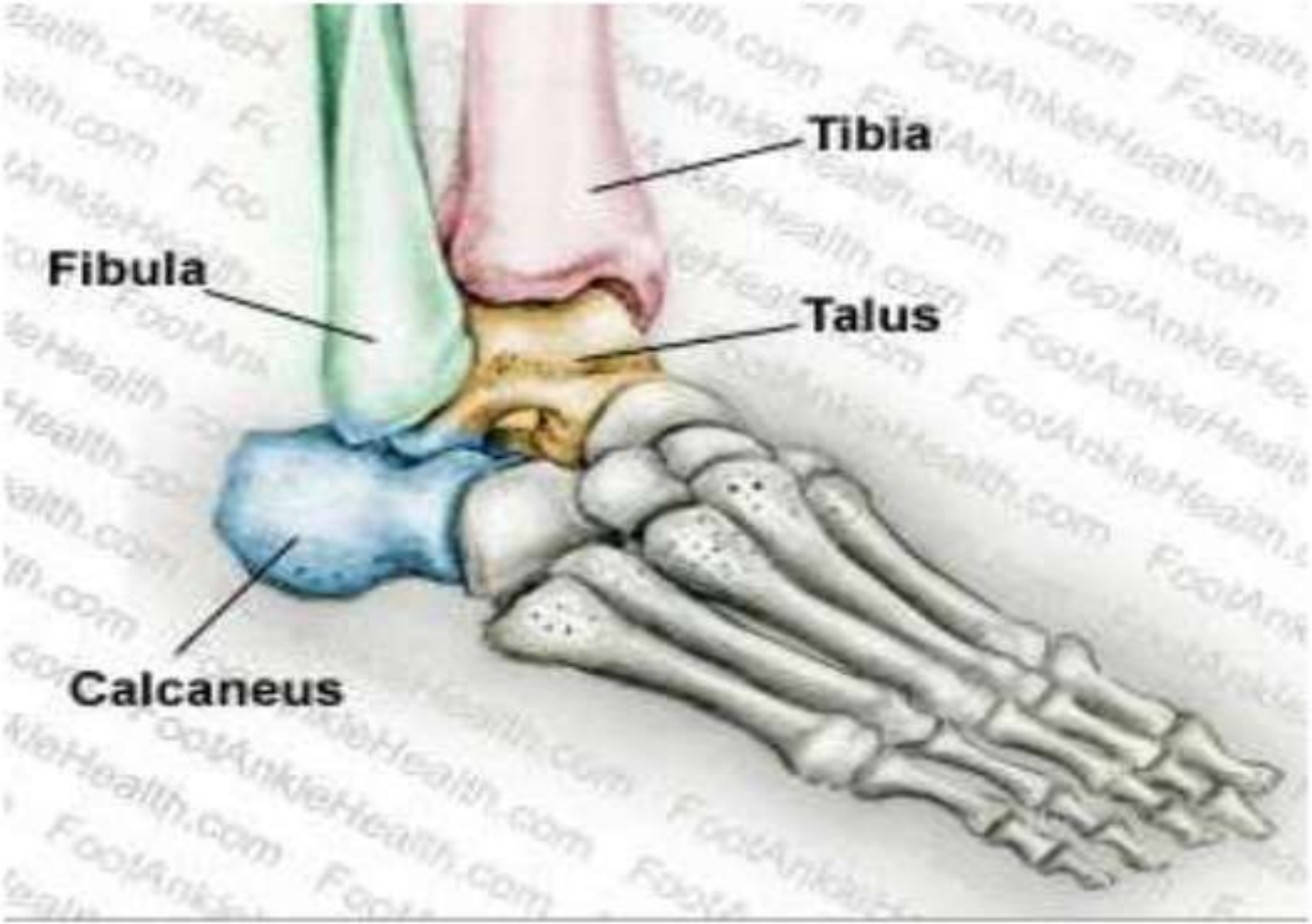
- The talocrural joint is a hinge type synovial joint.

- It is located between the distal ends of the tibia and the fibula and superior part of the talus.

- It is uniaxial joint

Articular surface

- The distal end of the tibia and its medial malleolus, together with the lateral malleolus of the fibula and inferior transverse tibiofibular ligament, form a malleolar mortise into which the pulley shaped trochlea.


Tibia
Fibula
Talus
Calcaneus

- The trochlea is the rounded superior articular surface of the talus

Fibrous Capsule

- Around the joint, the fibrous capsule is thin in front and behind.

- It is attached proximally to the borders of the tibial and malleolar articular surfaces, and distally to the talus near the margins of its trochlear surface, except in front where it reaches the dorsum of the talar neck.

- The capsule is strengthened by strong collateral ligaments.

Synovial Membrane

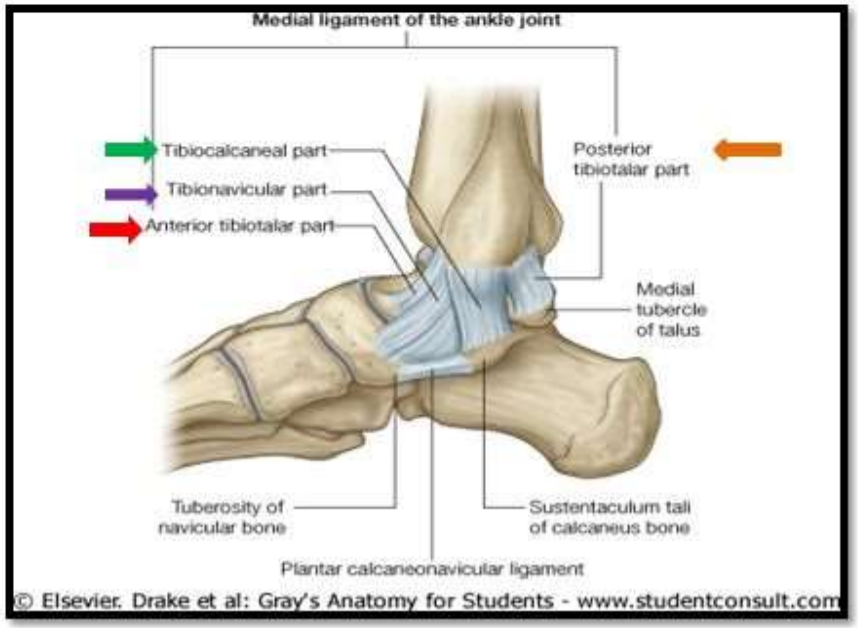
- Lining the capsule, it ascends as a short vertical recess between the tibia and fibula.

LIGAMENTS

MEDIAL (DELTOID) LIGAMENT:

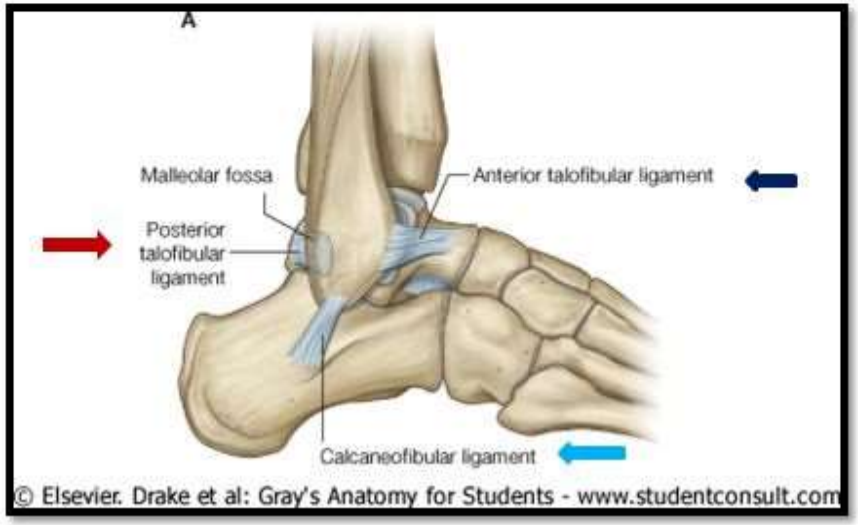
- A strong triangular ligament.
- Apex: attached to medial malleolus.
- Base: subdivided into 4 parts:

1. Anterior tibiotalar part.
2. Tibionavicular part.
3. Tibiocalcaneal part.
4. Posterior tibiotalar part.



LATERAL LIGAMENT:

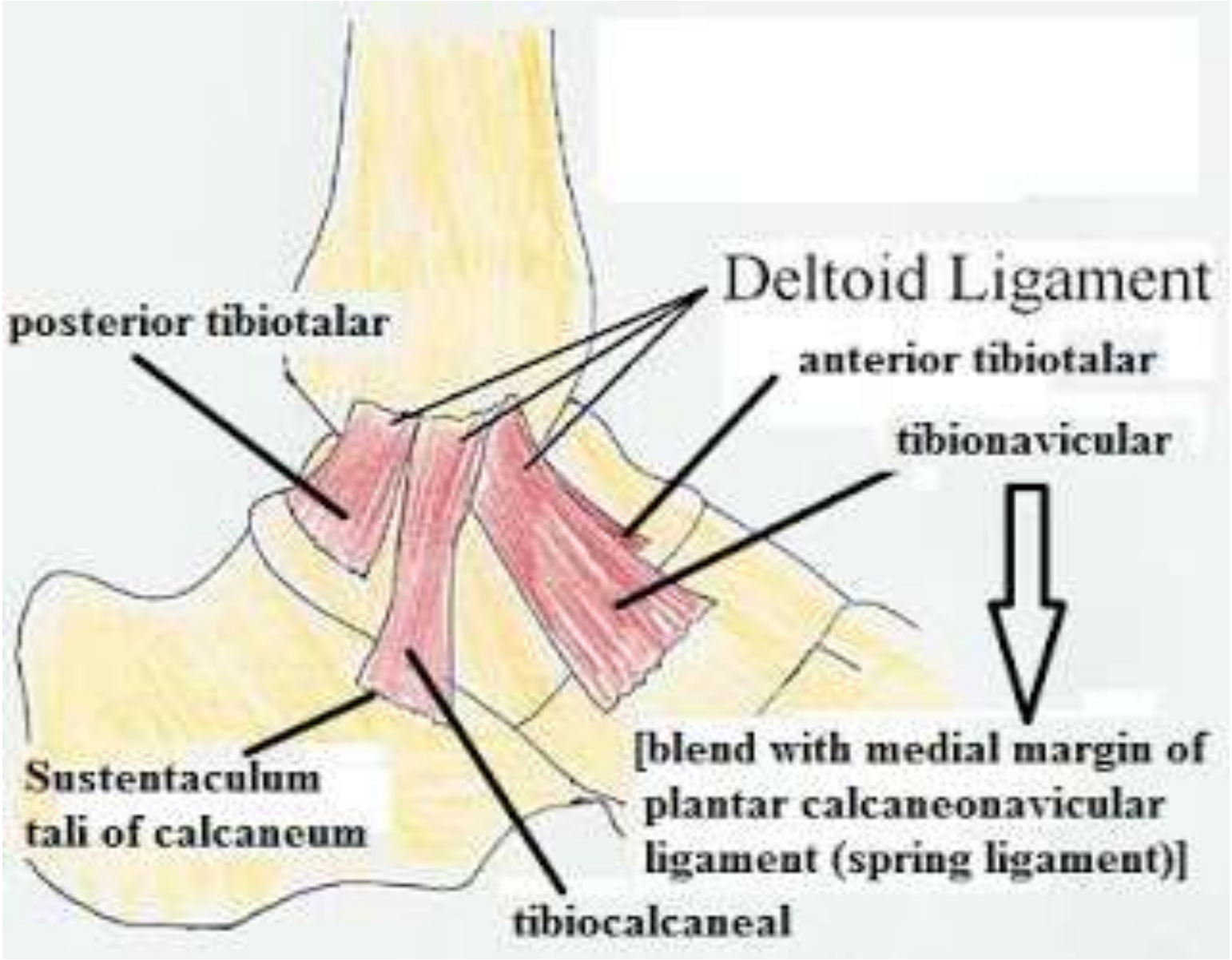
- Composed of 3 separate ligaments (WHY?).
- Anterior talofibular ligament.
- Calcaneofibular ligament.
- Posterior talofibular ligament.



1. MCL (deltoid ligament)

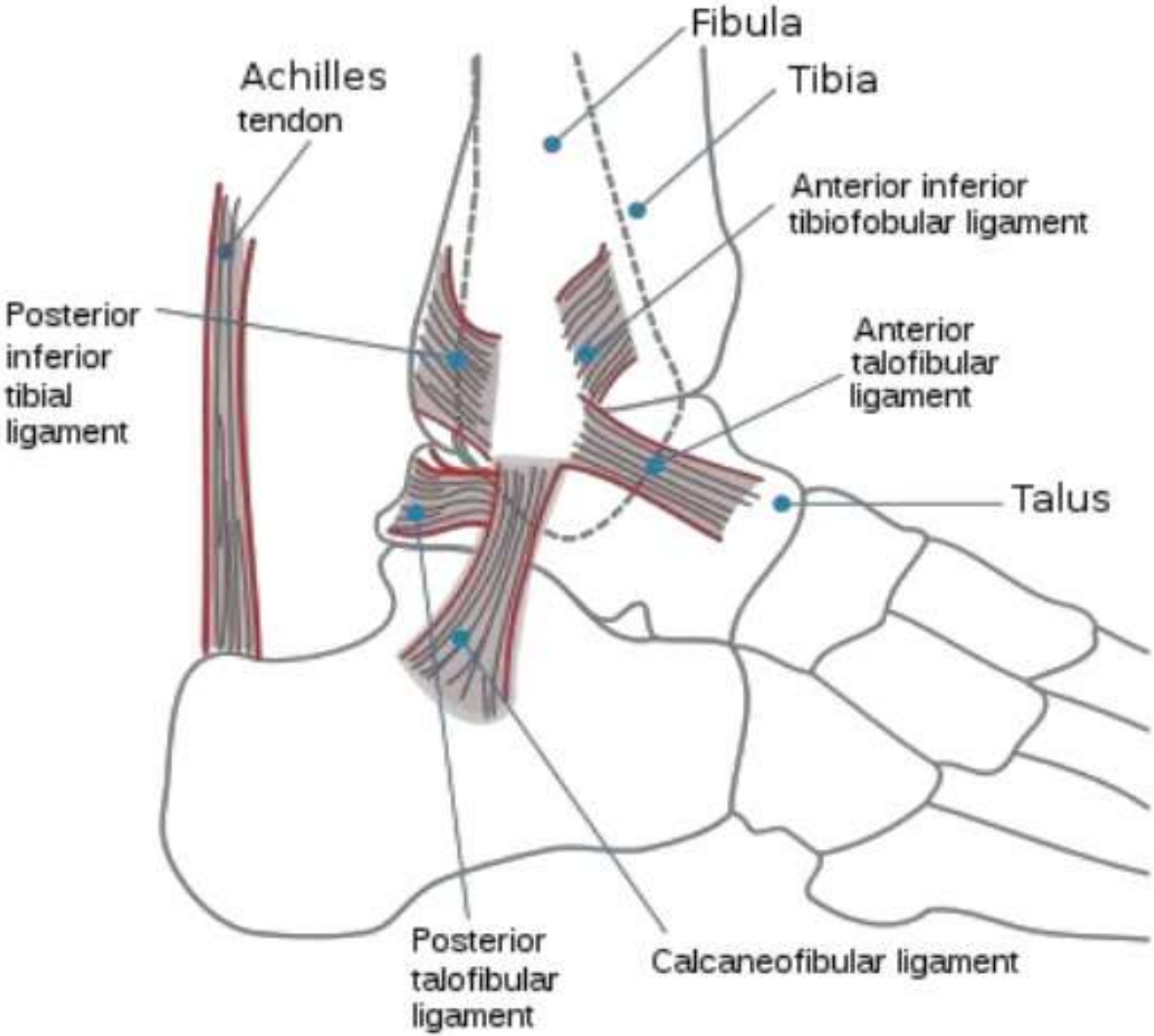
- The deltoid ligament is a strong, triangular band, attached to the apex and the anterior and posterior borders of the medial malleolus.

- The deltoid ligament is composed of the anterior tibiotalar ligament, tibiocalcaneal ligament, posterior tibiotalar ligament, and the tibionavicular ligament. It consists of two sets of fibers, superficial and deep.


Deltoid Ligament
posterior tibiotalar
anterior tibiotalar
tibionavicular
[blend with medial margin of plantar calcaneonavicular ligament (spring ligament)]
Sustentaculum tali of calcaneum
tibiocalcaneal

2. Lateral collateral ligament

- The lateral collateral ligament has three discrete parts.
- The anterior talofibular ligament a flat, weak band that extends anteromedially from the anterior margin of the lateral malleolus to the talus.
- The posterior talofibular ligament runs almost horizontally from the distal part of the lateral malleolar fossa to the lateral tubercle of the talus.
- The calcaneofibular ligament, a long cord, that passes postero-inferiorly from the tip of the lateral malleolus to the lateral surface of the calcaneus.


Fibula
Tibia
Achilles
tendon
Anterior inferior
tibiofobular ligament
Posterior
inferior
tibial
ligament
Anterior
talofibular
ligament
Talus
Posterior
talofibular
ligament
Calcaneofibular ligament

NOTE-: The lateral ligament complex is injured most commonly with inversion sprains, often during sport

Movement

- Dorsiflexion
- Planterflexion

Blood supply

- The talocrural joint is supplied by malleolar branches of the anterior and posterior tibial and fibular arteries.


Dorsiflexion
Plantar flexion

Innervations

- Tibial nerves
- Deep fibular nerve , a division of common fibular nerve.

Clinical condition

1. **Club foot (talipes equinovarous)**

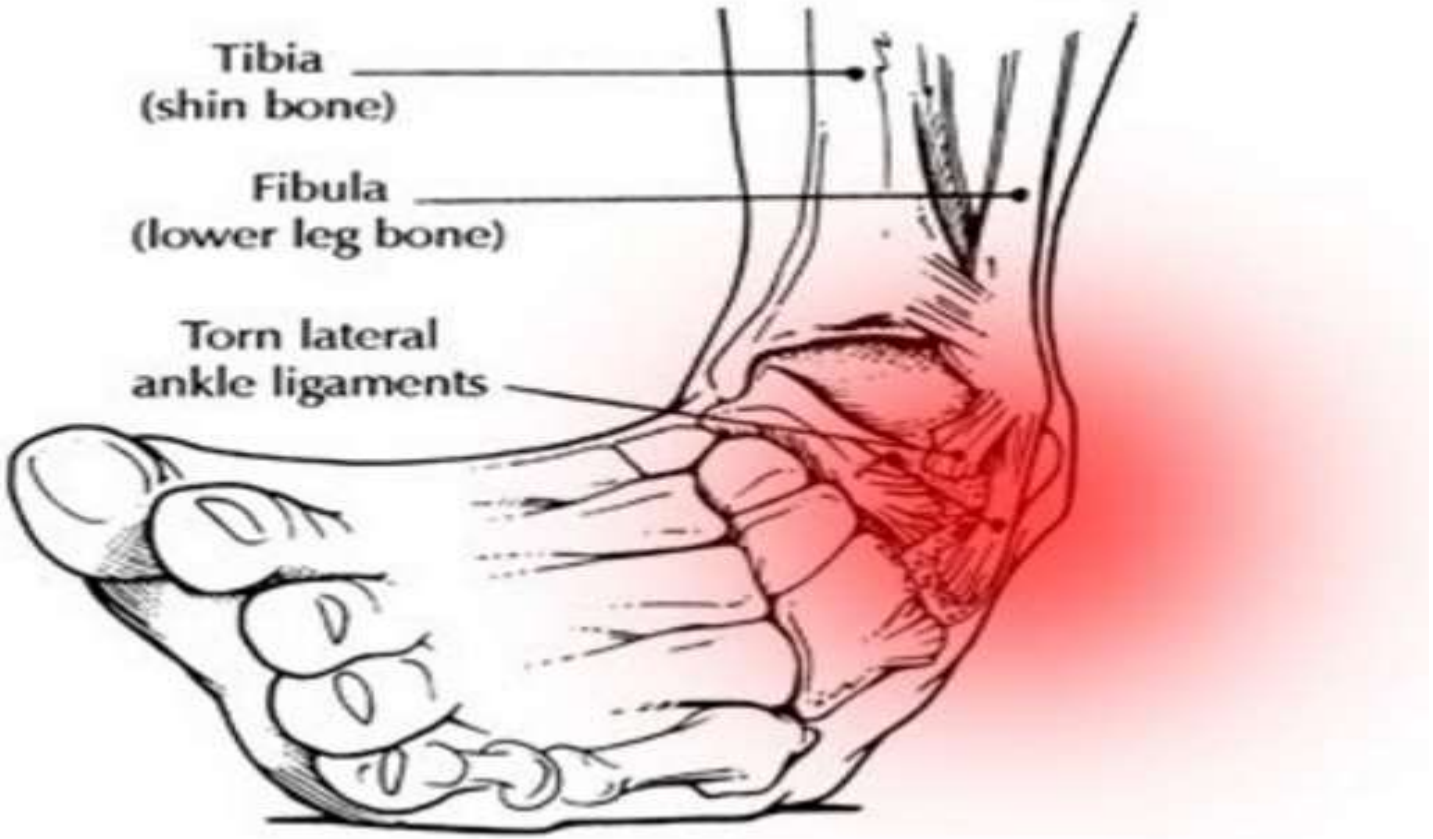
- Foot that is twisted out of position
- The foot is inverted, the ankle is planterflexed, and the forefoot is adducted.
- The foot assumes the position of a horse hoof.

Clubfoot

Normal foot

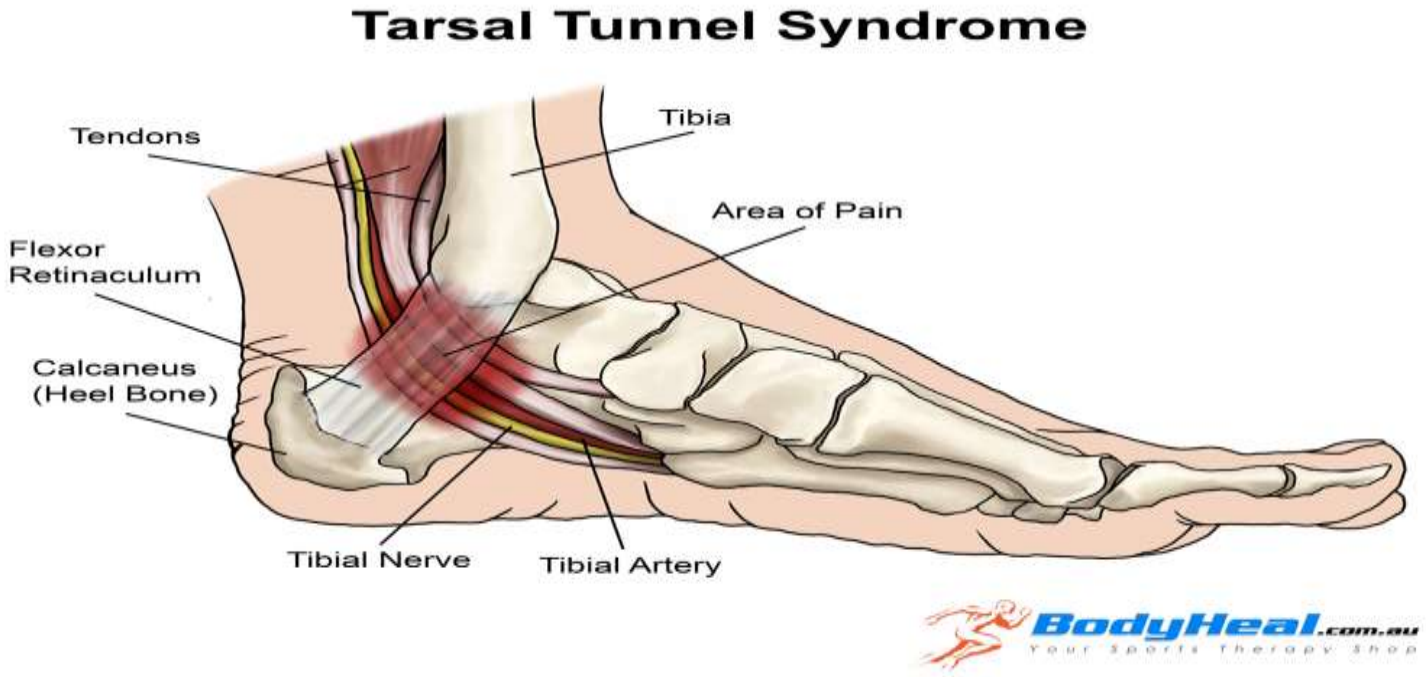
2. Ankle sprain

- This means person have stretched and possibly torn the ligaments of ankle.



3. Tarsal tunnel syndrome

Tarsal tunnel syndrome (TTS), also known as posterior tibial neuralgia, is a compression neuropathy and painful foot condition in which the tibial nerve is compressed as it travels through the tarsal tunnel.



4. Achillies tendinopathy

A stretch, tear or irritation to the tendon connecting the calf muscle to the back

5. Lateral ligament injuries

Formative Assessment (MCQ)

- **1. Which bones make up the ankle joint?**

  a) Tibia, Fibula, and Talus
  b) Femur, Tibia, and Fibula
  c) Talus, Calcaneus, and Cuboid
  d) Tibia, Patella, and Talus

- **2. Which of the following ligaments provides the primary support to prevent inversion of the ankle?**

  a) Deltoid ligament
  b) Anterior talofibular ligament
  c) Calcaneofibular ligament
  d) Posterior talofibular ligament

- **3. The distal end of the fibula forms a bony prominence known as the:**

  a) Lateral malleolus
  b) Medial malleolus
  c) Talus
  d) Calcaneus

- **4. Which muscle is primarily responsible for dorsiflexion of the ankle?**

  a) Tibialis anterior
  b) Gastrocnemius
  c) Soleus
  d) Flexor digitorum longus

- **5. The 'spring ligament' is associated with which structure in the foot?**

  a) Lateral malleolus
  b) Medial longitudinal arch
  c) Calcaneus
  d) Talus

- **6. What type of synovial joint is the ankle (talocrural) joint?**

  a) Ball and socket joint
  b) Hinge joint
  c) Pivot joint
  d) Saddle joint

7. Ankle sprains most commonly occur due to excessive:

a) Eversion
b) Inversion
c) Dorsiflexion
d) Rotation

8. The most commonly injured ligament in a lateral ankle sprain is the:

a) Calcaneofibular ligament
b) Posterior talofibular ligament
c) Deltoid ligament
d) Anterior talofibular ligament

- **9. In flatfoot (pes planus), which structure is commonly weakened or collapsed?**

  a) Tibialis anterior tendon
  b) Plantar aponeurosis
  c) Deltoid ligament
  d) Medial longitudinal arch

Thank you