TRANSVERSE TARSAL JOINT

-Types, axis of motion, arthro & osteokinematics

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The foot is divided into three segments:

Hindfoot

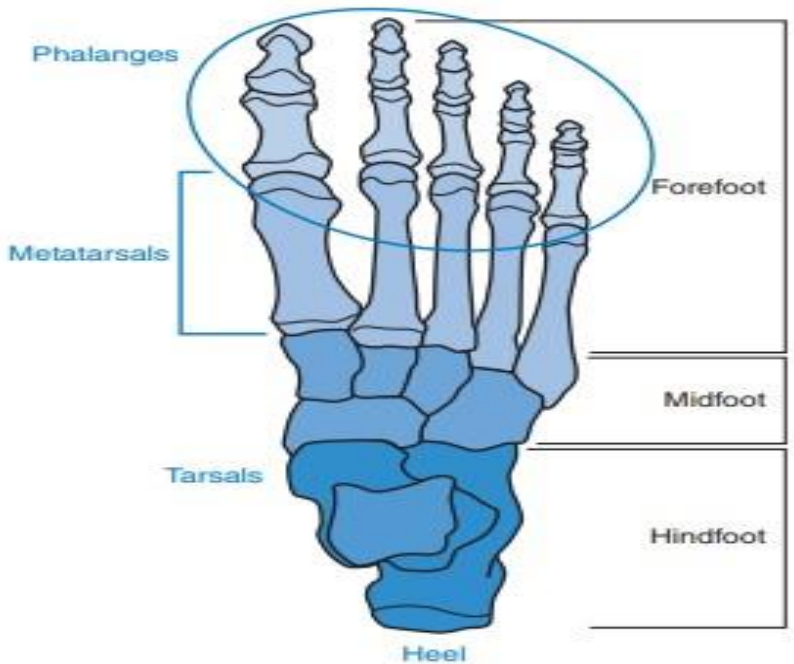
- **Posterior segment**
- **Talus and calcaneus**

Midfoot

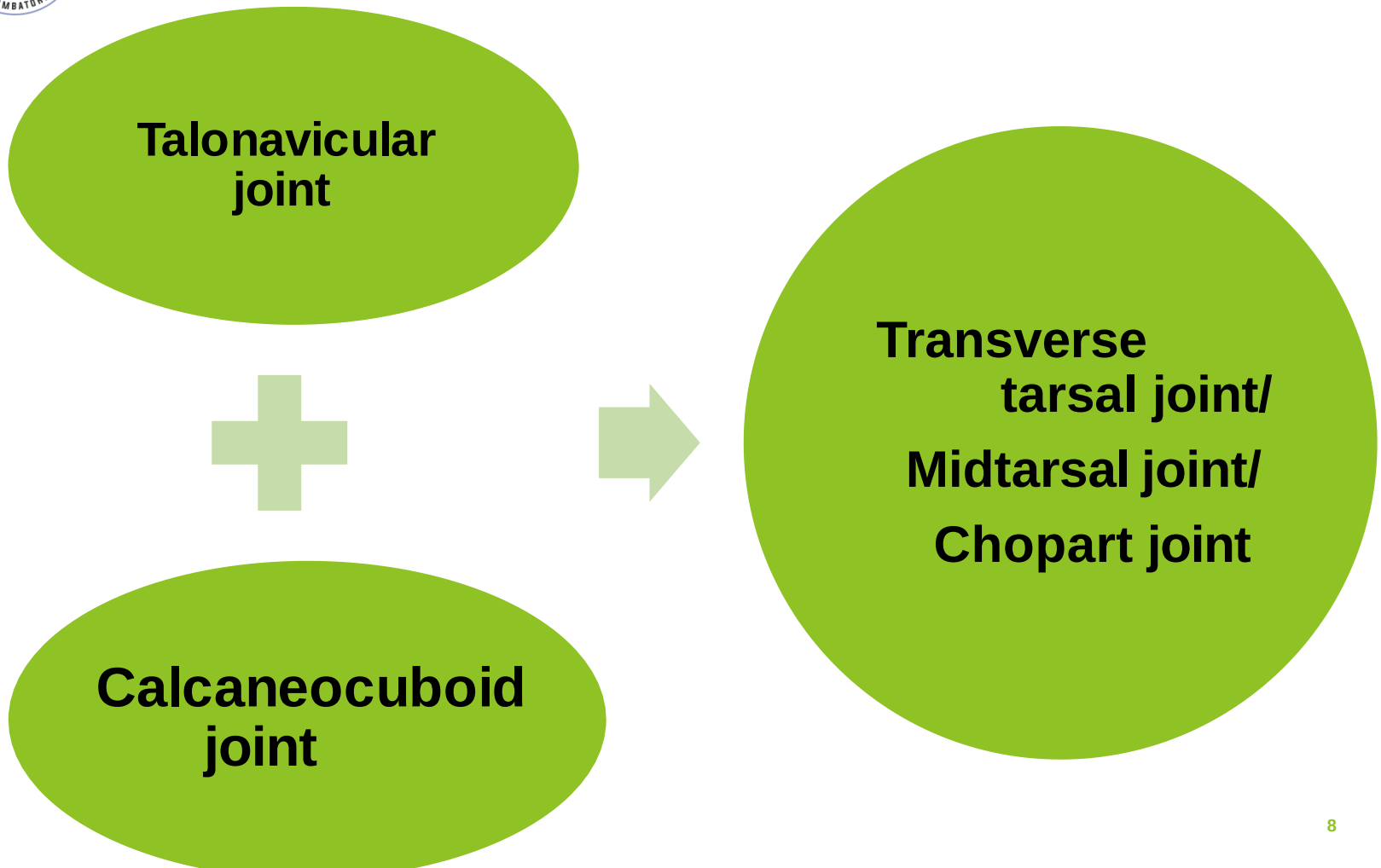
- **Middle segment**
- **Navicular, cuboid and 3 cuneiforms**

Forefoot

- **Anterior segment**
- **5 metatarsals & 14 phalanges**



Transverse tarsal joint



- S shaped joint line

that transects the foot horizontally, dividing hind foot from midfoot and forefoot.

Talonavicular joint

Articulating surfaces:

Proximal- anterior portion of head of talus

Distal- Concave portion of posterior aspect of navicular bone.

Motions: supination and pronation

ligaments

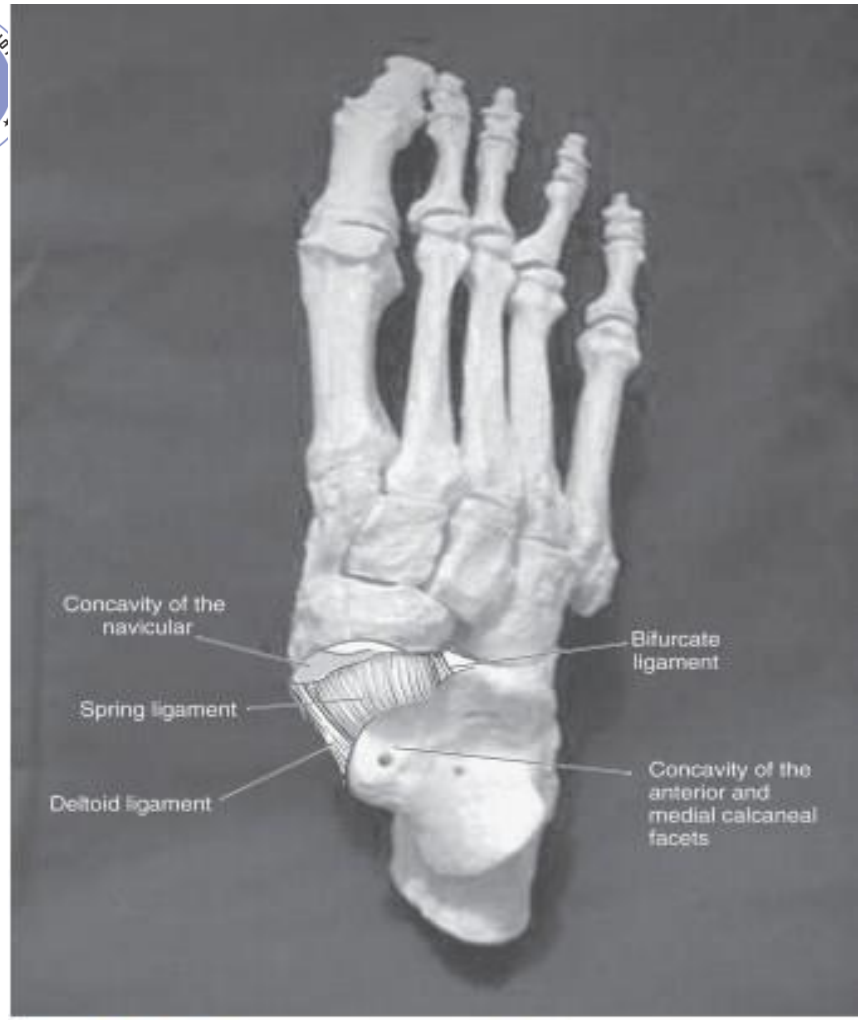


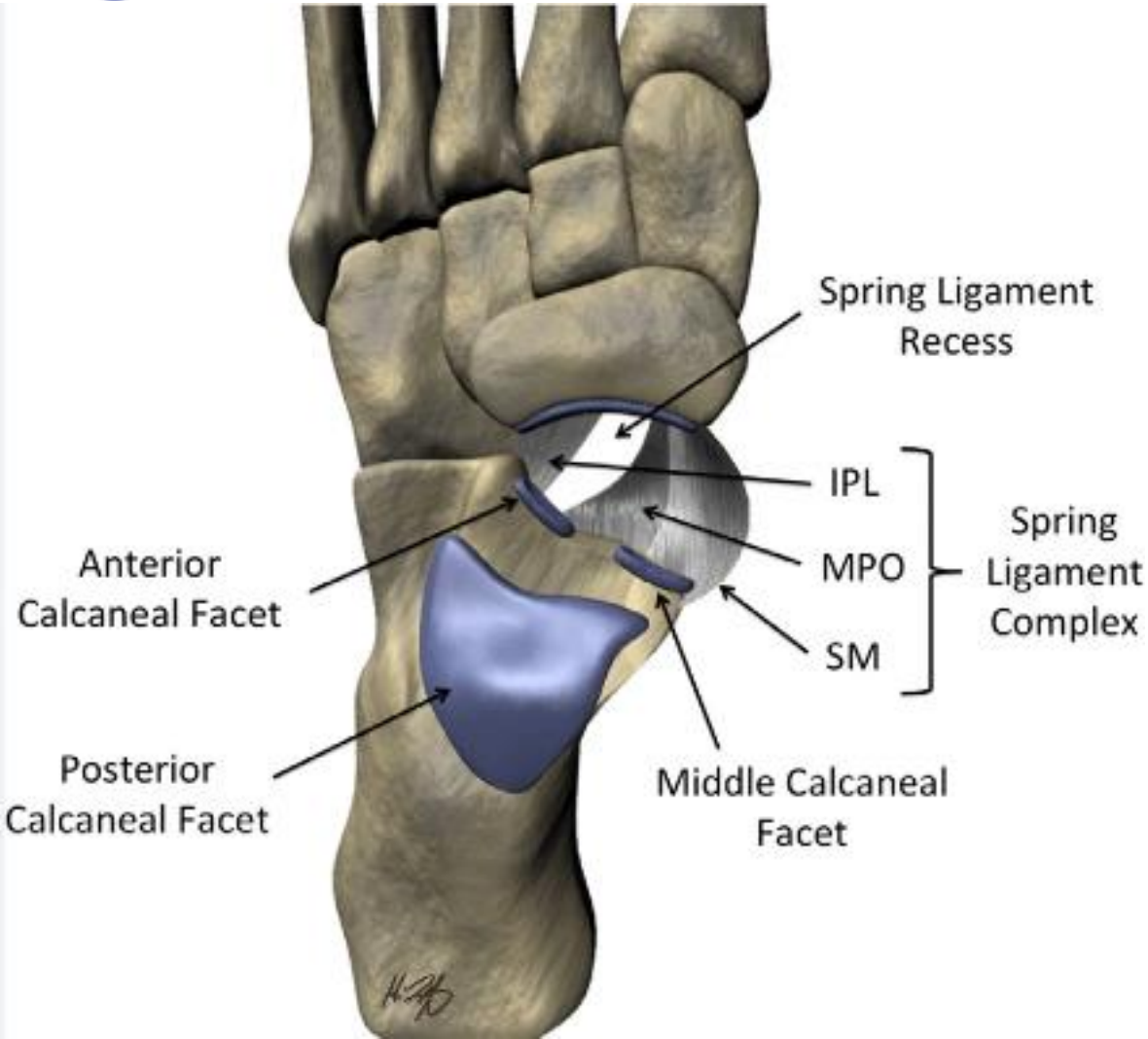
Figure 12–20 With the talus removed, this superior view shows the concavity ("socket") formed by the navicular bone anteriorly, the deltoid ligament medially, the medial band of the bifurcate ligament laterally, and the spring (plantar calcaneonavicular) ligament inferiorly.

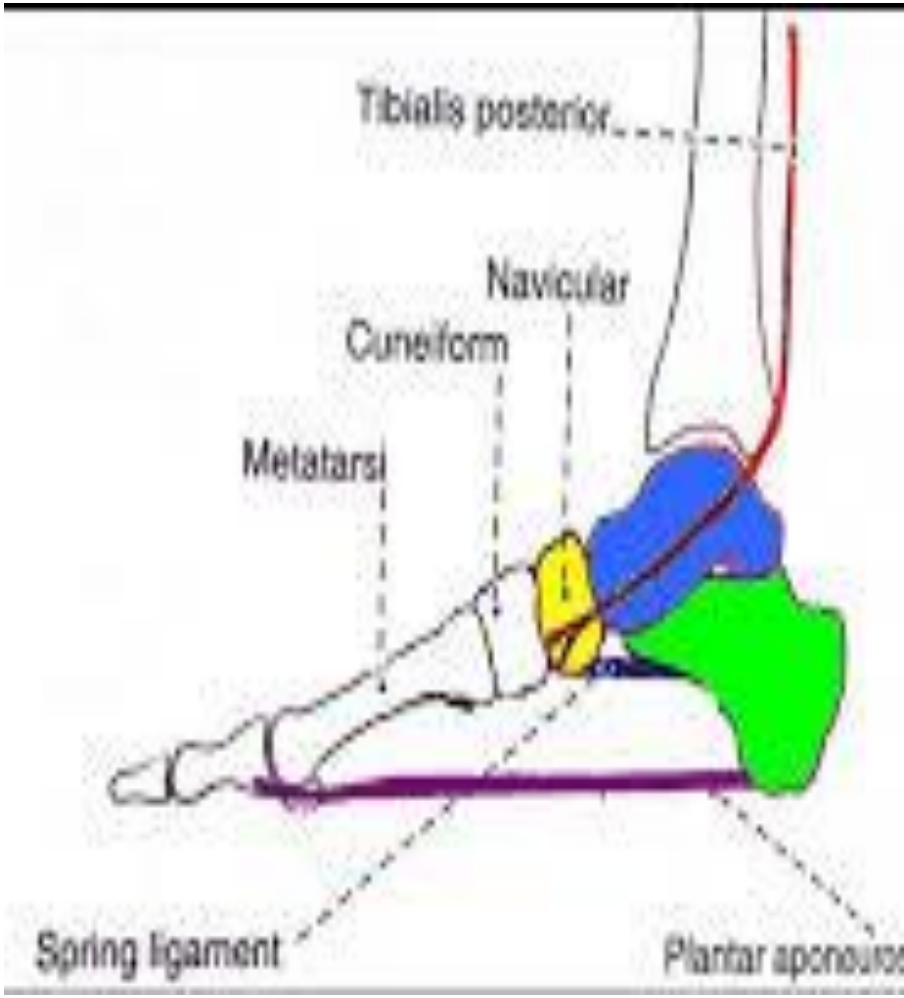
1. **Spring (plantar calcaneonavicular ligament)-**
2. **Deltoid- medialy**
3. **Bifurcate (calcaneo navicular part)- laterally**
4. **Dorsal talonavicular ligaments.**

Spring ligament

- The spring ligament fills the gap between the calcaneus and the navicular bone, it attaches from **the sustentaculum tali of the calcaneus** to the medial-plantar surface of the **navicular.**
- serves as the **primary static stabilizer of the medial longitudinal arch of the foot.**
- **The plantar calcaneonavicular ligament** also referred to as spring ligament.
- is a thick wide band of cartilaginous connective tissue that supports the medial longitudinal arch of the foot, failure in the spring ligament leads to **flat foot deformity**

- Its individual components are the:
- **superomedial calcaneonavicular ligament**
- **medioplantar oblique ligament.**
- **inferior calcaneonavicular** ligament.
- These ligament components attach to different parts of the navicular bone.


Spring Ligament
Recess
IPL
MPO
SM
Spring
Ligament
Complex
Anterior
Calcaneal Facet
Posterior
Calcaneal Facet
Middle Calcaneal
Facet


Tibialis posterior
Navicular
Cuneiform
Metatarsi
Spring ligament

Calcaneocuboid joint

Saddle shaped – reciprocaly concave and convex

<u>Articulations:</u>

Proximally – anterior calcaneum

Distally - posterior cuboid bone

- **Function**
- The spring ligament functions as static restraint of the medial longitudinal arch,
- it supports the **head of the talus** from planter and medial subluxation against the body weight during standing

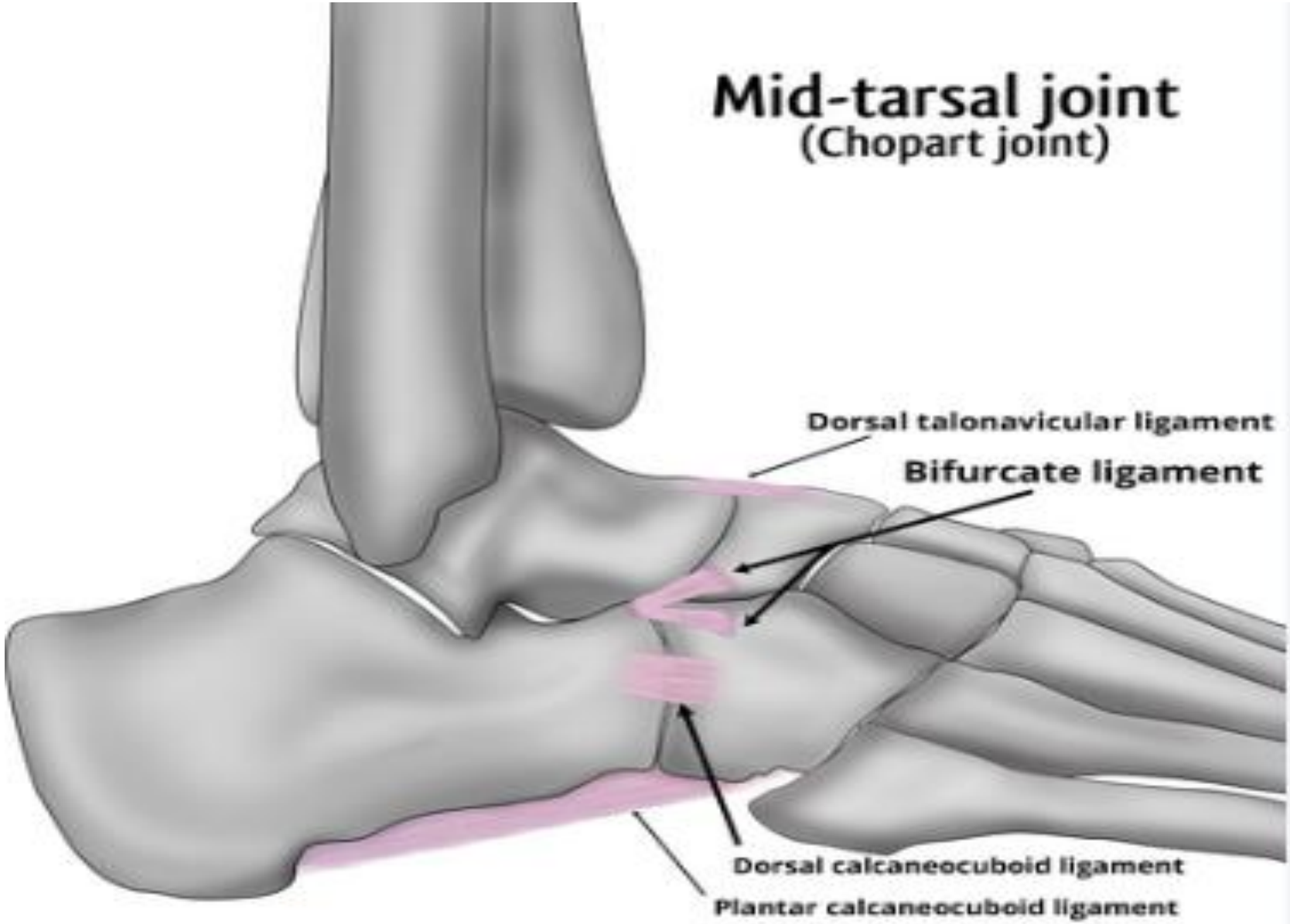
Ligaments

- Lateral band of Bifurcate (calcaneocuboid ligament),
- Dorsal calcaneocuboid ligament,
- Plantar calcaneocuboid ligament (short plantar) and long plantar ligaments.

- The **bifurcate ligament** is a strong band, attached behind on the upper surface of the calcaneus and dividing in front in a **Y-shaped manner** into a :
  - **calcaneocuboid**
  - **calcaneonavicular part.**
- The **calcaneocuboid part** is fixed to the medial side of the cuboid.
- The **calcaneonavicular part** is attached to the lateral side of the navicular.

- Function:
- The bifurcate ligament provides stability to the calcaneocuboid and talocalcaneonavicular joints

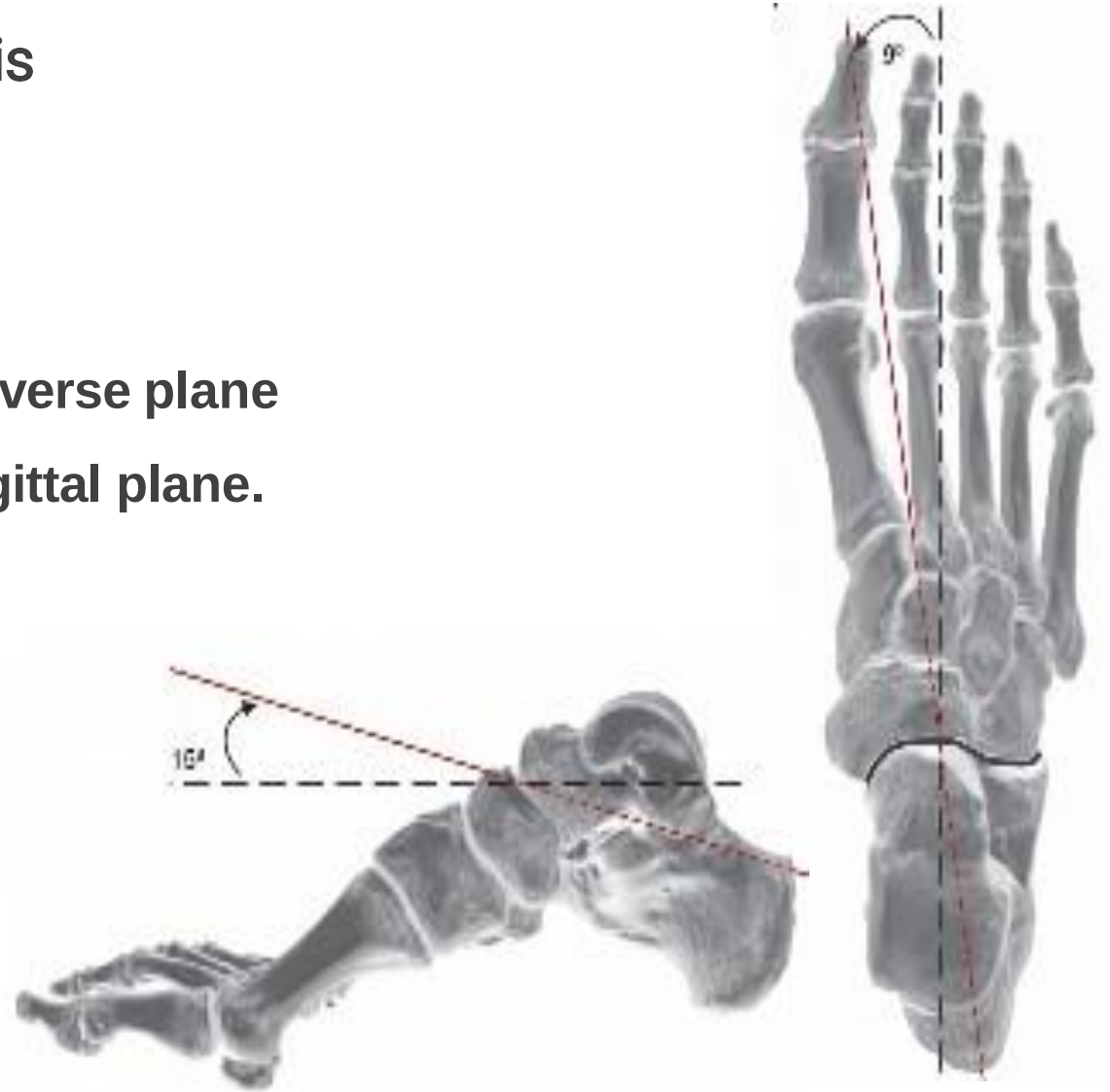
Mid-tarsal joint
(Chopart joint)



Transverse Tarsal Joint Axis

1. **LONGITUDINAL AXIS :**

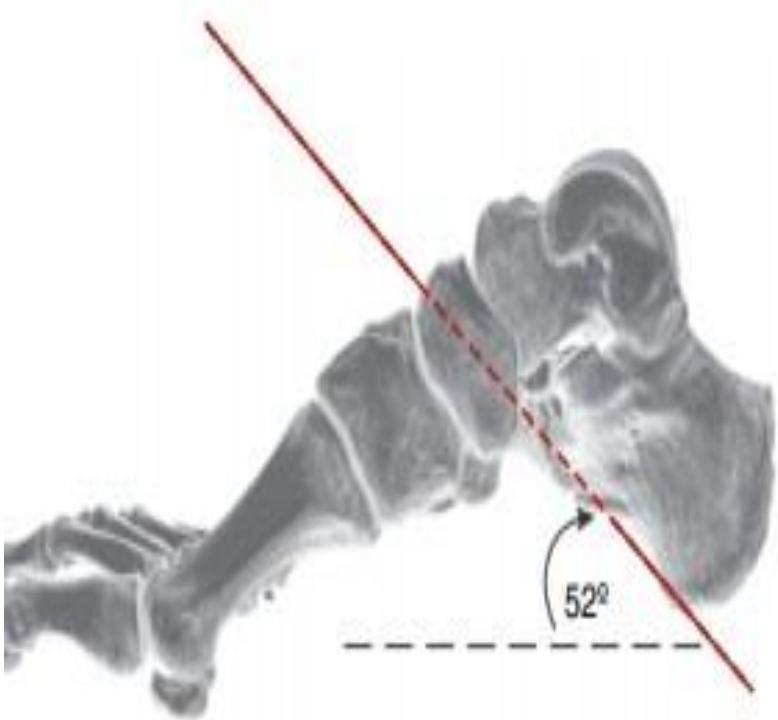
- **Inclined 15^0 upwards** from trasnverse plane and **angled 9^0 medially** from sagittal plane.
- inversion/ eversion movements



2. OBLIQUE AXIS

- **Positioned approximately 57° medial to the sagittal plane and 52° superior to the transverse plane**

  Movements- abduction, adduction and PF and DF



TRANSVERSE TARSAL JOINT FUNCTION

- **Any weight-bearing subtalar motion causes the talonavicular and calceneocuboid joint to move simultaneously**

- **When the subtalar joint is fully supinated and locked the transverse tarsal joint is also carried into full supination. (CLOSE PACKED POSITION)**

- **When the subtalar joint is pronated and loose-packed, the transverse tarsal joint is also mobile and LOOSE PACKED.**

- **Wt bearing hindfoot pronation and transverse tarsal joint function:**
- In bilateral standing, on level ground both subtalar joint and transverse tarsal joint pronate slightly.
- To allow foot to absorb the body weight.

- During Single limb support- walking
- **Subtalar joint continue to pronate**
- **Transverse tarsal joint supinate**.
- To maintain proper weight bearing of forefoot

- In bilateral standing,
- If pronation continues…
- Lateral border of foot end tend to lift from the ground
- Diminishes BOS.
- Unequal weight bearing stress to multiple joint

- **<u>Weghtbearing hindfoot supination and transverse tarsal joint motion:</u>**
- In weight bearing, lateral rotatory force on leg create **subtalar joint supination** with a **pronation of transverse tarsal joint.**
- With increasing supination of subtalar joint , transverse tarsal joint also supinates.

- When tibia maximally lateral rotated on the weight bearing foot, the fully supinated subtalar and trasnverse joint will tend to shift the weight bearing fully to lateral border of foot.
- As a compensatory mechanism, the entire medial border of the foot may lift.