

وسهلا

أهلا

يُمنع أخذ السلايدات بدون  
إذن المحرر واي اجراء  
يخالف ذلك يقع تحت  
طائلة المسؤولية القانونية



# 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

دكتورة من جامعة كولونيا المانيا

جروب الفيس د. يوسف حسين (استاذ التشريح)

Prof. Dr. Youssef Hussein Anatomy - YouTube

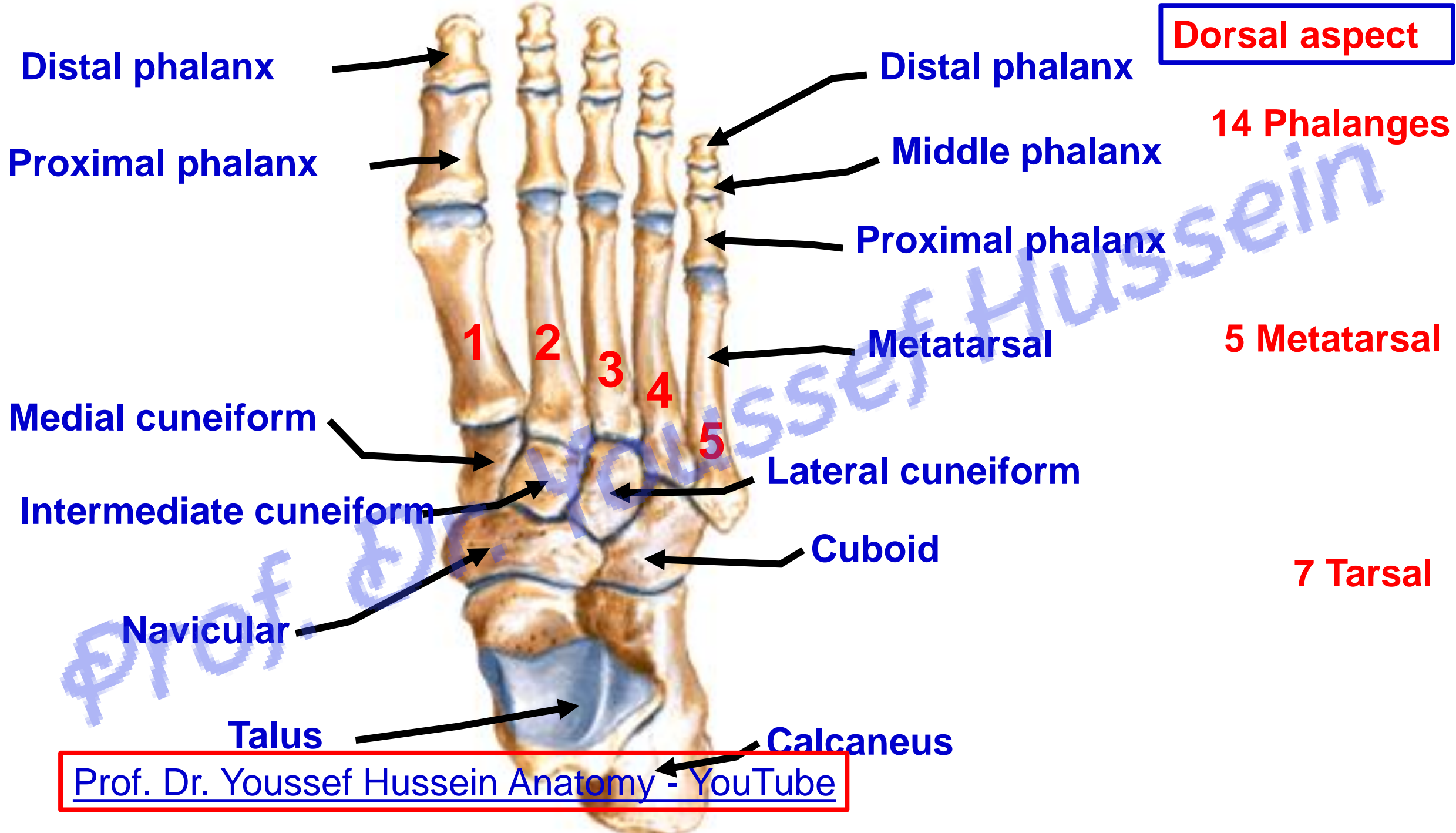
اليوتيوب د. يوسف حسين

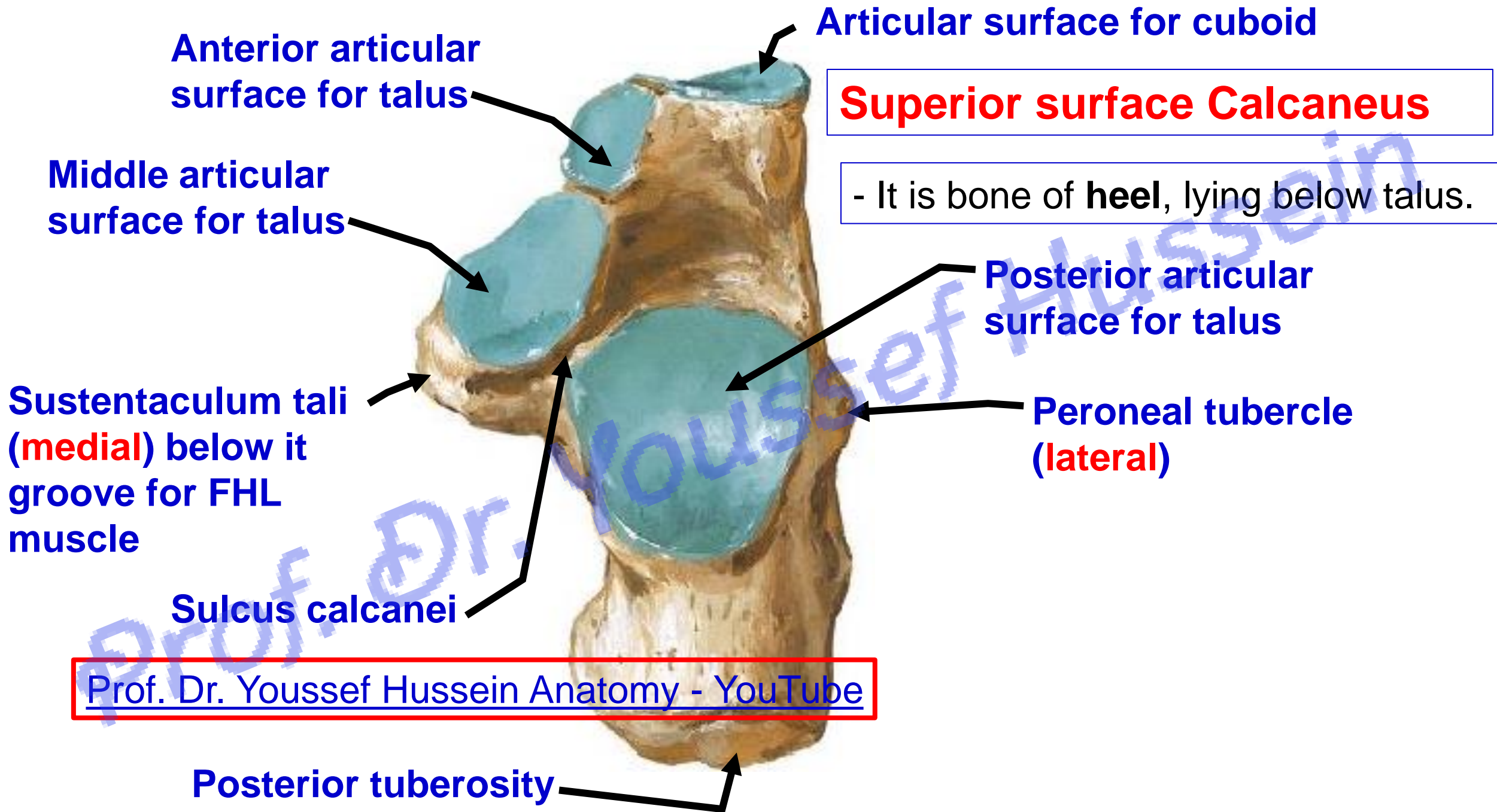
<https://www.youtube.com/@ProfDrYoussefHusseinAnatomy/playlists>



# Bones of the foot

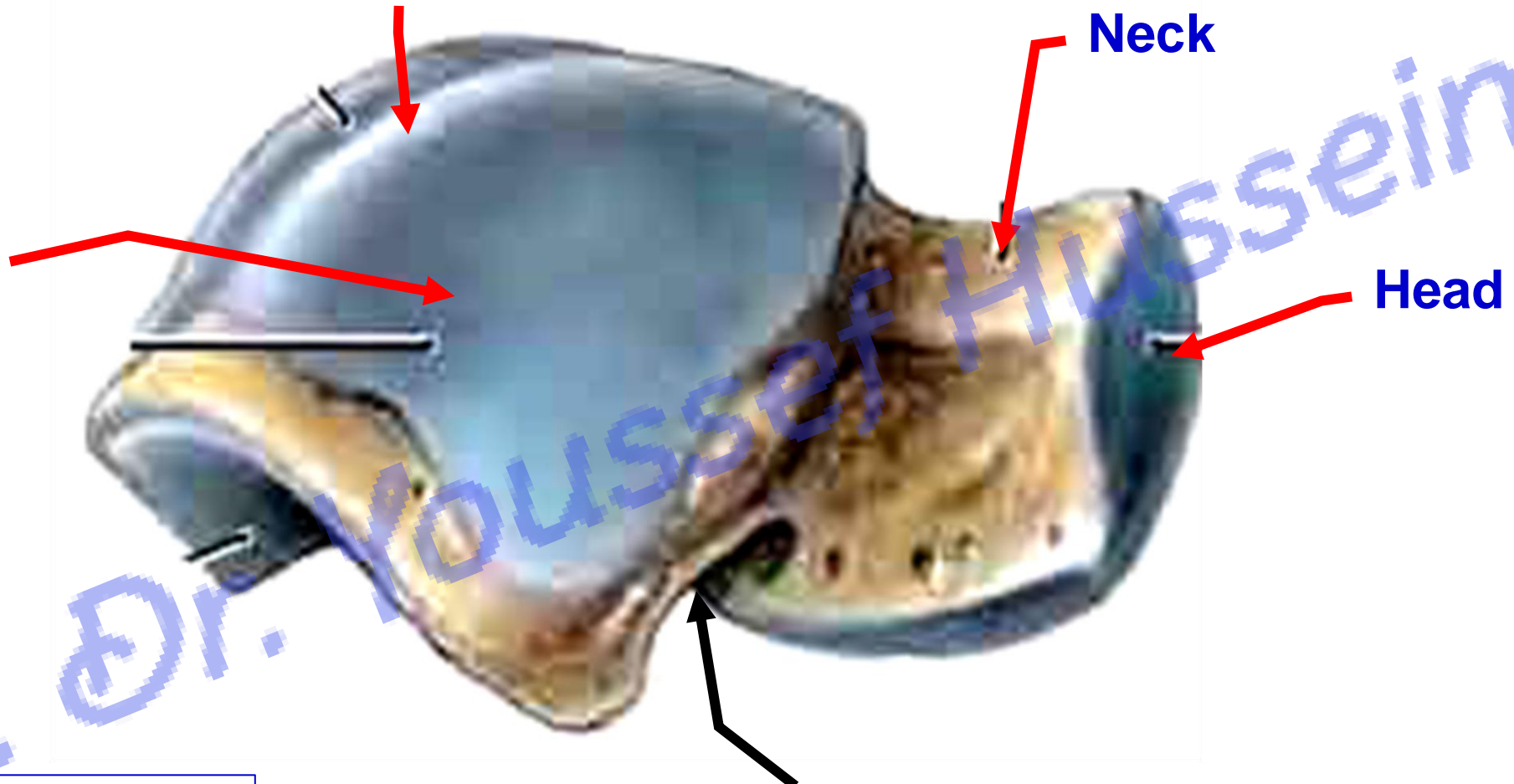
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**Talus**

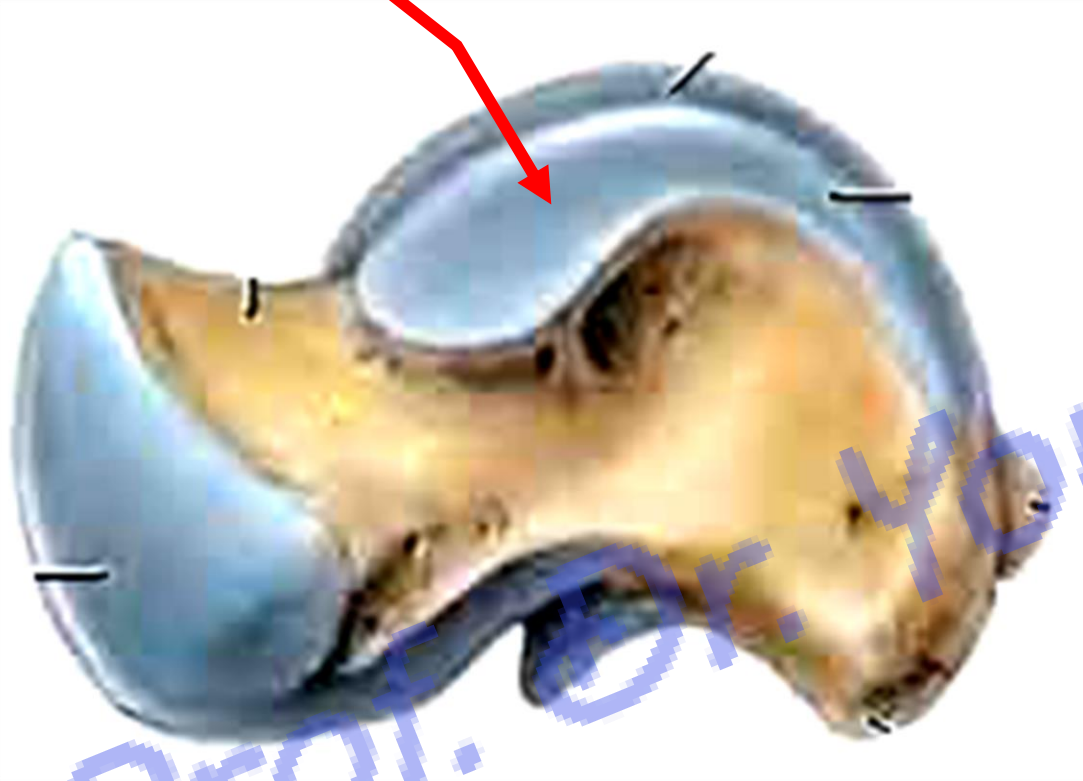
**Triangle** shape articulates with **lateral malleolus** of fibula



- **The talus does not give attachment to muscles**

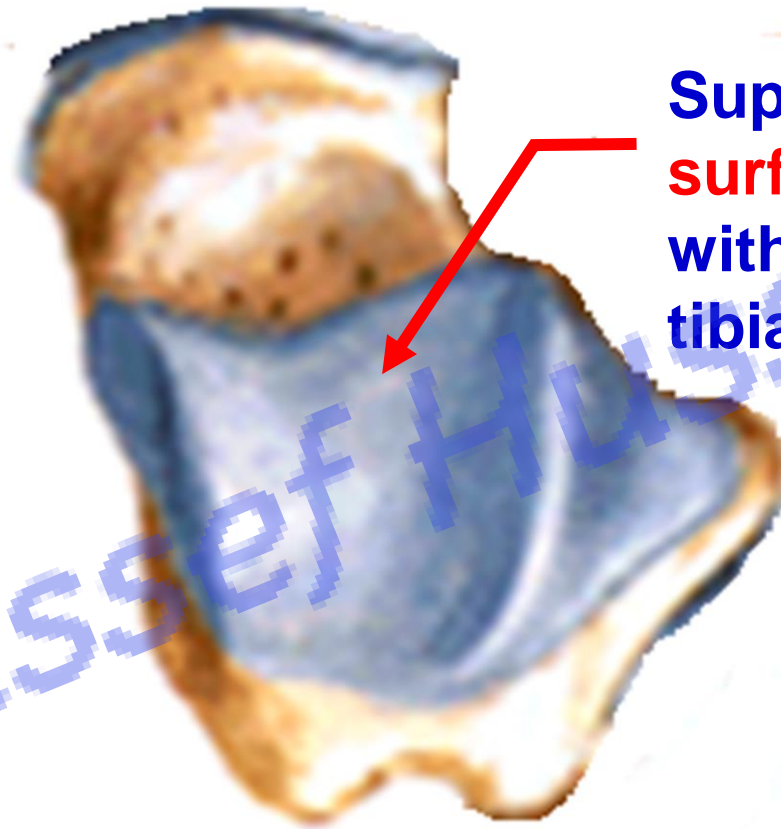
**Sulcus tali below neck**

**Coma** shape articulates with **medial** malleolus of tibia



**Talus**

Superior trochlear **surface** articulates with lower end of tibia





- **Navicular Bone**

- Its **posterior surface**, oval concave articular surface articulates with **head of talus**.
- Its **anterior surface** is convex and divided into **three articular facets which articulate with cuneiform bones**.
- The **medial surface** forms **tuberosity** of navicular which receives the main insertion of the **tibialis posterior**.

- **Cuneiform bones**

- These are 3 wedge-shaped bones arranged as medial, intermediate and lateral.

- **Cuboid bone**

- Its **plantar** surface presents oblique **groove for the tendon of peroneus longus**.

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# Arches of the foot

Prof. Dr. Youssef Hussein

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- **Arches of the Foot**

- The skeleton of the foot is built up in an arched form.

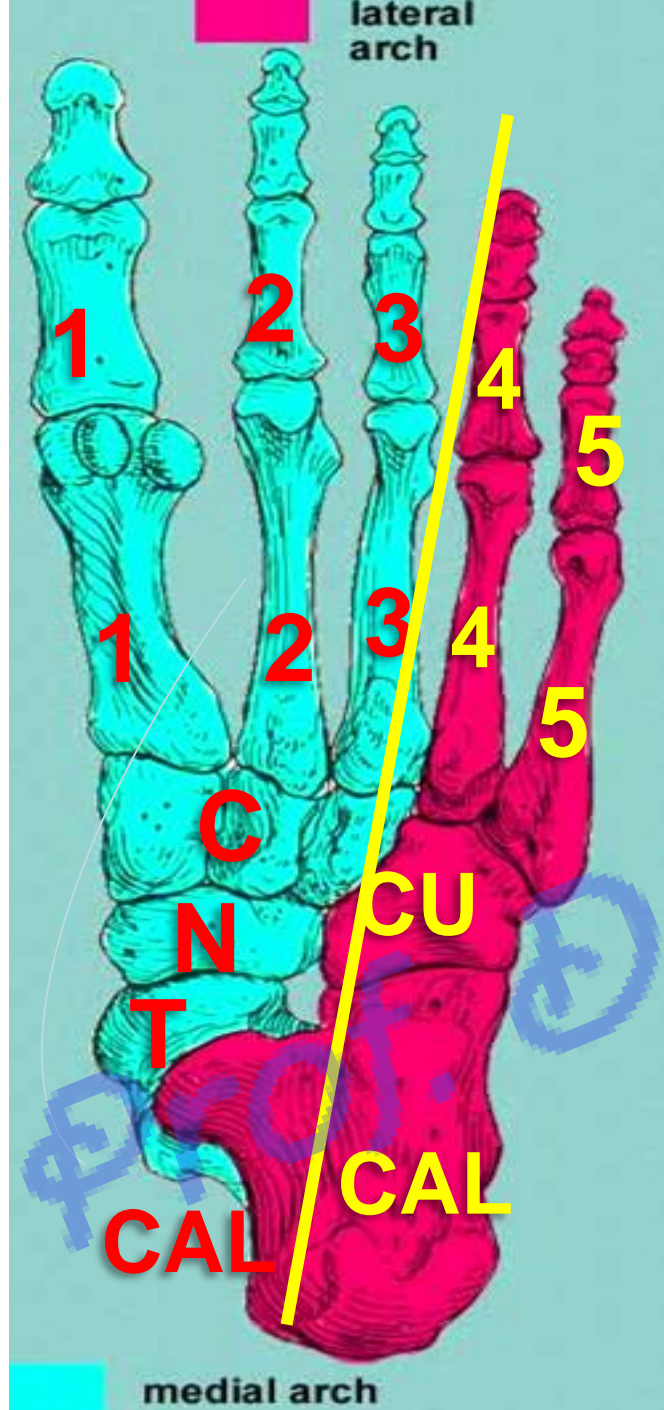
**\*\* Functions;**

**1- Distribution of the body weight** on the bones of the foot.

**2- Protection of the structures in the sole of the foot** especially plantar nerves, vessels and muscles.

**3- Absorption of shock** in falling and jumping.

**4- Act as lever** as it propels the body forward in walking and running.



- **Longitudinal arch:**

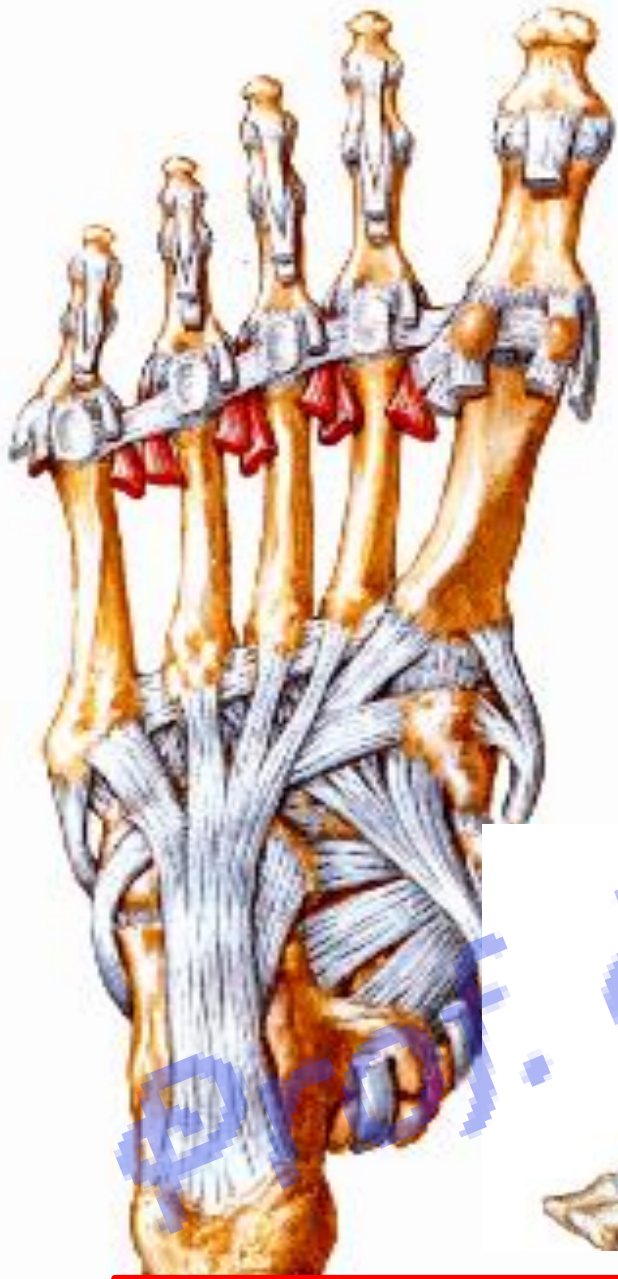
**1- Medial longitudinal arch:** is formed by

- **3 bones:** calcaneus العقب, talus القعب & navicular الزورقي.
- **3 cuneiform** الاسفيني bones.
- **3 medial metatarsal** المشطيات bones
- **Phalangeal bones of the medial 3 toes.**

**2- Lateral longitudinal arch:** is formed of

- **2 bones:** calcaneus and cuboid المكعب.
- **2 lateral metatarsal bones**
- **Phalangeal bones of the lateral 2 toes.**

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### 1- Medial longitudinal arch:

- It is **higher** than the lateral.
- **Posterior pillar** ركيزة medial tubercle of the calcaneus.
- **Anterior pillar**, head of the 1st metatarsal bone.
- **Summit** (highest point), talus.

### 2- Lateral longitudinal arch:

- **Posterior pillar** ركيزة, lateral tubercle of the calcaneus.
- **Anterior pillar**, head of the 5th metatarsal bone.





- **Transverse arch:**

- It is formed of:

**a- Proximal:** cuboid and three cuneiform bones.

**b- Distal:** bases of the metatarsal bones.

**Base of  
Metatarsal bones**

**Cuboid**

**Cuneiform**

## **\*\* Factors supporting the arches of the foot;**

**1- Shape of the bones.**

**2- Plantar aponeurosis**

**3- Muscles**

**A. Muscles support the longitudinal arch:**

- 1- Flexor digitorum longus and flexor hallucis longus.
- 2- Tendons of tibialis anterior and posterior.
- 3- Short muscles of the sole of the foot

**B. Muscles support the transverse arch**

- 1- Peroneus longus.
- 2- Transverse head of adductor hallucis

**4- Ligaments;**

- a- Deltoid ligament.
- b- Spring ligament.
- c- Short and Long plantar ligaments.
- d- Superficial and deep transverse metatarsal ligaments

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## • Plantar Aponeurosis

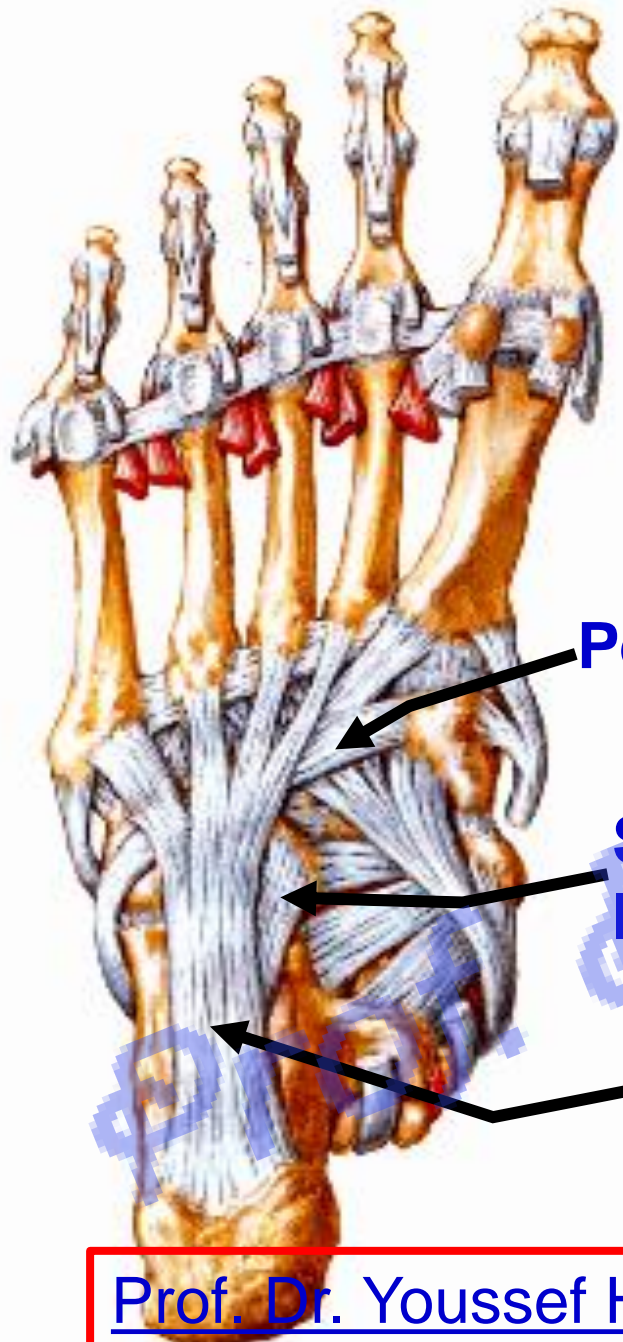
- It is a thickening of the deep fascia of the sole of the foot.

### \*\* Attachment;

- **Posteriorly** (apex) to the both tubercles of the calcaneus.
- **Anteriorly**, (base) it becomes wider and divides into **5 slips** to:
  - Bases of the proximal phalanges of the toes.
  - Transverse metatarsal ligament.
  - Fibrous flexor sheath.

### \*\* Functions of the plantar aponeurosis,

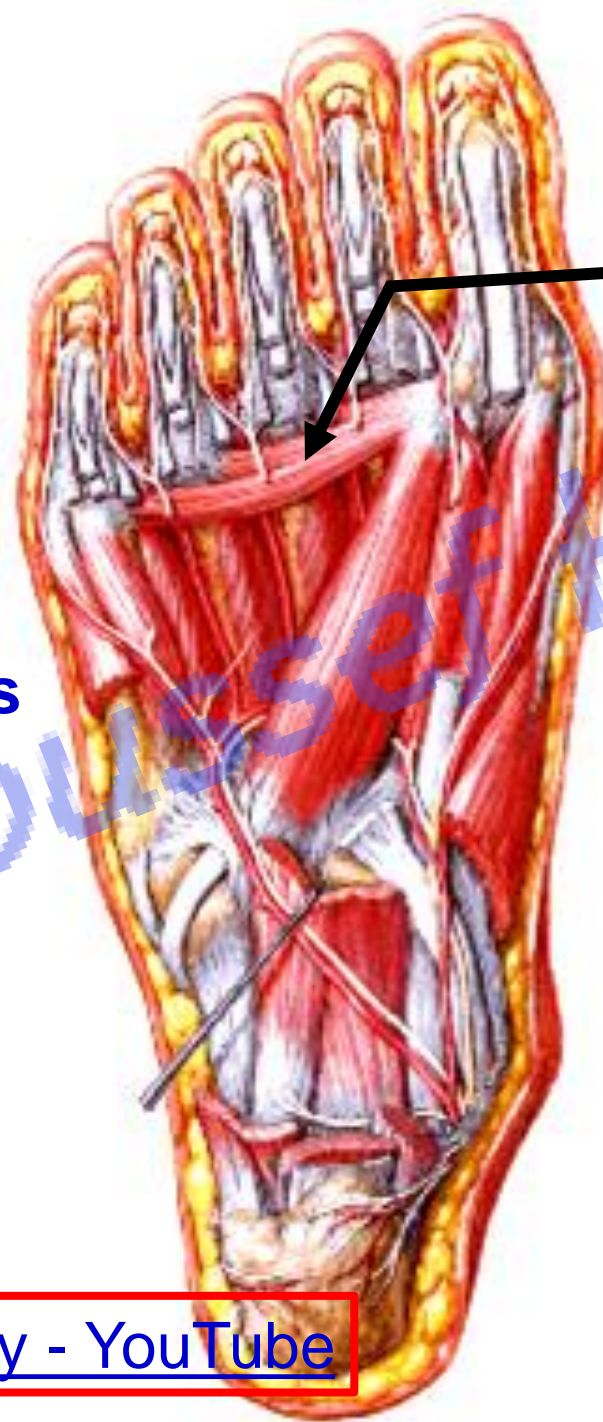
- 1- Protracts the deeper structures
- 2- Gives origin to the muscles of the first layer.
- 3- Helps in maintaining the longitudinal arches of the foot.



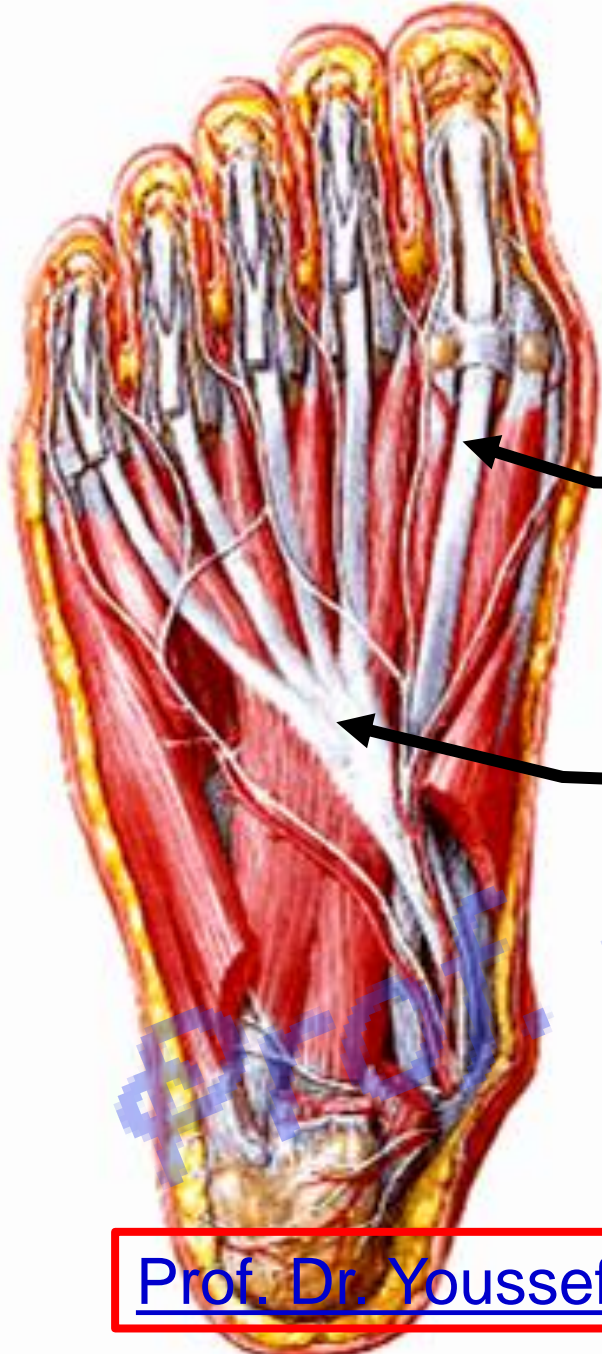
**Peroneus longus**

**Short plantar ligament**

**Long plantar ligament**



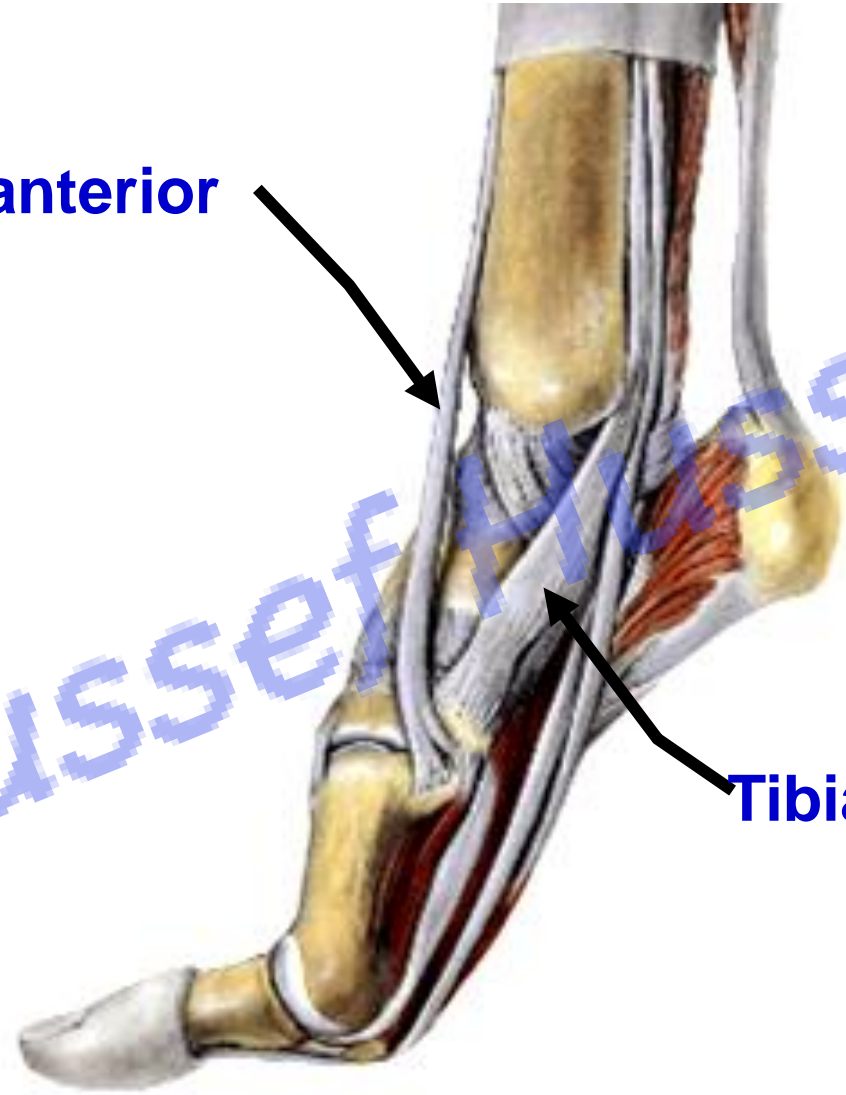
**Transverse head of adductor hallucis**



**Flexor hallucis longus**

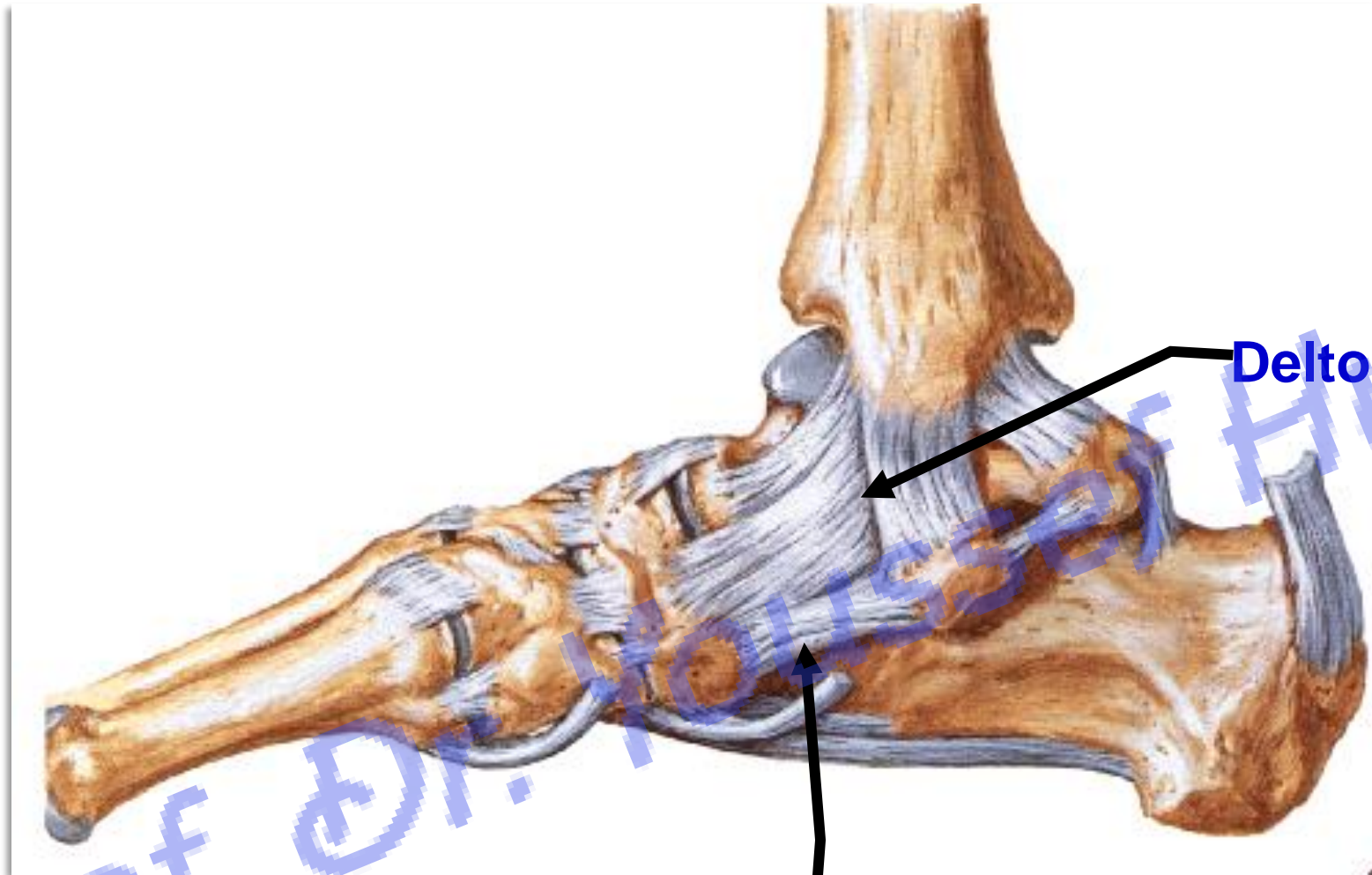
**Flexor Digitorum longus**

**Tibialis anterior**



**Tibialis posterior**





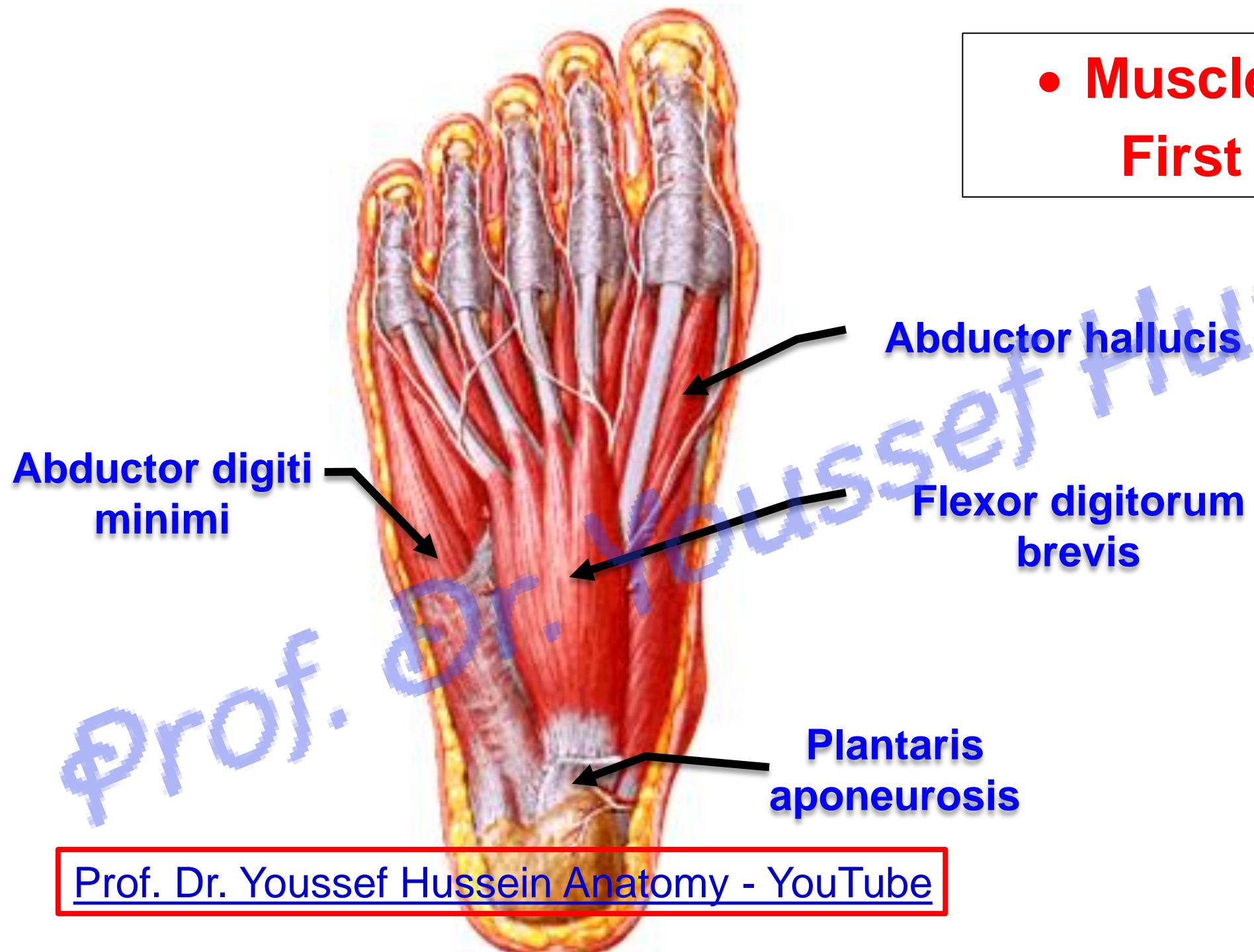
Deltoid ligament

Spring ligament

# Sole of the foot

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• **Muscles of the First Layer**



**Abductor hallucis**

**Abductor digiti minimi**

**Flexor digitorum brevis**

**Plantaris aponeurosis**



- **1- Abductor Hallucis (medial)**

\*\* **Origin:** from the medial tubercle of calcaneus.

\*\* **Insertion:** into the medial side of the base of the proximal phalanx of the big toe.

\*\* **Nerve supply;** medial plantar nerve.

\*\* **Actions:** Abduction of the big toe.

- **3- Abductor digiti minimi (lateral)**

\*\* **Origin;** from both medial and lateral tubercles of the calcaneus.

\*\* **Insertion;** into the lateral side of the base of the proximal phalanx of the little toe.

\*\* **Nerve supply,** lateral plantar nerve.

\*\* **Action:** Abduction of the little toe.



## 2- Flexor digitorum brevis (middle)

\*\* **Origin;** from the medial tubercle of calcaneus.

\*\* **Insertion;** It divides into 4 tendons to the margins of the **middle phalanges** of the lateral 4 toes.

- Each tendon splits to give passage for a tendon of the flexor digitorum longus inserted into distal phalanges.

\*\* **Nerve supply,** medial plantar nerve.

\*\* **Actions,** Flexion of the metatarsophalangeal and **proximal interphalangeal** joints of the lateral four toes.

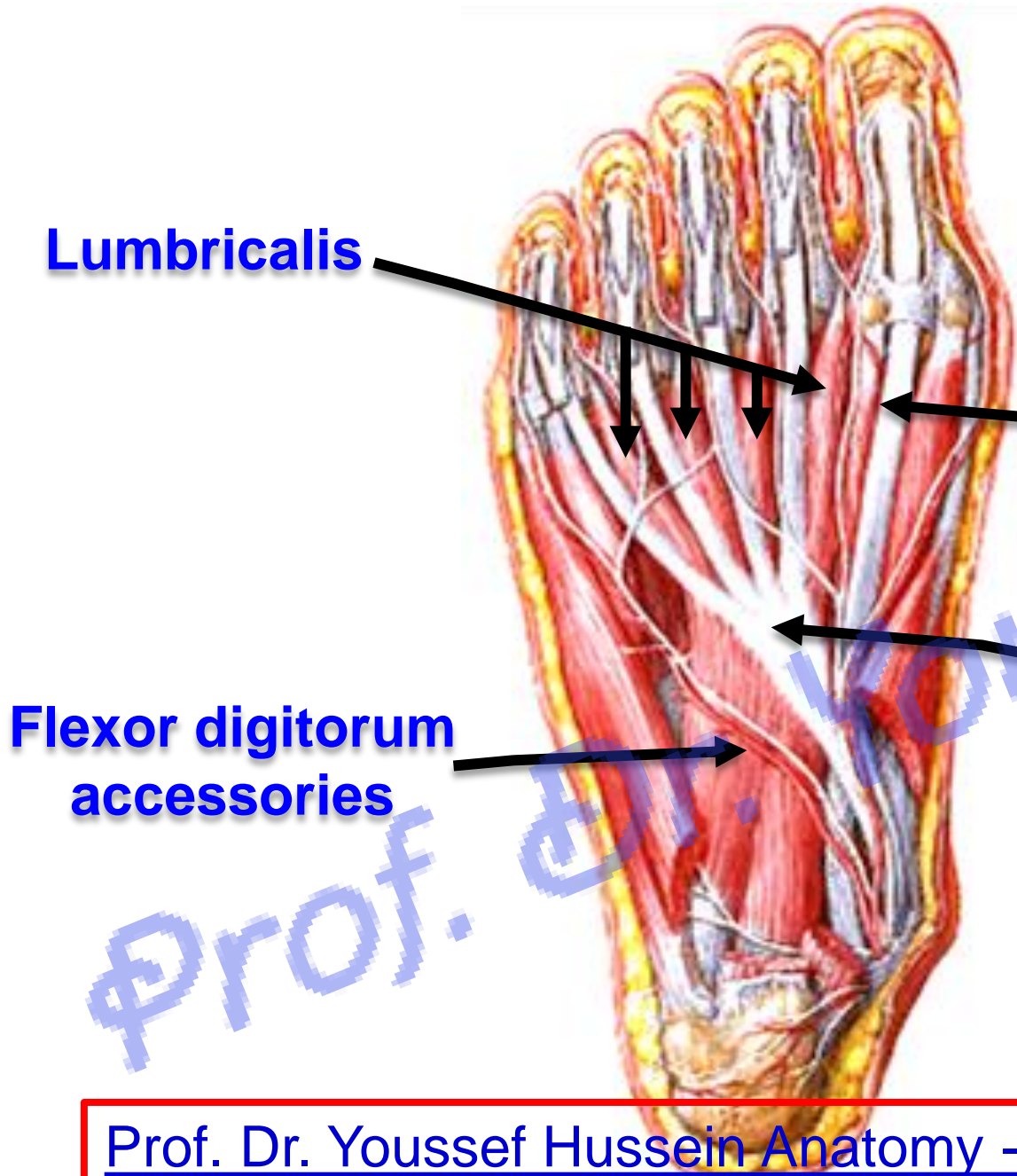
• **The second Layer**

**Lumbricalis**

**Tendon of flexor  
hallucis longus**

**Tendon of flexor  
digitorum longus**

**Flexor digitorum  
accessories**



## • The second Layer

### 1- Flexor digitorum accessorius

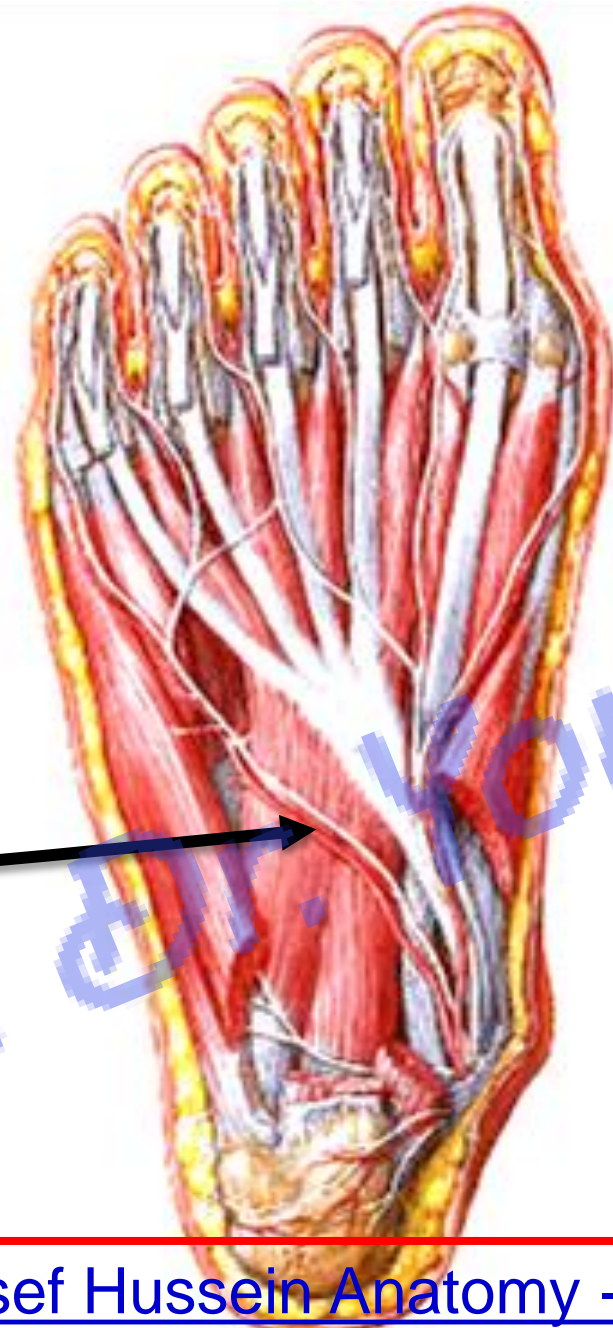
\*\* **Origin;** by two heads from the medial and plantar surfaces of the calcaneus.

\*\* **Insertion;** into the tendon of flexor digitorum longus.

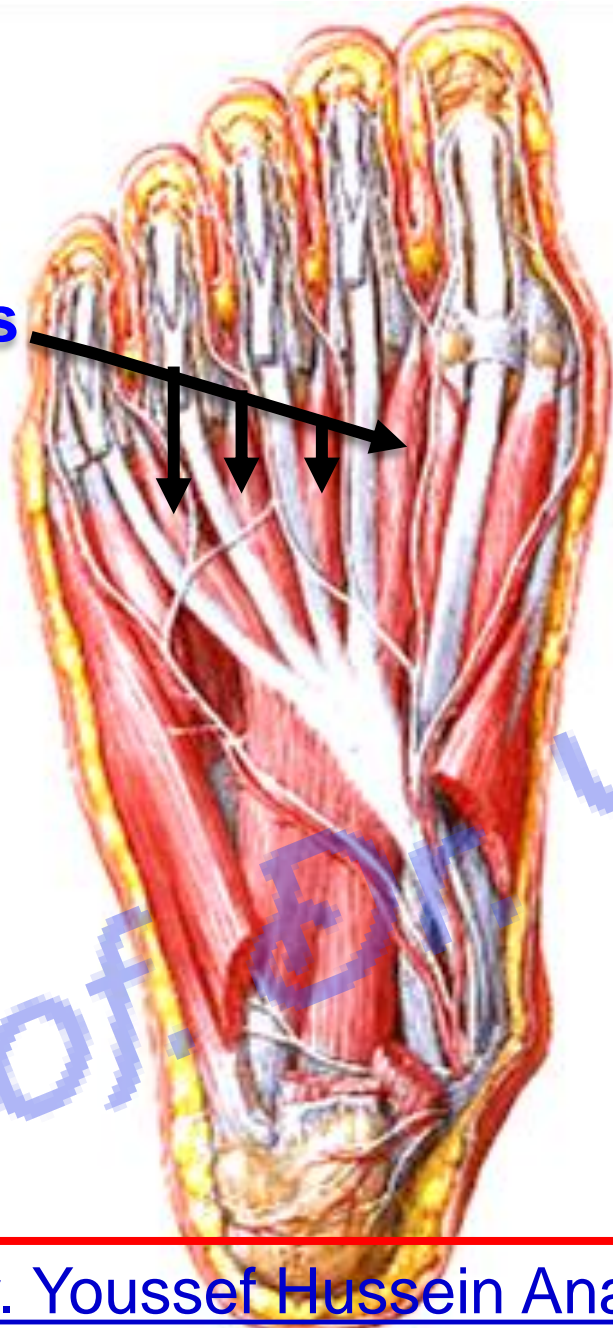
\*\* **Nerve supply,** lateral plantar nerve.

\*\* **Action;** it helps in the action of flexor digitorum longus (brings the tendons of muscle more in a straight line with the toes).

Flexor digitorum  
accessories



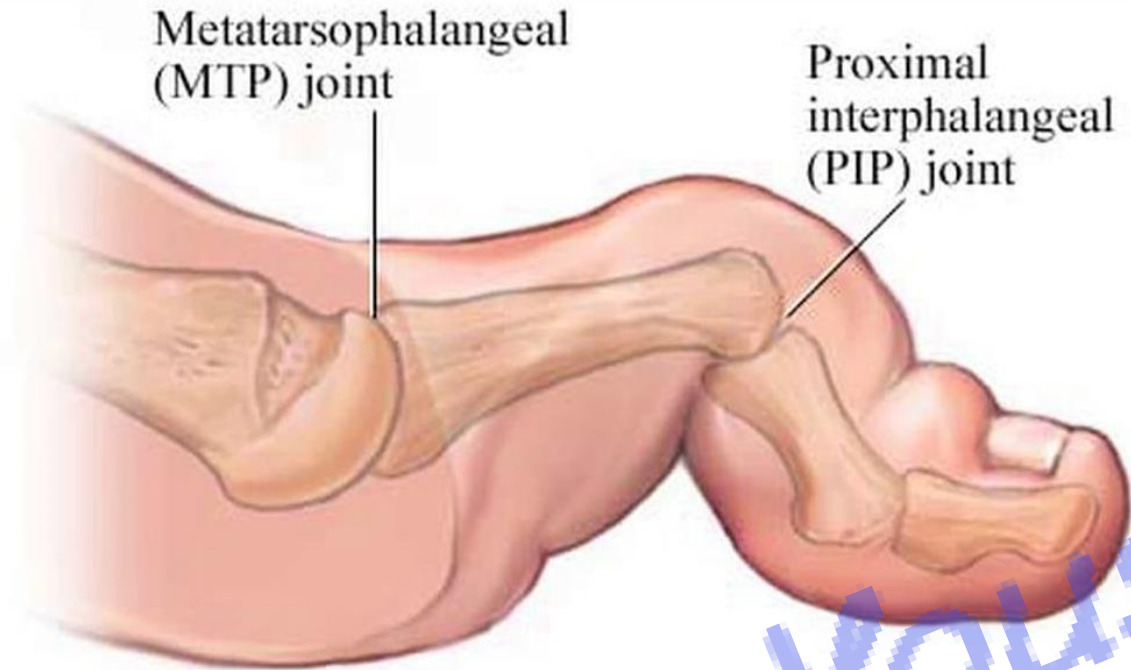
**Lumbricalis**



## 2 - Lumbrical muscles (4 muscles)

- \*\* **Origin;** from tendons of the flexor digitorum longus.
  - They arranged 1st to 4th from medial to lateral side.
- \*\* **Insertion;** base of proximal phalanges and extensor expansions of the lateral 4 toes.
- \*\* **Nerve supply;**
  - 1- The 1st is supplied by medial plantar nerve.
  - 2- The lateral 3 are supplied by lateral plantar nerve.
- \*\* **Actions;**
  - 1- Flexion of metatarsophalangeal joints of lateral 4 toes.
  - 2- Extension of interphalangeal joints of lateral 4 toes.





- **Paralysis of lumbricals** muscles will lead to **Hammer toes (only lateral 4 toes)**
- **Extension** of metatarsophalangeal joint
- **Flexion** of proximal interphalangeal joint.

• **The third Layer**

**Flexor digiti  
minimi brevis**

**Medial head of flexor  
hallucis brevis**

**Lateral head of flexor  
hallucis brevis**

**Transverse head of  
adductor hallucis**

**Oblique head of  
adductor hallucis**

- **Flexor hallucis brevis (medial)**

\*\* **Origin;** from the cuboid bone and the tendon of tibialis posterior.

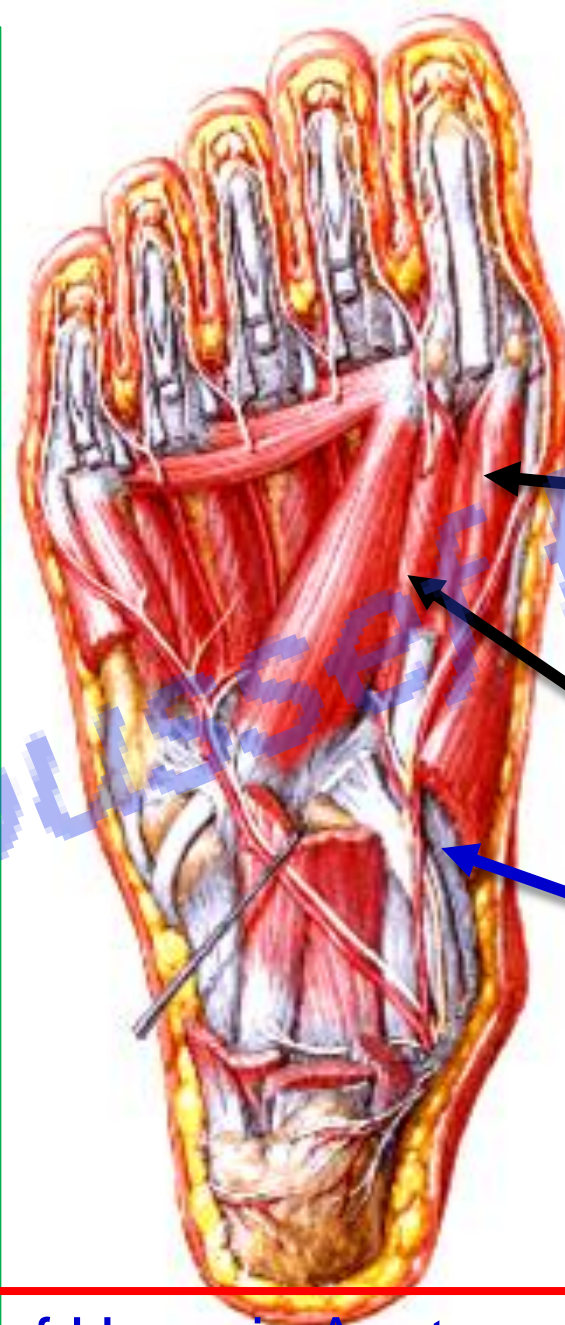
\*\* **Insertion;** It divides into 2 parts.

a- **Medial part** inserted with **abductor** hallucis into **medial** side of base of proximal phalanx of big toe.

b- **Lateral part** inserted with **adductor** hallucis into **lateral** side of base of proximal phalanx of big toe.

\*\* **Nerve supply;** medial plantar nerve.

\*\* **Action;** flexion of the big toe.



- **The third Layer**

Medial head of flexor hallucis brevis

Lateral head of flexor hallucis brevis

Tendon of tibialis posterior

## 2- Adductor hallucis (middle)

**\*\* Origin; by 2 heads**

**a- Transverse head** from the plantar ligaments of the metatarsophalangeal joints.

**b- Oblique head** arises from bases of the 2nd, 3rd and 4th metatarsal bones and from fibrous sheath covering the tendon of peroneus longus.

**\*\* Insertion;** with the **lateral part of flexor hallucis brevis** into the **lateral side** of the base of the proximal phalanx of big toe.

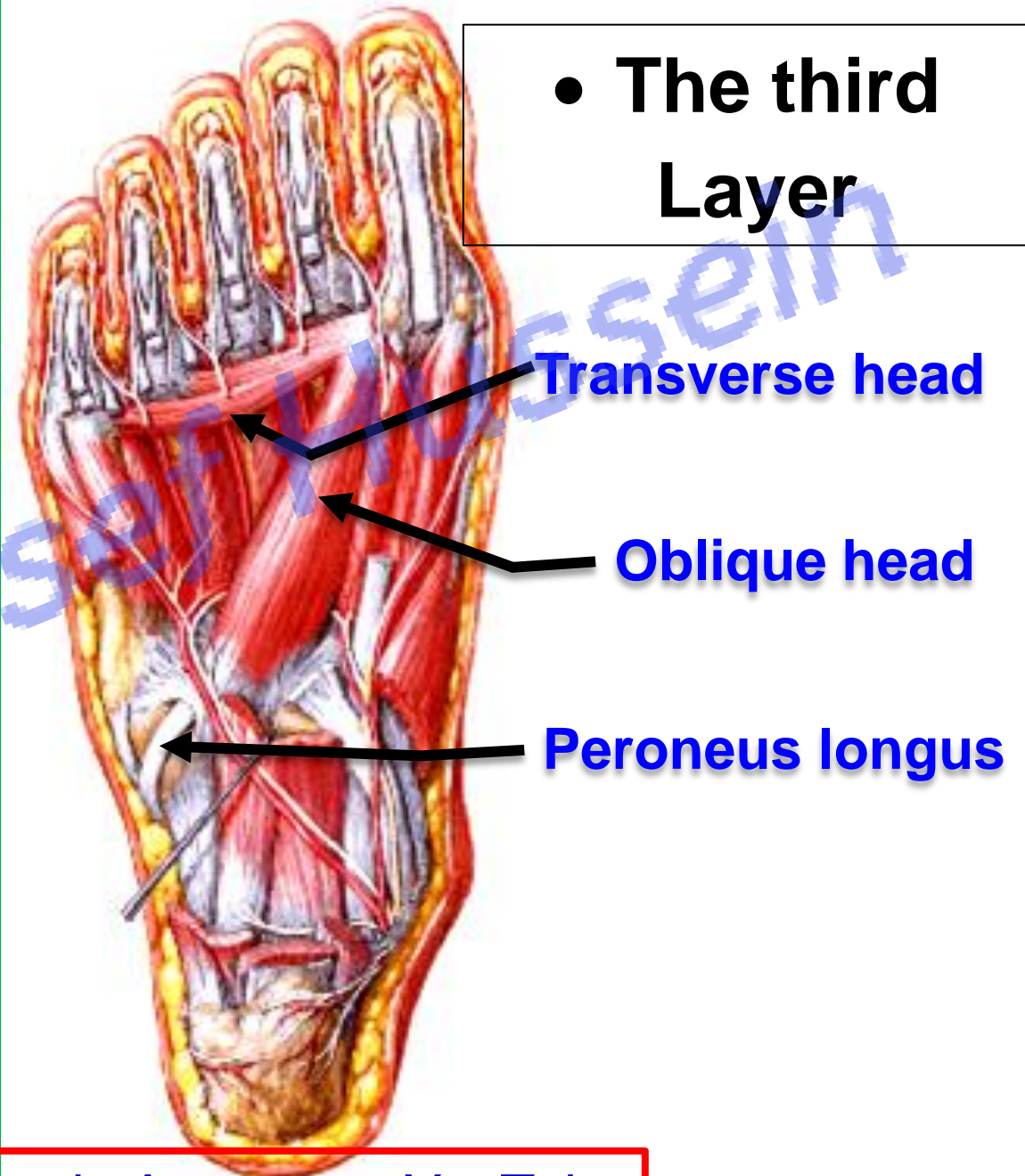
**\*\* Nerve supply;** lateral plantar nerve.

**\*\* Actions;**

**a- Oblique head:** adduction of big toe.

**b- Transverse head:** supporting the

transverse arch of the foot. [Prof. Dr. Youssef Hussein Anatomy - YouTube](#)

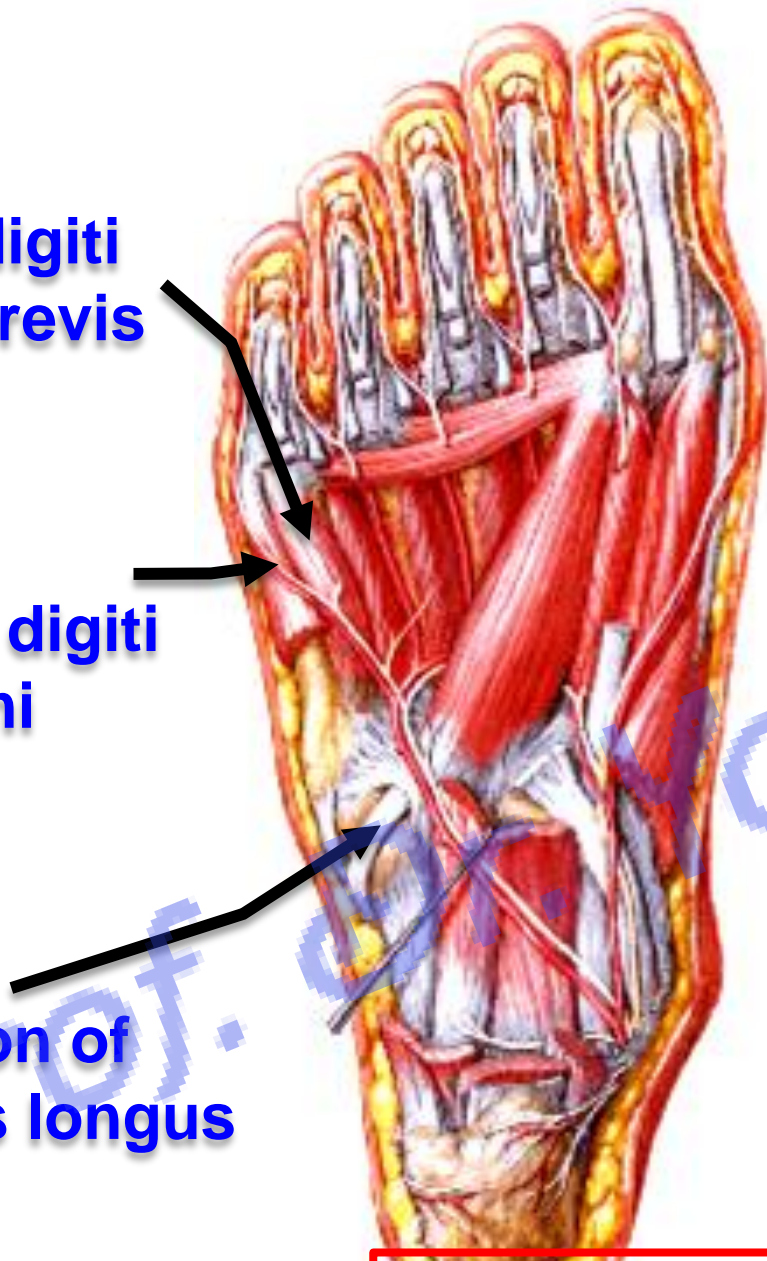


## • The third Layer

**Flexor digiti  
minimi brevis**

**Abductor digiti  
minimi**

**Tendon of  
peroneus longus**



### • **Flexor digiti minimi brevis (lateral)**

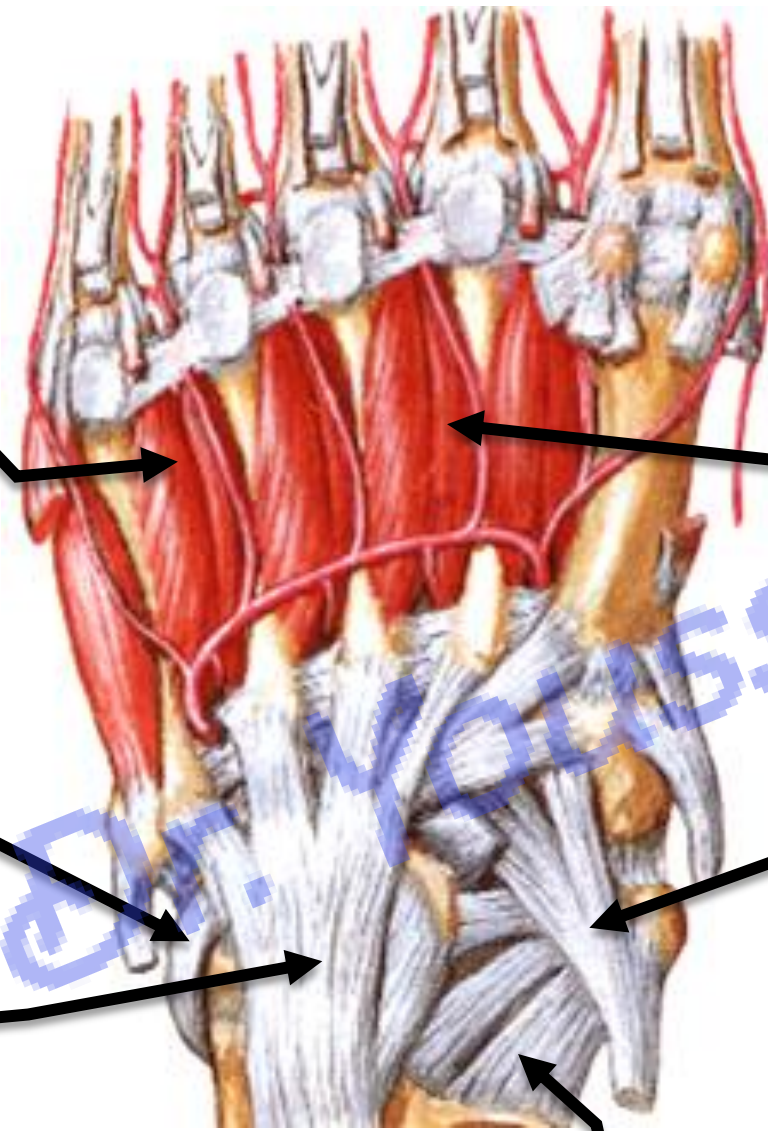
\*\* **Origin**; from the plantar surface of the base of the 5th metatarsal bone and the fibrous sheath of the tendon of peroneus longus.

\*\* **Insertion**, with the **abductor digiti minimi** into the **lateral side** of the base of the proximal phalanx of the little toe.

\*\* **Nerve supply**; lateral plantar nerve.

\*\* **Action**; flexion of the little toe.

• The fourth Layer



Plantar interossei  
(3 muscles)

Dorsal interossei  
(4 muscles)

Tendon of  
peroneus longus

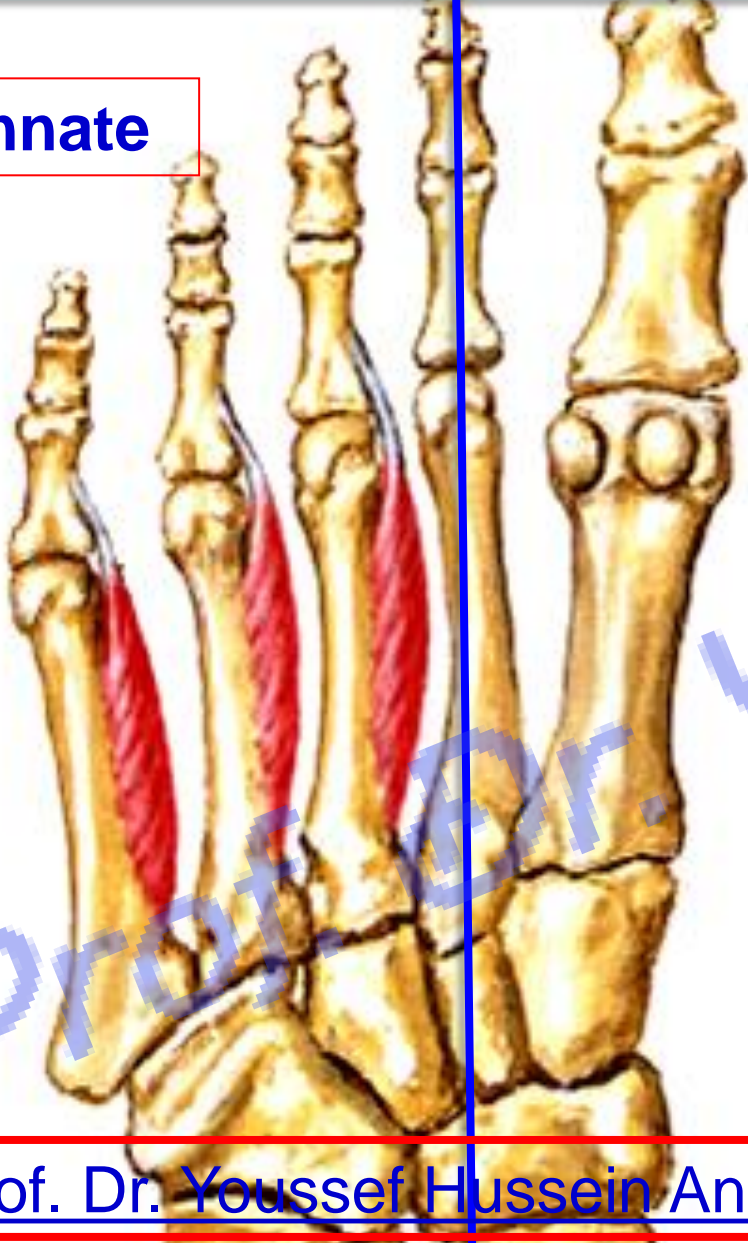
Tendon of Tibialis  
posterior

Long plantar  
ligament

Spring ligament

# Plantar interossei

Unipennate



- **Plantar interossei (3 muscles)**

\*\* **Origin**; from the shafts of the 3<sup>rd</sup>, 4<sup>th</sup> and 5<sup>th</sup> metatarsal bones.

\*\* **Insertion**; base of the **medial side** of the proximal phalanx of the 3<sup>rd</sup>, 4<sup>th</sup> and 5<sup>th</sup> toes.

\*\* **Nerve supply**, lateral plantar nerve.

\*\* **Action**; Adduction of the lateral 3 toes (the 2<sup>nd</sup> toe is the axis of the foot).

- **Dorsal interossei ( 4 muscles)**

**\*\* Origin,** from the adjacent sides of the two metatarsal bones.

**\*\* Insertion;**

- **The 1st muscle** into the **medial side** of the base of the proximal phalanx of the **2nd toe** and extensor expansion.
- **The 2nd muscle** into the **lateral side** of the base of the proximal phalanx of the **2nd toe** and extensor expansion.
- **The 3rd muscle** into the **lateral side** of the base of the proximal phalanx of the **3rd toe** and extensor expansion.
- **The 4th muscle** into the **lateral side** of the base of the proximal phalanx of the **4th toe** and extensor expansion.

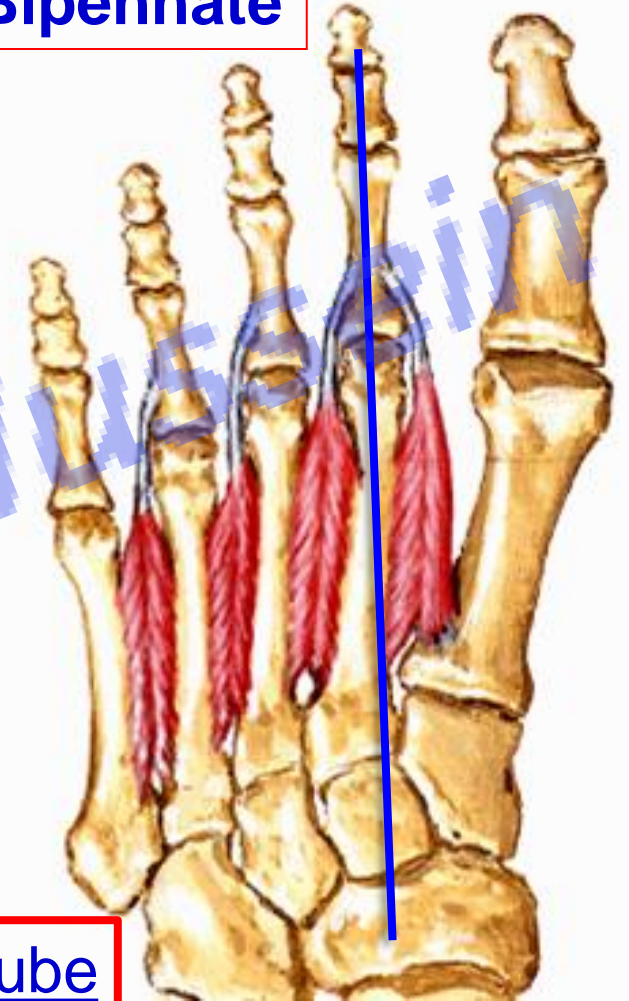
**\*\* Nerve supply;** lateral plantar nerve.

**\*\* Action;**

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- 1- Abduction of the toes. (The 2nd toe is the axis of the foot).
- 2- Acting with lumbricalis muscles through extension expansion,
  - a- Flexion of the metatarsophalangeal joints.
  - b- Extension of the interphalangeal joints.

**Bipennate**





- **No** interossei muscles for the **big toe**.
- **No Planter** interossei muscles to the **2<sup>nd</sup> toe** as it is the axis of the toes.
- **No Dorsal interossei** muscles of the **little toes** as they have their own abductor.

- **Nerve supply**

- **All muscles** of foot (18 muscles) supplied by **lateral plantar nerve** **except 4 muscles** supplied by medial plantar nerve

1- **1<sup>st</sup> lumbrical** muscle (2<sup>nd</sup> layer).

2- **Abductor hallucis** muscle (1<sup>st</sup> layer).

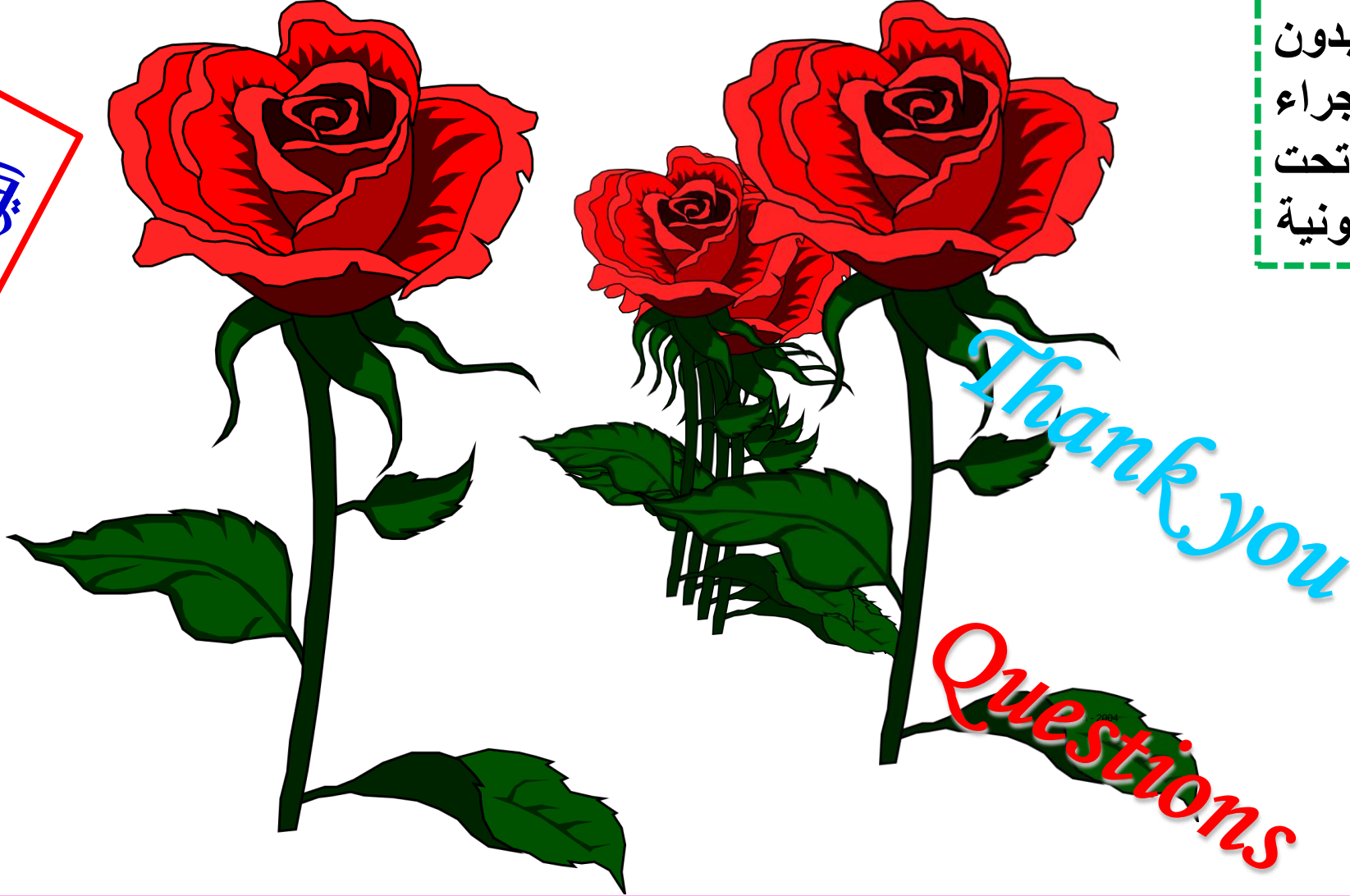
3- **Flexor hallucis** brevis muscle (3<sup>rd</sup> layer).

4- **Flexor digitorum brevis** muscle (1<sup>st</sup> layer).

[https://www.youtube.com/channel/UCVSNqbibj9UWYaJdd\\_cn0PQ](https://www.youtube.com/channel/UCVSNqbibj9UWYaJdd_cn0PQ)

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