

# BONES OF LOWER LIMB



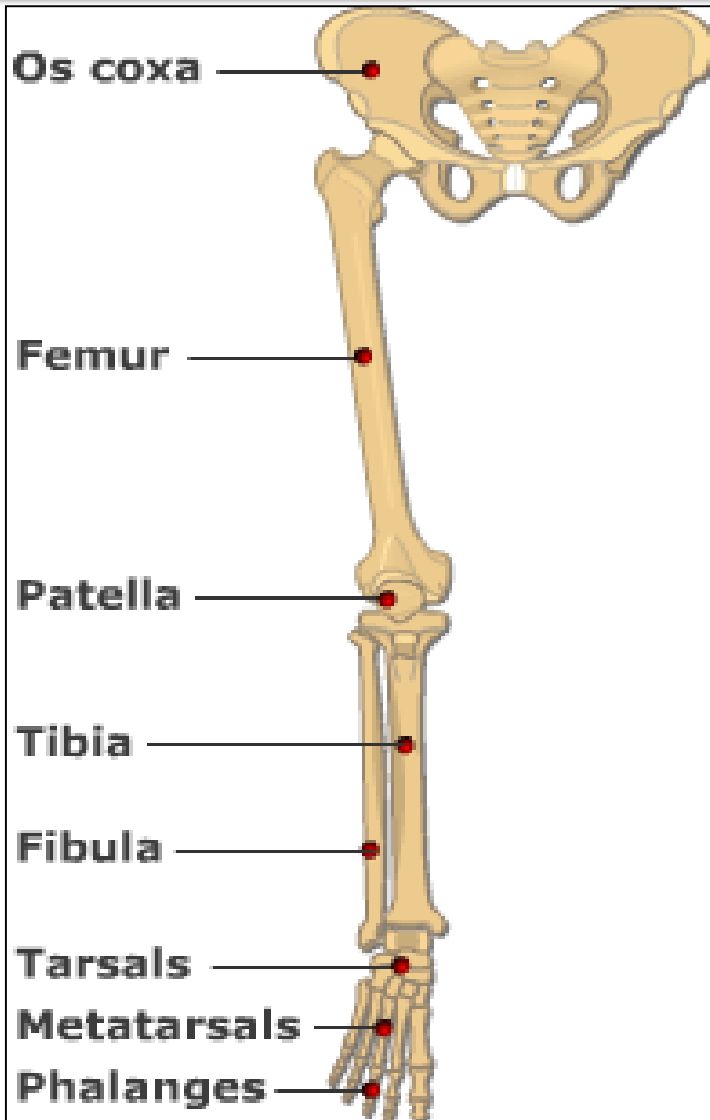
**ANATOMY DEPARTMENT**

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# OBJECTIVES

- *At the end of the lecture the students should be able to:*
- **Classify the bones** of the three regions of the lower limb (thigh, leg and foot).
- **Memorize the main features of the**
  - Bones of the thigh (femur & patella)
  - Bones of the leg (tibia & Fibula).
  - Bones of the foot (tarsals, metatarsals and phalanges)
- **Recognize the side of the bone**

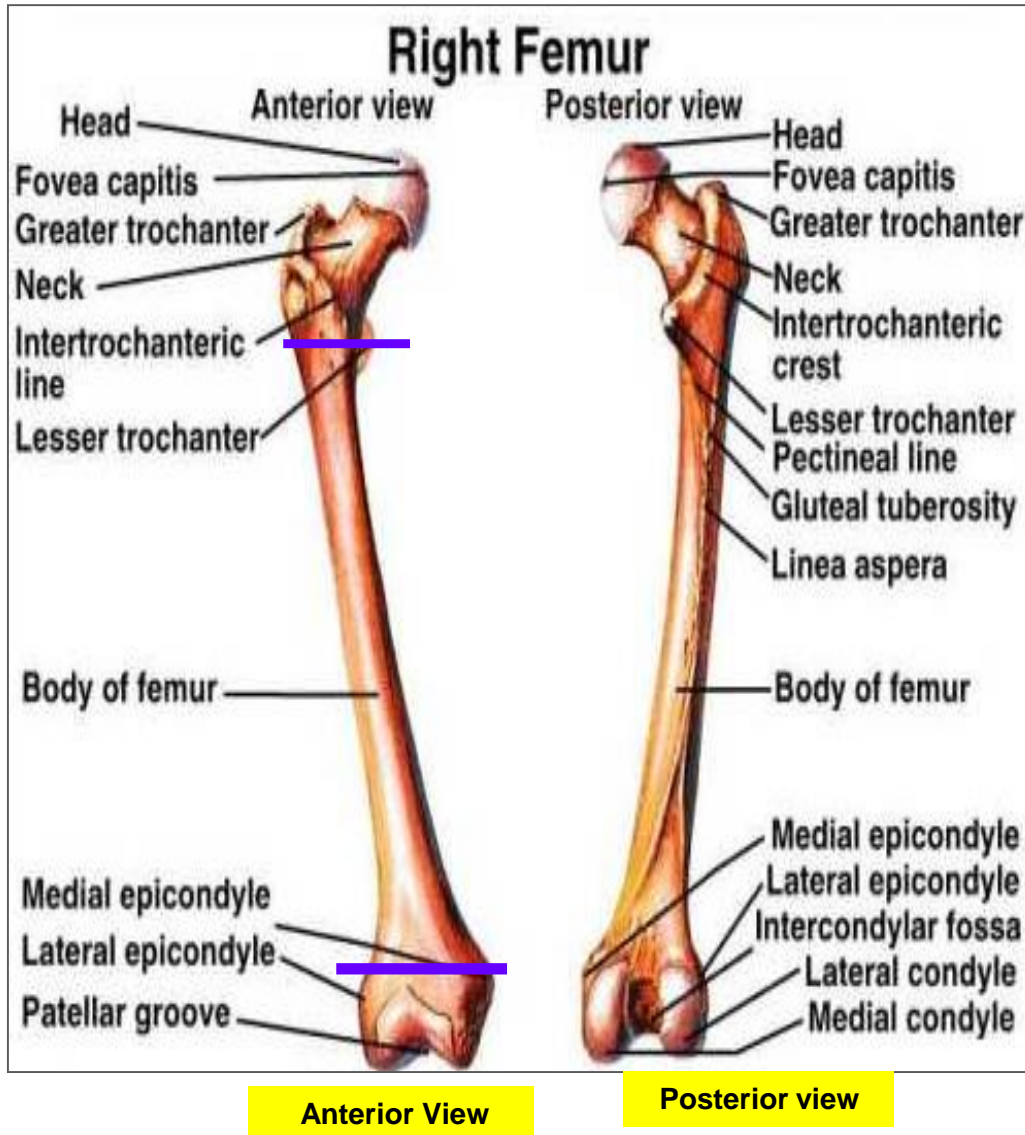
# BONES OF THIGH (Femur and Patella)



## Femur:

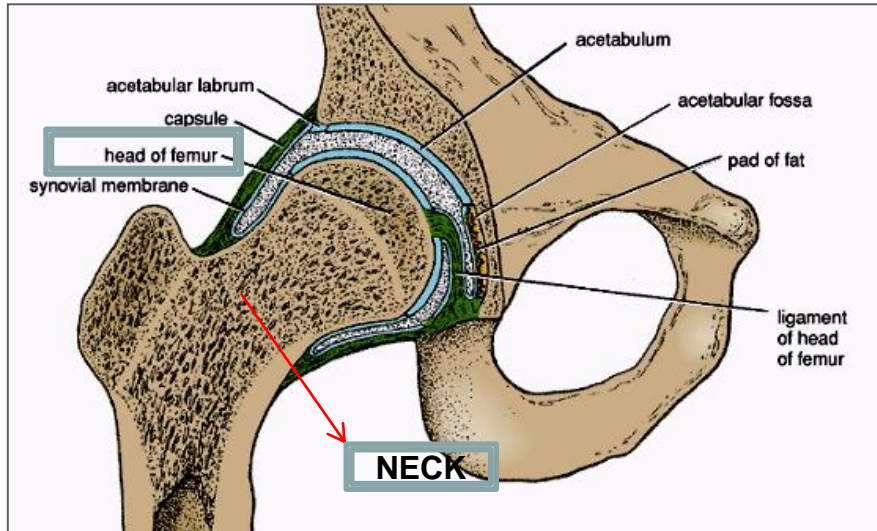
- Articulates above with acetabulum of hip bone to form the **hip joint**.
- Articulates below with tibia and patella to form the **knee joint**.

# BONES OF THIGH (Femur and Patella)

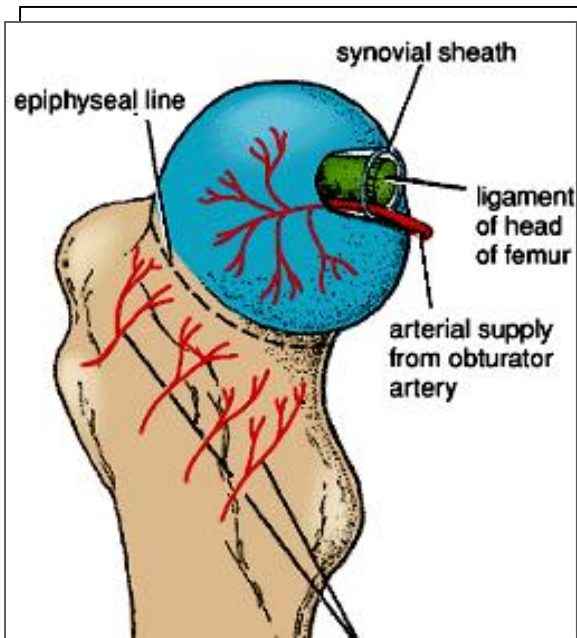


- **Femur :**  
Consists of :
- **Upper end**
- **Shaft**
- **Lower end**

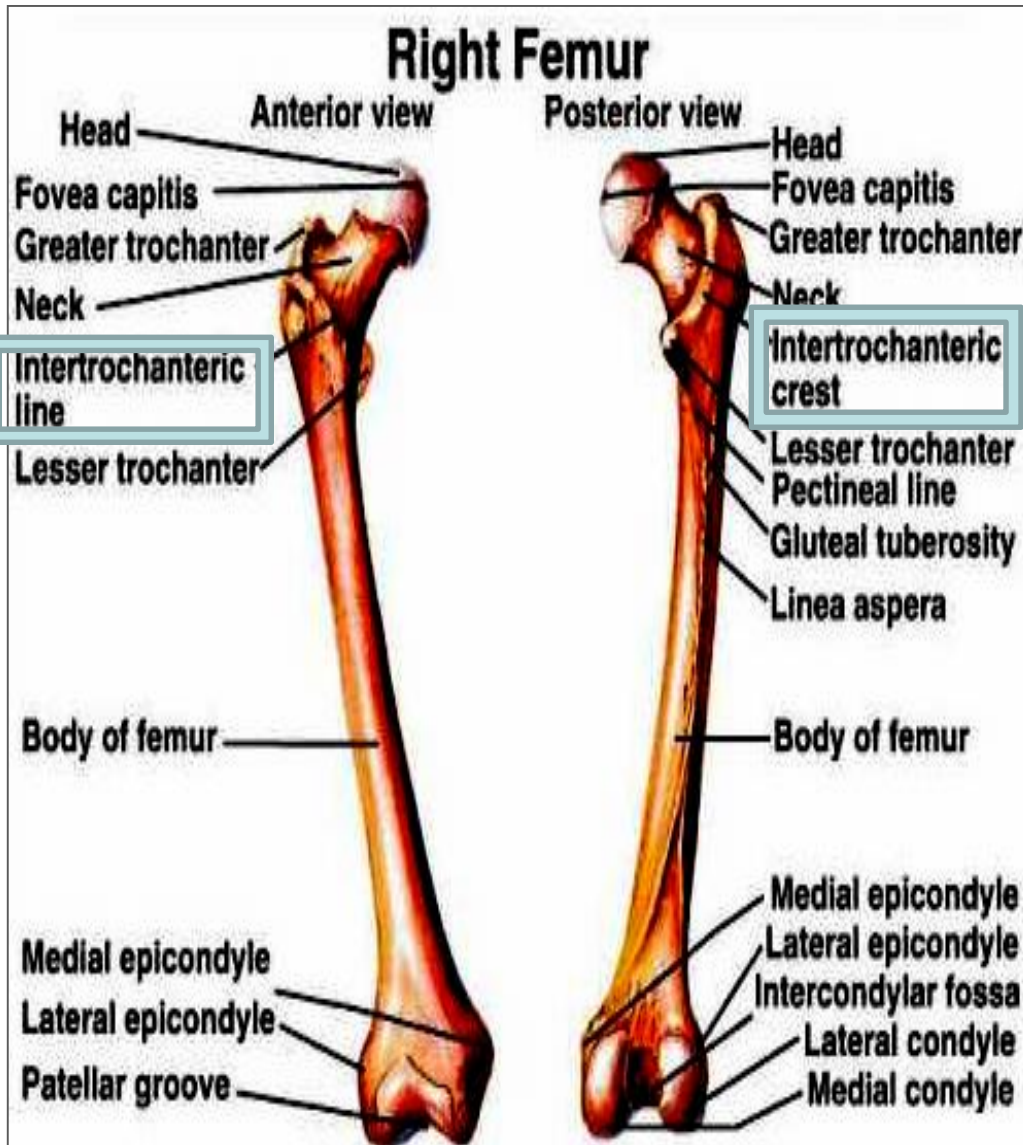
# UPPER END OF FEMUR



- **Head :**
- **It articulates** with acetabulum of hip bone to form hip joint.
- Has a depression in the center (**fovea capitis**), for the attachment of ligament of the head of femur.
- **Obturator artery** passes along this ligament to supply head of femur.
- **Neck :**
- It connects head to the shaft.

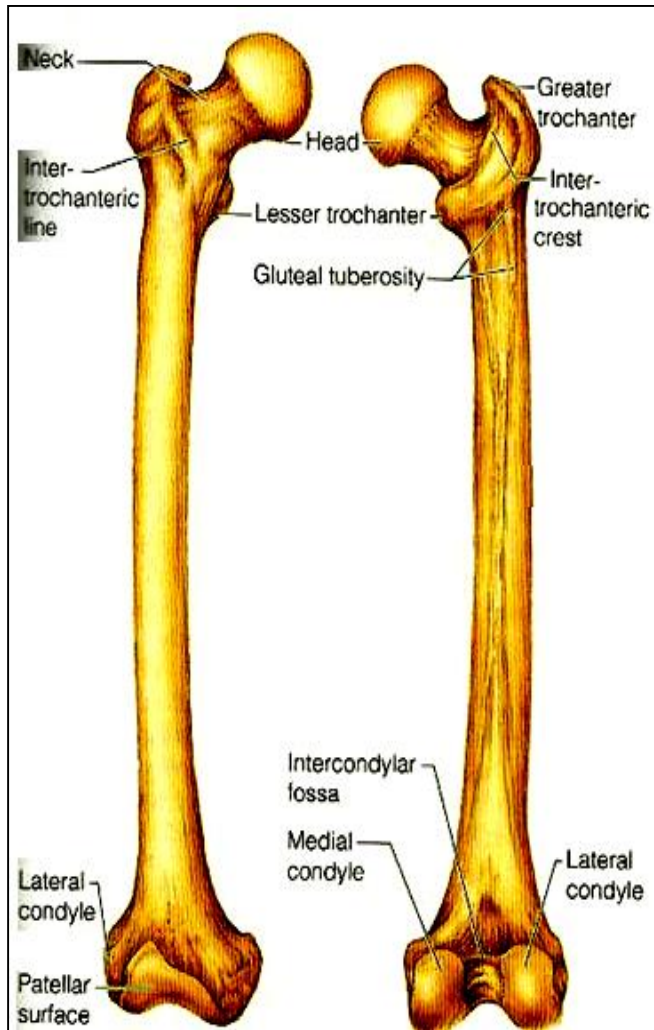


# UPPER END OF FEMUR



- **Greater & lesser trochanters :**
- **Anteriorly,** connecting the 2 trochanters, the **inter-trochanteric line**, where the **iliofemoral ligament** is attached.
- **Posteriorly,** the **inter-trochanteric crest**, on which is **the quadratus femoris muscle** (Quadratus femoris muscle).

# SHAFT OF FEMUR



Anterior view

Posterior view

**It has 3 surfaces**

Anterior

Medial

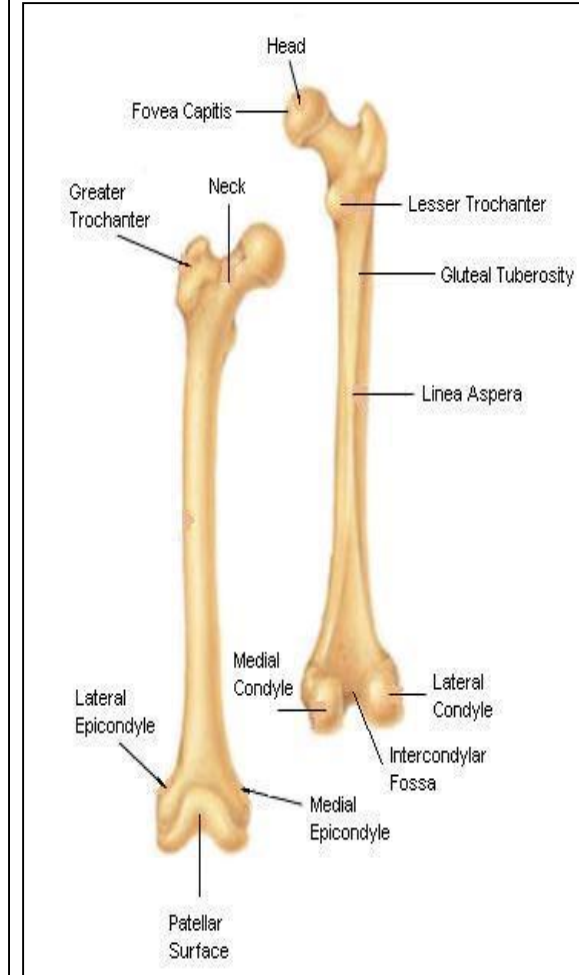
Lateral

**It has 3 borders**

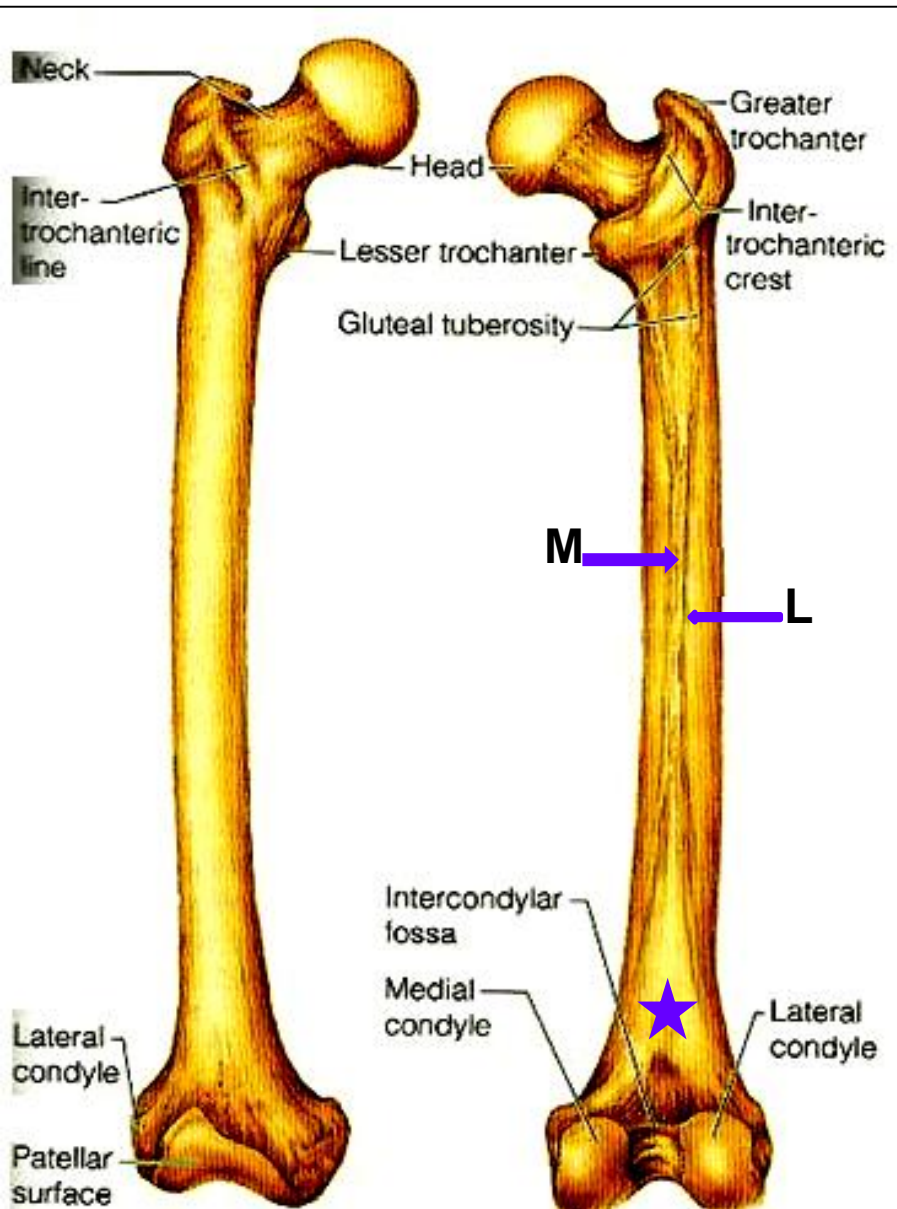
**Two rounded**

**medial and lateral**

**One thick posterior border or ridge called**  
**linea aspera**



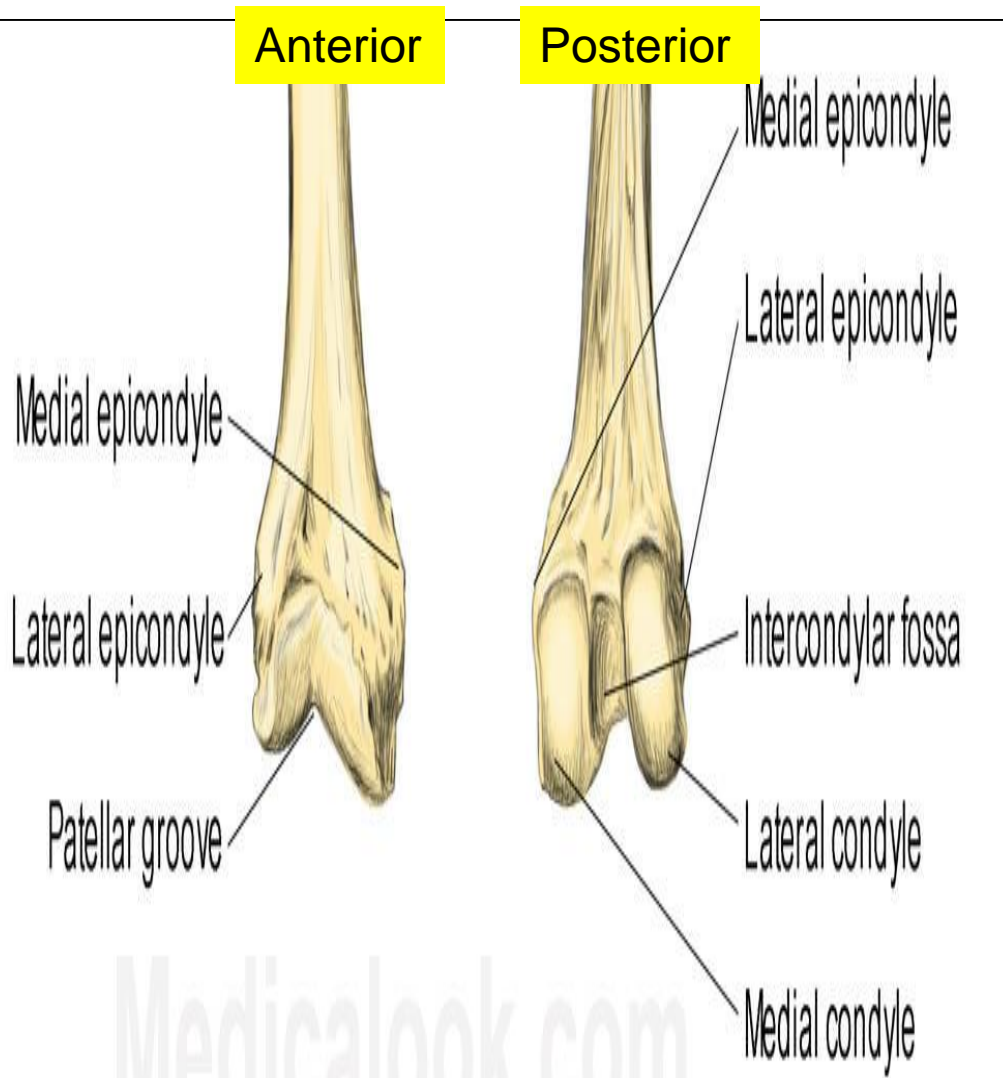
# SHAFT OF FEMUR



- **Anteriorly** : is smooth and rounded.
- **Posteriorly** : has a ridge, the **linea aspera**.
- **Posteriorly** : below the greater trochanter is the **gluteal tuberosity** for attachment of gluteus maximus muscle.
- The medial margin of linea aspera continues below as **medial supracondylar ridge**.
- The lateral margin becomes continues below with **the lateral supracondylar ridge**.
- A Triangular area, **the popliteal surface**★ lies at the lower end of shaft.

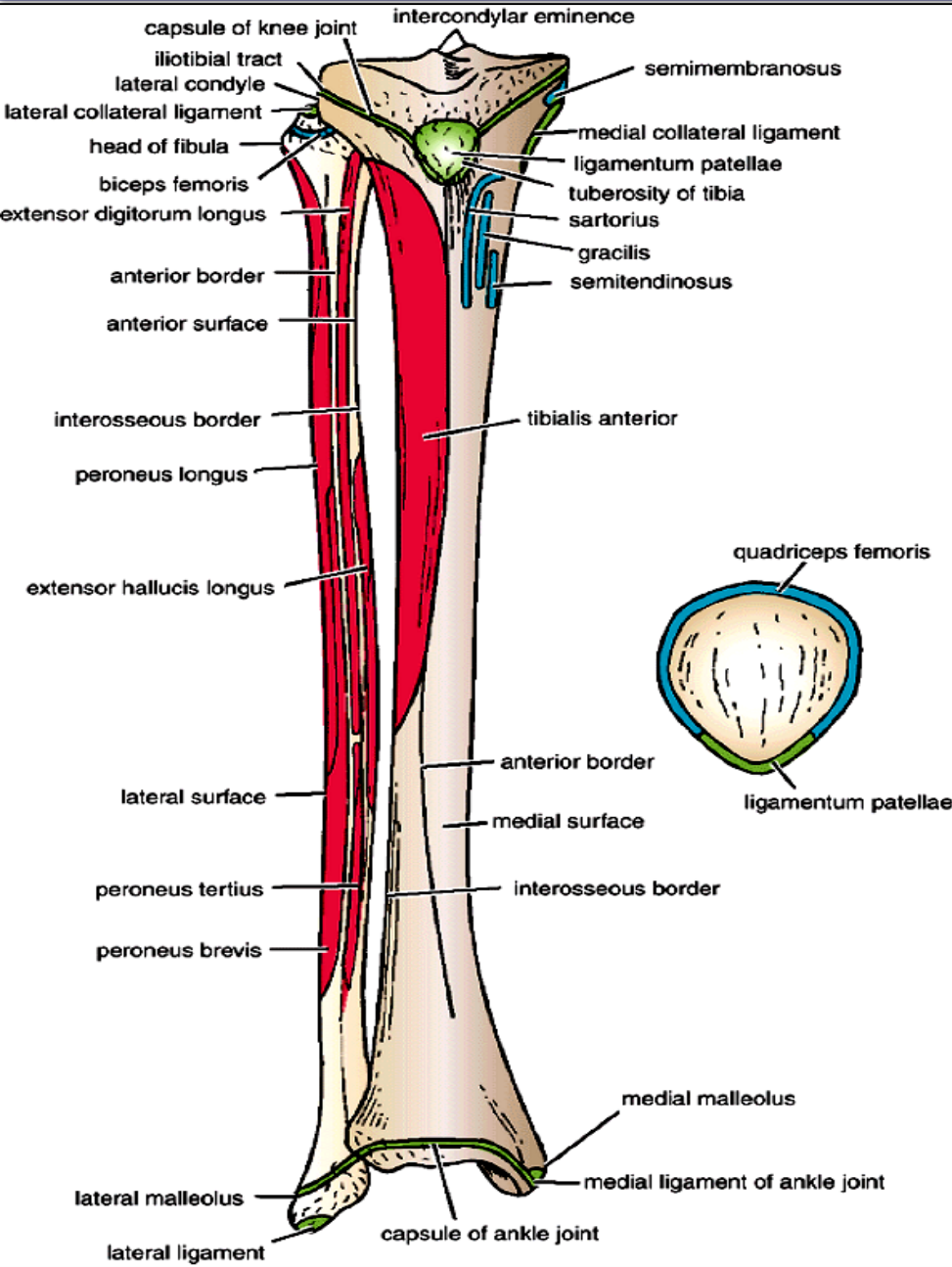


# LOWER END OF FEMUR



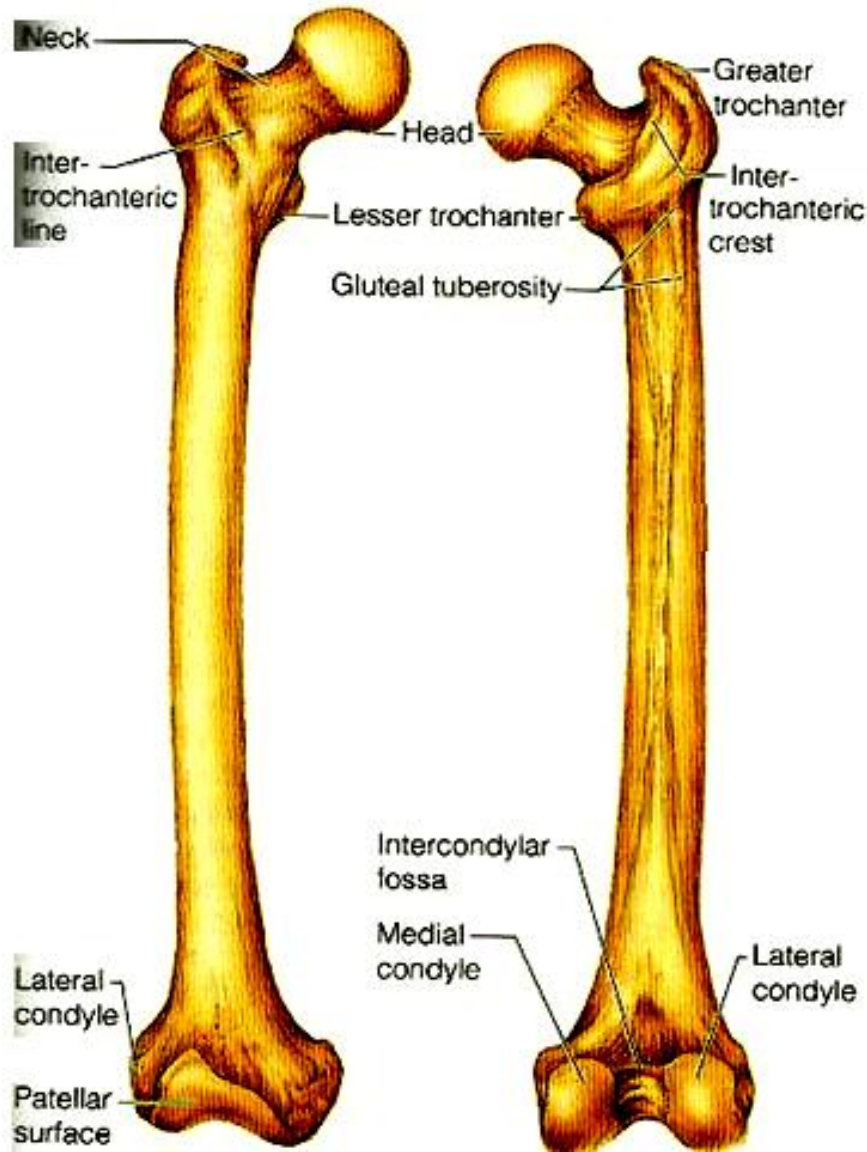
- Has lateral and medial **condyles**, separated anteriorly by **articular patellar surface**, and posteriorly by **intercondylar notch or fossa**.
- The 2 condyles take part in **the knee joint**.
- Above the condyles are **the medial & lateral epicondyles**.

# PATELLA



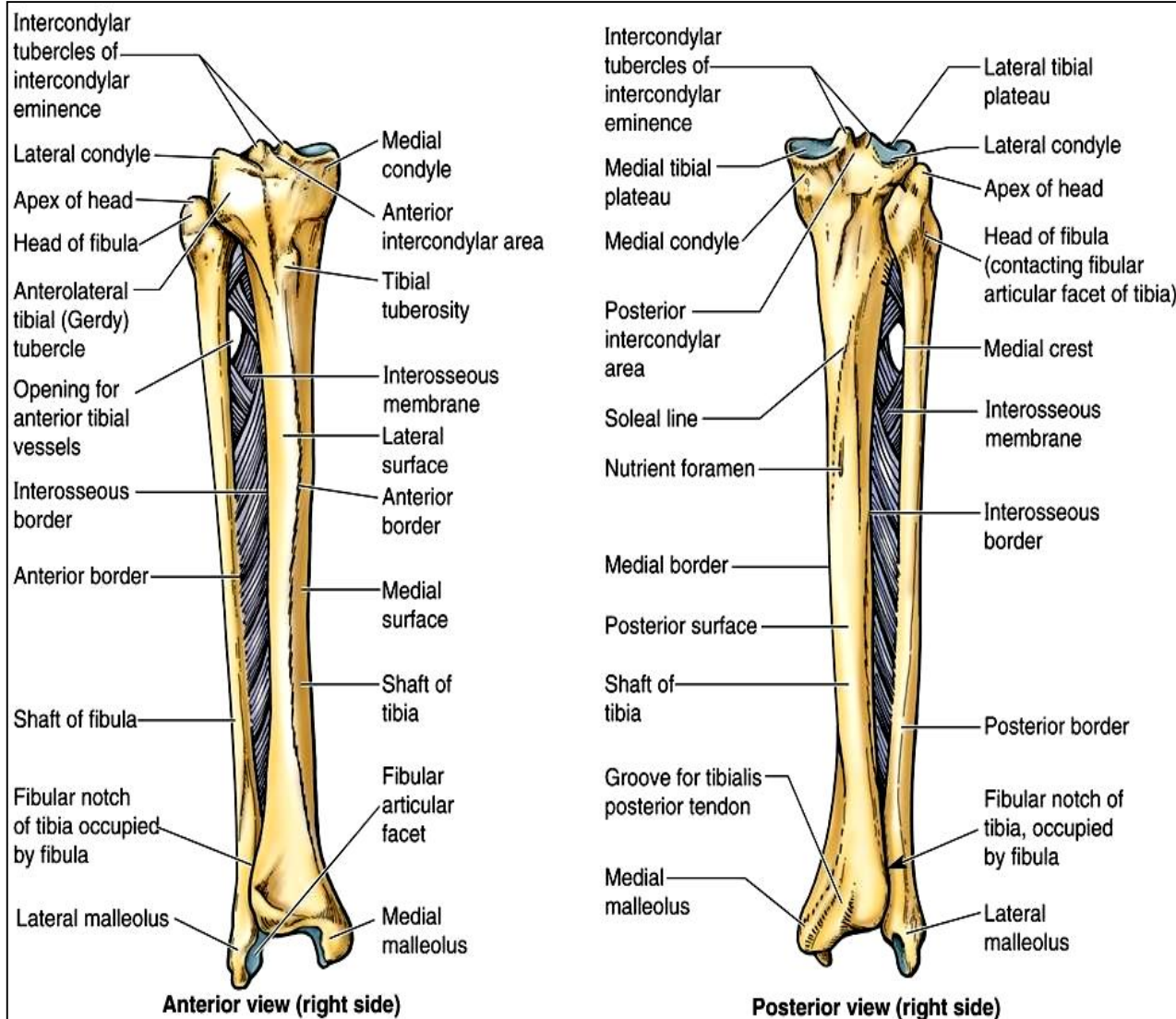
- It is a largest sesamoid bone (lying inside the Quadriceps tendon in front of knee joint).
- Its anterior surface is rough and subcutaneous.
- Its posterior surface articulates with the condyles of the femur to form knee joint.
- Its apex lies inferiorly and is connected to tuberosity of tibia by ligamentum patellae.
- Its upper, lateral, and medial margins give attachment to Quadriceps femoris muscles.

# POSITION OF FEMUR (RIGHT OR LEFT)



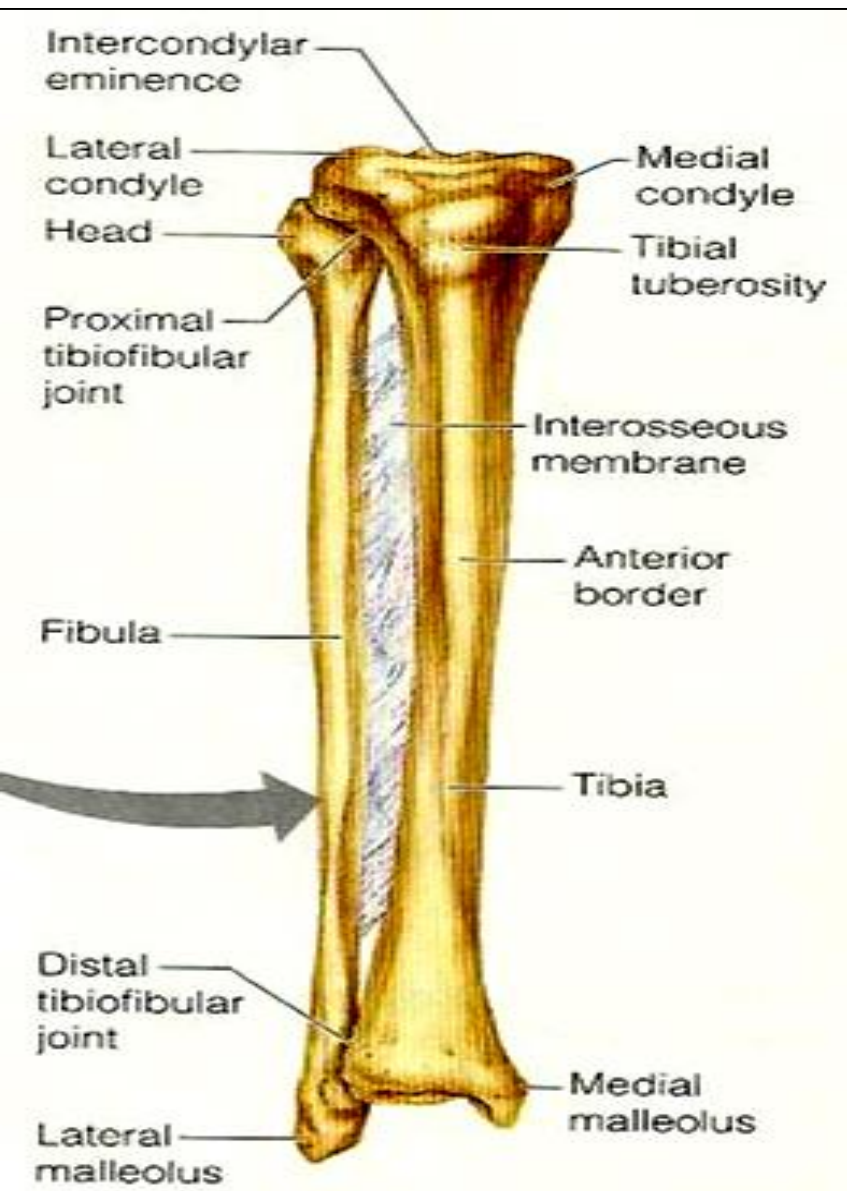
- **Head** is directed upward & Medially.
- **Shaft** is smooth and convex anteriorly.
- **Shaft** is rough and concave posteriorly.

# BONES OF LEG (TIBIA AND FIBULA)



- **Tibia :**
- It is the medial bone of leg.
- **Fibula :**
- It is the lateral bone of leg.
- Each of them has **upper end**, **shaft**, and **lower end**.

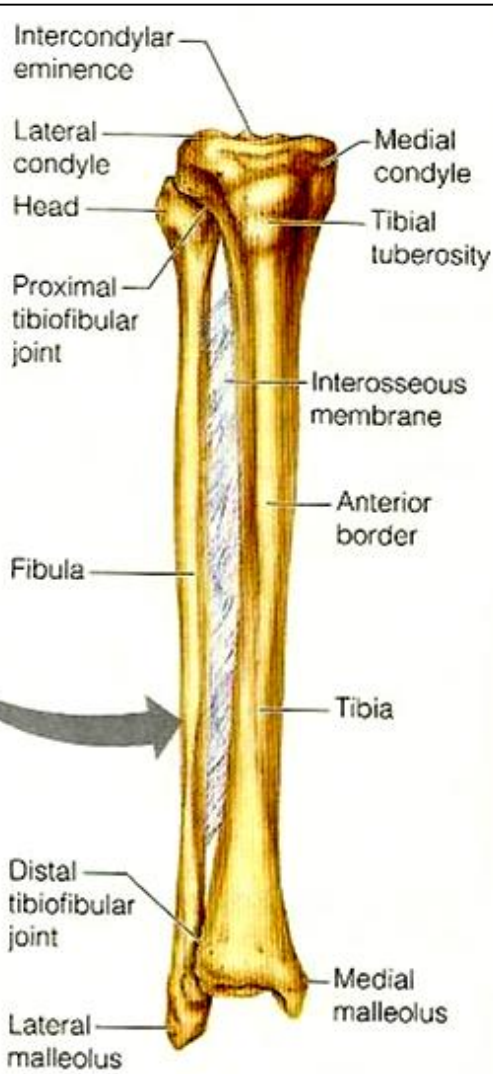
# TIBIA



## Upper end has:

- **2 tibial condyles:**
- **Medial condyle** : is larger and articulate with medial condyle of femur. It has a **groove** on its posterior surface for semimembranosus ms.
- **Lateral condyle** : is smaller and articulates with lateral condyle of femur. It has **facet** on its lateral side for articulation with head of fibula to form **proximal tibio-fibular joint**.
- **Intercondylar area** : is rough and has intercondylar eminence.

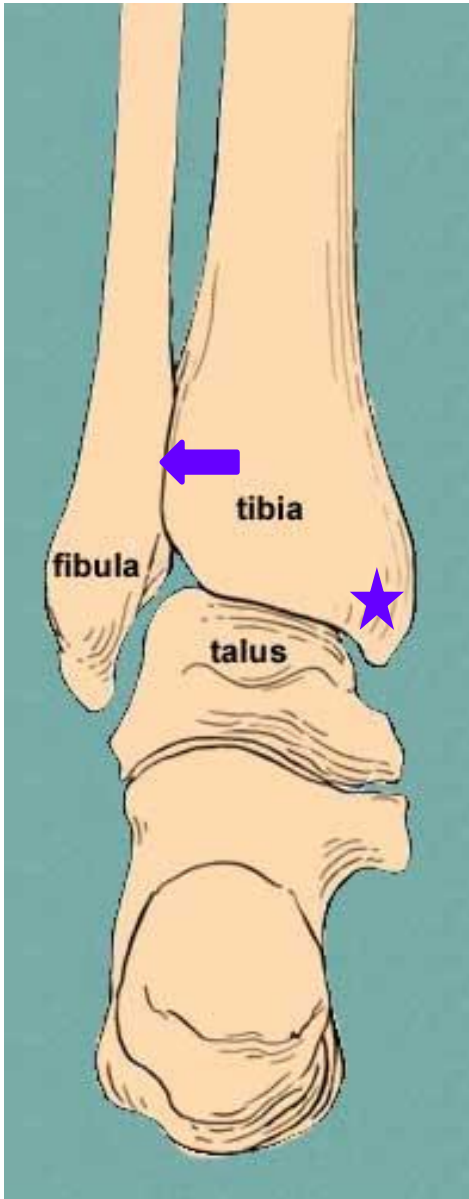
# TIBIA



## Shaft has:

- **Tibial tuberosity :**  
Its upper smooth part gives attachment to ligamentum patellae.  
Its lower rough part is **subcutaneous**.
- **3 borders :**
- **Anterior border :** sharp and **subcutaneous**.
- **Medial border.**
- **Lateral border** interosseous border.
- **3 surfaces :**
- **Medial :** **subcutaneous**.
- **Lateral**
- **Posterior** has oblique line, soleal line for attachment of soleus muscle

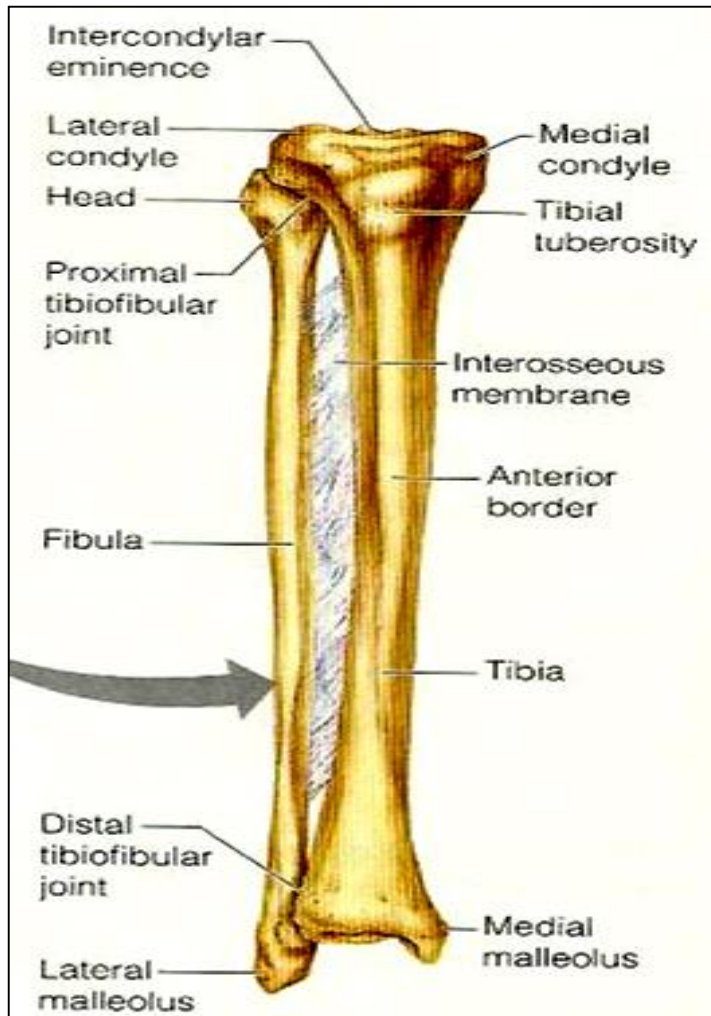
# TIBIA



## Low end:

- Articulates with **talus** for formation of **ankle joint**.
- **Medial malleolus:** ★
  - Its medial surface is **subcutaneous**.
  - Its lateral surface articulate with talus.
- **Fibular notch:** lies on its lateral surface of lower end to form **distal tibiofibular joint**.

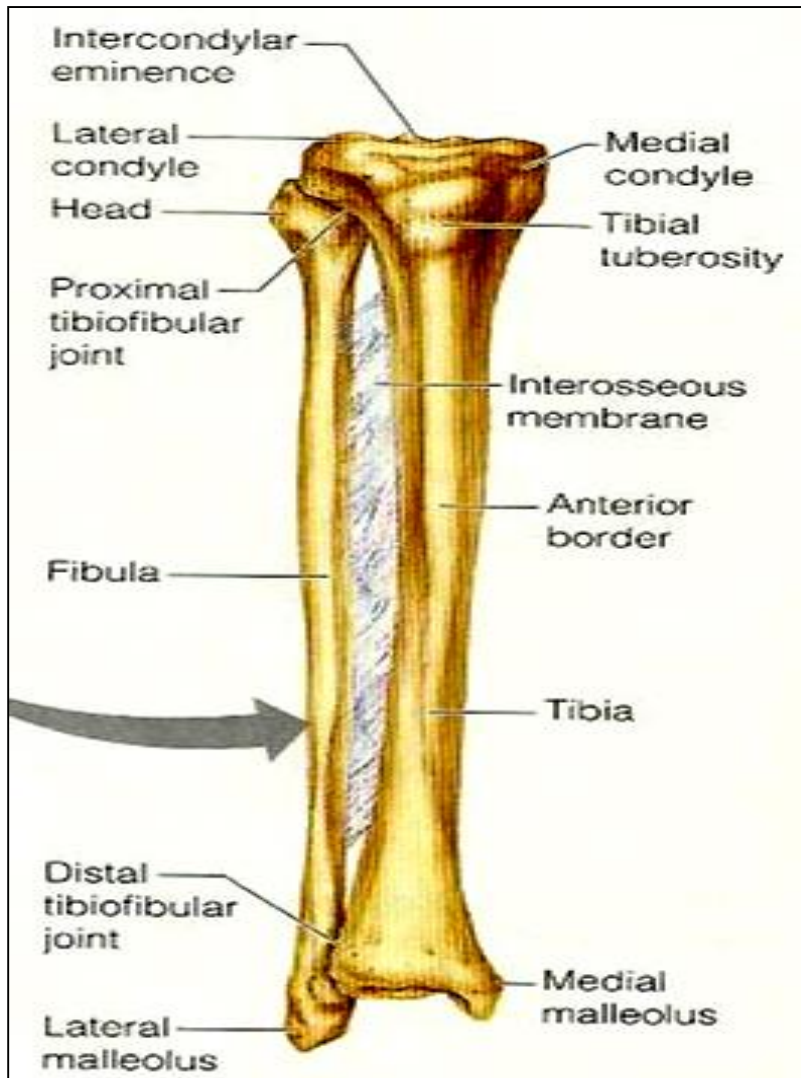
# POSITION OF TIBIA (RIGHT OR LEFT)



- **Upper end** is larger than lower end.
- **Medial malleolus** is directed downward and medially.
- **Shaft** has sharp anterior border.

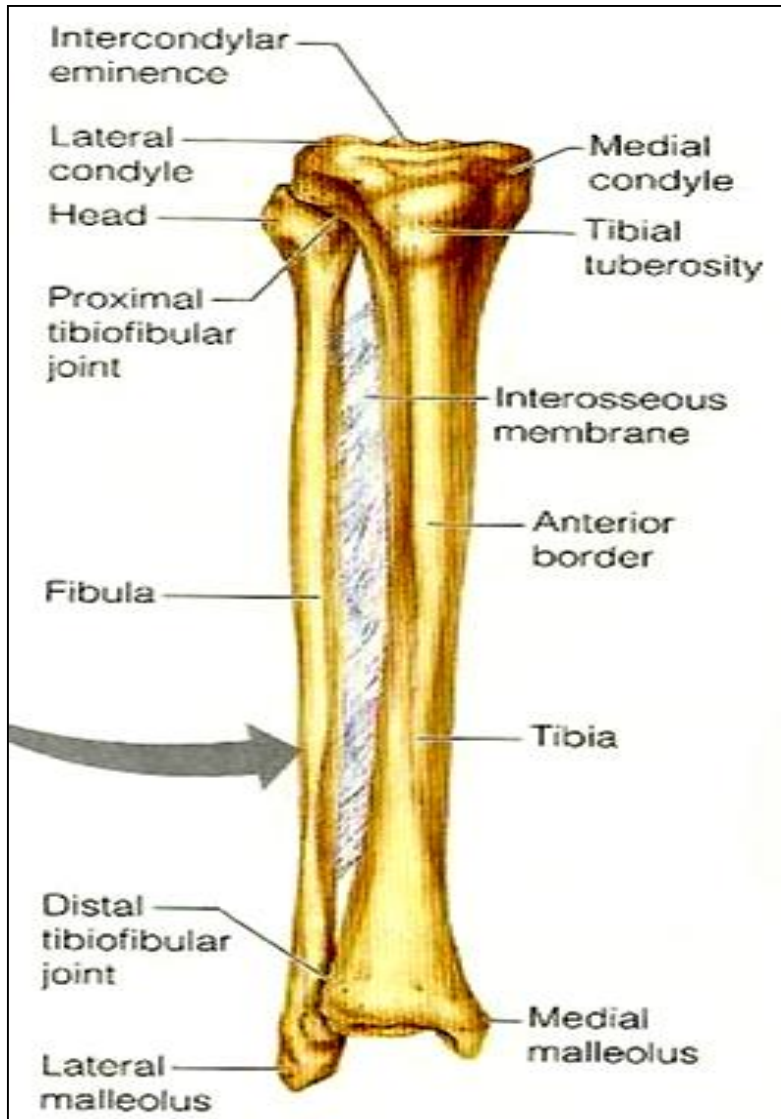


# FIBULA



- It is the slender lateral bone of the leg.
- It takes no part in articulation of knee joint.
- Its upper end has :
- Head : articulates with lateral condyle of tibia.
- Styloid process.
- Neck.

# FIBULA



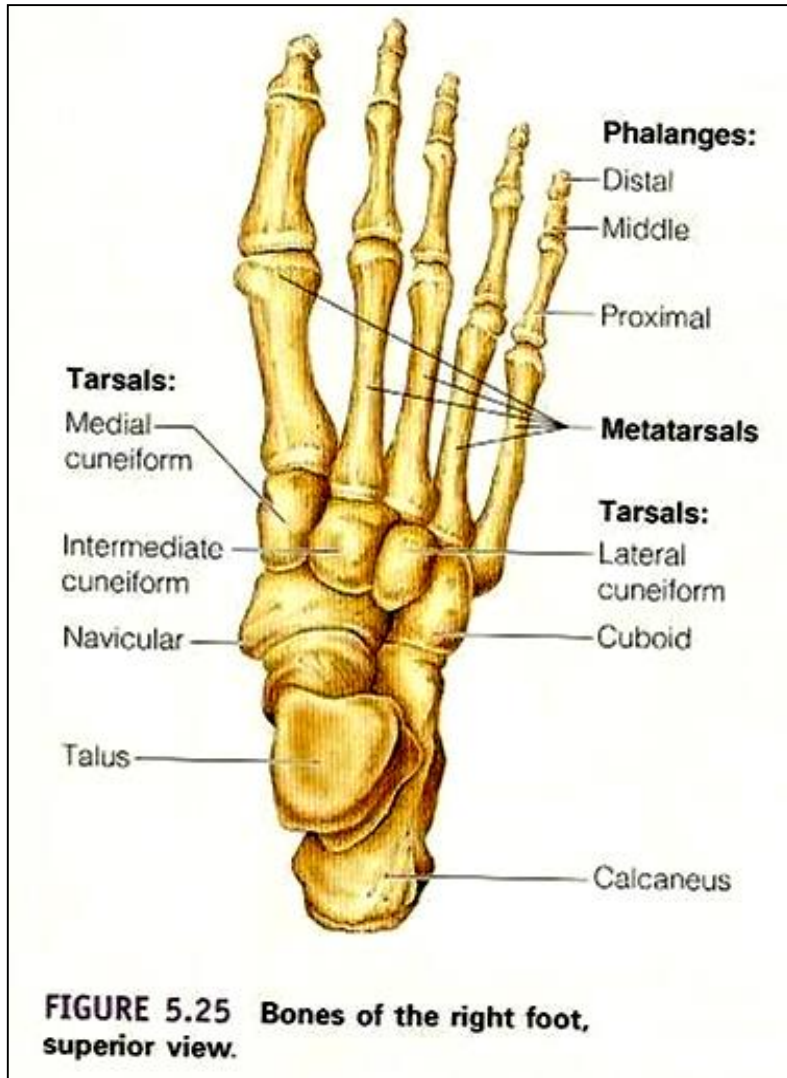
## Shaft has :

- **4 borders** : its medial 'interosseous border gives attachment to interosseous membrane.
- **4 surfaces**.

## Lower end forms :

- **Lateral malleolus** : is **subcutaneous**.
- Its medial surface is **smooth** for articulation with talus to form ankle joint.

# BONES OF FOOT



**7 Tarsal bones:** start to ossify before birth and end ossification by 5<sup>th</sup> year in all tarsal bones. They are :

1. Calcaneum.

2. Talus .

3. Navicular.

4. Cuboid.

5. 3 cuneiform bones.

- **Only Talus** articulates with tibia & fibula at ankle joint.

- **Calcaneum**: the largest bone of foot, forming the heel.

# BONES OF FOOT

## 5 Metatarsal bones:

- They are numbered from medial (big toe) to lateral.
- 1<sup>st</sup> metatarsal bone is large and lies medially.
- Each metatarsal bone has a base (proximal), a shaft and a head (distal).

## 14 phalanges:

- 2 phalanges for big toe (proximal & distal)
- 3 phalanges for each of the lateral 4 toes (proximal, middle & distal)
- Each phalanx has base, shaft and a head.



FIGURE 5.25 Bones of the right foot, superior view.

**THANK YOU**

# SUMMARY

## ▪ **Skeleton of lower limb consists of:**

▪ **Femur:** is the bone of thigh.

▪ **Tibia:** is the medial bone of the leg.

▪ **Fibula:** is the lateral bone of leg.

## ▪ **Skeleton of foot :**

▪ **Tarsal bones** (7 in number), calcaneum is the largest bone forming the heel.

▪ **Metatarsal bones** (5 in number).

▪ **Phalanges** (14 in number).

## **The subcutaneous parts of bones in the lower limb are:**

▪ Patella.

▪ Anterior border of the tibia

▪ Tibial tuberosity.

▪ Medial surface of shaft of tibia.


▪ Medial malleolus of tibia.

▪ Lateral malleolus of fibula.


▪ **The foot is a complex structure. There are 26 bones in each foot alone. The foot is also well muscled and is supported by ligaments and tissue known as fascia.**

▪ **Support is of prime importance in the foot, as it bears the weight of the body and must adopt different configurations to permit locomotion.**


- **The patella :**

- Lies on the back of the knee joint.
- Has apex lying superiorly.
- Has smooth articulating anterior surface.
- Gives attachment to quadriceps femoris tendon. 

- **Which one of the foot bones contributes in the ankle joint ?**

- Calcaneum.
- Talus. 
- Cuboid.
- Navicular.

- **The tarsal bones of foot consists of :**

- 5 bones.
- 7 bones. 
- 9 bones.
- 10 bones.

**•Which one of the following bones is the largest bone in the foot ?**

- Cuboid.
- Cuneiform.
- Navicular.
- Calcaneum.



**•Which one of the following bones forms the heel of foot?**

- a. Talus.
- b. Calcaneum.
- c. Cuboid.
- d. Navicular.



**▪The medial bone of the leg is :**

- Femur.
- Humerus.
- Tibia.
- Fibula.

