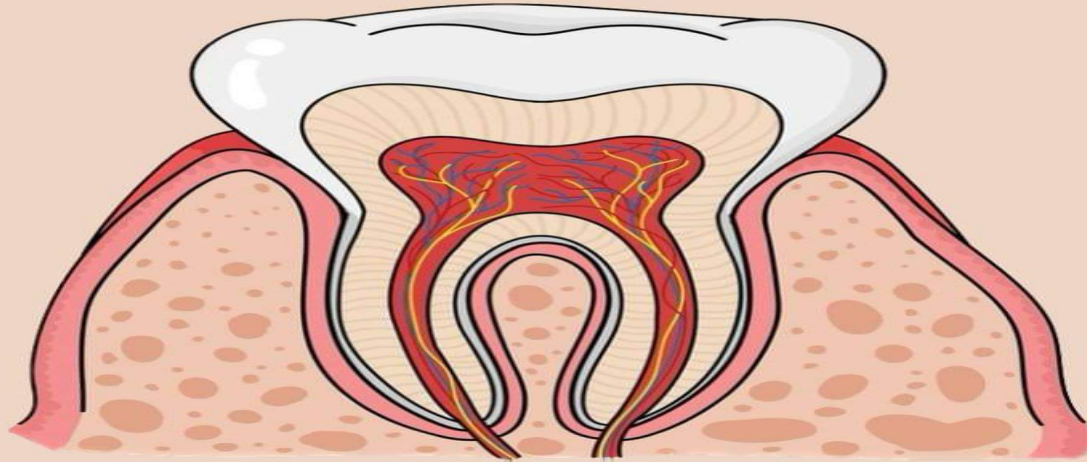




ANATOMY



LEC NO. : 4

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وَقُلْ رَبِّ زِدْنِي عِلْمًا



Appendicular system part 1

General Anatomy lecture # 3

Bones of upper limb

By Heba Ali
DDS, MSc, PhD (UK)

DIVISIONS OF THE SKELETAL SYSTEM

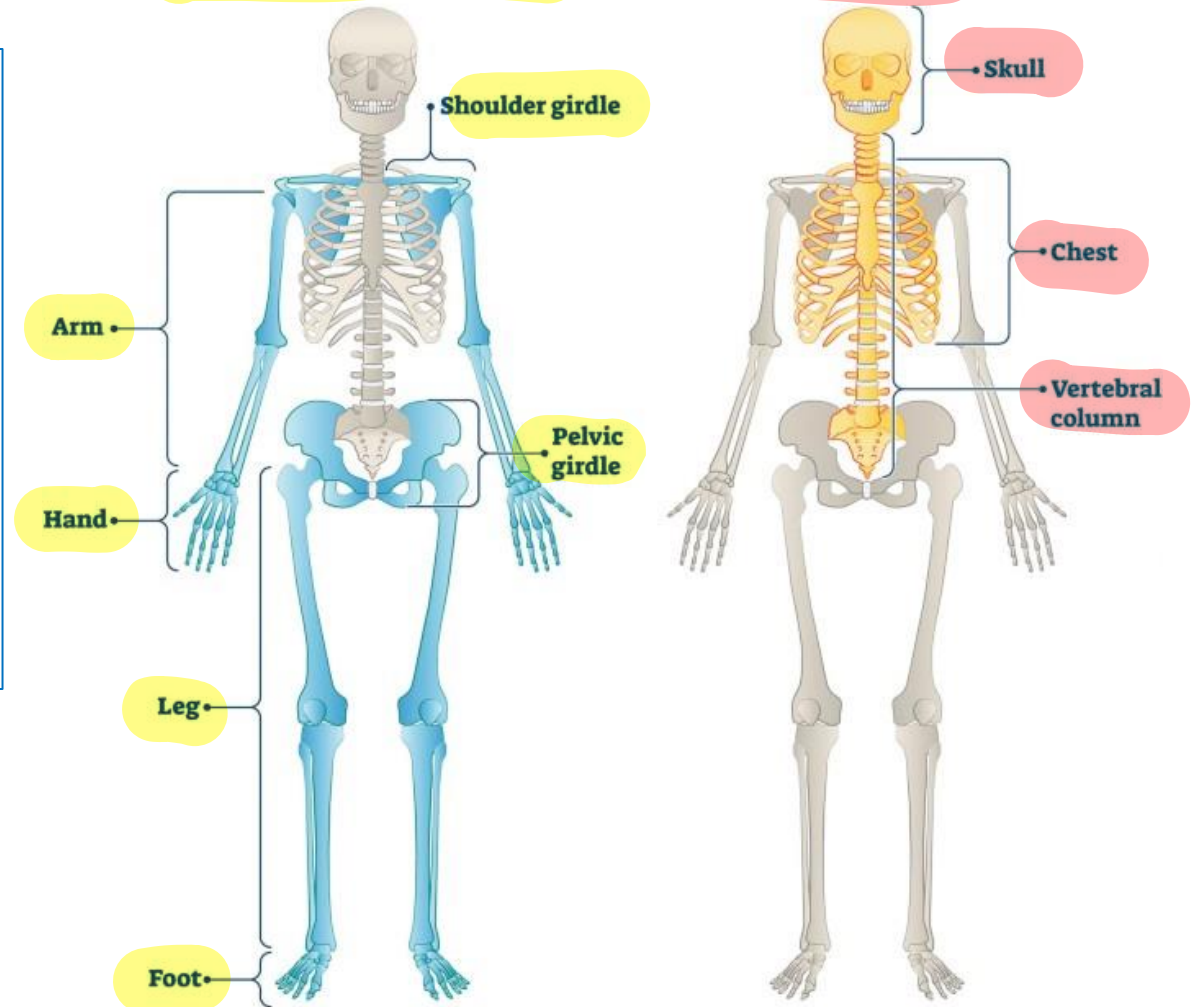
زوائد نخریے سے

Appendicular skeleton

Axial skeleton

The **axial skeleton** consists of the elements forming the central axis of the body.

The **appendicular skeleton** consists of the bones forming the upper and lower limb girdles and extremities.



REGION OF SKELETON	NUMBER OF BONES (ADULT)
I. Axial skeleton	
Skull	
Cranium	8
Face	14
Auditory ossicles	6
Hyoid	1
Vertebrae (including sacrum and coccyx)	26
Sternum	1
Ribs	24
II. Appendicular skeleton	
Shoulder girdles	
Clavicle	2
Scapula	2
Upper extremities	
Humerus	2
Radius	2
Ulna	2
Carpals	16
Metacarpals	10
Phalanges	28
Pelvic girdle	
Os coxae	2
Lower extremities	
Femur	2
Patella	2
Fibula	2
Tibia	2
Tarsals	14
Metatarsals	10
Phalanges	28

BONE MARKING	EXAMPLE
Linear elevation مرتفع / بارز	
Line	Superior nuchal line of the occipital bone
Ridge	The medial and lateral supracondylar ridges of the humerus
Crest	The iliac crest of the hip bone
Rounded elevation منحنی line میں	
Tubercle	Pubic tubercle
Protuberance	External occipital protuberance
Tuberosity	Greater and lesser tuberosities of the humerus
Malleolus	Medial malleolus of the tibia, lateral malleolus of the fibula
Trochanter	Greater and lesser tuberosities of the humerus
Sharp elevation حاد	
Spine or spinous process	Ischial spine, spine of the vertebra
Styloid process	Styloid process of temporal bone

Expanded ends for articulation

انتعاش مسان یرھل تحفصل

Head	Head of humerus, head of femur
Condyle	Medial and lateral condyles of femur (knuckle-like process)
^{above} Epicondyle (a prominence situated just above condyle)	Medial and lateral epicondyles of femur

Small flat area for articulation

چابکوں میں بروز فی العظم

Facet	Facet on head of rib for articulation with vertebral body
-------	---

یچھو علیہا حرکتہ انی لاتے
آہفصل ع سطح مستوی

Depressions

جونیف

Notch	Greater sciatic notch of hip bone
Groove or sulcus	Bicipital groove of humerus
Fossa	Olecranon fossa of humerus, acetabular fossa of hip bone

Openings

فقوج نسمح لا structures
ب العور من حلالا

اھم openings موجود ہیں ب
الھام

Fissure	Superior orbital fissure
Foramen	Infraorbital foramen of the maxilla
Canal	Carotid canal of temporal bone

Meatus القنوی کے السمویة
internal or external

External acoustic meatus of temporal bone

Bones of upper limb

الوحيدة ياتي بنتيجة horizontal

• **Clavicle (1), scapula** (Shoulder plate)

(1), humerus (1), → The longest bone in upper limb.

← **ulna(1), radius(1)**, → lateraly

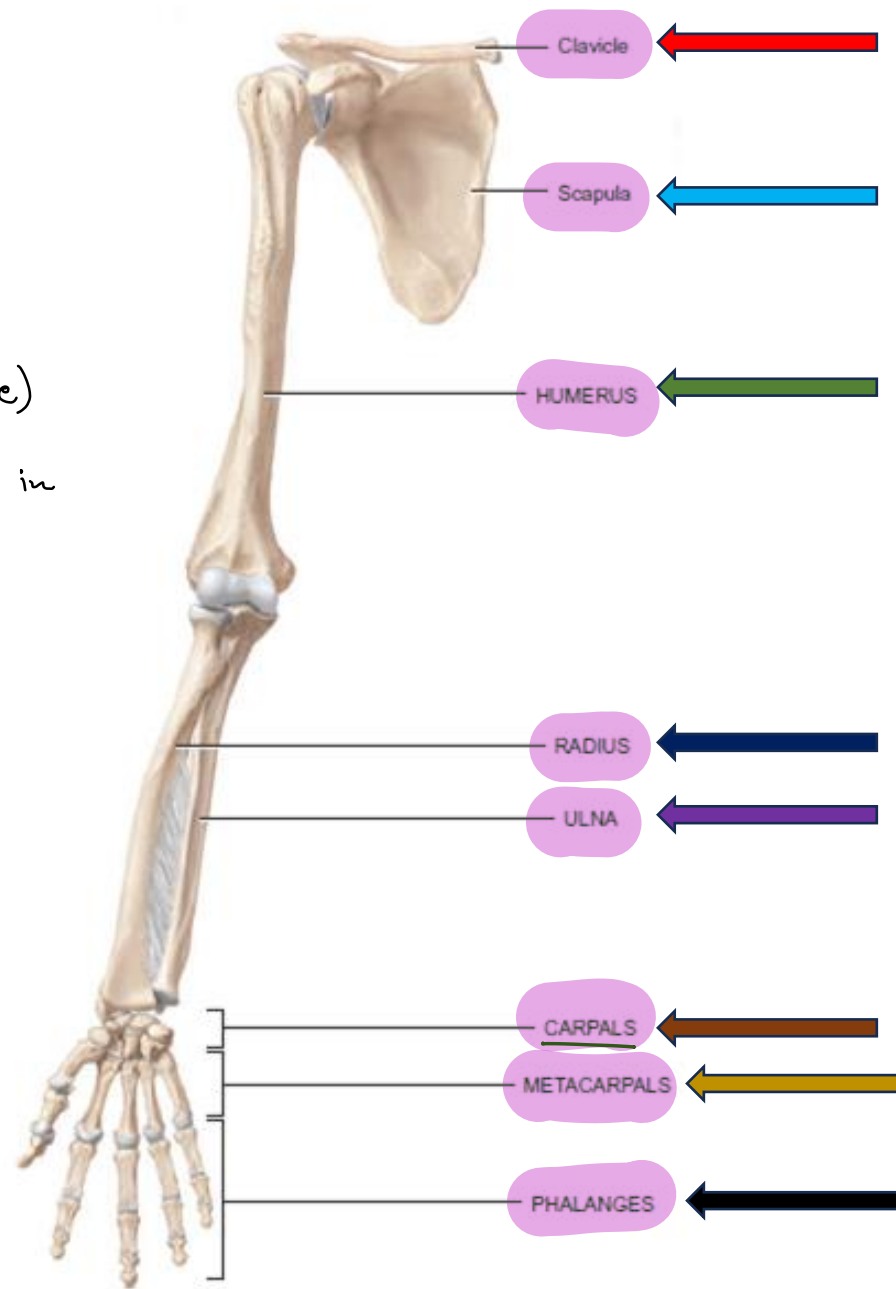
← **carpal bones (8)**,

metacarpal bones (5),

and **phalanges (14)**.

medialy

articulation ← سجالوا
radius ← فح
wrist joint ← عشان يكونوا



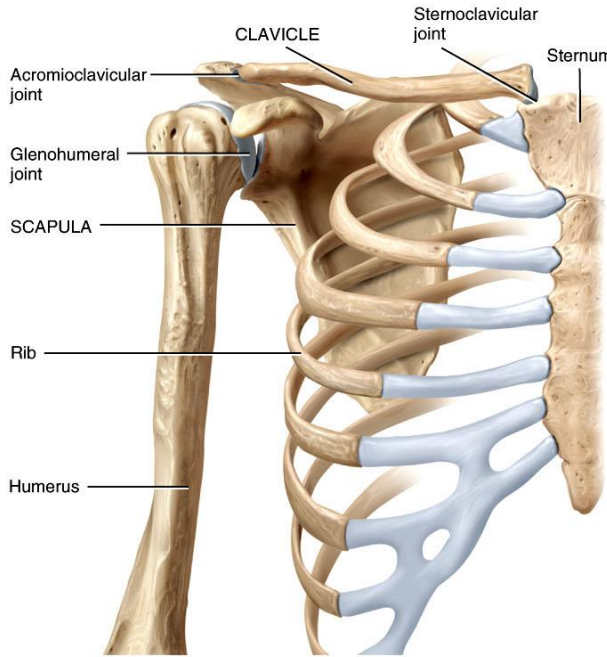
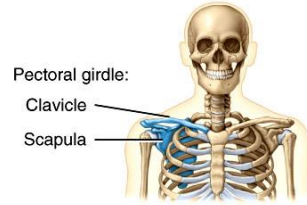
Anterior view of free upper limb

شيء يشبه الحزام

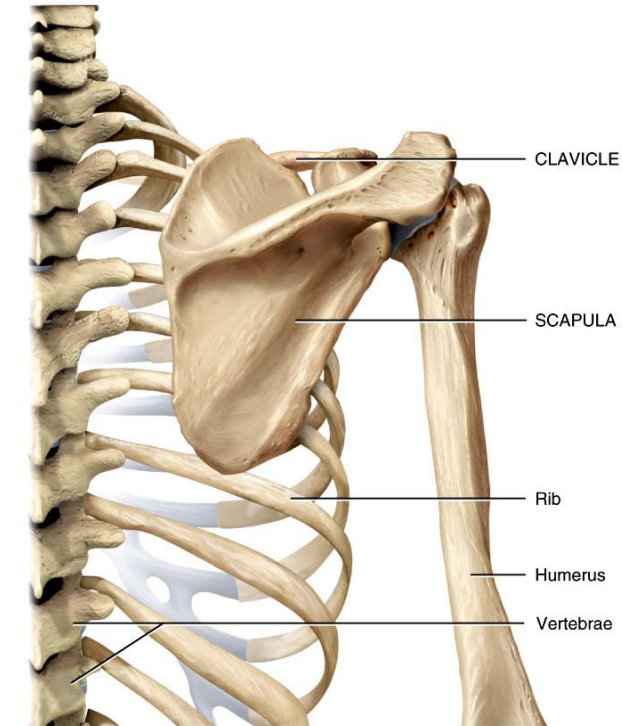
Pectoral (shoulder) girdle

The clavicle and scapula form the pectoral (shoulder) girdle.

Attaches the upper limb to the trunk



(a) Anterior view of pectoral girdle



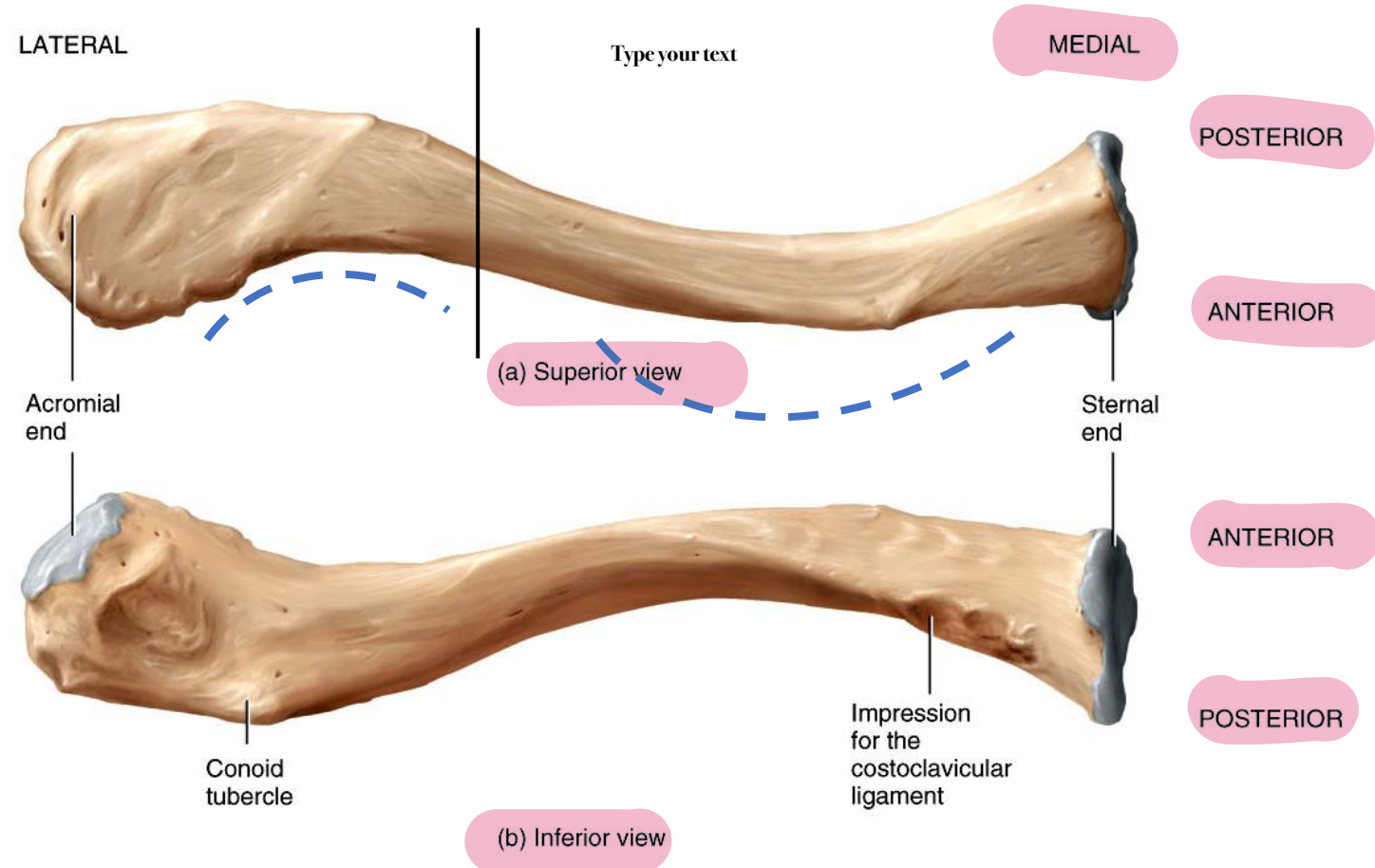
(b) Posterior view of pectoral girdle

الupper limbs ييرتبطوا مع الtrunk من خلال girdles و هي يلي بتضمن انه ال wide range of upper limb تكون شوي بعيدة عن trunk و يكون عندي و الforces تنتقل من الupper limb للaxial skeleton عن طريقهم.

في عنا short girdle(pectoral) و الثاني موجود ب اسمه pelvic girdle و هو يلي يربط الhip bone مع axial skeleton

Clavicle

- S-shaped, located between the sternum and the scapula
- Lies horizontally across the root of the neck
- The clavicle is subcutaneous and easily palpable
واضح للورثي واحسسه خصوصا عند الناس المنحرفة.
- The medial two-thirds of the clavicle is convex anteriorly, whereas the lateral one-third is concave anteriorly.
محدب مقعر
- The superior surface of the clavicle is smooth, while the inferior surface is rough.



Clavicle

• Has two ends:

1. **Sternal extremity:** ^{نهاية} it is rounded & articulates with **manubrium** part of sternum to form:

Sterno-clavicular joint.

2. **Acromial extremity**

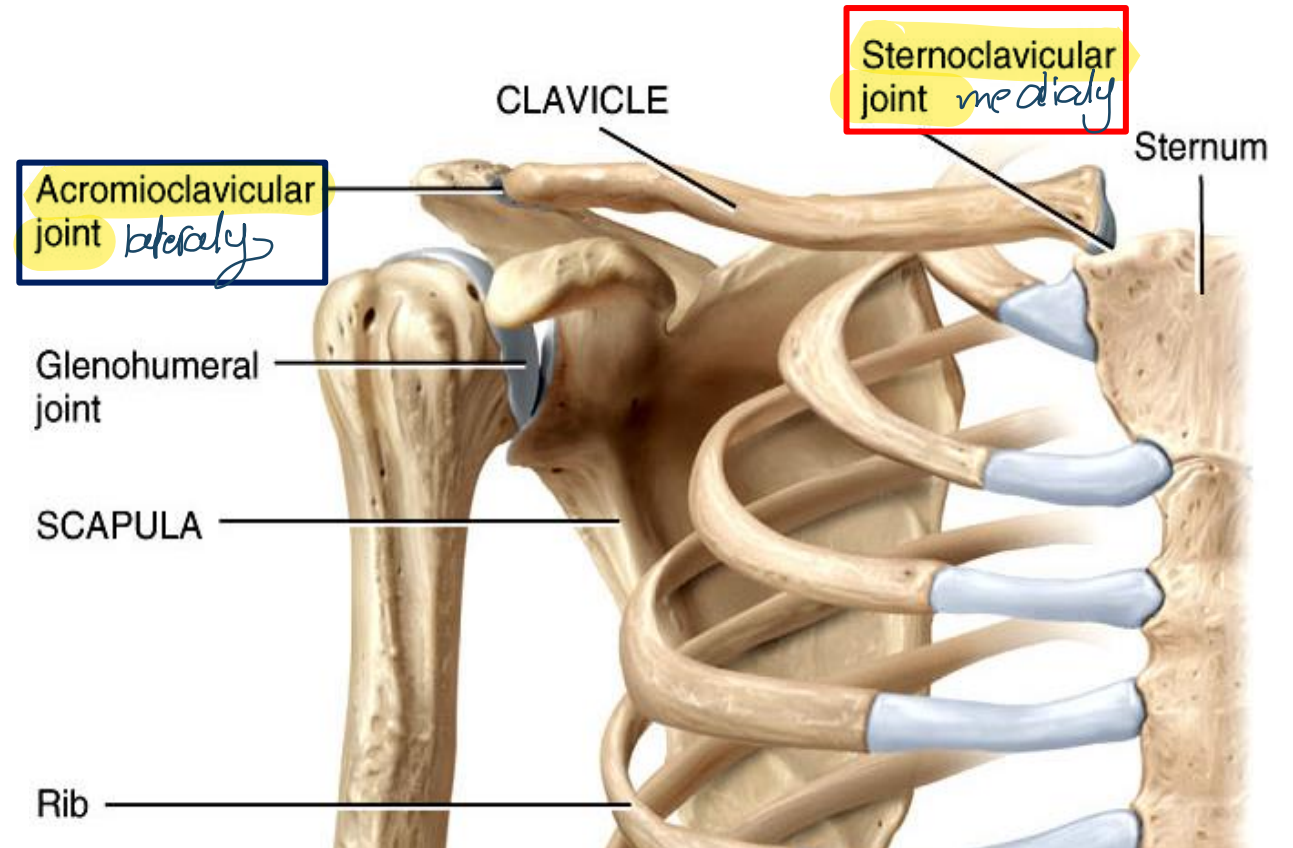
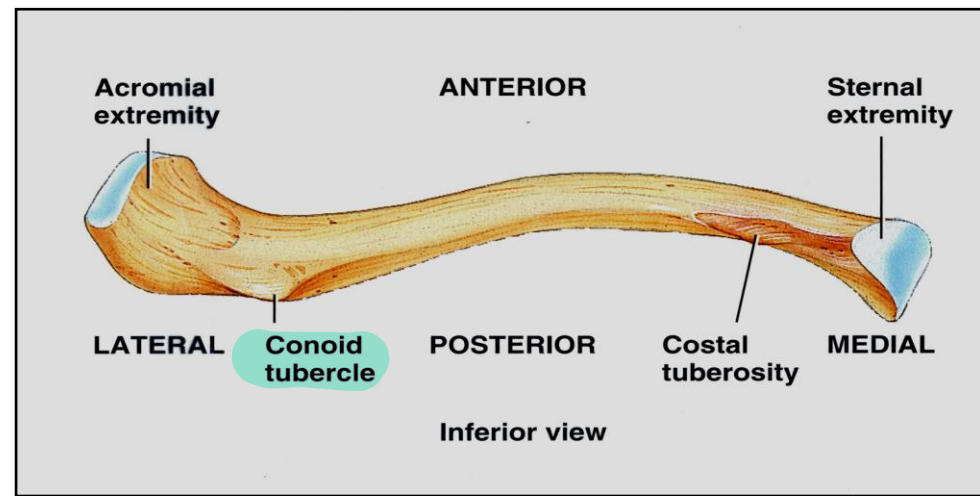
is broad and flat & articulates with the acromion process of **scapula** to form:

Acromio-clavicular joint.

الجزء البارز في الكتف
ويتكون من أعلى الكتف.

The **conoid tubercle** is a small, roughened elevation on the inferior surface, near the acromial end.

تسمى 5 attachment



خفيفة جداً

Scapula (shoulder blade)

freely articularily ما بتعمل
bone في ما في muscles مovable
بتمحلي بالحركة عن طريق الانزلاق على
thoracic cage

- Triangular in shape
- Floating freely posteriorly
- Lies on the posterior chest wall **between the second and seventh ribs** إذا. كيس فيها من أعلى رقبة
- Articulates with the acromial extremity of the **clavicle** and the head of the **humerus** في
glenohumeral joint / shoulder joint.



Scapula *irregular shaped*

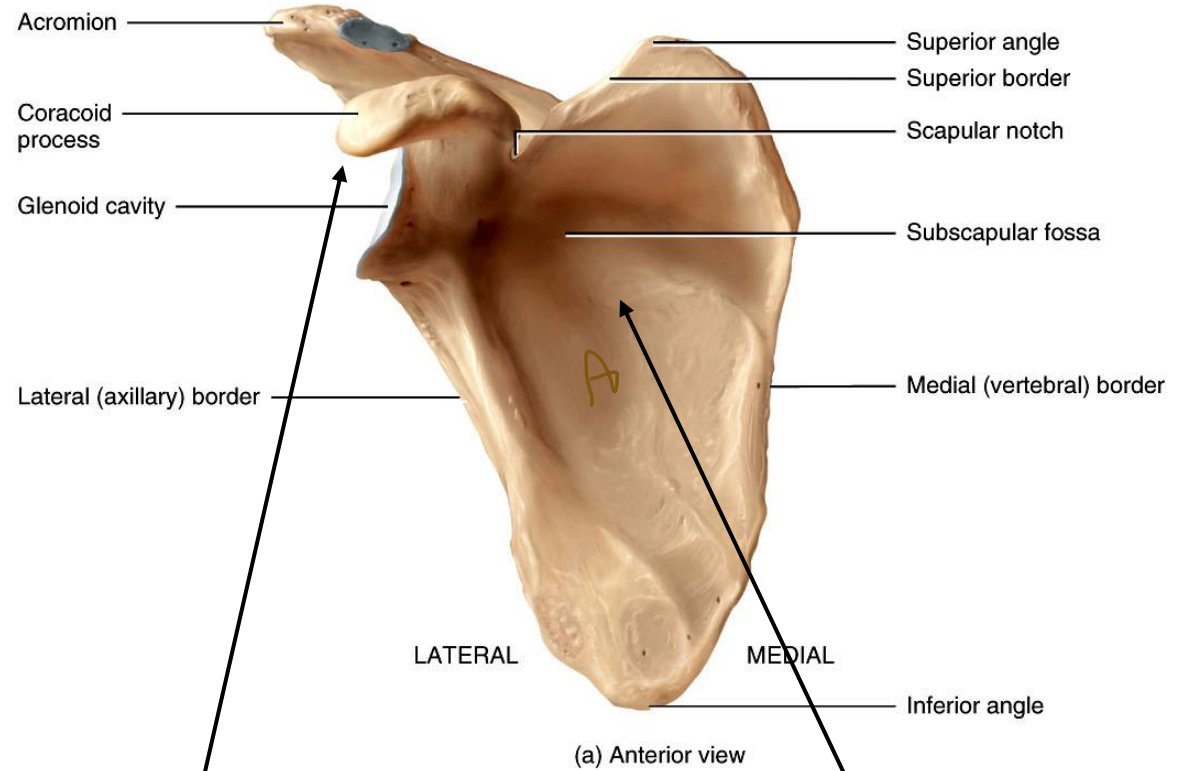
حظائے

- **Three borders (superior, medial, & lateral)**
- **Three angles (superior, inferior, & lateral)**
- **Two surfaces: dorsal (post.), costal (ant.)**
- **Three large bony processes (acromion, coracoid, & spine).**

عظمت

الاعمال

Scapula
نقسم ال
lower + upper



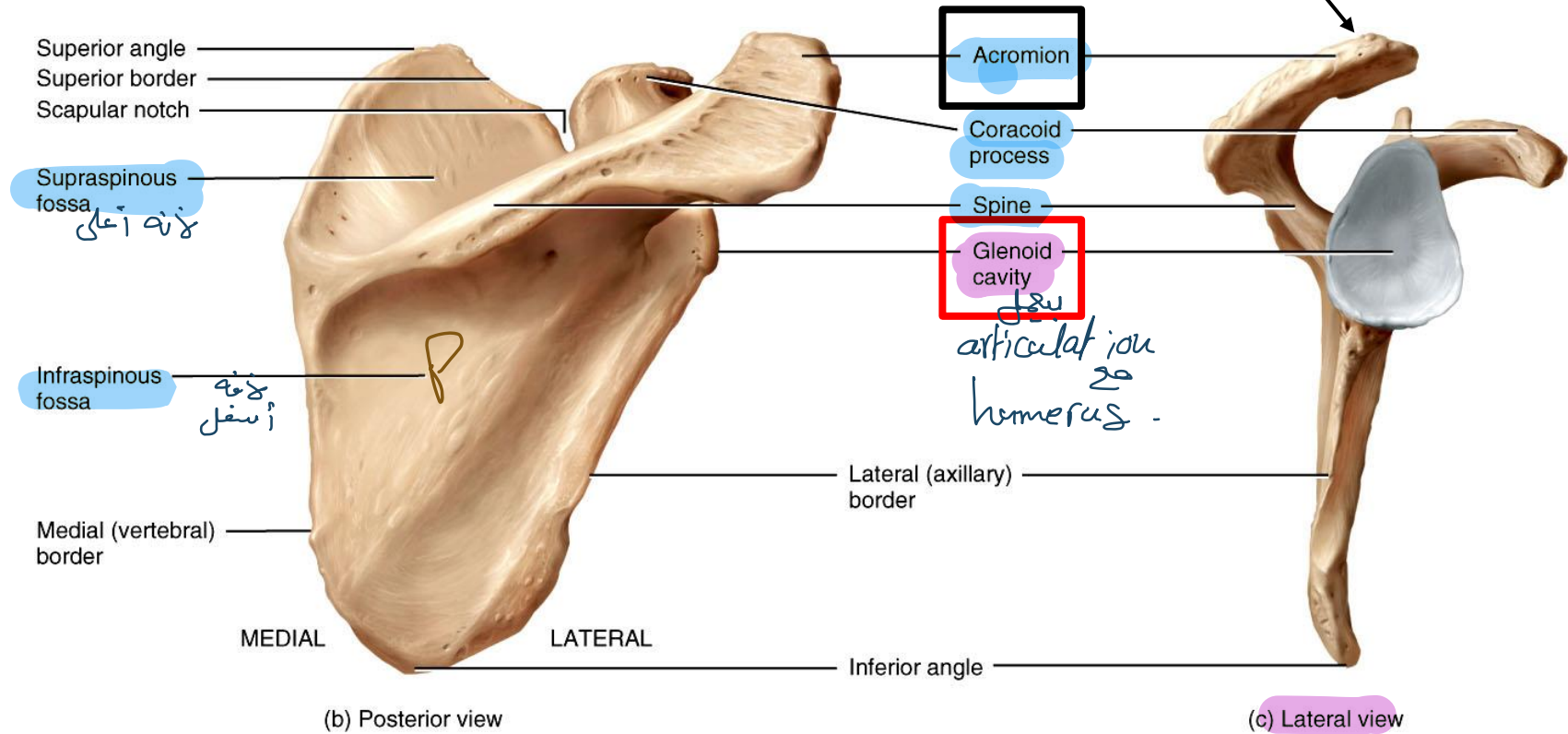
منقار
Coracoid process (Anteriorly)
 Beaklike structure projects anterolaterally

Subscapular fossa
 Shallow concavity at the costal (ventral, anterior) surface of the scapula

Scapula

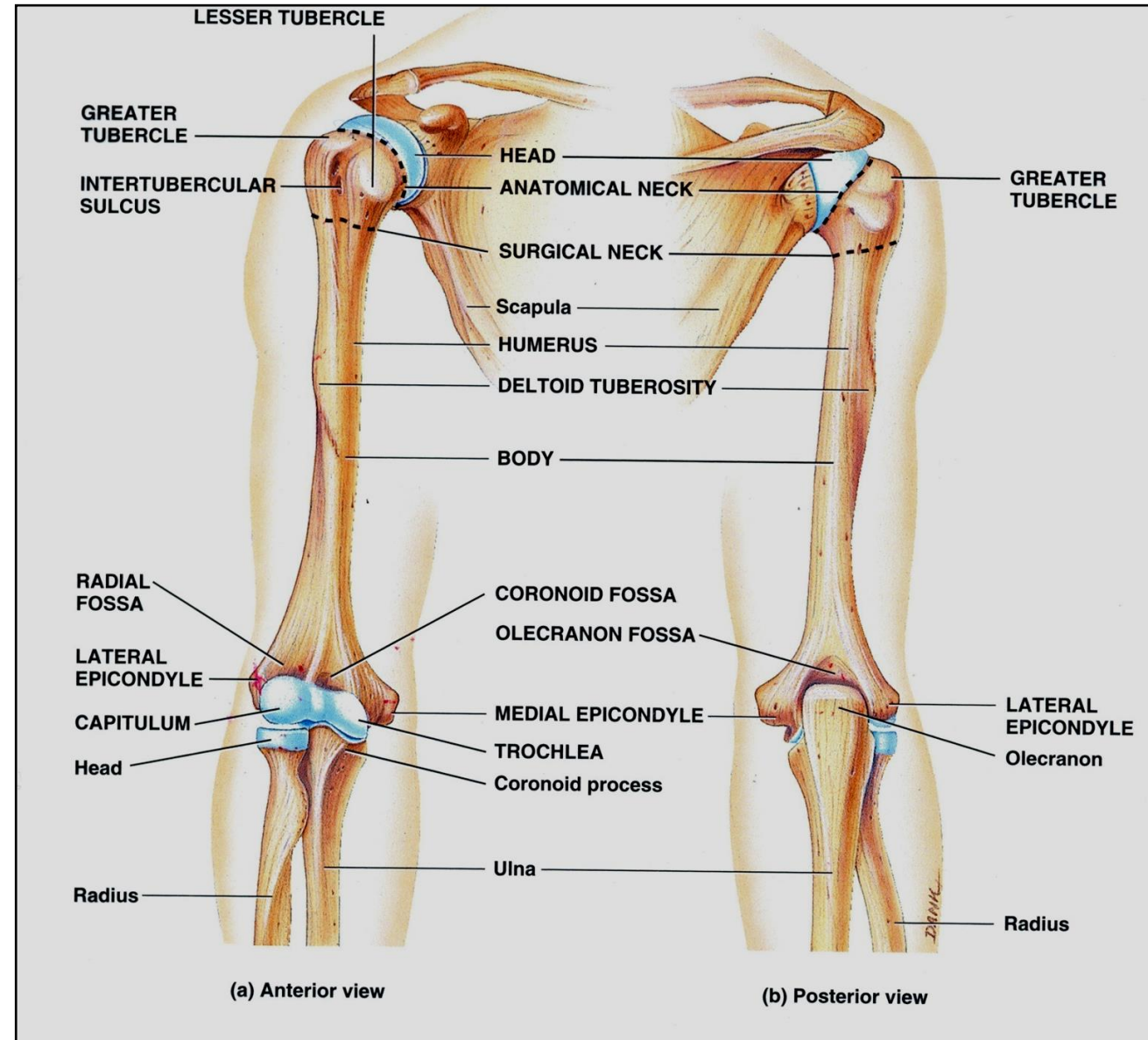
- **The glenoid cavity** is a shallow articular surface, or fossa articulates with the head of the humerus.

Acromion: Flat lateral extension of the spine of the scapula, easily palpable tip of the shoulder.



Humerus

- The longest bone of the upper limb.
- **Proximally**, articulates with the **glenoid cavity of the scapula**, at the **glenohumeral (shoulder) joint**.
قريب من Frank
- **Distally**, it articulates with **the head of the radius and the trochlear notch of the ulna**, at the **elbow joint**.
بعيد من Frank
- Can be divided into three main regions: (1) **proximal extremity**, (2) **body or shaft**, and (3) **distal extremity**.

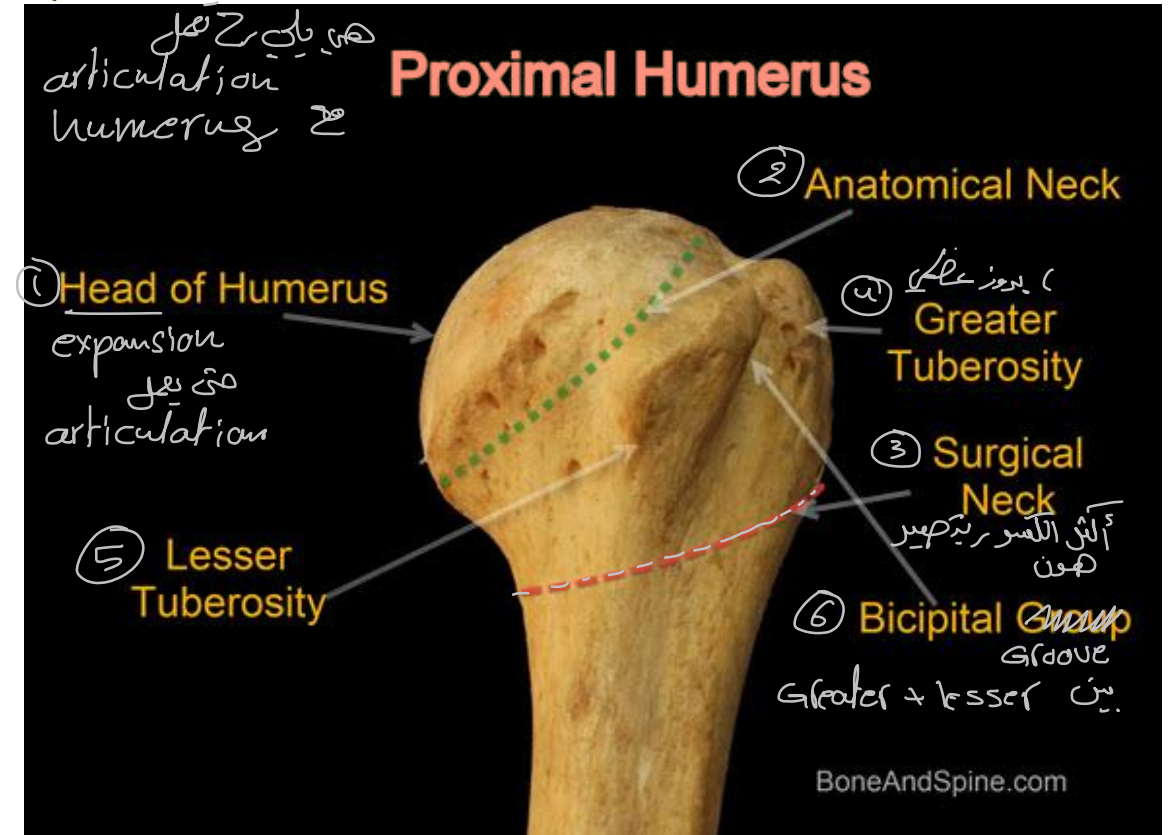


Humerus (proximal end)

توجيه

- **The head** : round **Orientation**: medially, superiorly, and slightly posteriorly
- **The greater tubercle (tuberosity)**: on the lateral proximal end of the humerus, lateral to the head.
- **The lesser tubercle (tuberosity)** on the anterior proximal end of the humerus, and medial to the greater tubercle.
- **The intertubercular (bicipital) groove** on the anterior surface of the humerus that separates the greater and lesser tubercles.
- **The anatomical neck** is the slightly constricted region surrounding the articular surface of the head.
- **The surgical neck** is the constricted area immediately inferior to the greater and lesser tubercles.

سهلين
من احفظوا
صواعقهم مع
الرسيه

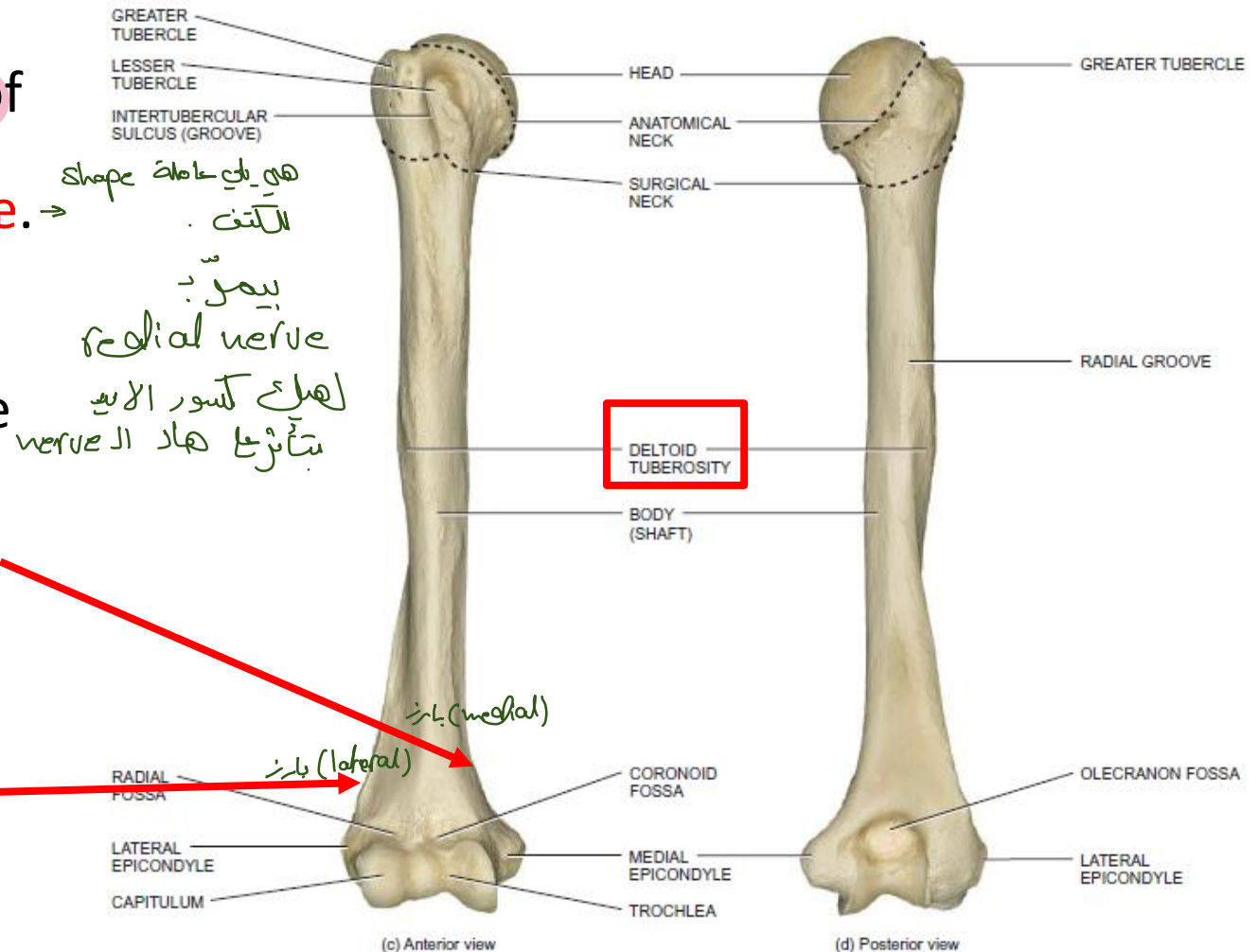


Humerus (shaft)

- founded elevation*

• **The deltoid tuberosity** : on the anterolateral surface of the midshaft of the humerus. This serves as the attachment area for the **deltoid muscle**. →
- **Radial groove, or spiral groove** is the shallow depression that spirals around the posterior and lateral aspects of the midshaft of the humerus.
- ind elevation*

• **The medial supracondylar ridge** is the narrow ridge running proximally from the medial epicondyle, forming the lower medial border of the humerus.
- **The lateral supracondylar ridge** is the narrow ridge running proximally from the lateral epicondyle, forming the lower lateral border of the humerus.

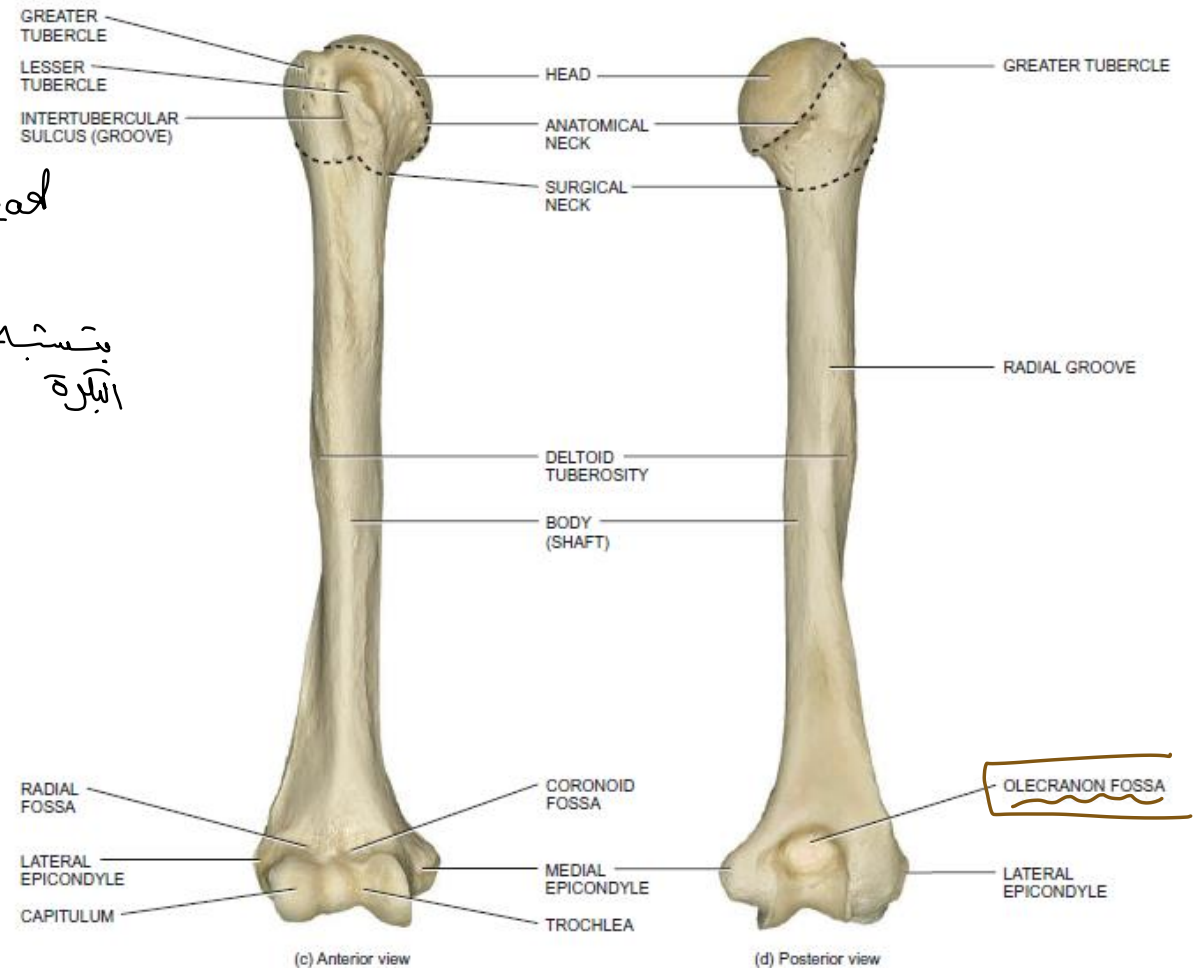


away from the origin.

Humerus (distal end)

muscle attachment مواقع الارتباط العضلي

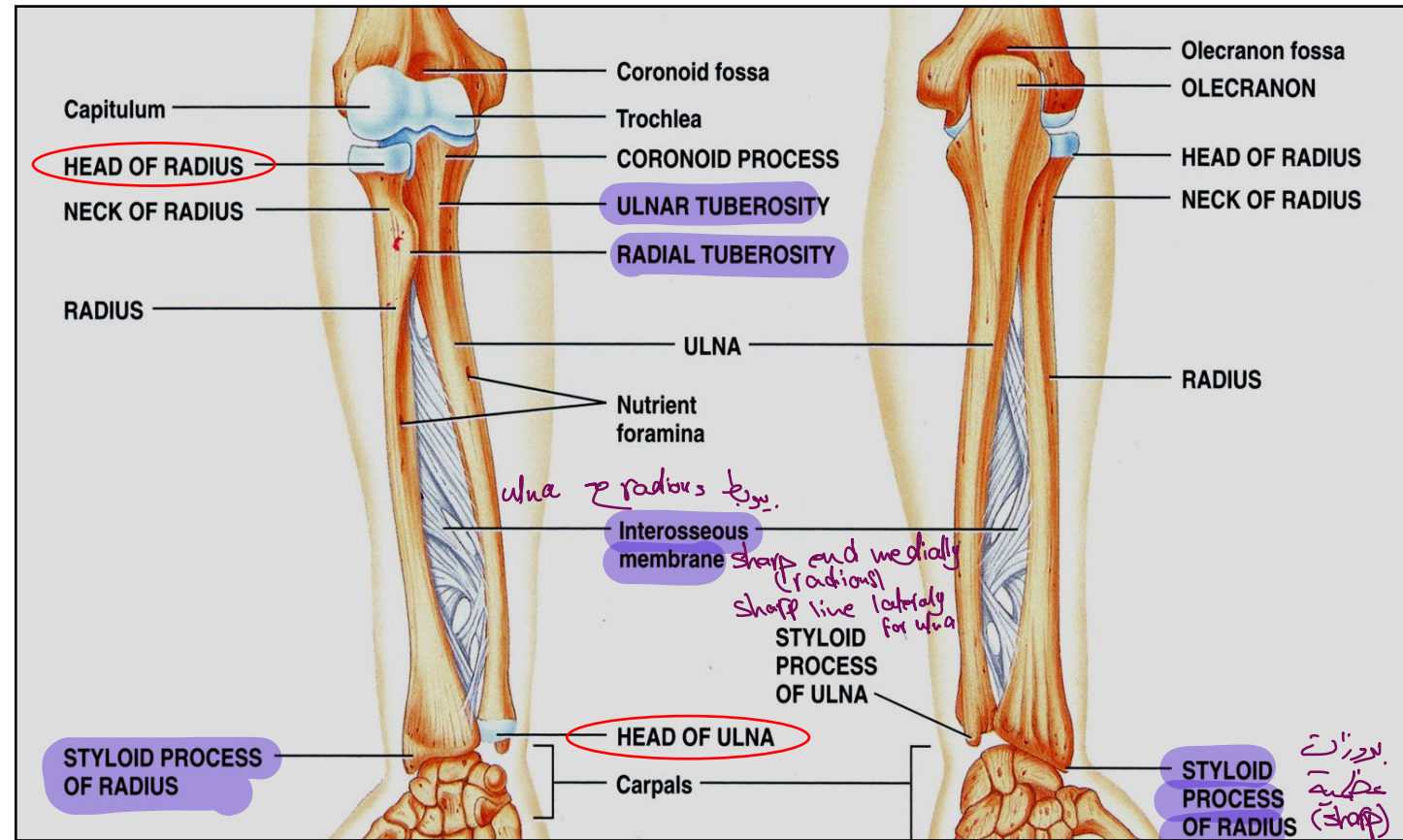
- **The lateral epicondyle**
- **The medial epicondyle:** larger, knoblike projection on the distal, medial side of the humerus (ulnar nerve, funny nerve!). بارزة أكثر
- **The capitulum** at distal lateral end, articulates with the head of the radius. قبة
- **The trochlea** is the pulley-shaped articular process at the distal, medial end of the humerus. قبة
- **The coronoid fossa** on anterior end of the humerus. This receives the coronoid process of the ulna when the **elbow is fully flexed**. cavity
- **The radial fossa** This receives the head of the radius when the elbow is **fully flexed**.
- **The olecranon fossa** on the distal, posterior end of the humerus receives the olecranon process of the ulna when the **elbow is extended**. posterior part of the humerus



Radius

من ال shoulder joint لل elbow joint هي arm
من ال elbow joint لل wrist joint هي forearm

- The bone on the lateral side of the forearm
- **Proximally**, it articulates with both **the capitulum of the humerus** and **the radial notch of the ulna**, in the elbow joint.
(laterally) head is distal
- **Distally**, it articulates with **the head of the ulna** and **the scaphoid and lunate bones**, in the wrist.
- **The head** round, proximal end of the radius. Its proximal surface is a shallow concavity for articulation with the capitulum of the humerus. Its periphery articulates with the radial notch of the ulna.
- **The neck** is the constricted area immediately distal to the head.
round elevation
- **The radial tuberosity** on the anteromedial, proximal aspect of the radius.

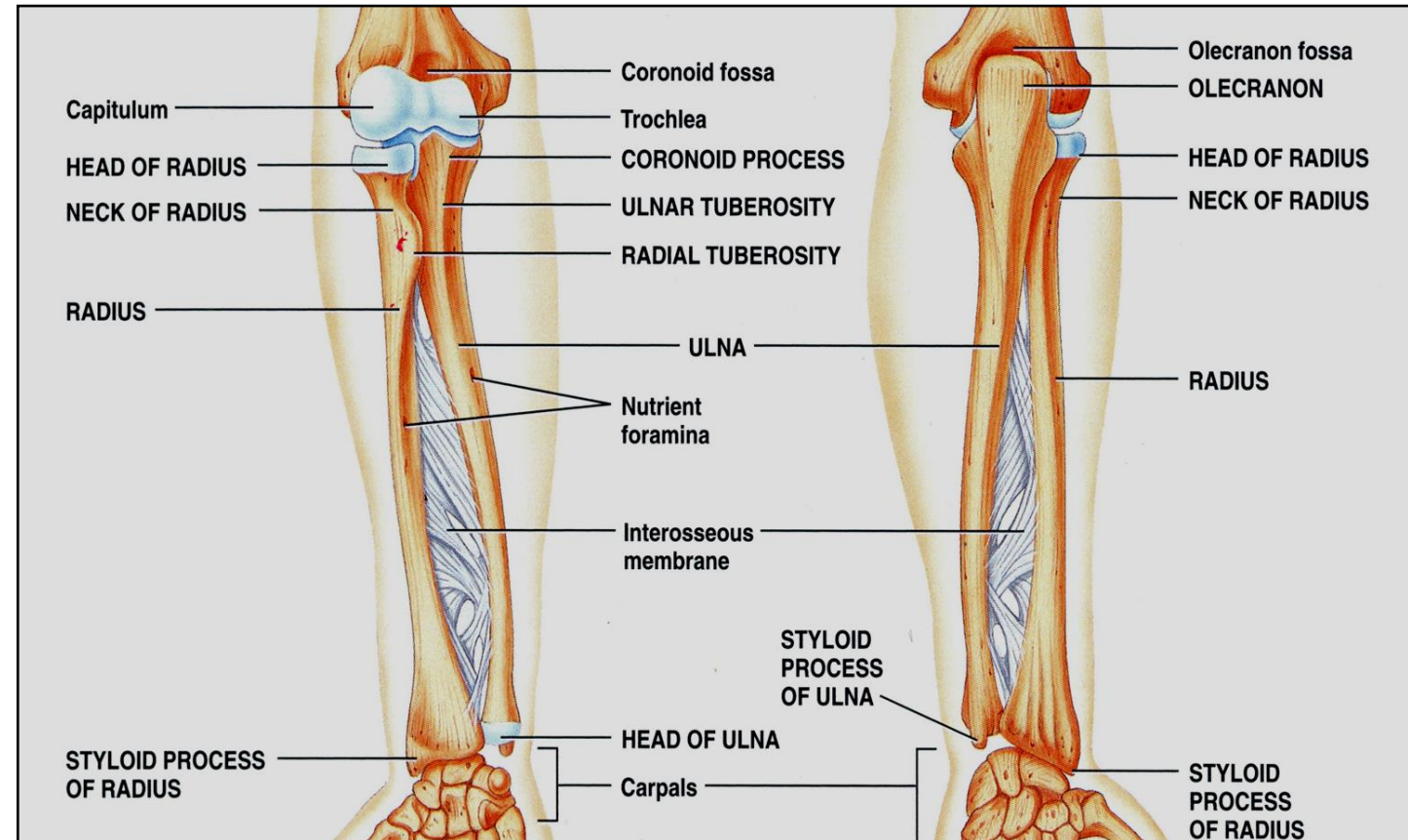


Radius

- **The body (shaft)** widens along its proximal to distal extent.

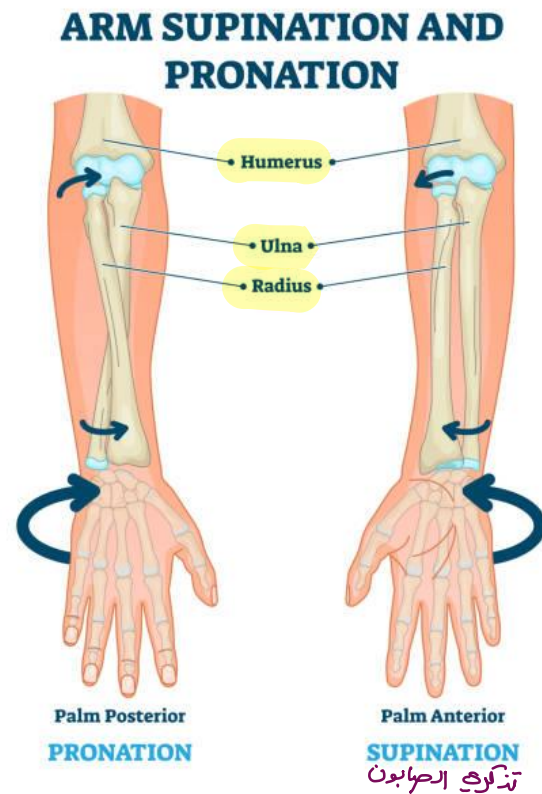
The medial border of the shaft forms a sharp crest (**the interosseous border**) for the attachment of the interosseous membrane.

- **The styloid process** is the distal projection from distal aspect of the radius.. *(sharp)*



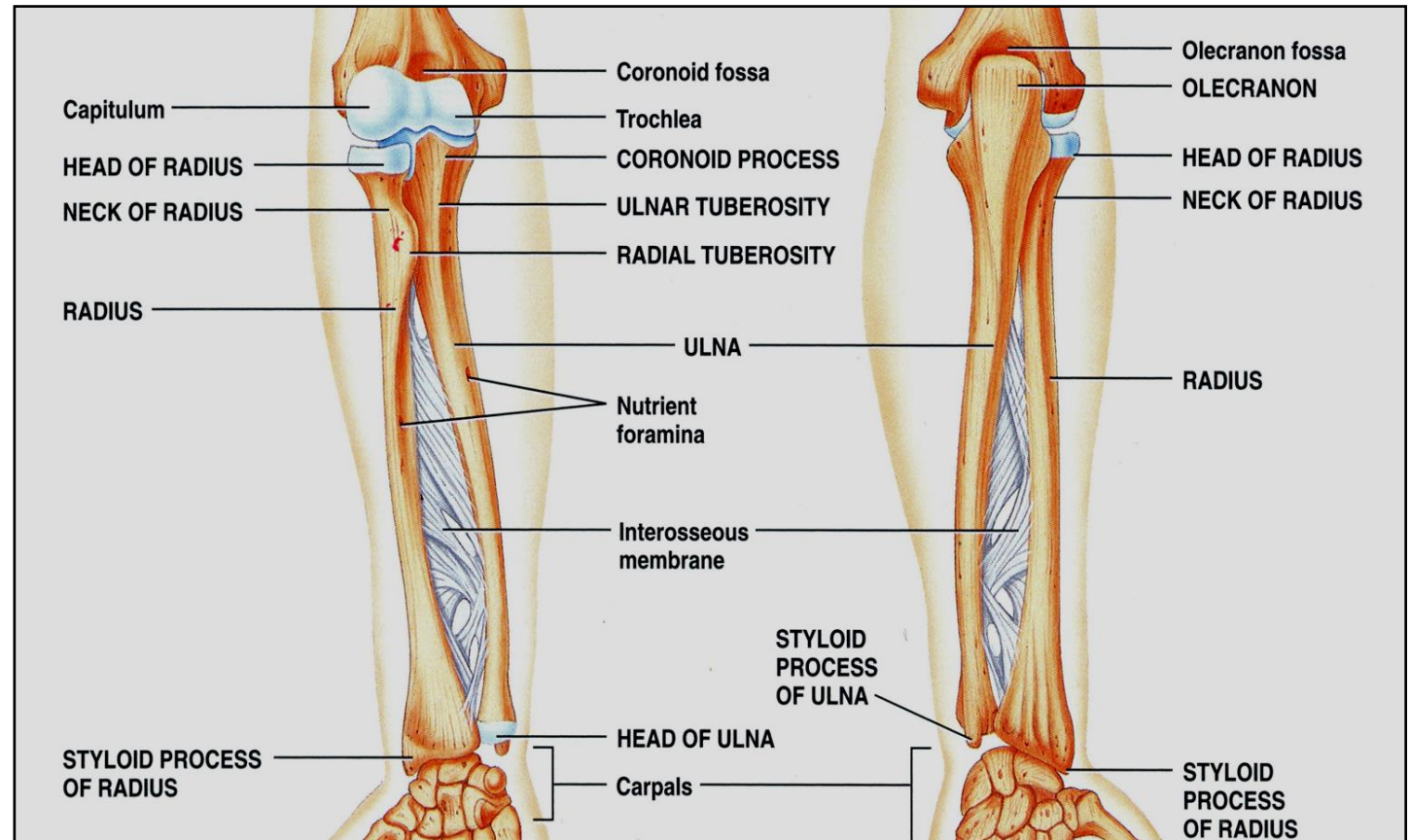
- During pronation and supination, the radius rotates about its long axis.

اي muscle بتعمل supination او pronation لازم تعمل insertion في radius



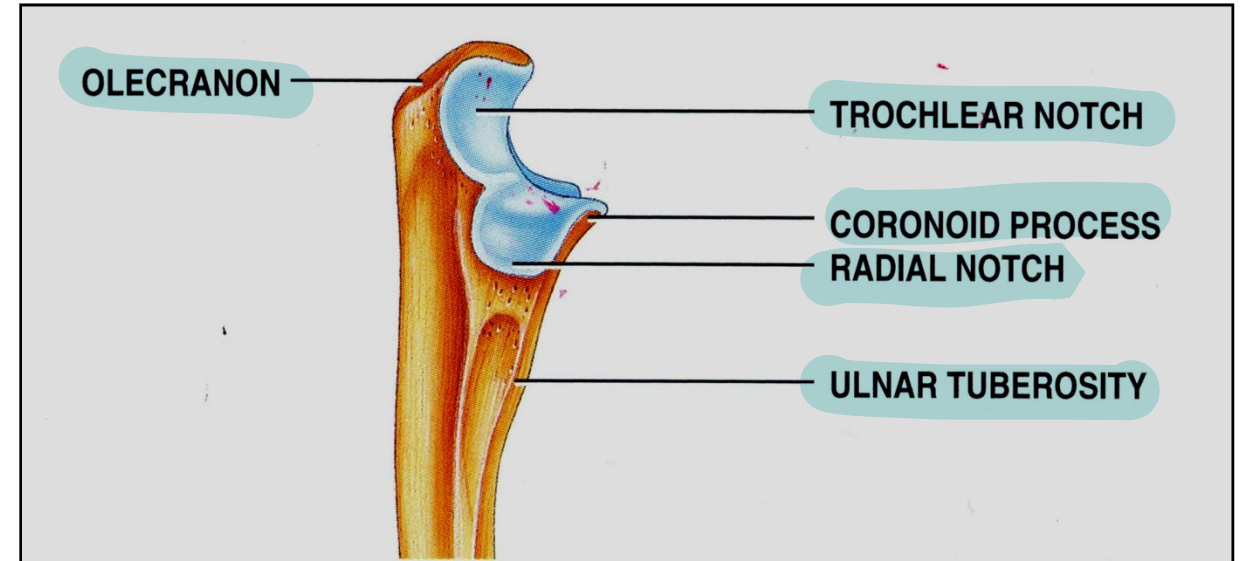
Ulna

- Lies on the medial side of the forearm.
- **Proximally:** the trochlea of the humerus and the head of the radius
- **Distally,** the ulnar notch of the radius.
- **The ulnar tuberosity** is the anterior, distal, roughened aspect of the coronoid process. This serves as the insertion area for the brachialis muscle.
- **The body (shaft)** is the elongated midportion of the ulna.
- **The head** is the small, rounded distal end of the ulna.
- **The styloid process** is a small projection from distal end of the ulna.



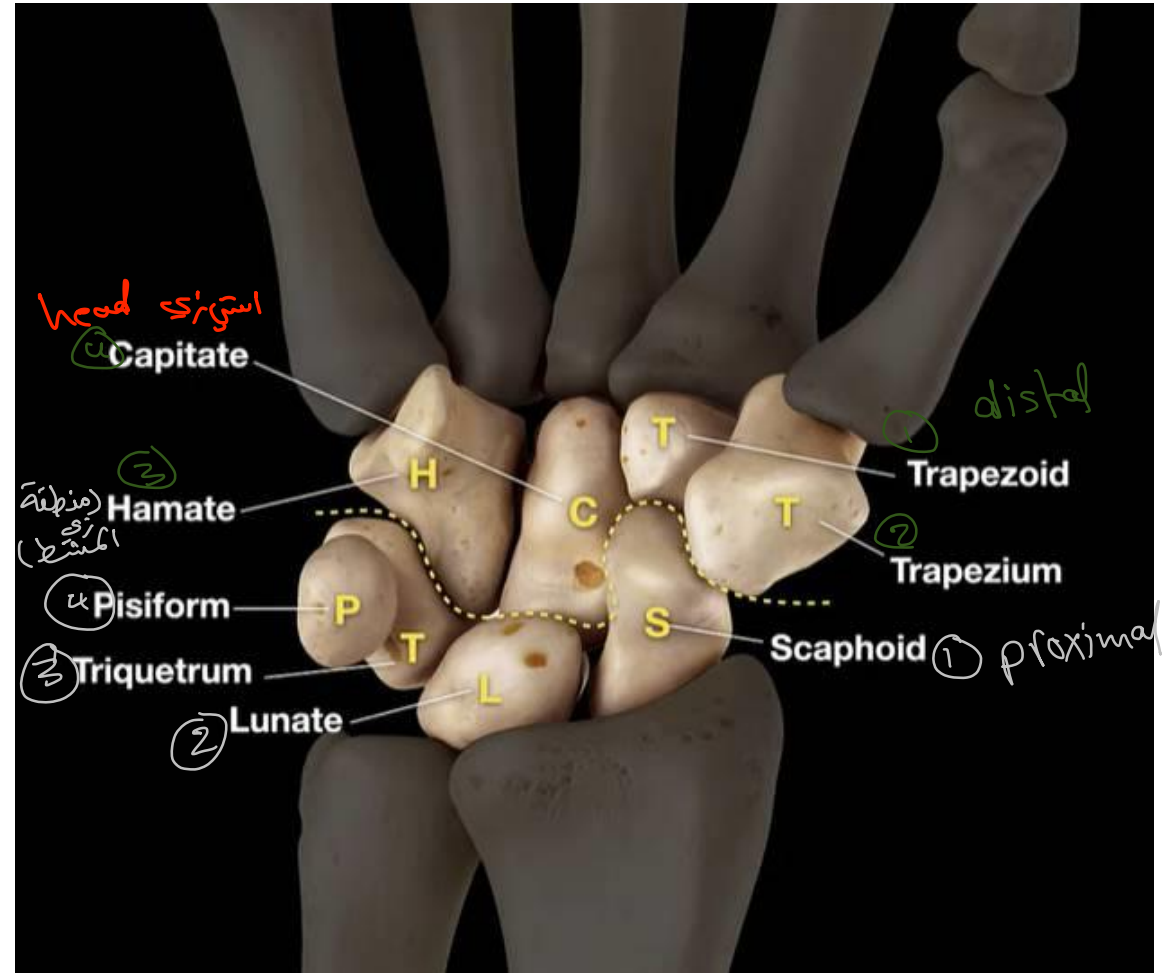
Ulna

- **The radial notch** the articular surface for the head of the radius. *laterally*
- **The olecranon** is the easily palpable proximal end of the ulna that forms the “point” of the elbow. It is the insertion site of **the triceps brachii muscle**.
- **The coronoid process** is the anterior projection. It contributes to the formation of the trochlear notch.
- **The trochlear notch** ^{تروچلر} is the large, crescent-shaped notch on the anterior aspect of the proximal end of the ulna.



Carpal Bones

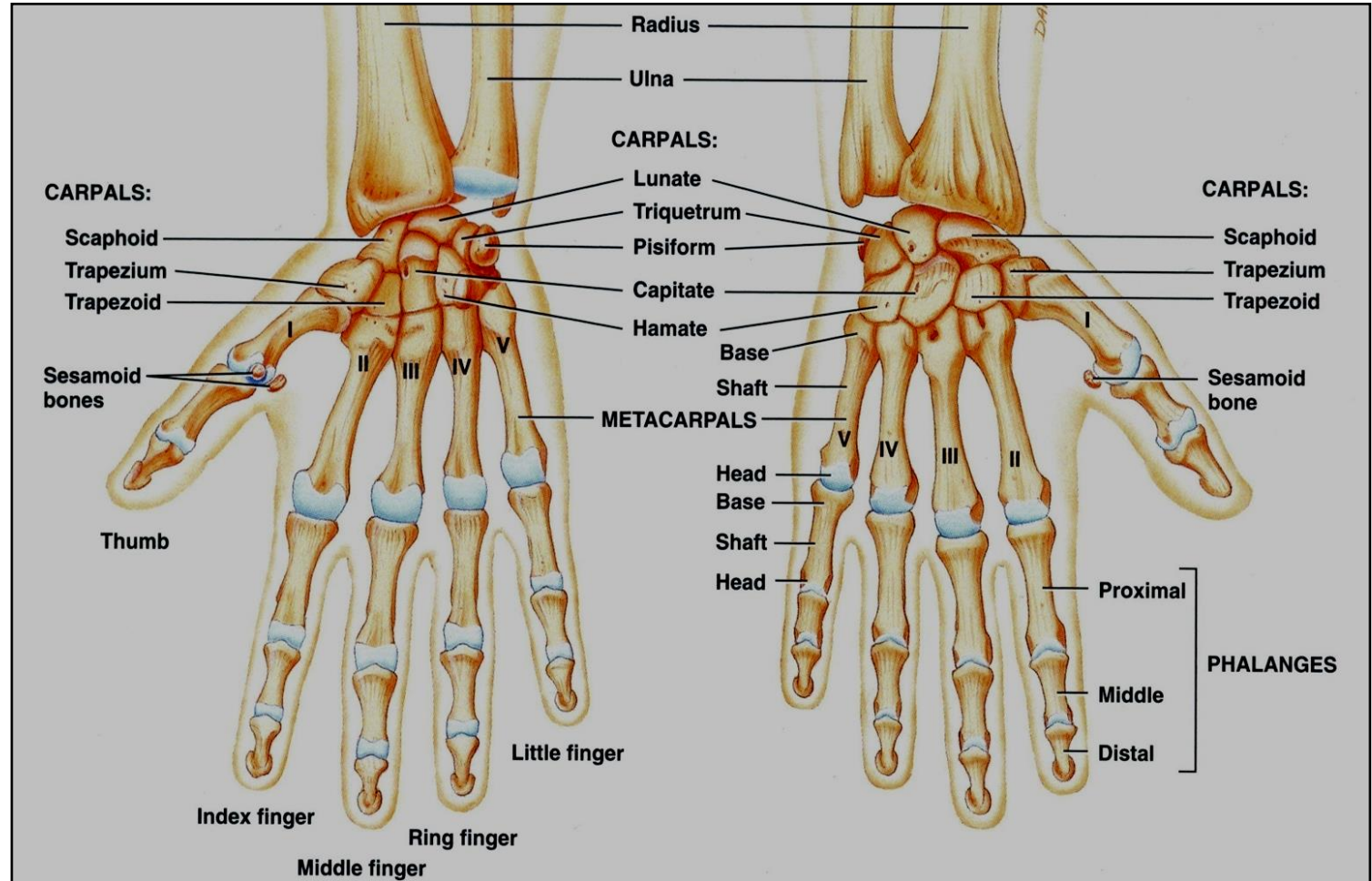
- Eight small bones comprising the wrist
- Arranged in two rows (**proximal and distal**), with four bones in each row .
- Forms a deep concave groove on the ventral aspect of the wrist (carpal tunnel).
- **Proximal Row** From lateral to medial: **scaphoid, lunate, triquetrum, and pisiform**. The scaphoid and lunate bones articulate with the carpal articular surface of the radius.
- **Distal row** Is formed by the following bones (from lateral to medial): **trapezium, trapezoid, capitate, and hamate**.



Metacarpal Bones

جزء من اليد

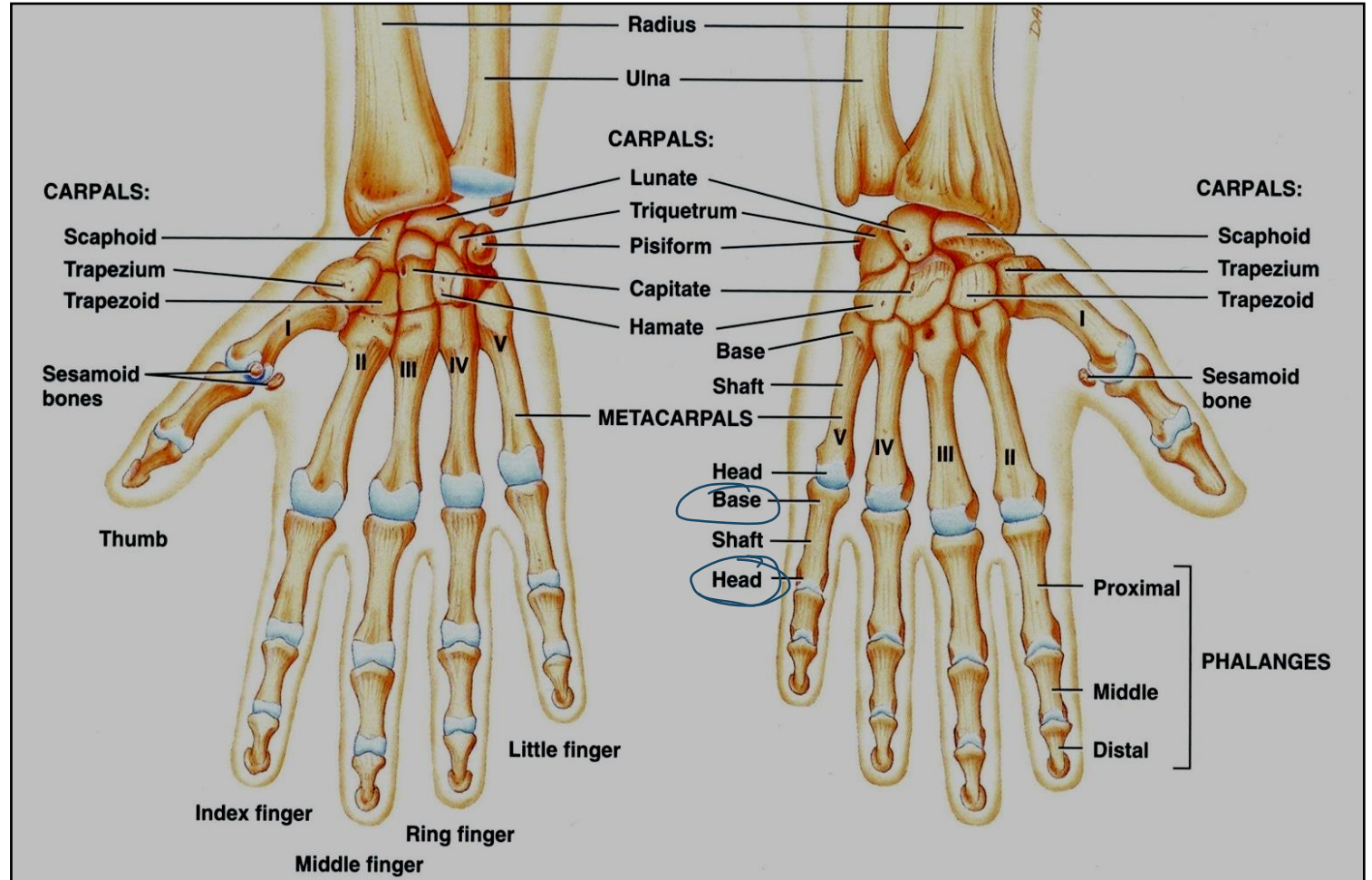
- The five bones located between the carpal bones and the phalanges of the hand
- There are five metacarpal bones; the 1st one is that of the thumb.
- Each metacarpal has: a proximal base, a body, and a distal head.



Phalanges

There are two phalanges in the thumb and three in each of the medial four digits.

Each phalanx has: a proximal base, a body, and a distal head.



- Thank you