



Bones of the Upper and Lower limb

Musculoskeletal block- Anatomy-lecture 1

Editing file



Objectives

- ✓ 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.

Color guide :

important in **Red**

Doctor note in **Green**

Extra information in **Grey**

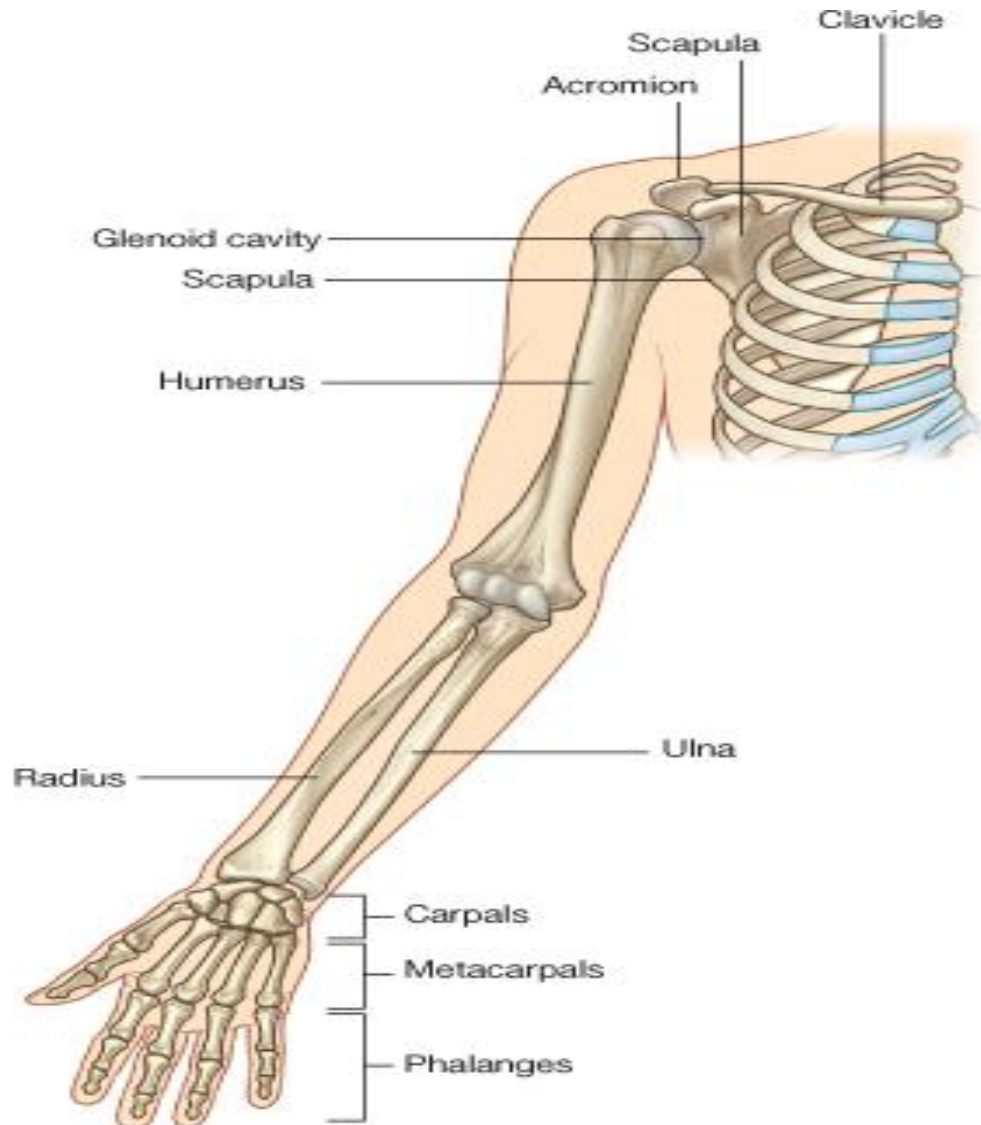
Note: this lecture is based on female slides since Prof abuel makarem said only things that are mentioned in the female slides will come in the exam

Note: All bones picture which are described in this lecture are bones on the right side of the body

Before start :Please make yourself familiar with these terms to better understand the lecture

Terms	Meaning	Example
Ridge	The long and narrow upper edge, angle, or crest of something	The supracondylar ridges (in the distal part of the humerus)
Notch	An indentation, (incision) on an edge or surface	The trochlear notch (in the proximal part of the ulna)
Tubercles	A nodule or a small rounded projection on the bone	(Dorsal tubercle (in the distal part of the radius)
Fossa	A hollow place (The Notch is not complete but the fossa is complete and both of them act as the lock of the joint)	Subscapular fossa (in the concave part of the scapula)
Tuberosity	A large prominence on a bone usually serving for the attachment of muscles or ligaments (is a bigger projection than the Tubercle)	Deltoid tuberosity (in the humerus) and it connects the deltoid muscle
Processes	A V-shaped indentation (act as the key of the joint)	(Coracoid process (in the scapula)
Groove	A channel, a long narrow depression sure	Spiral (Radial) groove (in the posterior aspect of the humerus)
Interosseous border	Between bones (the place where the two parallel bones attach together by the interosseous membrane)	Lateral interosseous sharp end of the ulna
Spine	Thick projecting ridge of bone	Spine of the scapula
Articulation	Meeting of two bones to make the joints	The articulation between the glenoid cavity and humerus

The Upper Limbs:



The Bones of the **Upper limbs** are:

Pectoral Girdle: **Clavicle** and **Scapula**

Arm : **Humerus**

Forearm : **Radius & Ulna**

Wrist : **Carpal** bones

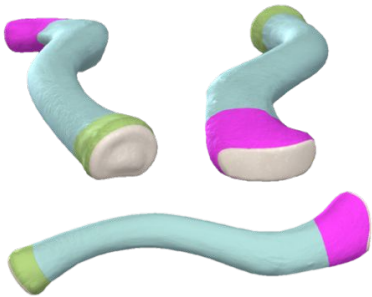


Hand: **Metacarpals & Phalanges**

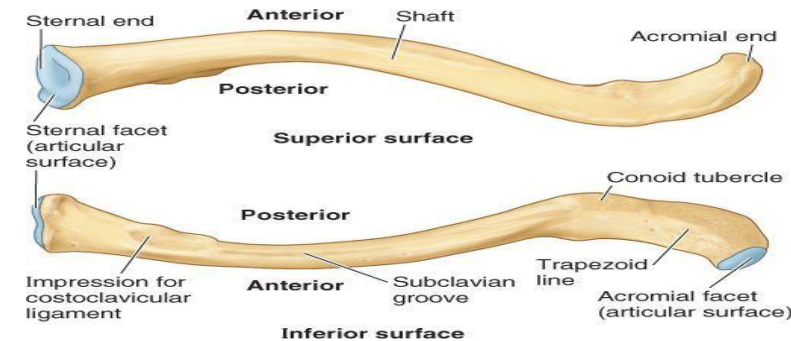
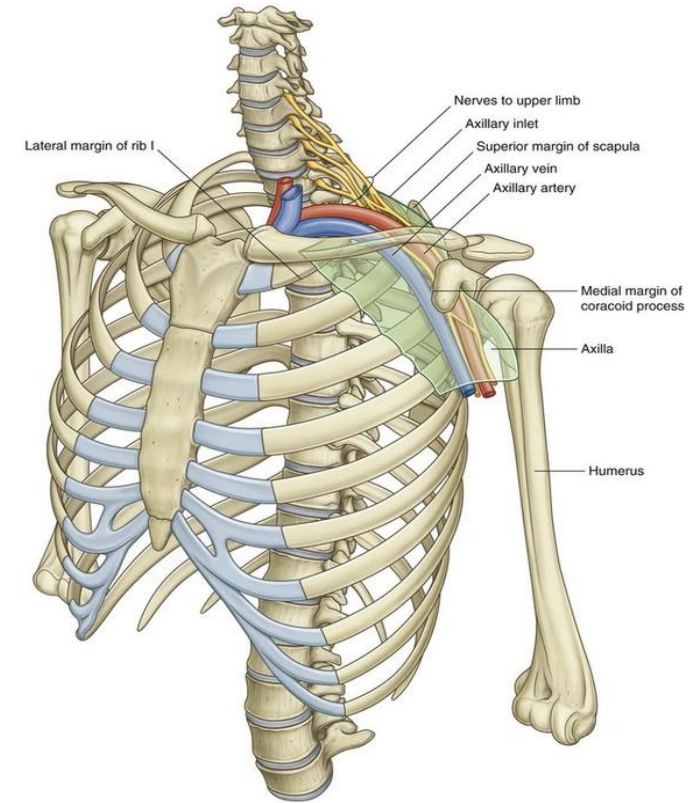
Pectoral Girdle:

- **Formed of Two Bones:** 1- **Clavicle** (anteriorly) and 2- **Scapula** (posteriorly).
- It is very light and allows the upper limb to have exceptionally free movement.

1- Clavicle: it is a doubly curved **long bone** with no medullary (**bone marrow**) cavity, lying **horizontally** across the root of the neck. It is **subcutaneous** (**under the skin**) throughout its length.

it has:

Two Ends	Body (shaft)	Two Surfaces
<p>Medial(sternal): enlarged and triangular</p> <p>Lateral(Acromial): flattened</p> <p><small>note: The sternal end is attached to the sternum The acromial end is attached to the acromion part of scapula</small></p>	<p>It's medial $\frac{2}{3}$ is convex (محدب) forward</p> <p>It's lateral $\frac{1}{3}$ is concave (مقعر) forward</p>	<p>Superior surface which is smooth because it lies just deep to the skin</p> <p>Inferior surface which is rough because strong ligaments bind to 1st rib</p>
	<p>medial $\frac{2}{3}$</p>  <p>lateral $\frac{1}{3}$</p>	<p>Superior surface (smooth)</p>  <p>Inferior surface (rough)</p>



Pectoral Girdle:

2- Scapula (shoulder blade): It is a triangular Flat bone ,Extends between the 2nd 7th ribs.

It has :

Three Processes:

- 1- **Spine**
- 2- **Acromion**
- 3- **Coracoid**

Three Borders:

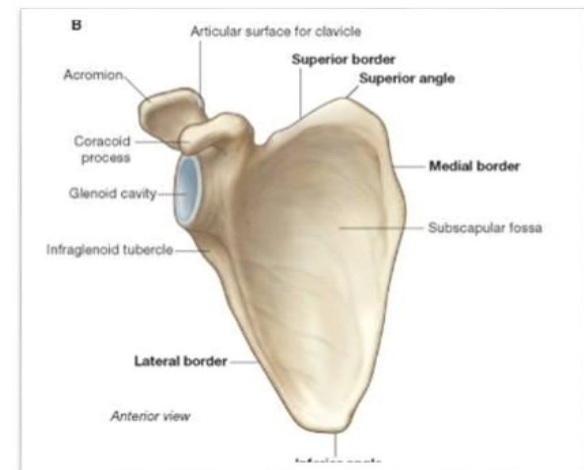
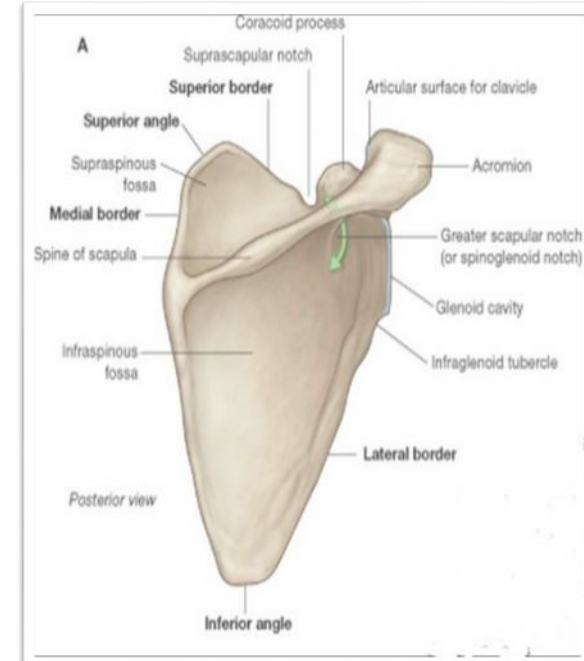
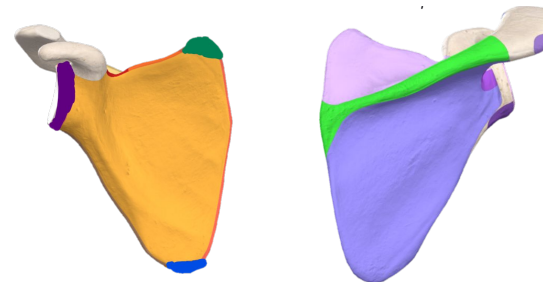
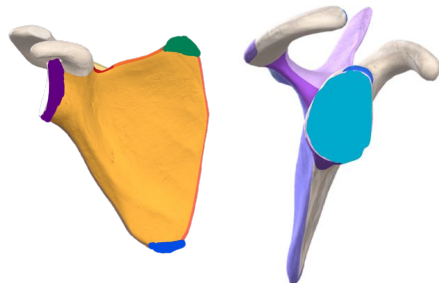
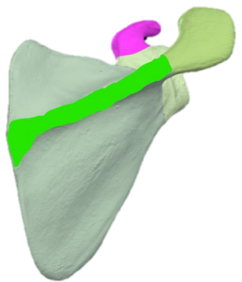
- 1- **Superior**
- 2- **Medial** (Vertebral)
- 3- **Lateral** (Axillary)

Three Angles:


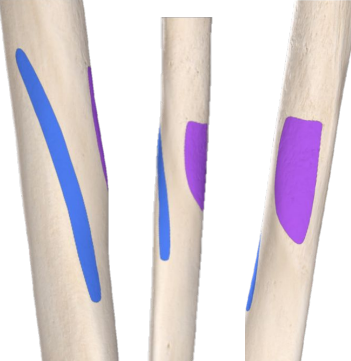
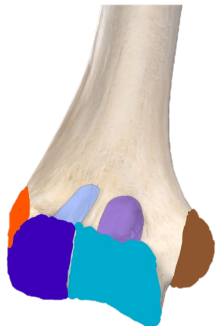
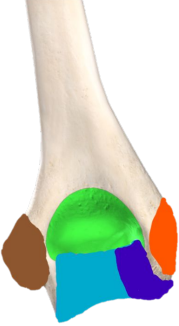
- 1- **Superior**
- 2- **Lateral** (forms the **Glenoid cavity**)
- 3- **Inferior**.

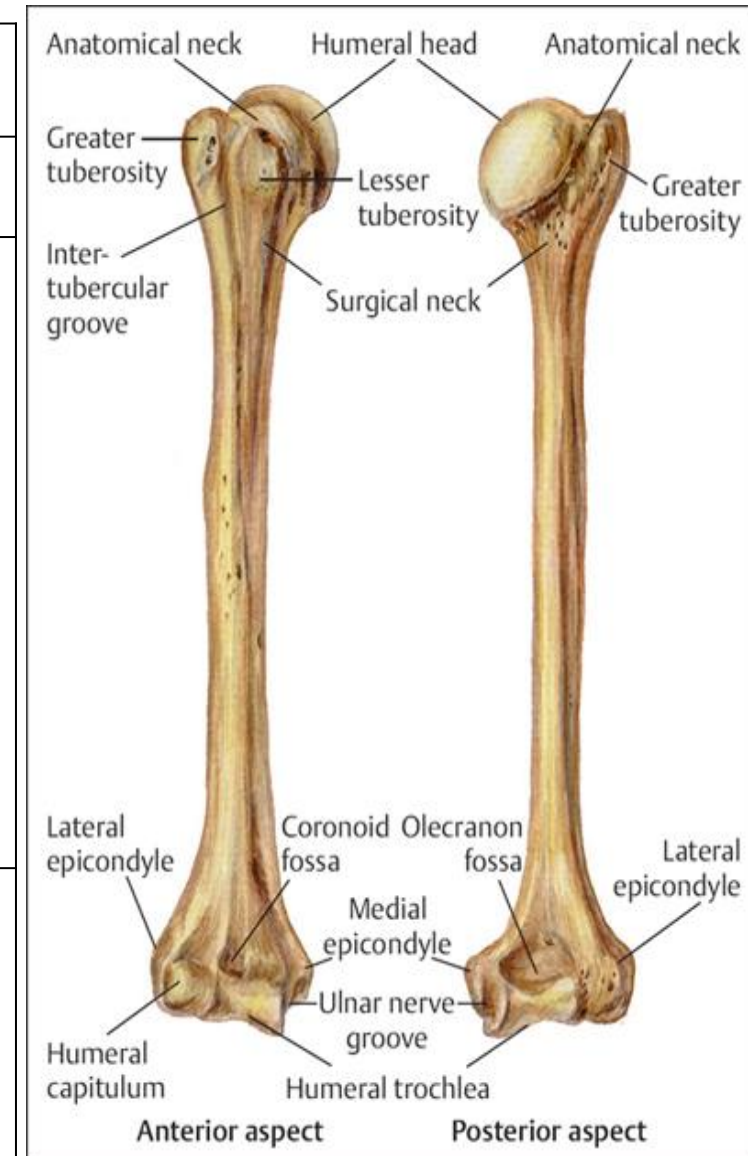
Two Surfaces:

- 1- **Convex Posterior**, **Smaller Supraspinous Fossa** (above the spine) and the **larger Infraspinous Fossa** (below the spine).
- 2- **Concave Anterior (Costal)** it forms the large **Subscapular Fossa**



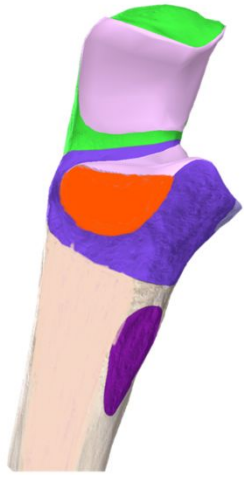
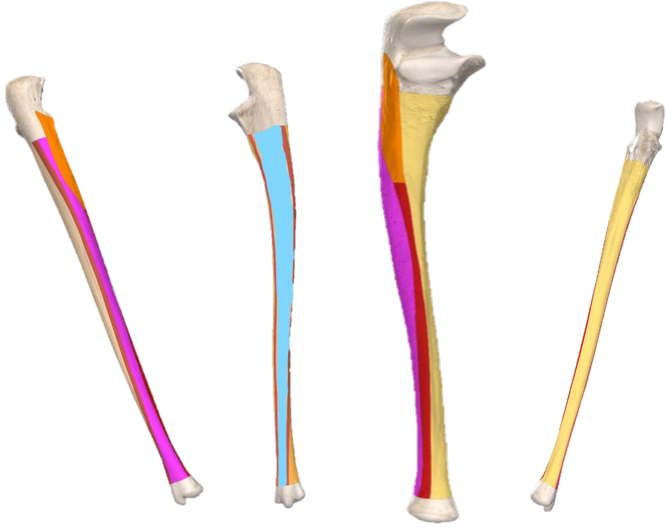

Humerus: Typical Long bone **it has:**

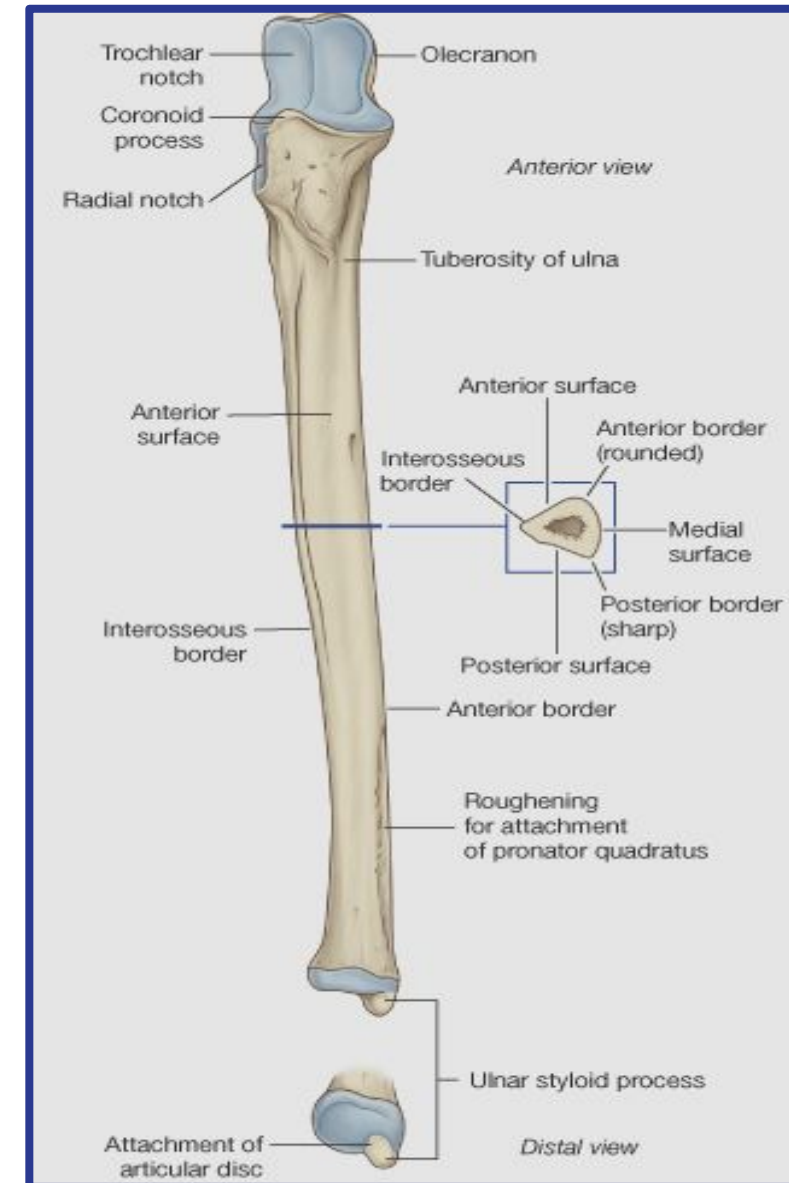
Proximal End	Shaft (Body)	Distal end	
<ul style="list-style-type: none"> ● Head, Neck ● Greater Tubercles ● Lesser Tubercles ● Intertubercular Groove. ● Anatomical neck: formed by a groove separating the head from the tubercles. ● Surgical Neck: a narrow part distal to the tubercles. 	<p>Has two prominent features:</p> <ol style="list-style-type: none"> 1. Deltoid tuberosity 2. Spiral (Radial) groove <p>Note: The radial nerve passes along the radial groove</p>	<p>Anteriorly</p>	<p>Posteriorly</p>
			



IMPORTANT: Don't mix up between the coracoid in the scapula and the coronoid in the humerus


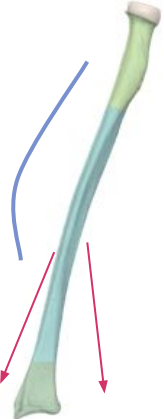
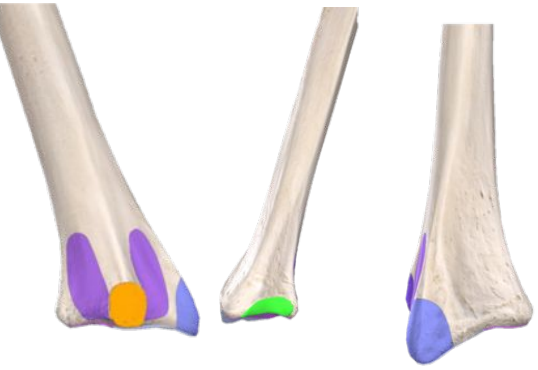
Ulna: it is stabilizing bone of the forearm also it longest bone in forearm

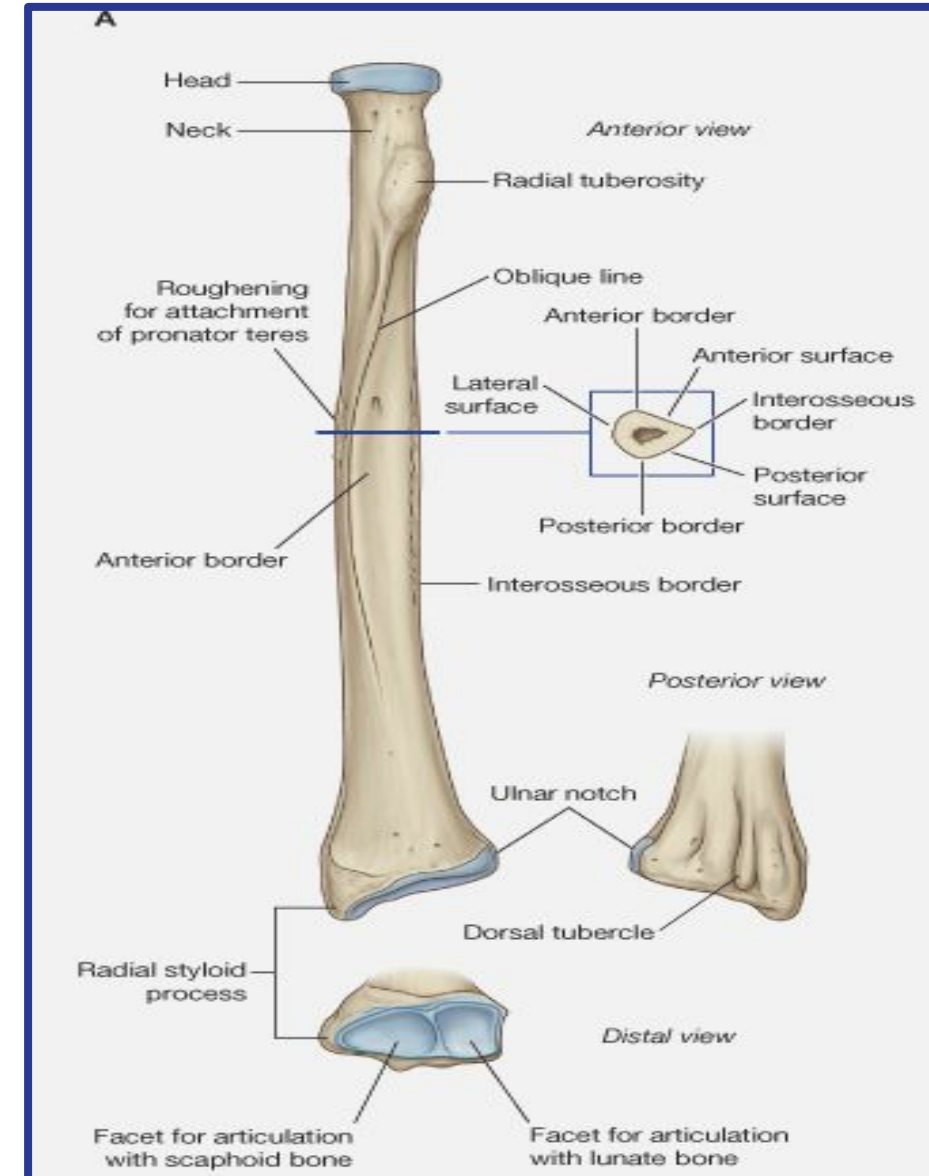
Proximal End	Shaft (Body)	Distal end
<ol style="list-style-type: none"> 1. Olecranon Process 2. Coronoid Process 3. Tuberosity of Ulna 4. Trochlear Notch 5. Radial Notch 	<p>Thick & cylindrical superiorly but diminishes in diameter inferiorly It has Three Surfaces (Anterior, Medial & Posterior). Sharp Lateral Interosseous border.</p>	<ul style="list-style-type: none"> • Small rounded <ol style="list-style-type: none"> 1. Head: lies distally at the wrist. . 2. Styloid process: Medial.
		



Helpful Note The ulna is a medial bone it has a medial surface and a medial styloid process

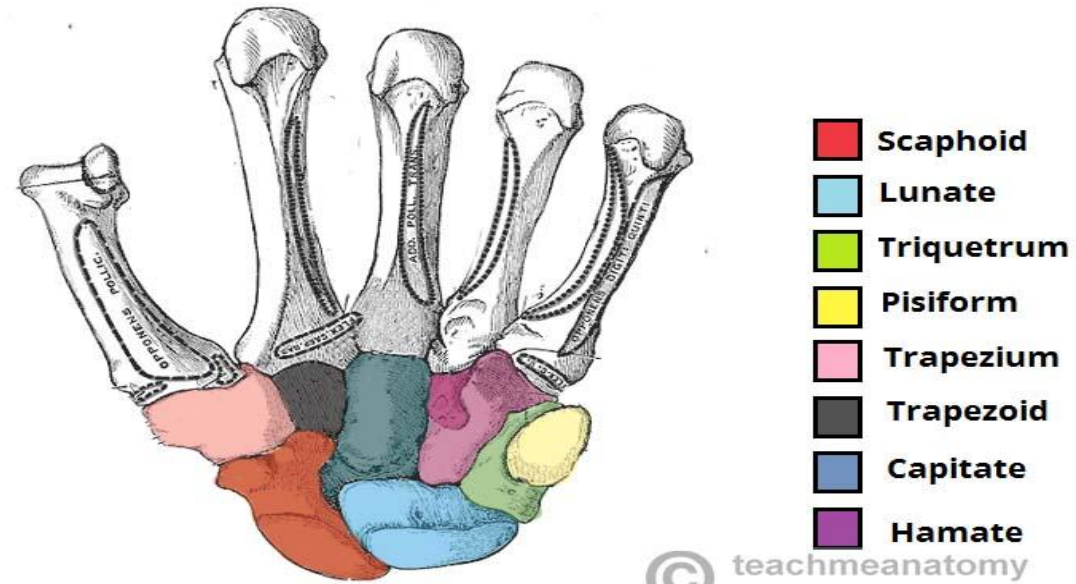
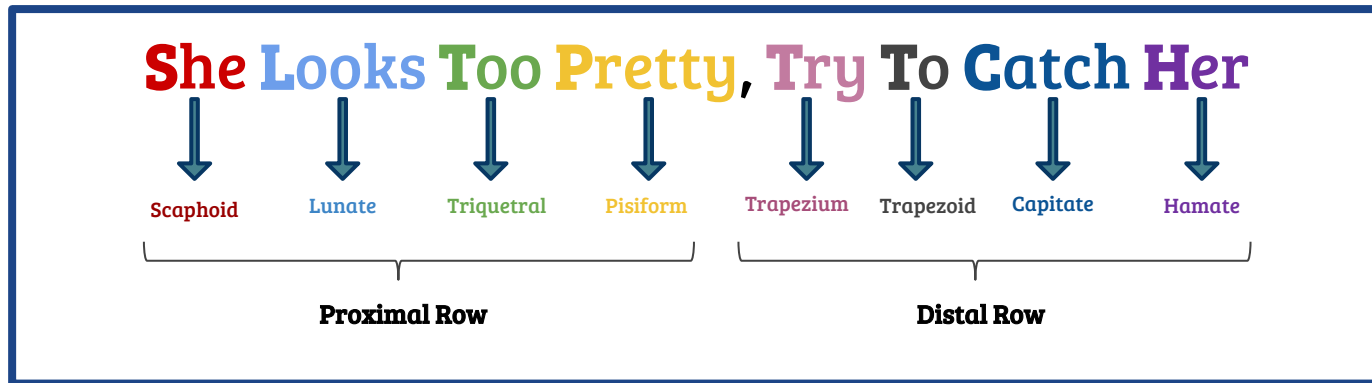
Radius: it shortest and lateral bone of forearm

Proximal End	Shaft (Body)	Distal end
<p>1. Head: small & circular, it's upper surface is concave for articulation with the capitulum.</p> <p>2. Neck</p> <p>3. Radial (bicipital) tuberosity: medially directed and separates the proximal end from the body.</p>	<ul style="list-style-type: none"> Has a lateral convexity It gradually enlarges as it passes distally. 	<ul style="list-style-type: none"> It is rectangular <p>Ulnar Notch: a medial concavity to accommodate the head of the ulna.</p> <p>2. Radial Styloid process: extends from the lateral aspect.</p> <p>3. Dorsal tubercle: projects dorsally</p>
		



Bones of the Wrist and Hand :

- 1. Carpal bones** :Composed of **Eight** short bones
- **Proximal row** (from lateral to medial): **Scaphoid**, **Lunate**, **Triquetrum** & **Pisiform** bones.
 - **Distal row** (from lateral to medial):**Trapezium**, **Trapezoid**, **Capitate** & **Hamate**.

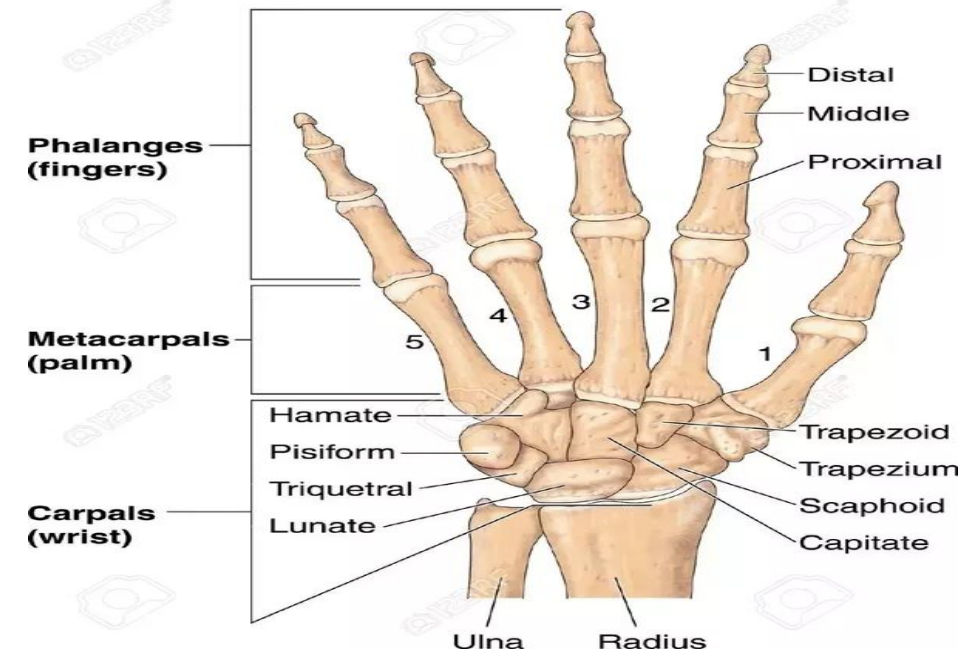


© teachmeanatomy
The #1 Applied Human Anatomy Site on the Web.

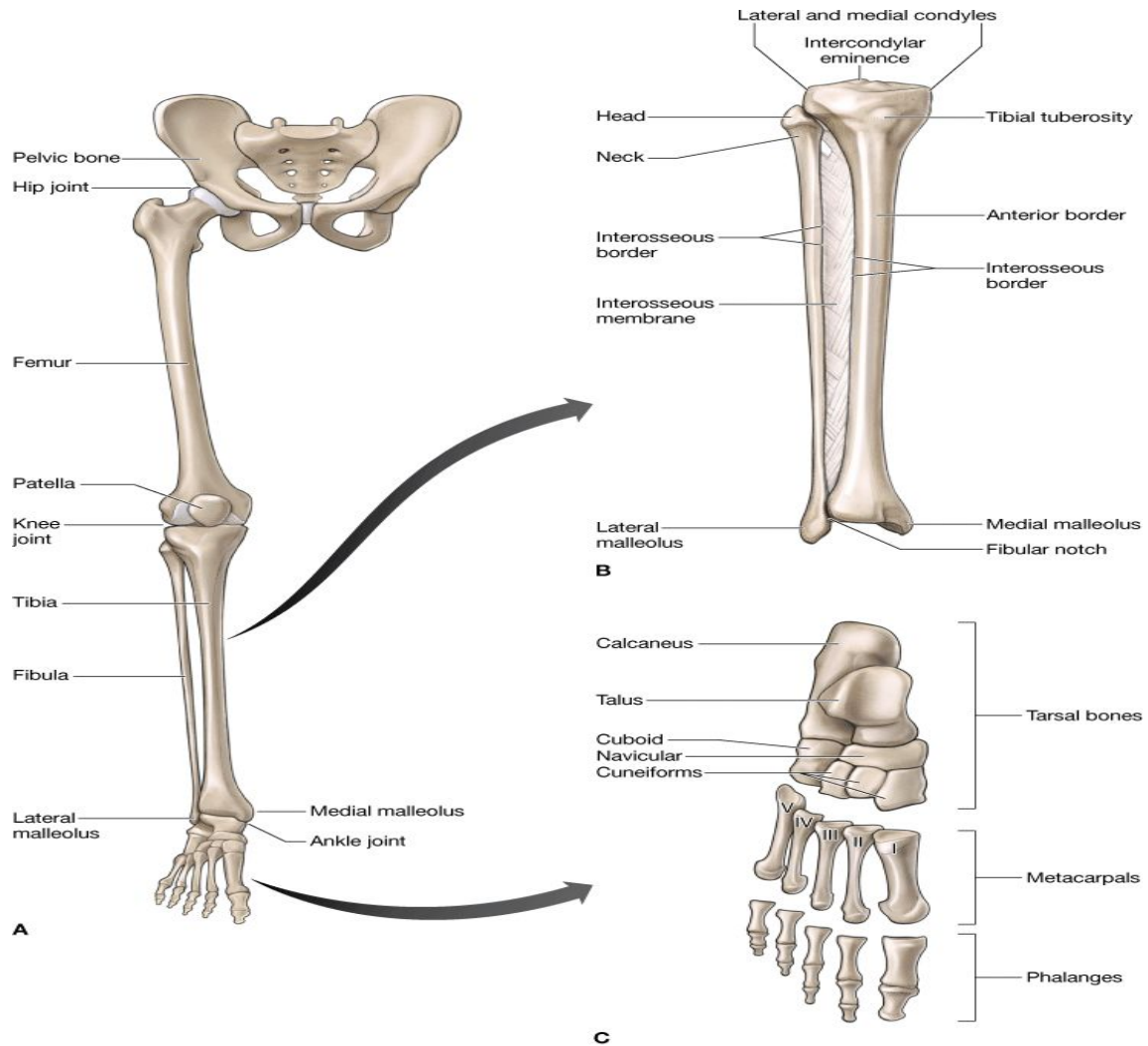
2. Metacarpal bones: **Five** Metacarpal bones, each has a Base, Shaft, and a Head.

3. Phalanges: **Fourteen** Each digit has **Three** Phalanges **Except** the **Thumb** which has only **Two**

Don't forget we start from thumb always.



The Lower Limbs:




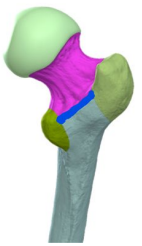

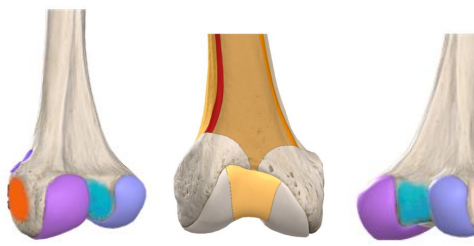
Source: Morton DA, Foreman KB, Albertine KH: *The Big Picture: Gross Anatomy*; www.accessmedicine.com
Copyright © The McGraw-Hill Companies, Inc. All rights reserved.

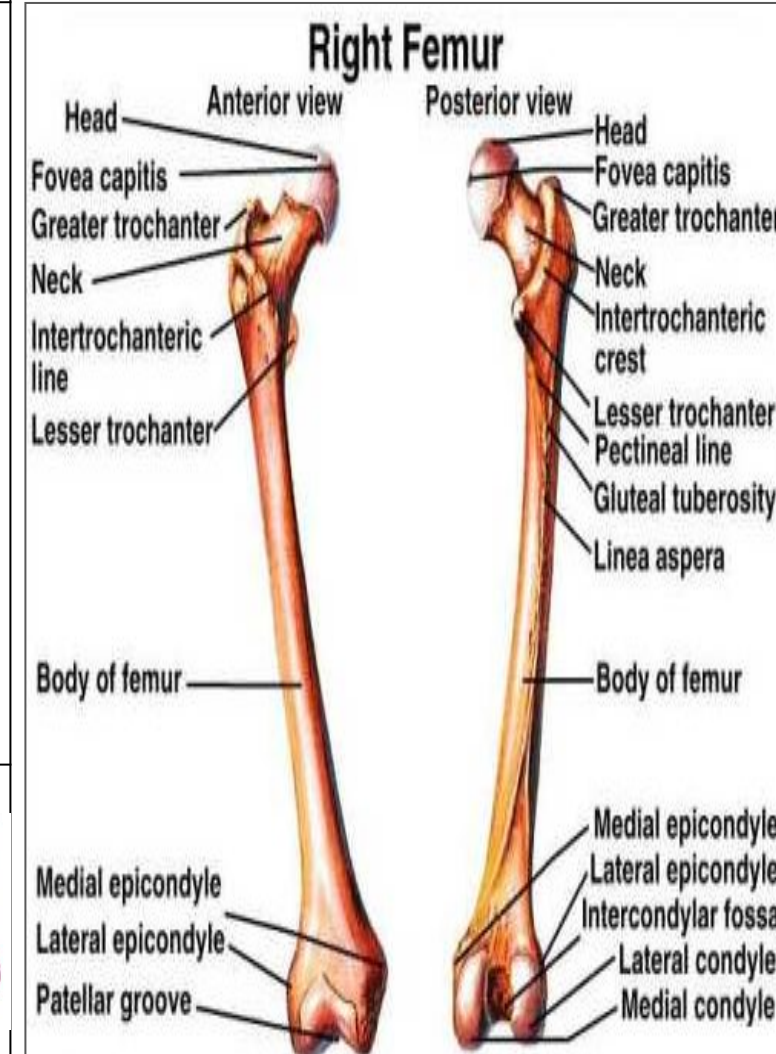
The Bones of **Lower limbs** are:

- Pelvic Girdle: **Hip bone & Sacrum**
- Thigh: **Femur & Patella**
- Leg: **Tibia & Fibula**
- Ankle: **Tarsal bones**
- Foot : **Metatarsal & Phalanges**

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

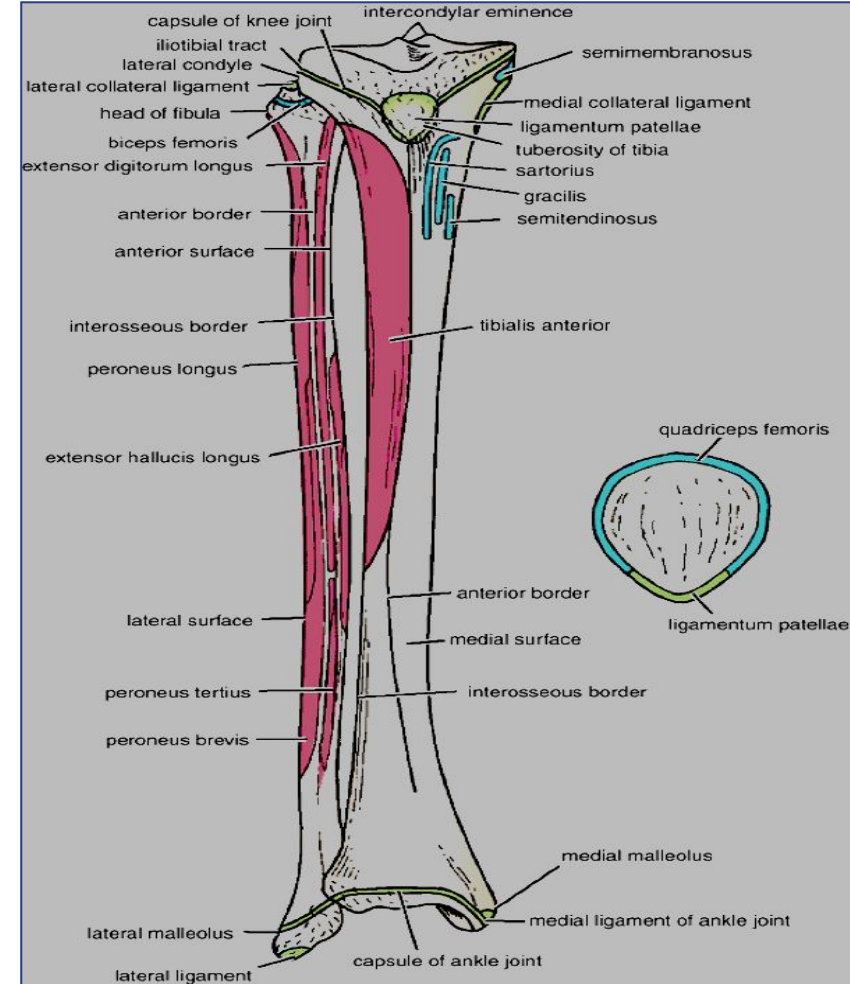
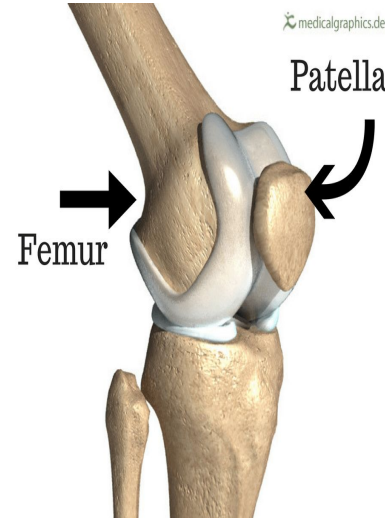
Consists of:

Upper End	Shaft (Body)		Lower end
<ul style="list-style-type: none"> • Head :It articulates with acetabulum of hip bone to form hip joint. • Neck : It connects head to the shaft. • Greater & lesser trochanters • Anteriorly, connecting the 2 trochanters, the inter-trochanteric line, where the iliofemoral ligament (ligament of the hip joint which extends from the ilium to the femur in front of the joint). is attached. • Posteriorly, the inter-trochanteric crest, on which is the quadratus femoris tubercle (Quadratus femoris muscle). 	<p>3 surfaces</p>	<p>3 borders</p>	<ul style="list-style-type: none"> • 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.
<p>Anteriorly  Posteriorly </p>			



Patella:

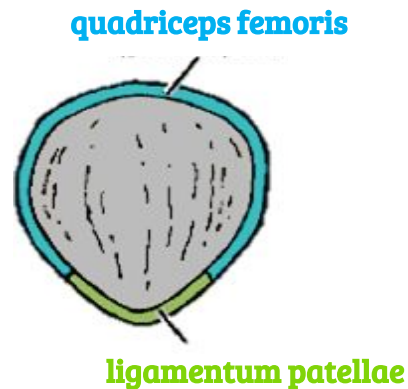
- It's the **largest sesamoid bone**. It lies inside the Quadriceps tendon in front of the knee joint
- It's **anterior surface** is rough and subcutaneous
- It's **posterior surface** articulates with the condyles of the femur to form the knee joint
- It's **apex** lies inferiorly and is connected to the tuberosity of the tibia by **ligamentum patellae**
- It's **upper, lateral, and medial margins** gives **attachments to quadriceps femoris** muscle
- **Base of patella*** (Extra note)



Anterior



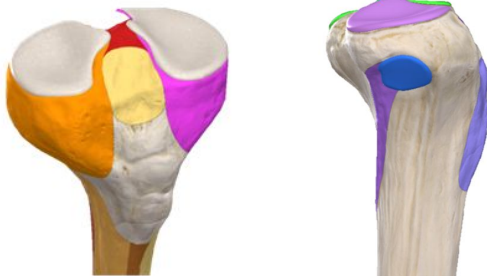




posterior

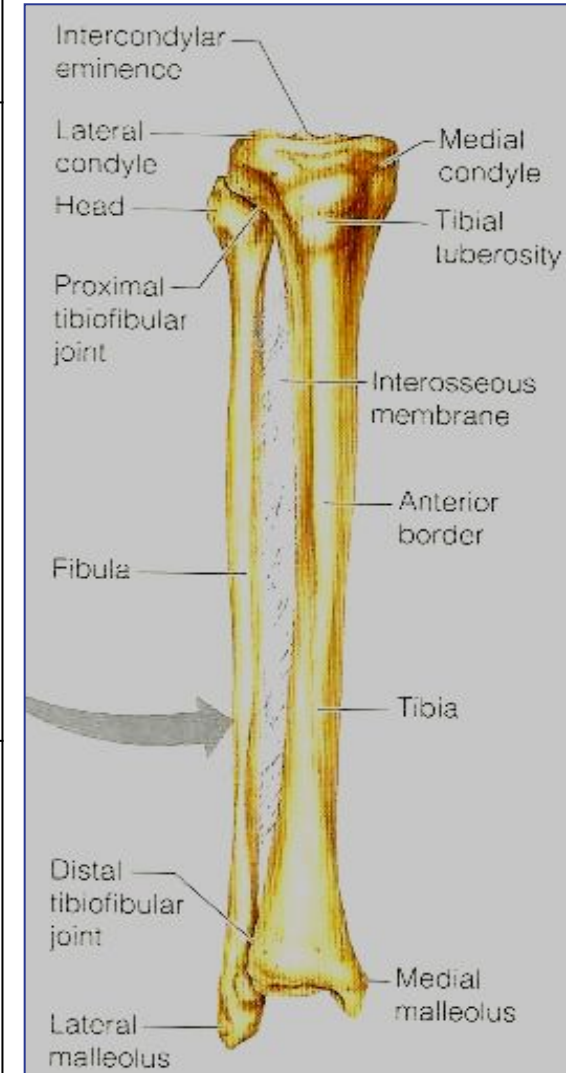


ligamentum patellae

Bones of leg(Tibia and Fibula): Each of them has upper end, shaft, and lower end.




1- Tibia :It is the medial bone of leg.

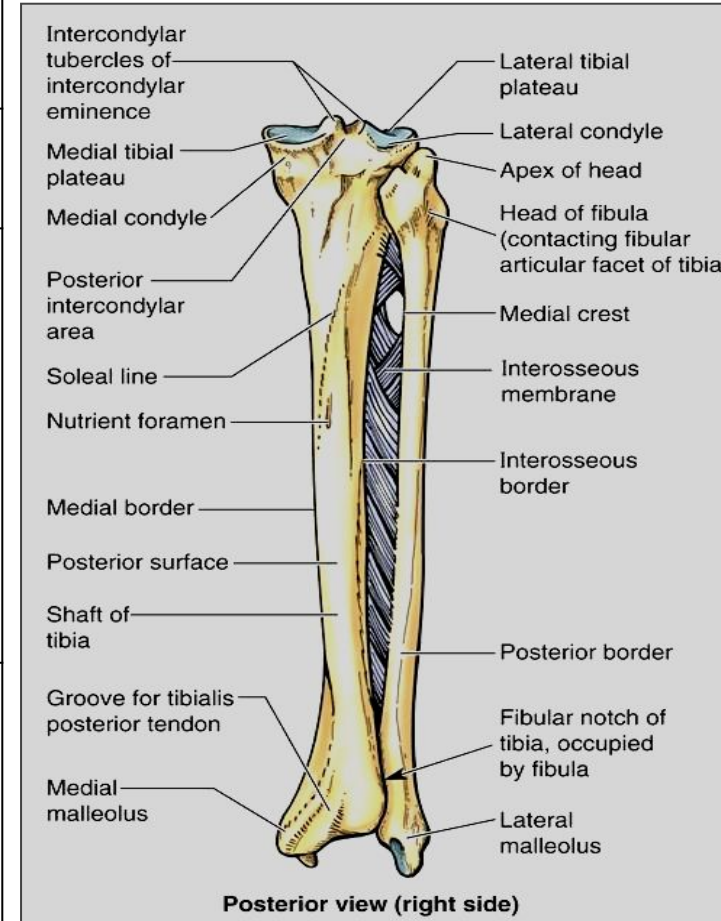
Upper End	Shaft (Body)			Lower end
<p>Medial condyle : is larger and articulate with medial condyle of femur. It has a groove on its posterior surface for semimembranosus muscles.</p> <p>Lateral condyle : is smaller and articulates with lateral condyle of femur.</p> <p>It has facet on its lateral side for articulation with head of fibula to form proximal tibio-fibular joint.</p> <p>Intercondylar area : is rough and has intercondylar eminence.</p>	<p>Tibial tuberosity :</p>	<p>It has 3 surfaces</p>	<p>It has 3 borders</p>	<p>Articulates with talus for formation of ankle joint.</p> <p>Medial malleolus: Its medial surface is subcutaneous. Its lateral surface articulate with talus.</p> <p>Fibular notch: lies on its lateral surface of lower end to form distal tibiofibular joint</p>
		 <p>Posterior</p>	 <p>Medial</p> <p>Anterior</p> <p>Lateral</p>	



2- Fibula: It is the lateral bone of leg.

- It is the slender lateral bone of the leg
- It takes no part in articulation of knee joint

Upper End	Shaft	Lower end
<ul style="list-style-type: none"> • Head: articulate s with lateral condyle of tibia • Neck • Styloid process 	<ul style="list-style-type: none"> • 4 borders: it's medial interosseous border gives attachment to interosseous membrane • 4 surfaces: 	<p>Lateral malleolus: It's subcutaneous, it's medial surface is smooth for articulation with talus to form ankle joints</p> <p>Malleolus Groove*</p> <p>Extra note</p>
		



Fibula

Upper end:

- fibular head
- neck of fibula

Shaft:

- interosseous border

Lower end:

- lateral malleolus



Bones of the Ankle and Foot:

- **7 Tarsal Bones:**

1. **Calcaneum**
2. **Talus**
3. **Navicular**
4. **Cuboid**
5. **Medial cuneiform**
6. **Intermediate cuneiform**
7. **Lateral cuneiform**



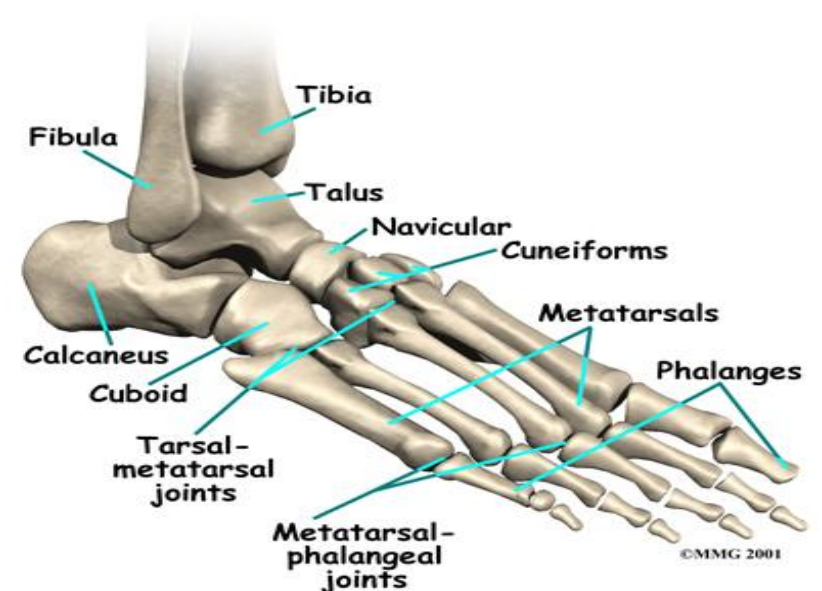
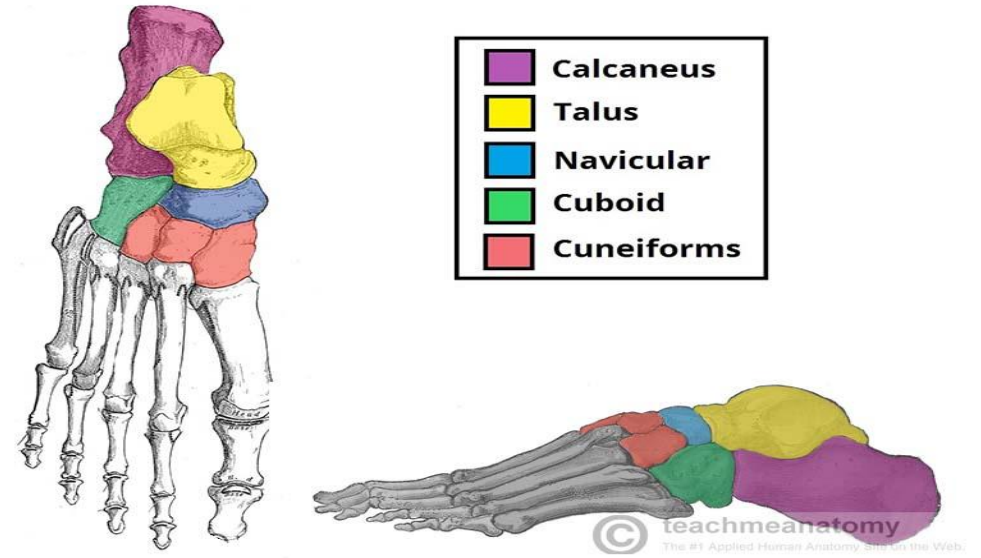
- Only **Talus** articulates with the tibia & fibula at ankle joint
- **Calcaneum** is the largest bone of the foot, it forms the heel

- **5 Metatarsal Bones**

They are numbered from medial (big toe) to lateral.
 1st 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 the big toe (proximal & distal)
3 phalanges for each of the lateral 4 toes (proximal, middle, and distal).



MCQs

Question 1: The medial bone of the leg is:

- A. Femur
- B. Humerus
- C. Tibia
- D. Fibula

Question 2: The cuboid bone of the foot is considered:

- A. Metatarsal and is located on the medial side of the foot
- B. Tarsal and is located on the medial side of the foot
- C. Metatarsal and is located on the lateral side of the foot
- D. Tarsal and is located on the lateral side of the foot

Question 3: The lower end of the articulates with the talus to formation of ankle joint

- A. Tibia
- B. Femur
- C. fibula
- D. Both A,C

Question 4: A thick border found posteriorly in the femur:

- A. Axillary border
- B. Medial border
- C. Linea aspera
- D. medial styloid

Question 5: Which surface of the medial malleolus of the tibia articulates with the talus:

- A. Anterior surface
- B. Posterior surface
- C. Lateral surface
- D. Medial surface

Question 6: Apex of the patella lies inferiorly and is connected to:

- A. tibia.
- B. Fibula
- C. Condyles of the femur
- D. Tuberosity of tibia

SAQ

Question 1: List the three Processes of the scapula .

- 1- Spine
- 2- Acromion
- 3- Coracoid

Question 2 : Lateral condyle has facet on its lateral side for articulation with head of fibula to form?

Proximal tibiofibular joint.

Team members

Boys team:

- Khalid AL-Dossari
- Naif Al-Dossari
- Faisal Alqifari
- ★ Salman Alagla
- Ziyad Al-jofan
- Suhail Basuhail
- Ali Aldawood
- Khalid Nagshabandi
- Mohammed Al-huqbani
- Jehad Alorainy
- Khalid AlKhani
- Omar Alammari

Team leaders

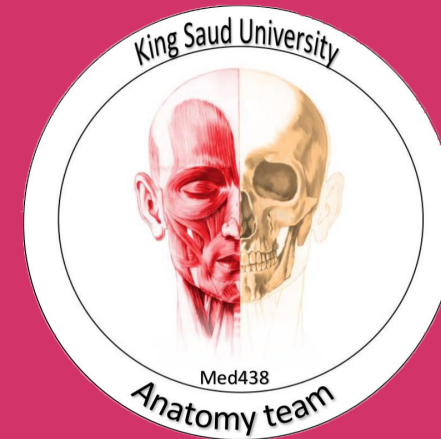
- ★ Abdulrahman Shadid
- Ateen Almutairi

★ =This lecture done by

Girls team :

- Ajeed Al Rashoud
- Taif Alotaibi
- Noura Al Turki
- Amirah Al-Zahrani
- Alhanouf Al-haluli
- Sara Al-Abdulkarem
- Rawan Al Zayed
- Reema Al Masoud
- Renad Al Haqbani
- Nouf Al Humaidhi
- Fay Al Buqami
- Jude Al Khalifah
- Nouf Al Hussaini
- Alwateen Al Balawi
- Rahaf Al Shabri
- Danah Al Halees
- Haifa Al Waily
- Rema Al Mutawa
- Amirah Al Dakhilallah
- Maha Al Nahdi
- Renad Al Mutawa
- Ghaida Al Braithen
- Reham Yousef

Special thank for
Anatomy team 436



Good luck

Give us your feedback:

