أهلا وسهلا

الأستاذ الدكتور يوسف حسين

أستاذ التشريح وعلم الأجنة - كلية الطب – جامعة الزقازيق – مصر

رئيس قسم التشريح و الأنسجة و الأجنة - كلية الطب - جامعة مؤتة - الأردن

دكتوراة من جامعة كولونيا المانيا

اليوتيوب **Prof. Dr. Youssef Hussein Anatomy**

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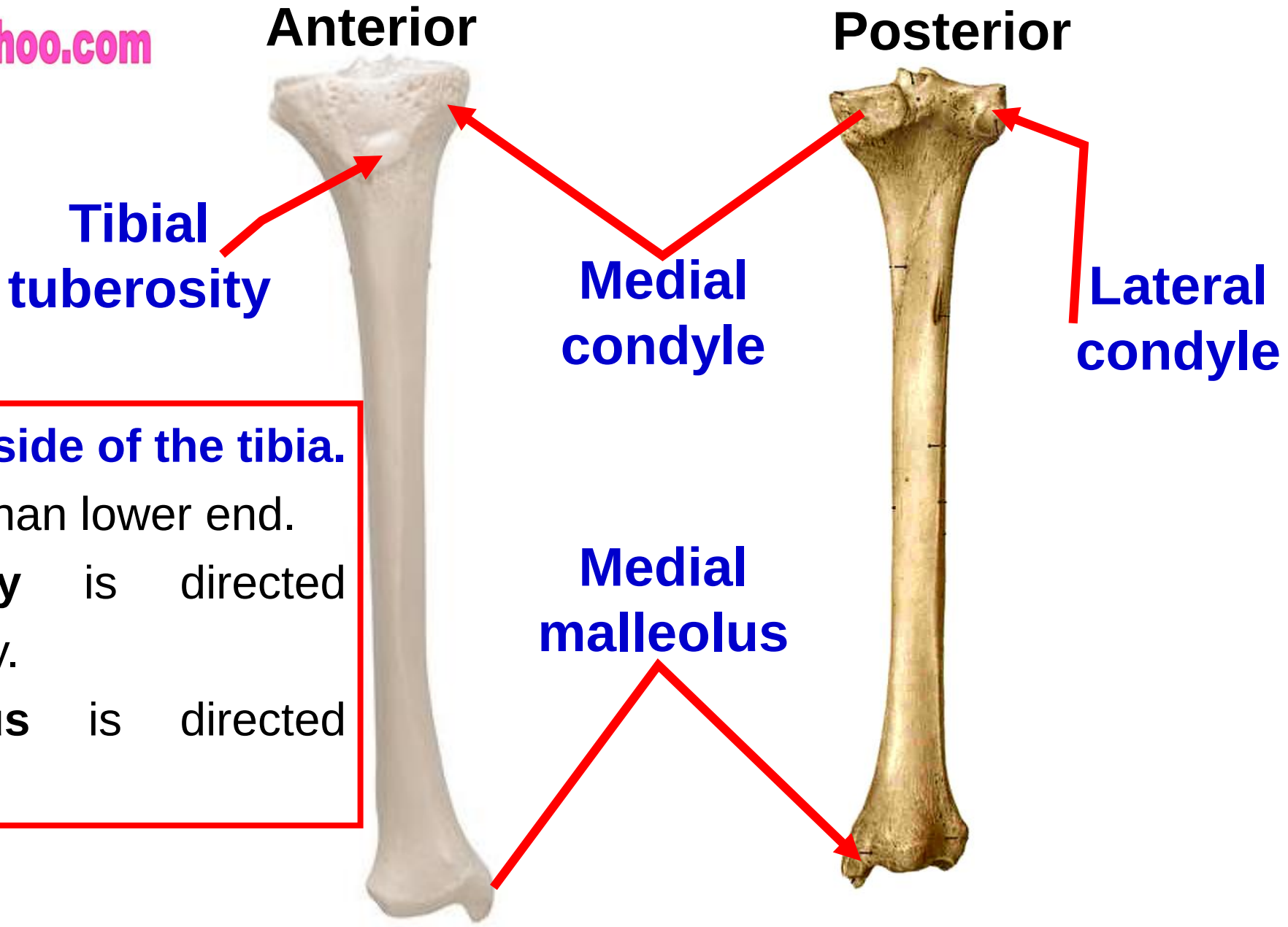


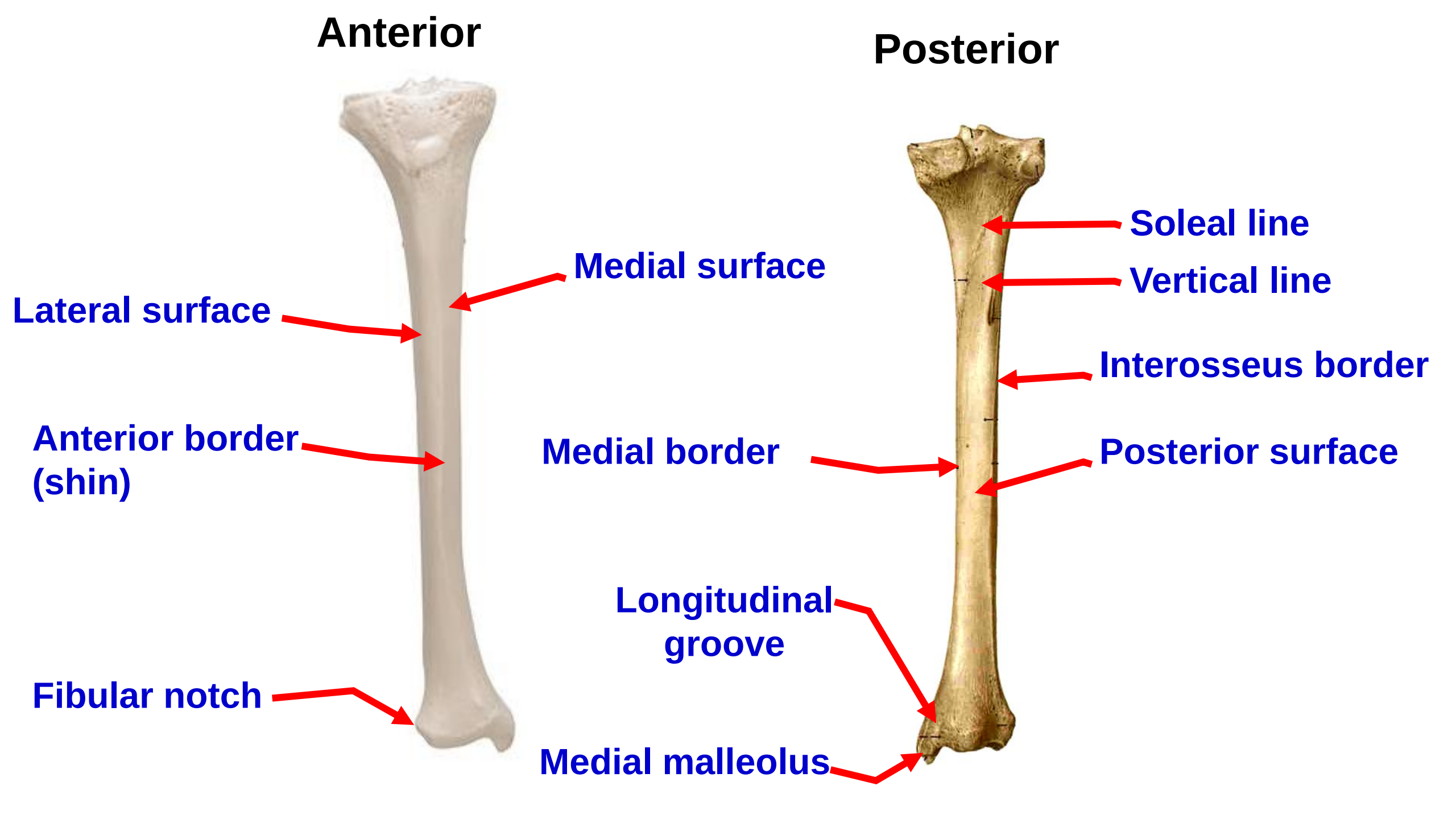
**** How to identify the side of the tibia.**

1- Upper end is larger than lower end.

2- T**ibial tuberosity** is directed anteriorly and superiorly.

3- M**edial malleolus** is directed medially.

Right tibia


Anterior
Posterior
Medial surface
Lateral surface
Anterior border
(shin)
Fibular notch
Soleal line
Vertical line
Interosseus border
Medial border
Posterior surface
Longitudinal
groove
Medial malleolus

- **Shaft of tibia**

- It is triangular in cross section, having 3 borders and 3 surfaces.

1- Anterior border: prominent forming **shin** of the tibia (subcutaneous).

2- Medial border: is **subcutaneous**.

3- interosseous border is directed laterally (towards the fibula)

**** The surfaces of the shaft are**:

1- Medial surface: between anterior and medial borders. almost **completely subcutaneous**.

2- Lateral surface: between anterior and interosseous borders.

3- Posterior surface: between interosseous and medial borders.

- Upper part is crossed by an oblique ridge called **soleal line.**
- The area **above the soleal line** is nearly triangular.
- The area **below the soleal** line is divided into medial and lateral parts by **vertical line.**

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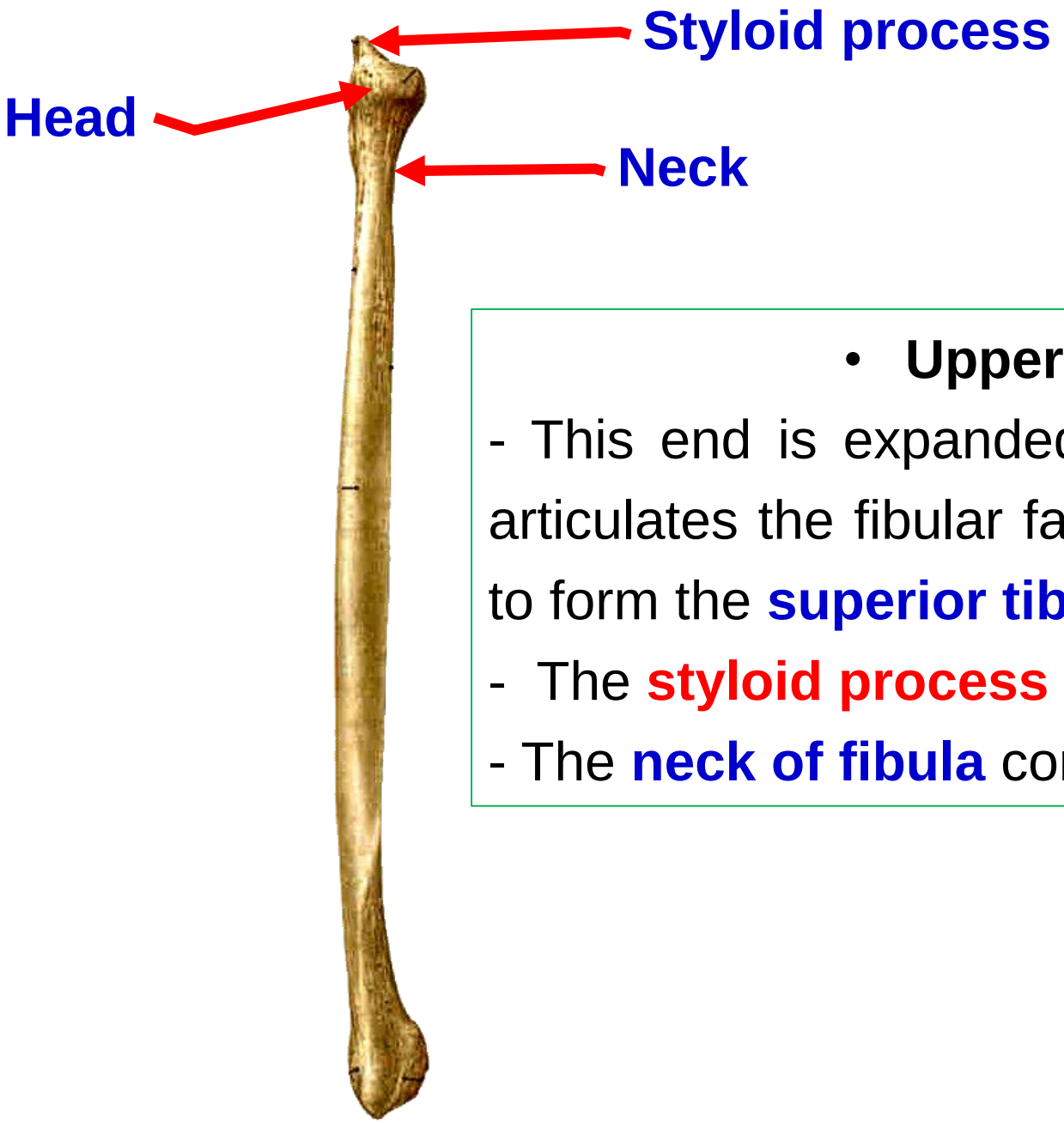

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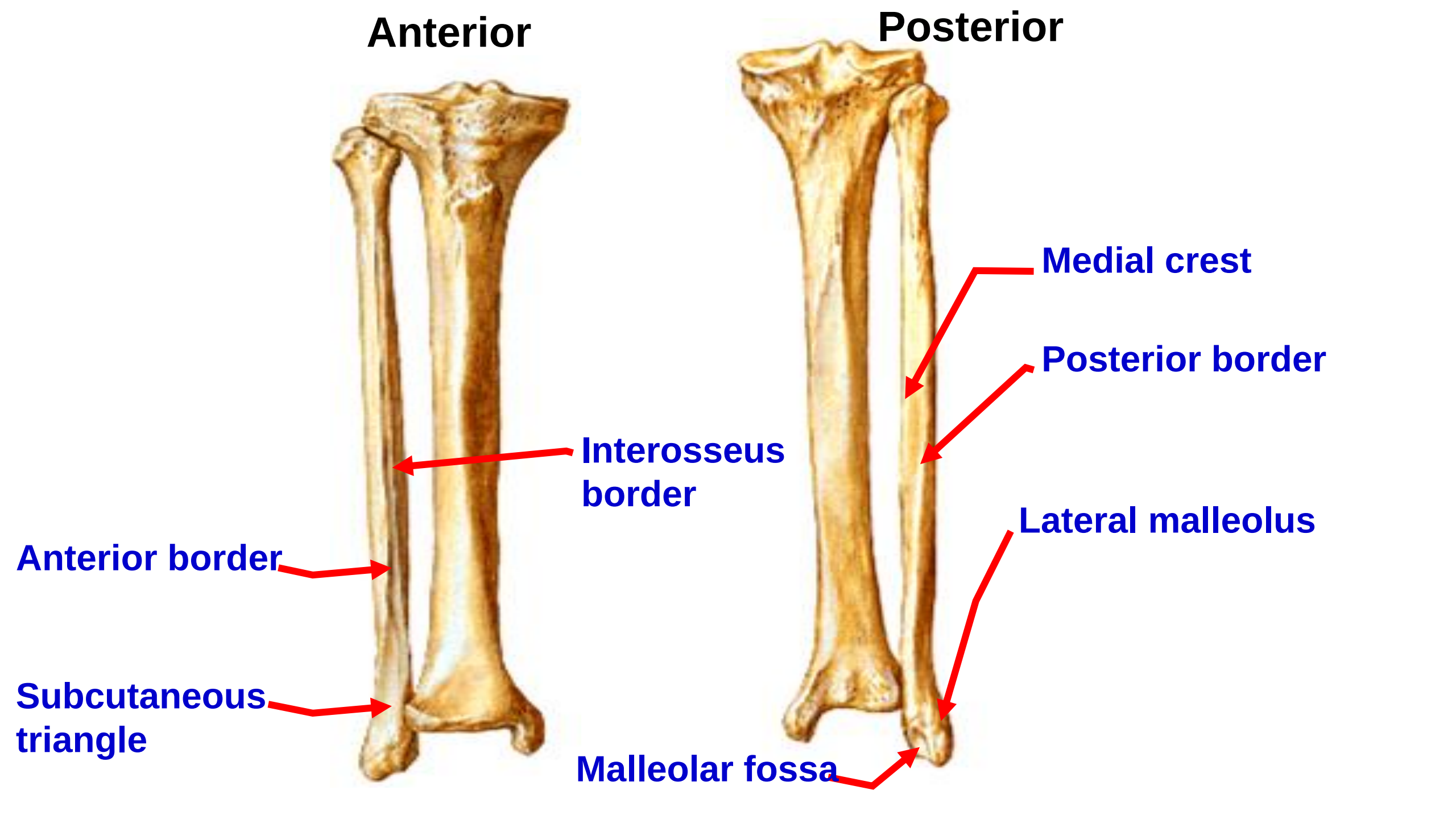
- **Upper end (Head of Fibula)**

- This end is expanded and carries a circular facet which articulates the fibular facet of the lateral condyle of the tibia to form the **superior tibiofibular Joint.**
- The **styloid process** or apex of the head.
- The **neck of fibula** constriction below the head


Anterior
Posterior
Medial crest
Posterior border
Interosseus border
Lateral malleolus
Anterior border
Subcutaneous triangle
Malleolar fossa

- **Shaft of fibula**

1- Anterior border; begins from the **apex of subcutaneous triangular area** on the lateral aspect of the lower part of the shaft above the lateral malleolus.

2- Interosseous border: close to **medial** side of anterior border.

3- Posterior border: extends from the back of the lateral malleolus.

- **The surfaces**

1- Anterior surface: between anterior and interosseous borders.

2- Lateral surface: between anterior and posterior borders.

3- Posterior surface: wide between posterior and interosseous borders.

- It divided into lateral and medial parts by a prominent ridge called **medial crest** which is more marked than the borders of the bone.

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- **Lower End (Lateral Malleolus) of fibula**

- This end is flattened from side to side.

1- Its **lateral surface** is **subcutaneous** and continuous with a triangular subcutaneous area on the lateral aspect of the lower part of the shaft.

2- The **medial** surface of the lateral malleolus is differentiated into

a- Anterior triangular articular part which articulates with the lateral surface of the body of the talus in the ankle joint.

b- **A posterior non-articular part** is depressed to form the **malleolar fossa**.

3- The **back** of the lateral nucleolus shows a **longitudinal groove** (for the tendon of **peroneus brevis**).

- **The lower end of the lateral malleolus is lower than the medial malleolus.**

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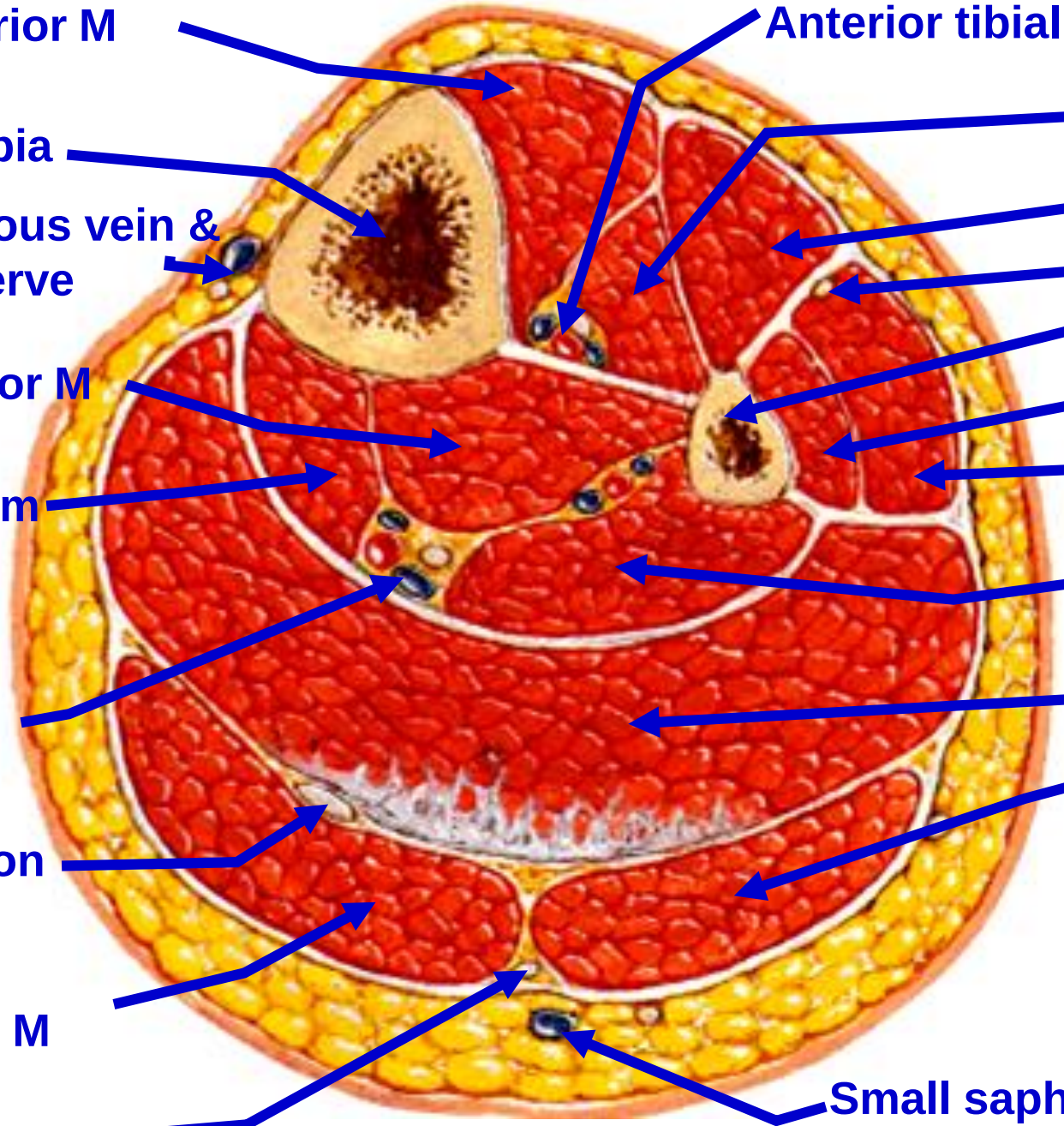
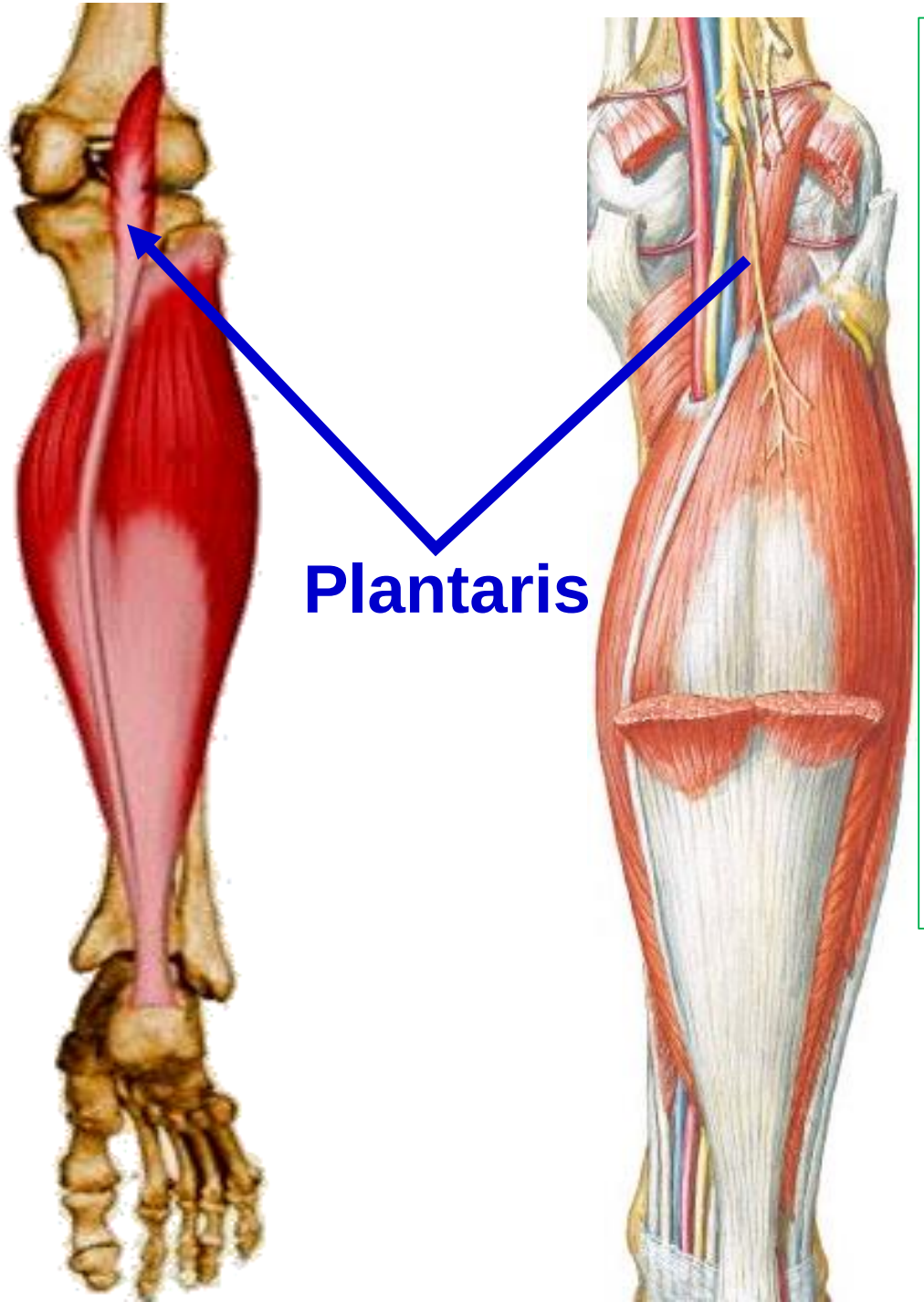


Transverse section of middle of leg



- **PLantaris**

** **Origin:** from the popliteal surface of the femur just above the **L**ateral condyle.

- **The muscle may be absent.**

** **Course;** It is a long slender tendon which descends between the gastrocnemius and soleus.

** **Insertion,** **either** Into the tendocalcaneus.

  - OR separately in the posterior surface of the calcaneus.

** **Nerve supply:** Tibial nerve.

** **Actions:** Plantar Flexion of the foot.

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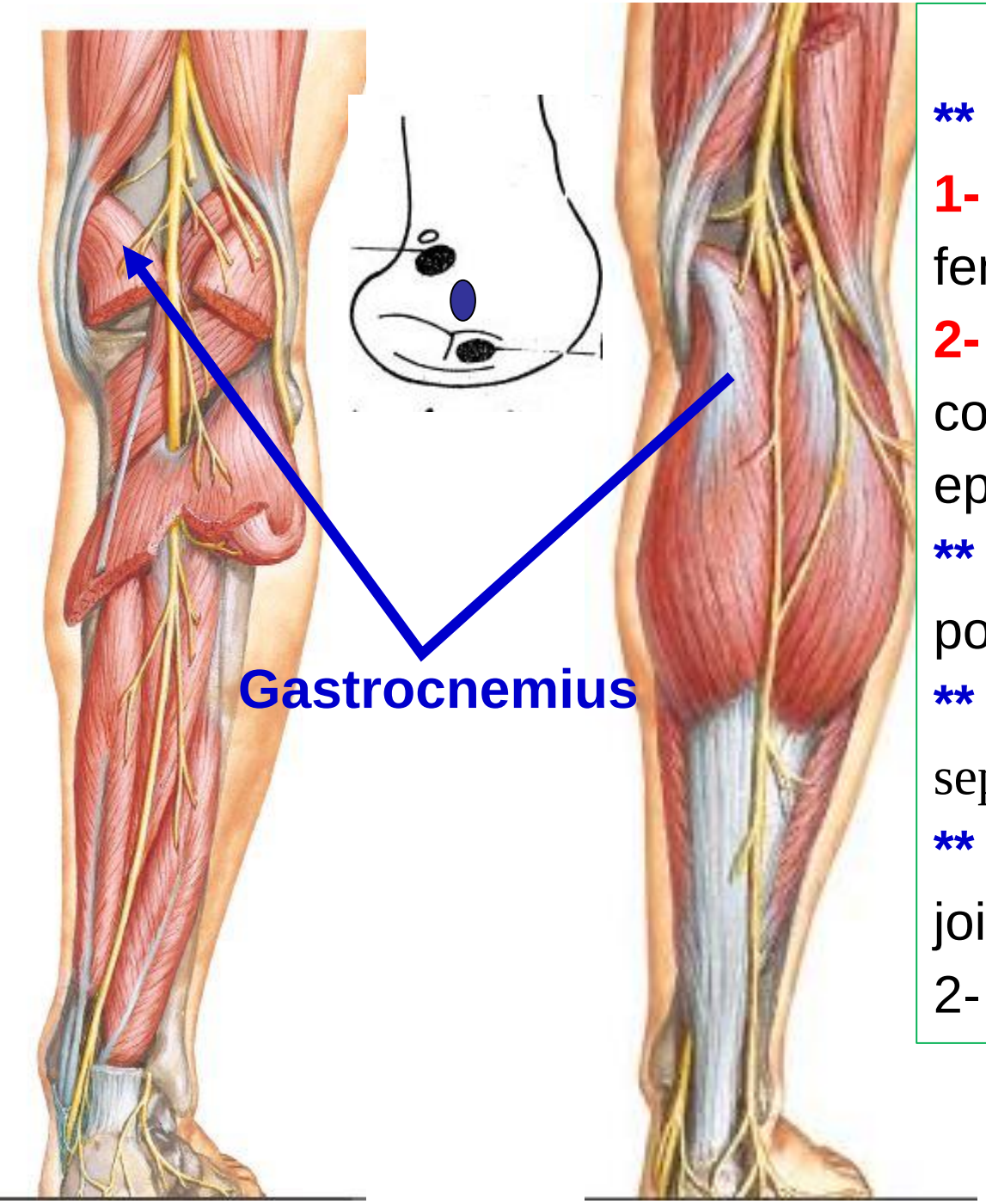

- **Gastrocnemius**

**** Origin:** by 2 heads:

1- Medial head: From the popliteal surface of the femur just above the medial condyle.

2- Lateral head: from lateral surface of lateral condyle of femur above and behind the lateral epicondyle. It contains sesamoid bone called **Fabella**.

**** Insertion:** Tendocalcaneus into the middle of the posterior surface of the calcaneus.

**** Nerve supply:** Tibial nerve (each head receive separate branch).

**** Actions:** 1- Plantar flexion of the foot (at ankle joint).

2- Flexion of the knee joint.

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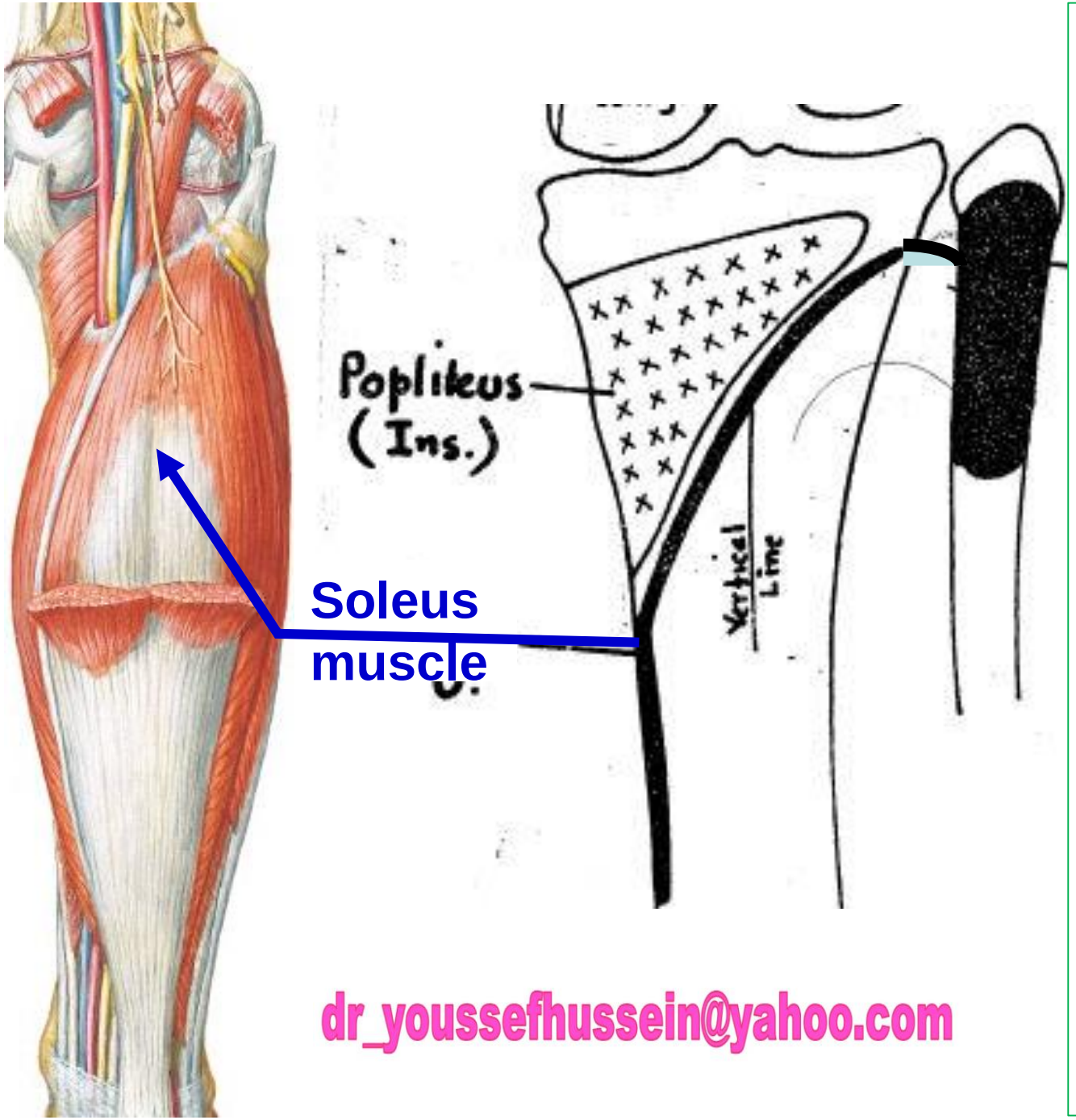

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- **Soleus**

**** Origin: from**

1- Upper 1/3 of posterior surface of fibula.

2- Back of the head of the fibula.

3- Tendinous arch (between head of fibula and soleal line).

4- Soleal line of the tibia

5- Middle 1/3 of medial border of tibia.

**** Insertion:** into the tendocalconeus.

**** Nerve supply:** Double nerve supply.

1- Its superficial surface, branch from the tibial nerve in the popliteal fossa.

2- Its deep surface, branch from the posterior tibial nerve in the leg.

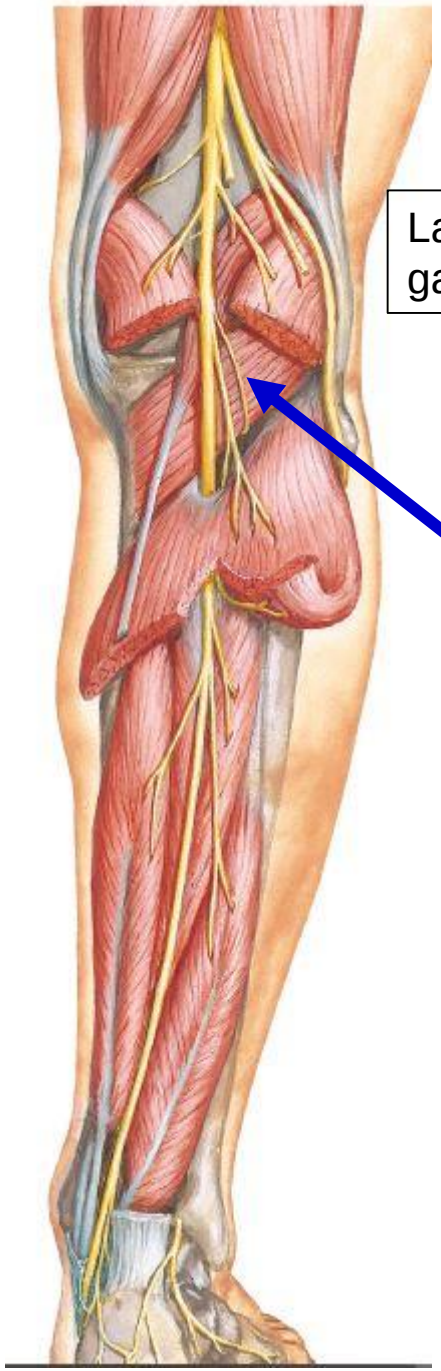
**** Action:** powerful plantar flexor of the foot (acted only on the ankle joint).

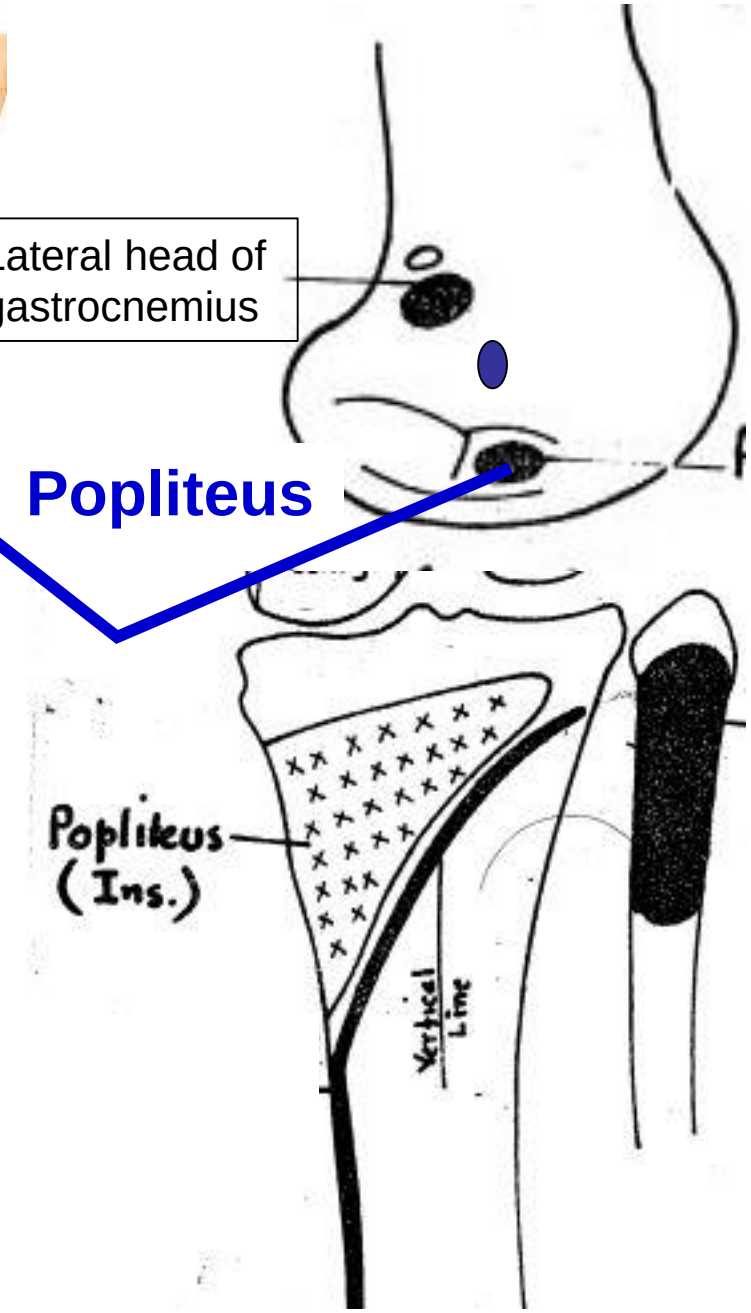
❖ Tendocalcaneus (Tendo-Achilles = Tennis player)

- It receives insertion of **Gastrocnemius, soleus and** plantaris muscles.
- It ends in the middle of the posterior surface of the calcaneus.
- Tendocalcaneus is the strongest and thickest tendon of the body.
- **Soleus** muscle has a very strong but slow action (**like 1st gear of car**).
- When movement is under way, the quicker acting **gastrocnemius** increases the speed (**like the top gear of the car**) e.g. in **running**.
- The 2 heads of gastrocnemius and soleus are called **triceps surae**.
- **The soleus muscle** contains a **rich venous plexus** which drains the superficial veins and pumps it to the deep veins against gravity (**peripheral heart**). So, it liable to **deep venous thrombosis** especially with old age, bed rest for a long time, sitting for long time, or fracture neck of femur
- Rupture of tendocalcaneus leading to walking disability and running is impossible.
- Rupture of tendon of plantaris leading to sudden and severe pain. Due to pushing a heavy item (ground) or trauma to ankle joint during stretch of plantaris (plantar flexion of ankle joint) while simultaneously keeping knee joint straight

Deep group
Posterior Compartment of the Leg

1- Tibialis posterior (Posterior Tibial nerve)
2- Flexor digitorum longus (Posterior Tibial nerve)
3- Flexor hallucis longus (Posterior Tibial nerve)
4- Popliteus (Tibial nerve)





- **PopLiteus**

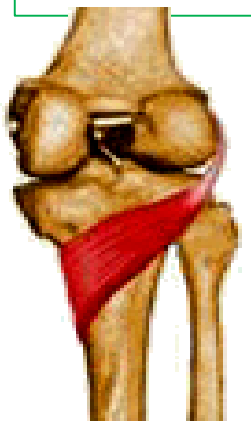
** **Origin:** groove on lateral surface of **Lateral** condyle of femur below the lateral epicondyle.

- **The muscle is intracapsular extrasynovial.**

** **Insertion:** triangular area on posterior surface of the tibia above the soleal line.

** **Nerve supply:** Tibial nerve.

- It descends superficial to the muscle and then hooks on the lower border to supply the muscle through its deep surface.



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Unlocking of knee joint

At the beginning of flexion of knee joint

Lateral rotation of femur on tibia when the foot is fixed on the ground

Or medial rotation of tibia on femur when the foot is raised from the ground

Protection of the lateral meniscus.

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- **Origin of Flexor Digitorum Longus**

** Posterior surface of the tibia below the soleal line and medial to the vertical line.

- **Origin of Flexor Hallucis Longus**

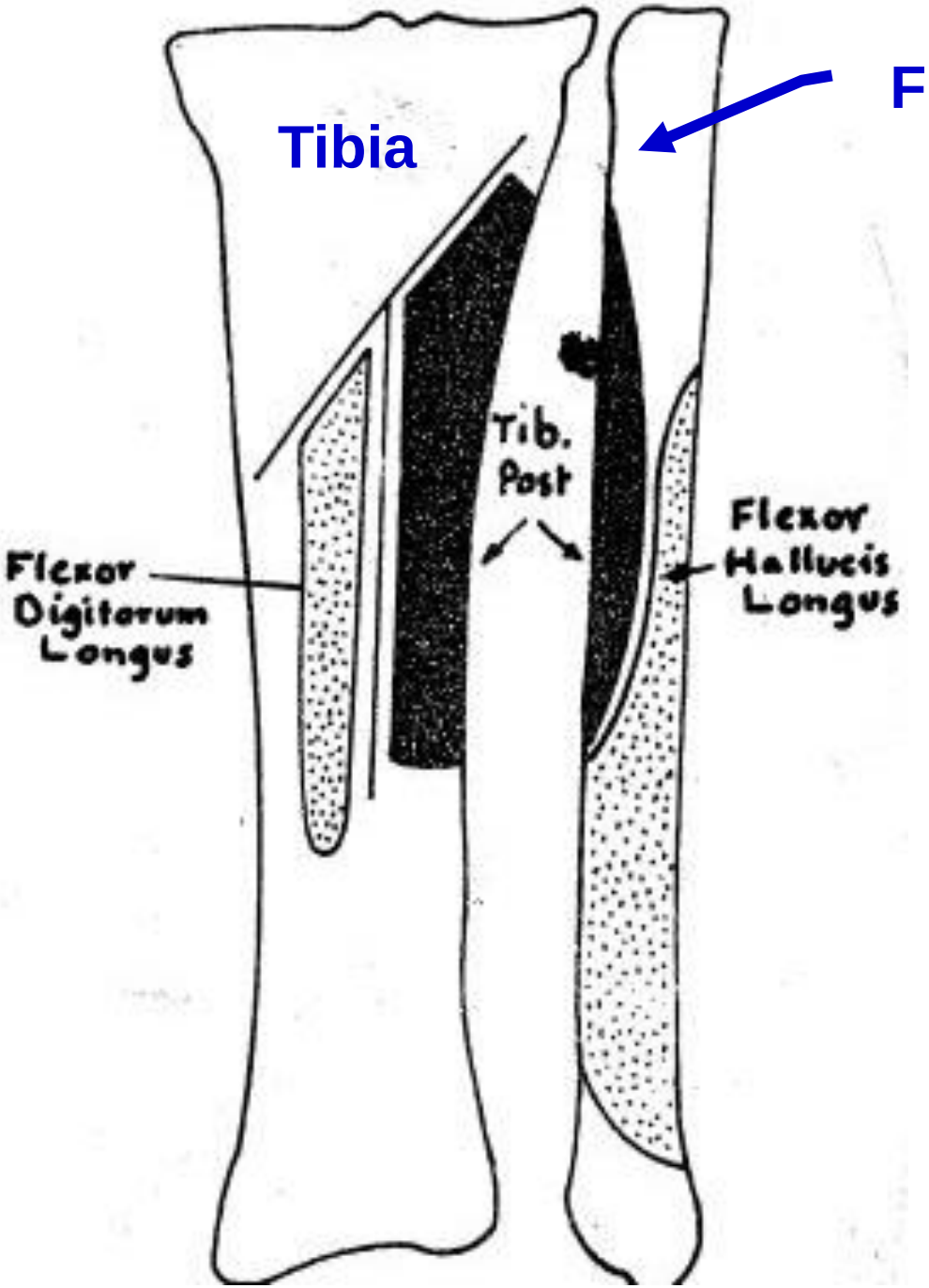
** Lower 2/3 of posterior surface of fibula lateral to the median crest.

- **Origin of Tibialis Posterior**

1- Posterior surface of tibia below soleal line and lateral to the vertical line

2- Posterior surface of fibula medial to median crest

3- Interosseus membrane.



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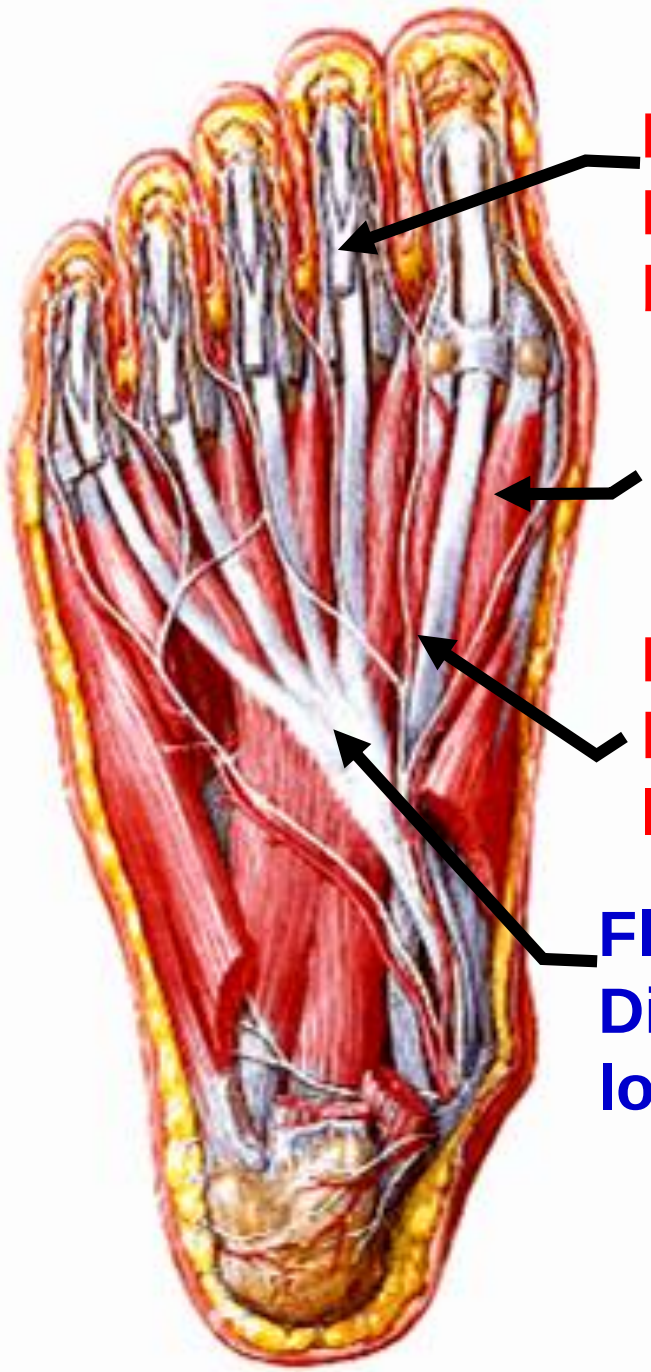

- **Insertion of Flexor Hallucis Longus:** plantar surface of terminal (distal) phalanx of **the big toe (hallux)** (Flexor hallucis brevis splits into lateral and medial to allow the passage of FHL)
- **Insertion of Flexor Digitorum Longus**

- They divide into 4 tendons which are **inserted into** plantar surface of the **distal (terminal) phalanges** of the **lateral 4 toes.**

- Each tendon passing through an opening in corresponding tendon of **Flexor digitorum brevis** opposite the proximal phalanx.

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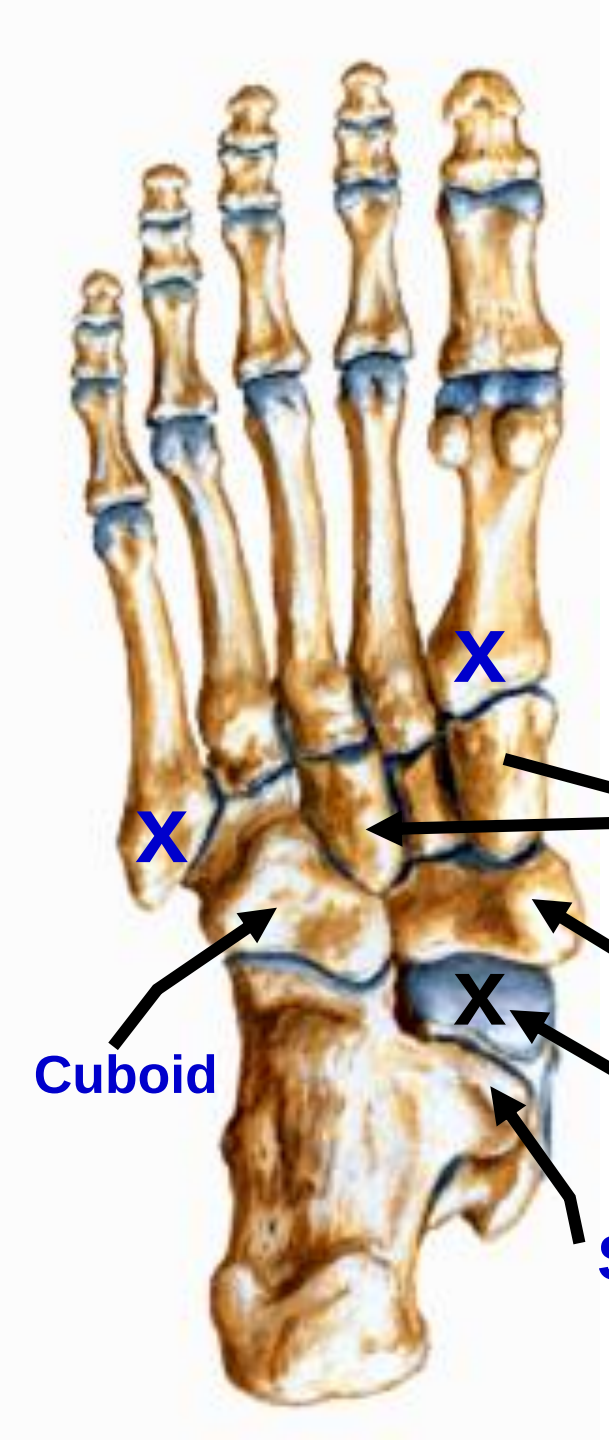

- **Insertion of Tibialis Posterior**

- It divided into 2 slips:

A- Medial slip to the tuberosity of navicular bone (**main insertion**).

B- Lateral slip divided into several slips to**:**

1- All tarsal bones **except** talus.

2- Bases of all metatarsal bones **except** the first and the 5th metatarsal bones.

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- ** Actions of Flexor Hallucis Longus

1- Plantar flexion of the foot.

2- Inversion of the foot.

3- Supporting the longitudinal arch of the foot

4- Flexion of all Joints of the big toe.

- ** Actions of Flexor Digitorum Longus

1- Plantar flexion of the foot.

2- Inversion of the foot.

3- Supporting the longitudinal arch of the foot.

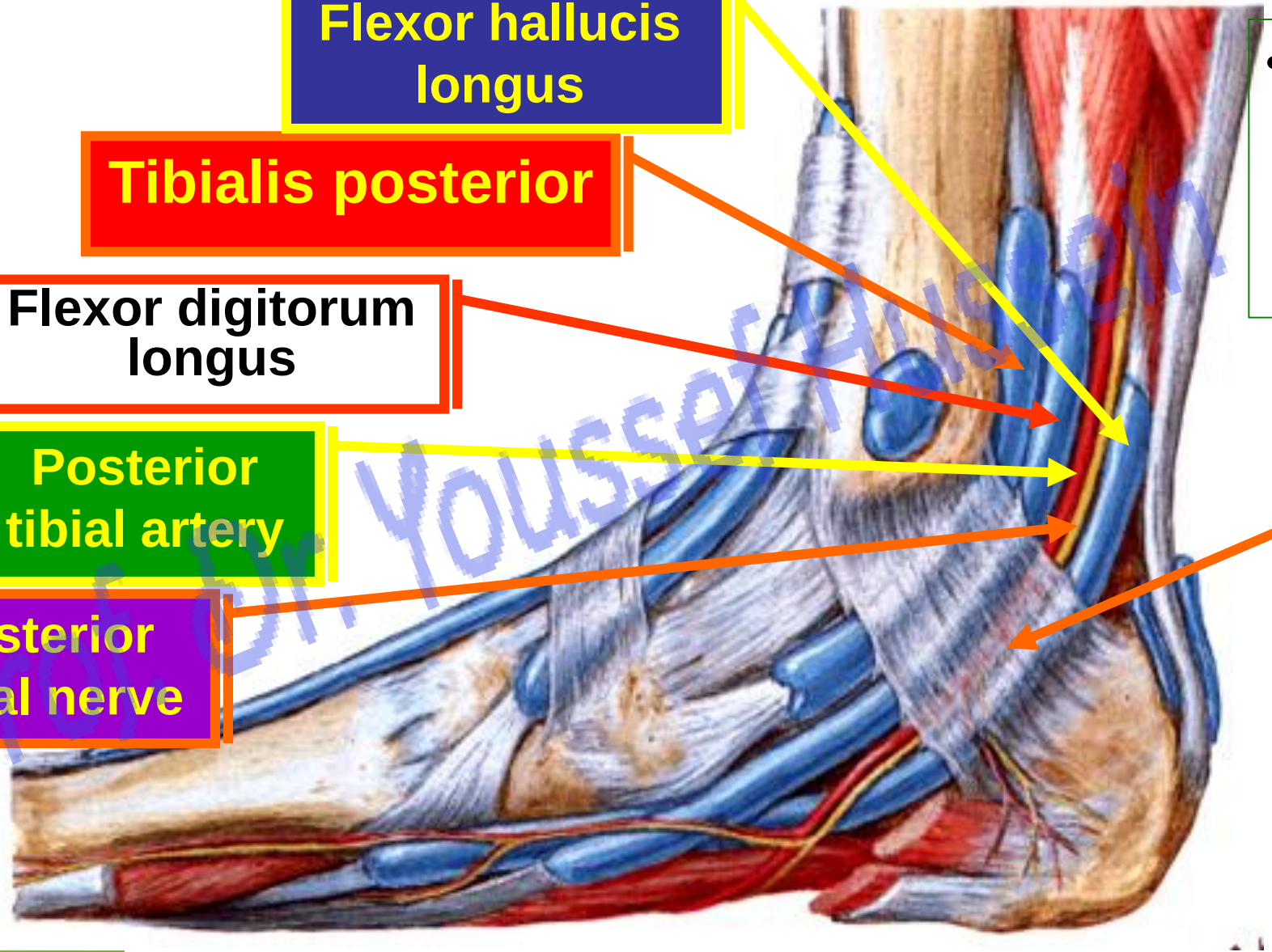
4- Flexion of all joints of the lateral 4 toes.

- ** Actions of Tibialis Posterior

1- Plantar flexion of the foot.

2- Inversion of the foot.

3- Supporting the longitudinal arch of the foot.



Flexor hallucis longus

Tibialis posterior

Flexor digitorum longus

Posterior tibial artery

Posterior Tibial nerve

- The structures deep to flexor retinaculum arranged form medial to lateral

Flexor retinaculum

Tom Designs Very Nice House

- **Injury of tibial nerve**

- The tibial nerve is **less frequently injured.**

A- Motor effects; leads to

1- Paralysis of muscles of the posterior compartment of the leg.

- **Deformity**, **Talipes calcaneovalgus** (dorsiflexion and eversion of the foot).

2- Paralysis of the muscles of the sole of the foot (**clawing of the toes**).

B- Sensory effects; Numbness, tingling, pain, then

1- Loss of cutaneous sensations on back of leg.

2- Loss of cutaneous sensations on sole of the foot (**trophic ulcer**).

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