Lecture: 4

Done By: Lina Imar

General Anatomy

Lecture 4: Appendicular Skeleton (1): Bones of Upper Limb

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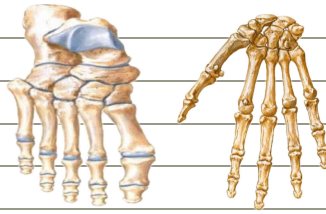
Classification of Bones according to the shape

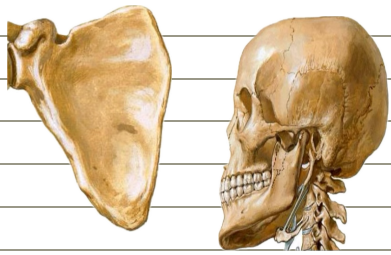
1. Long bones & 2. Short bones &3. Flat bones&4. Irregular bones&5. Pneumatic bones &6. Sesamoid bone

1. Long bones: have 2 ends (upper & lower)[typical], (medial & lateral) [Etypical] & a shaft [as bones of proximal& intermediate segments of the limbs] such as (humerus, radius, ulna, femur, tibia & fibula)

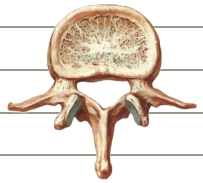
2.Short bones:as carpal&tarsal bones,These bones are strong&help in limited movements.



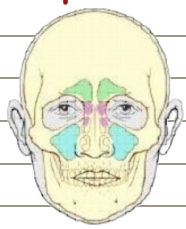
3. Flat bones: as scapula, sternum & skull cap. These have wide surface for muscle attachment or protection.



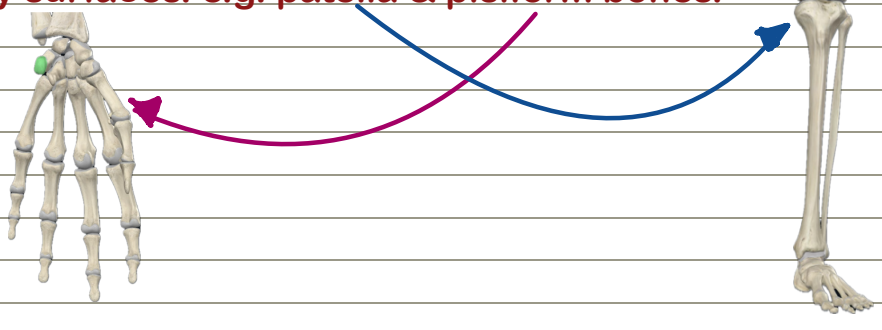
4. Irregular bones: as vertebrae & hip bones.



5. Pneumatic bones: contain air-filled spaces lined with mucous membrane (paranasal sinuses) in skull bones (maxilla & frontal bones) to reduce the weight of skull, help in resonance of voice & warm air.



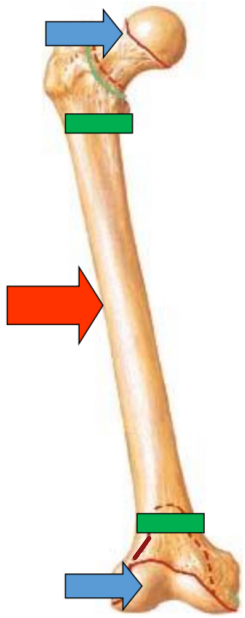
6. Sesamoid bone: are small nodules of bone found in the tendons of certain muscles to reduce friction over bony surfaces. e.g. patella & pisiform bones.

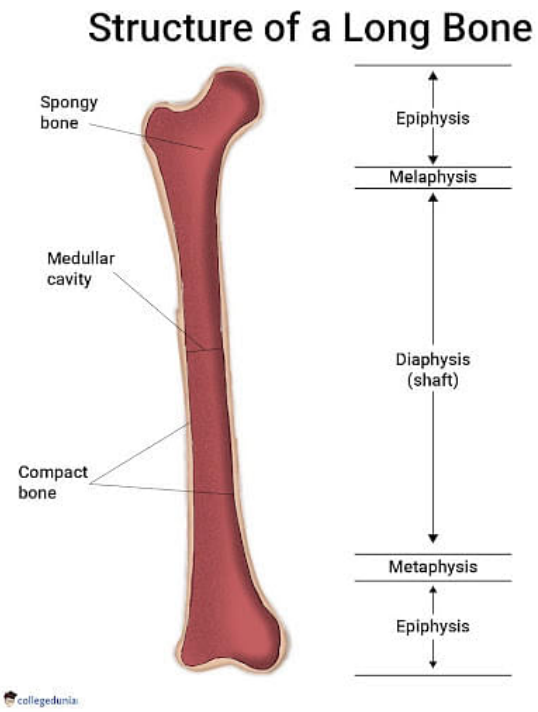


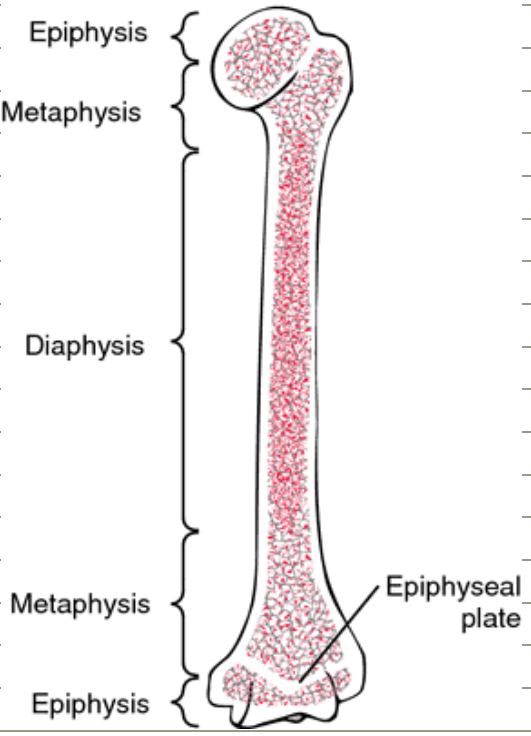
**Parts of a growing long bone

1. 2 ends called epiphysis.
2. A shaft called diaphysis.
3. Epiphyseal plate of cartilage:between the diaphysis & epiphysis. This is the most important factor for the growth of bone in length.
4. metaphysis:The part of the shaft close to the plate

	The 2 ends	The shaft
1. Name:	epiphysis	diaphysis
2. Develops from:	2ry center of ossification	1ry center of ossification (يتكون اول) (نقاط يخرج منها العظم اثناء تكون الجنين)
3. Covered by:	Articular hyaline cartilage (الغضروف الهيالي المفصلي)	Periosteum غشاء العظم
4. Medullary (bone marrow) cavity:	Absent	Present
5. Formed of:	Spongy bone	Compact bone





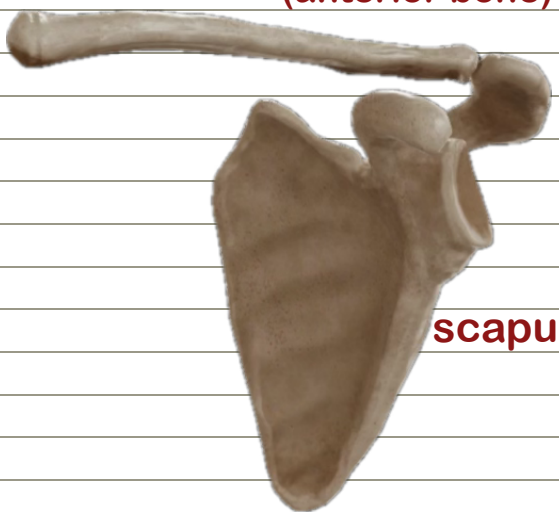


The Shoulder (Pectoral) Girdle Vs Shoulder joint

It is formed of 2 bones: clavicle & scapula.

Between Humerus and scapula

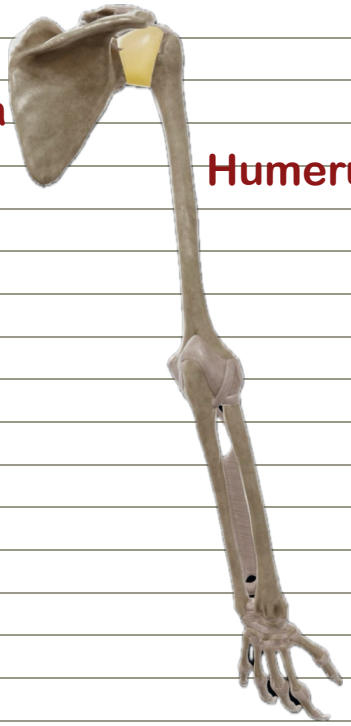
clavicle (anterior bone)



scapula (posterior bone)

scapula

Humerus



6 Bones of Upper Limb

The Clavicle | The Scapula | The Humerus | The Radius | The Ulna | Hand

Joints of the Upper Limb

كل هدول ال **joints** نوعهم الاساسي هو **synovial** وكل وحدة الها شكل مختلف ف بكون الها تصنيف غير بس مو مطلوب منا الا نميز ال **(sterno/acromio/ shoulder)**

synovial saddle joint — Synovial plane joint — synovial ball and socket joint

1)sterno-clavicular joint: The medial end of clavicle &manubrium part of sternum

2)acromio-clavicular joint: The lateral end of clavicle &acromion process of scapula

3)shoulder (glenohumeral) joint: glenoid cavity in scapula & head of humerus

4)humero-radial articulation: The capitulum& the head of radius

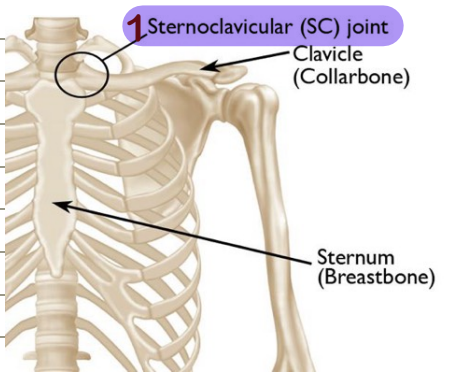
5)humero-ulnar articulation: The trochlea &The trochlear notch

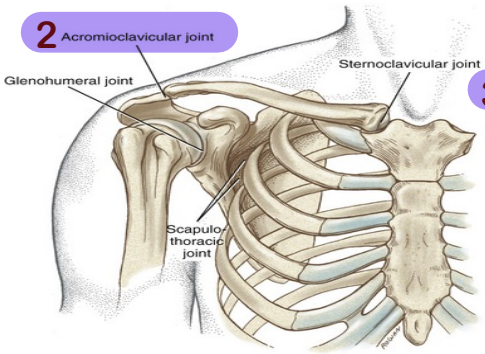
6)the elbow joint: humero-radial articulation &humero-ulnar articulation

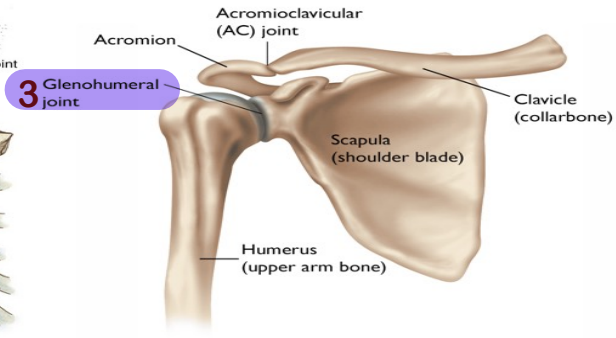
7)inferior radio-ulnar joint: ulnar notch& head of ulna

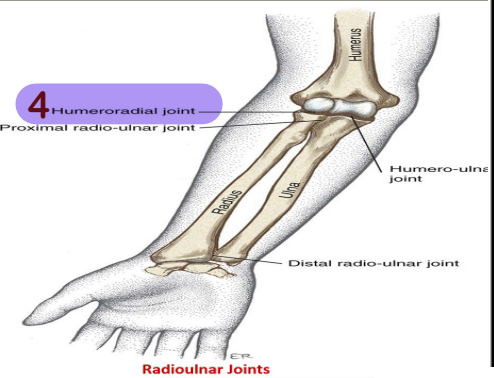
8)wrist joint: The inferior surface of the lower end of radius articulates with scaphoid bone (laterally) and the lunate bone (medially) and these two articulations make the wrist joint

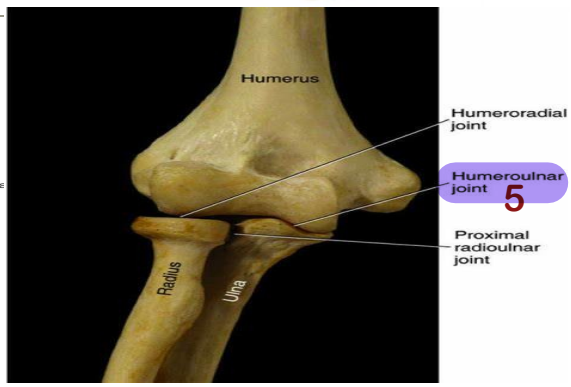
9)superior radio-ulnar joint: radial notch&head of radius

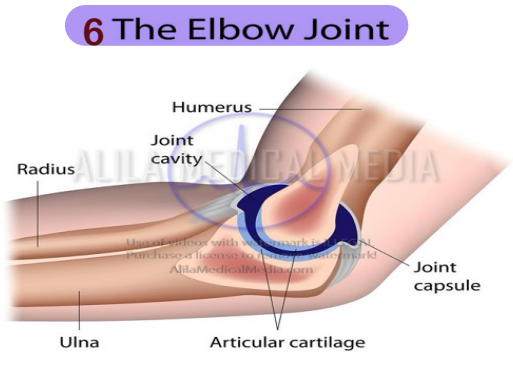




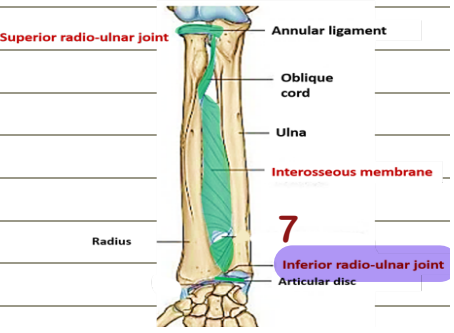


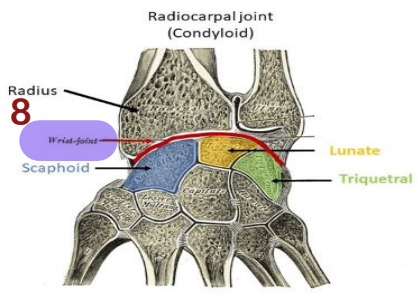




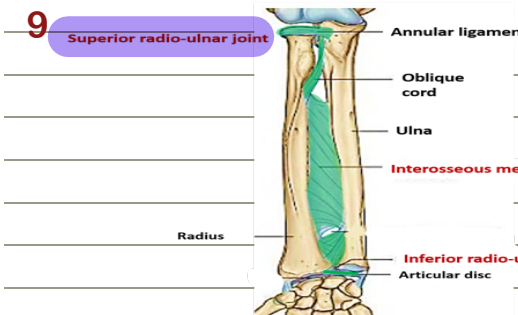


Radioulnar Joints



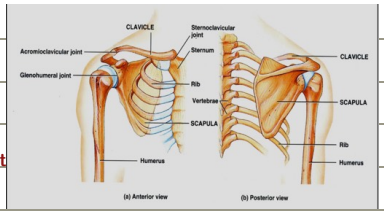


Radioulnar Joints



The Clavicle

2 joints — sterno-clavicular joint, acromio-clavicular joint

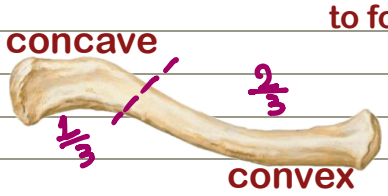


1. Atypical "Horizontal" long bone, It has two ends → medial and lateral.

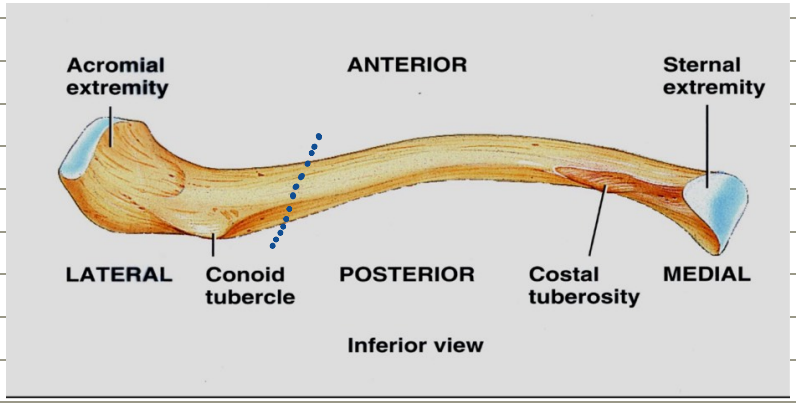
2. S shape

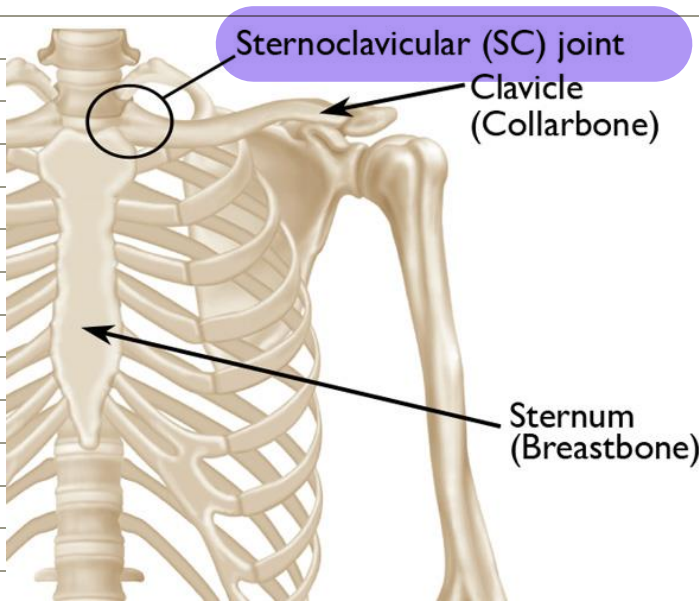
3. is the anterior bone of pectoral girdle.

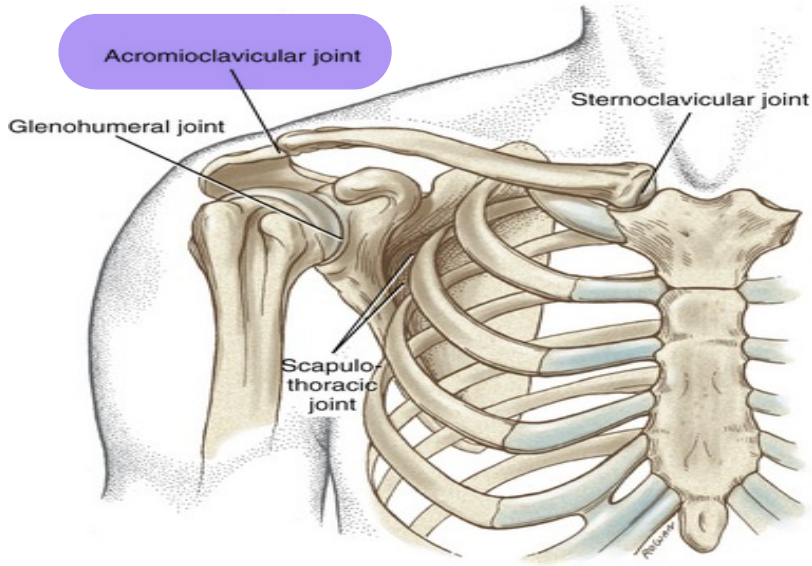
The medial end (sternal end)	Vs	The lateral end (acromial end)
rounded		broad and flat
two-thirds		one-third
convex anteriorly		concave anteriorly
articulates with manubrium part of sternum to form sterno-clavicular joint		articulates with the acromion process of scapula to form acromio-clavicular joint.

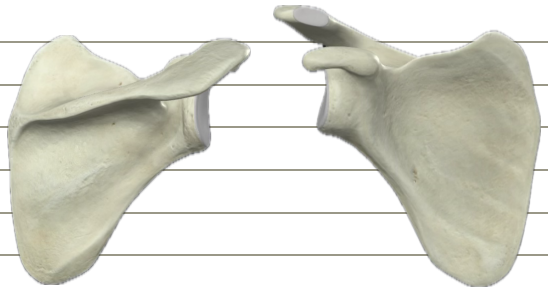


superior surface	Vs	inferior surface
smooth		rough



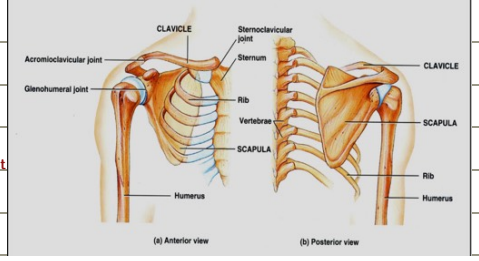






The Scapula

2 joints
- shoulder joint
- acromio-clavicular joint



1.large, flattened, triangular bone,it has 3 angles , 3processes , 3 borders, 3 fossae , 2 surfaces and 2 joints

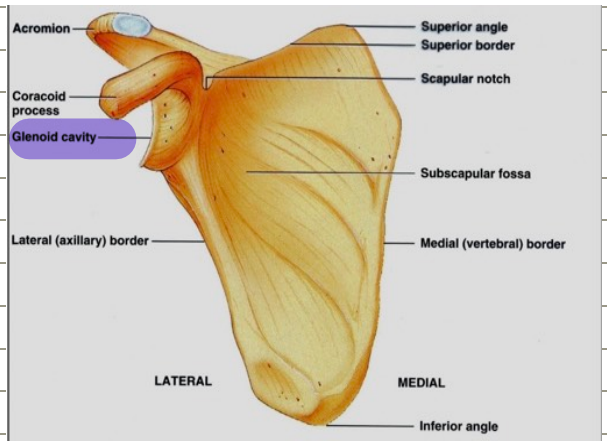
2. is the posterior bone of pectoral girdle

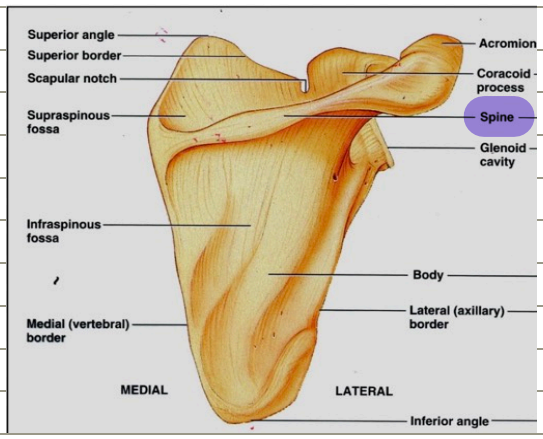
3. It lies on the posterior wall of thorax, overlapping the 2nd – 7th ribs.

anterior (costal) surface Vs posterior surface

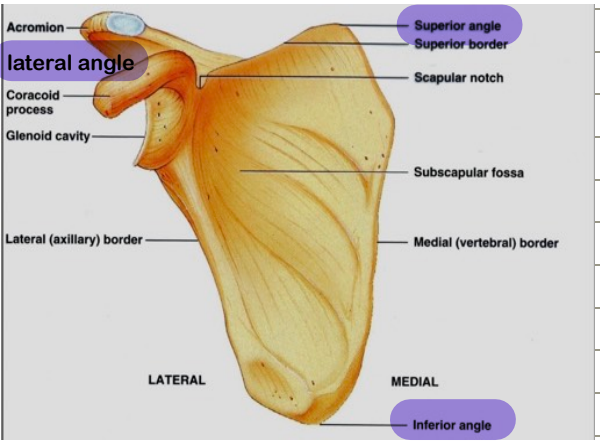
glenoid cavity اللي بميزه هو ال

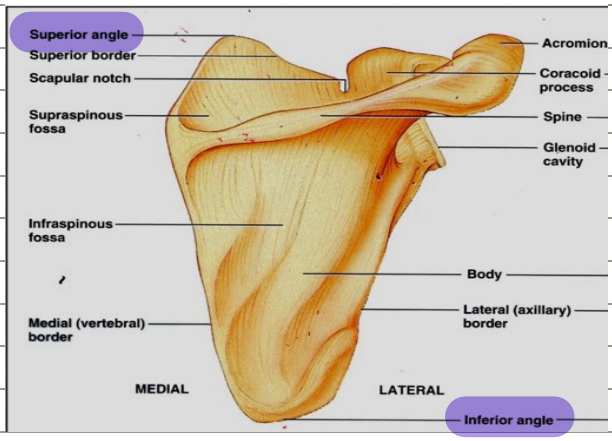
spine اللي بميزه هو ال



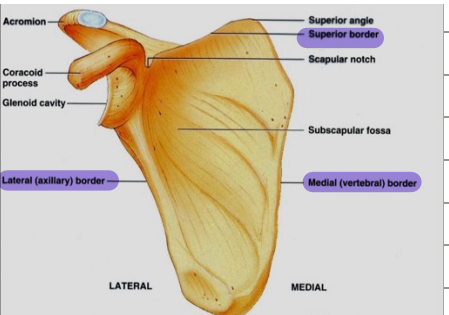


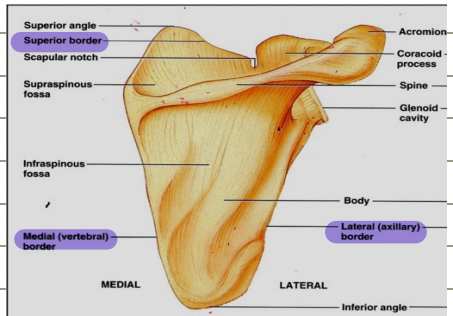
3 Angles: superior(medial) (اللي فوق الlateral), inferior (اللي تحت الlateral)& lateral(glenoid cavity اللي عند ال)



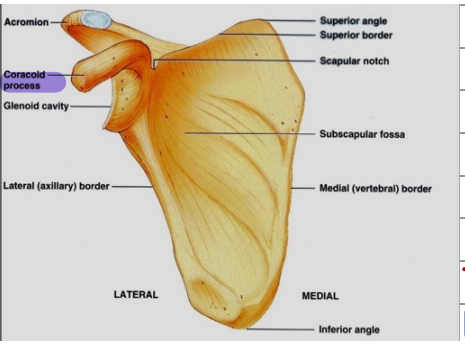


3 borders: superior(lateralاللي فوق ال), medial(lateralاللي قبال ال)& lateral(glenoid cavity اللي عند ال)





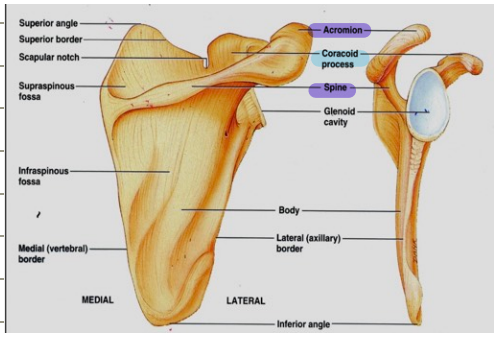
3processes: one on the anterior surface (The coracoid process) and two on the posterior surface (the acromion process& the spine)



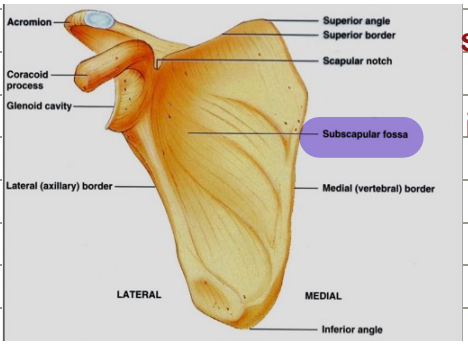
the spine: shelf-like projection

the acromion process:The lateral end of the spine projects as a flattened, expanded process

The coracoid process :arises from lateral end of superior border

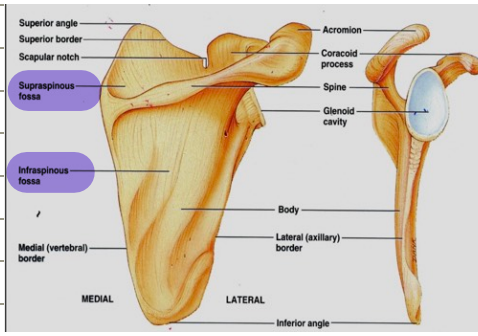


3 fossa:one on the anterior surface (the seubscapular fossa.) and two on the posterior surface (supraspinous fossa& infraspinous fossa)

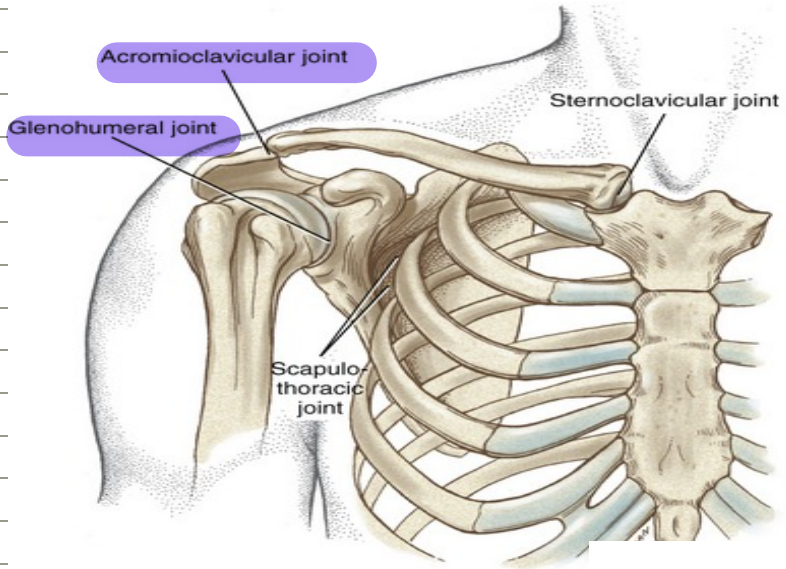


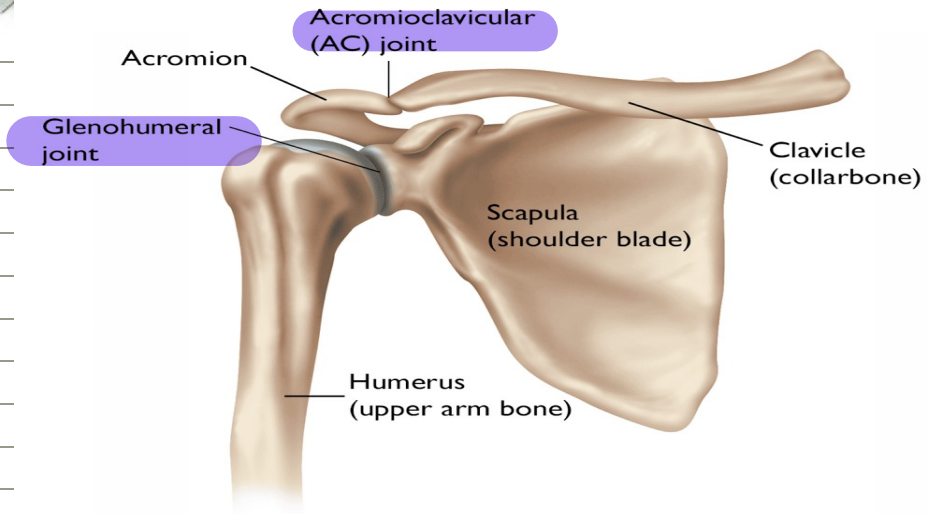
supraspinous fossa: smaller upper area

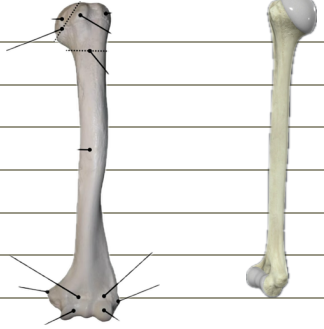
infraspinous fossa:larger lower area



2 joints: shoulder joint (head of humerus&glenoid cavity)&acromio-clavicular joint



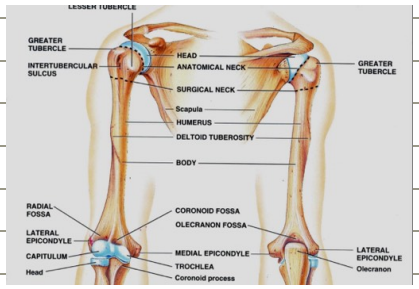




The Humerus

4 joints

- humero-radial articulation
- humero-ulnar articulation
- elbow joint
- shoulder joint



1. typical long bone, It has two ends →upper end & lower end and shaft

2. is the bone of the arm.

The upper end: head , 2 necks,2 tubercles & groove

A)The head: which is less than half of a sphere. It articulates with the glenoid cavity of scapula to form shoulder (glenohumeral) joint.

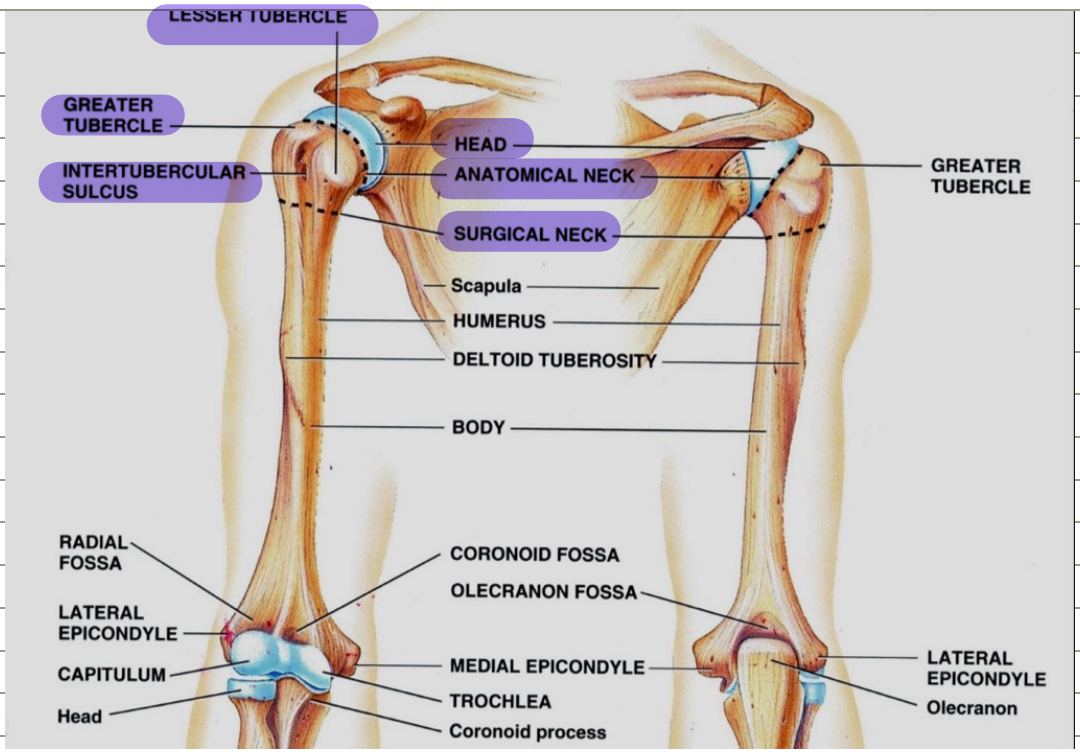
B)The anatomical neck → is the margin of the head that separates it from the tuberosities.

C)The surgical neck → is the constriction that separates the upper end from the shaft. And it is a critical area because nerves and blood vessels pass through it. If it's fractured, it can lead to damage to the axillary nerve and the circumflex humeral vessels Typically, an orthopedic surgeon would address the fracture, while a neurologist would handle nerve damage, and a vascular surgeon would manage any vascularcomplications

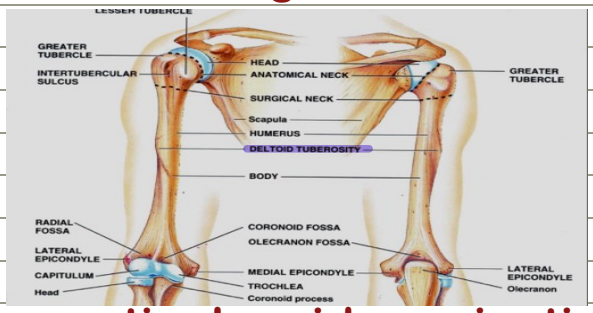
D)The greater tuberosity (tubercle) → which is a lateral projection.

E)The lesser tuberosity (tubercle) → which is an anterior projection.

F)The bicipital groove (inter- tubercular sulcus) → separates the 2 tuberosities.



Shaft (body):Laterally → it presents about its middle a rough area called the deltoid tuberosity.



The Lower end: 2 articular surfaces ,2 non-articular side projections 3 fossae

1)Two articular surfaces:

a. The capitulum → a convex surface laterally. It articulates with the head of radius in humero-radial articulation.

b. The trochlea → a pulley- shaped surface medially. It articulates with the trochlear notch of ulna in humero-ulnar articulation.

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Both the humero-radial & humero-ulnar articulations form the elbow joint

2.)Two non-articular side projections

a. the medial epicondyle

b. lateral epicondyle

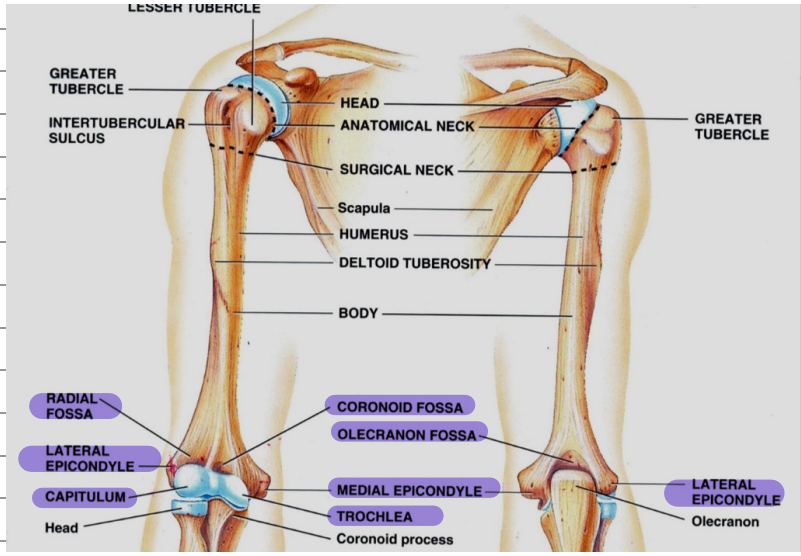
The medial epicondyle is more prominent and wider than the lateral, and is crossed on it posterior surface by ulnar nerve.

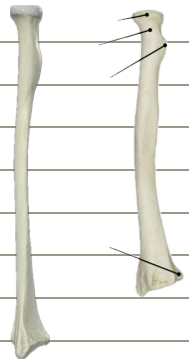
3)Three depressed fossae:

a. Radial fossa → above capitulum anteriorly.

b. Coronoid fossa → above trochlea anteriorly.

c. Olecranon fossa → above trochlea posteriorly.

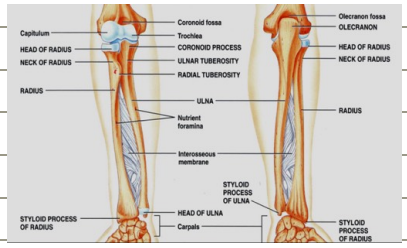




The Radius

3 joints

wrist joint — inferior radio-ulnar joint — humero-radial articulation



1. typical long bone, It has two ends →upper end & lower end and shaft

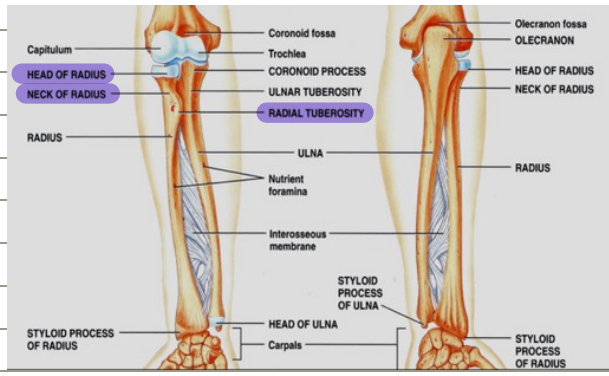
2.This is the lateral bone of the forearm

The upper end: head , neck & tuberosity

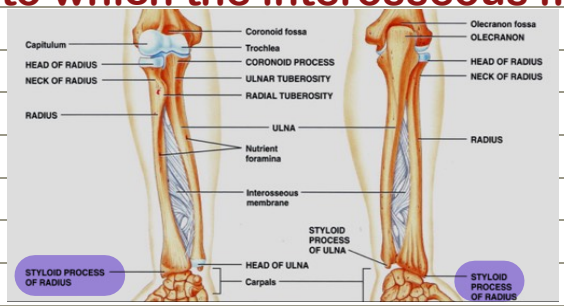
A)The head:Disc-shaped , It articulates superiorly with the capitalum of the humerus.

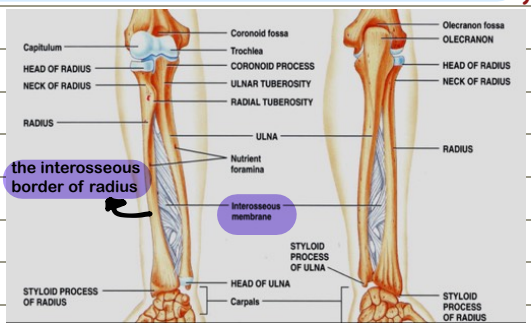
B)Neck

C)Radial tuberosity: a projection on ulnar side of shaft below the neck.



Shaft (body): Has a sharp medial border, the interosseous border of radius , to which the interosseous membrane is attached.



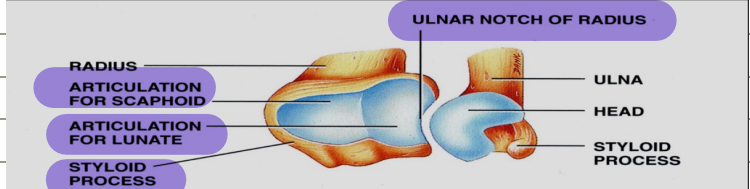


Lower end: notch, process, 2 articulars

A)The medial surface of lower end presents the ulnar notch, for articulation with head of ulna to form inferior radio-ulnar joint.

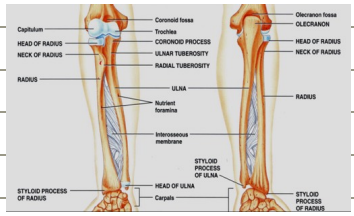
B) lateral Styloid process

C)The inferior surface of the lower end articulates with scaphoid bone (laterally) and the lunate bone (medially).



The Ulna

2 joints
- superior radio-ulnar joint.
- humero-ulnar articulation



1. typical long bone, It has two ends →upper end & lower end and shaft

2.This is the medial bone of the forearm.

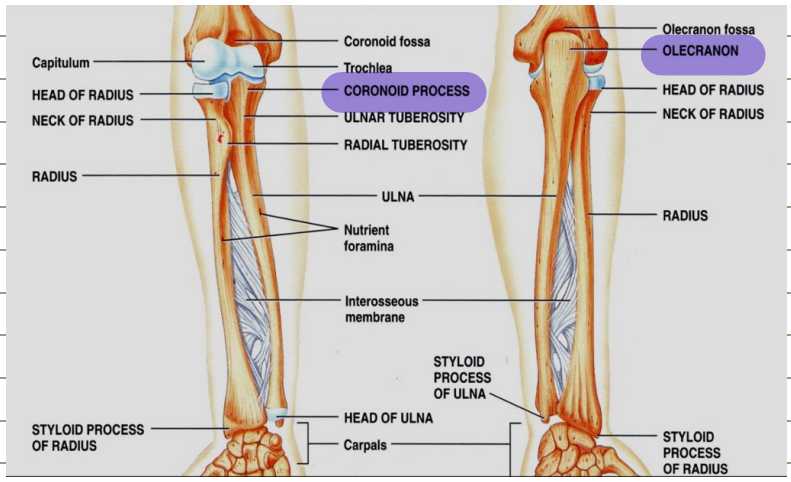
The upper end:2 notches &2 processes

A)The trochlear notch:A semilunar concavity that lies in the anterior aspect of the upper end of the bone,Articulates with the trochlea of the humerus.

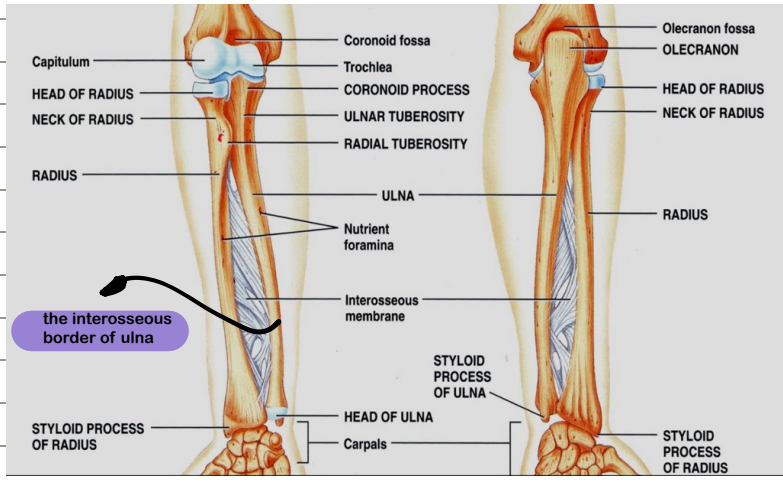
B)The lateral surface of coronoid process presents the shallow radial notch, for articulation with head of radius to form superior radio-ulnar joint.

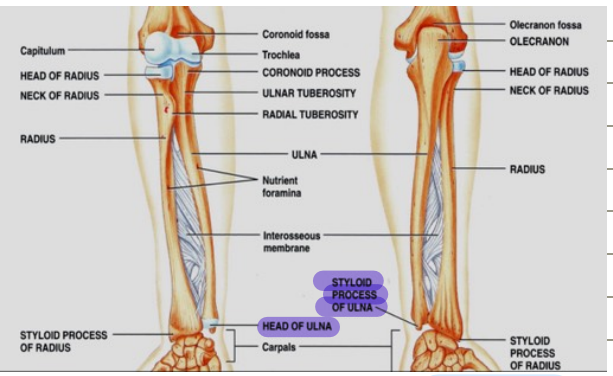
C) The olecranon process→ which forms the prominence of elbow

D)The coronoid process.

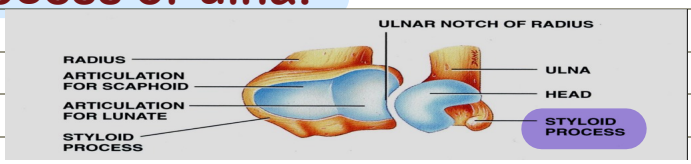


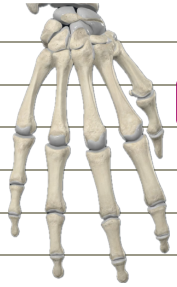
Shaft (body): Has a sharp lateral border, the interosseous border of ulna, to which the interosseous membrane is attached.



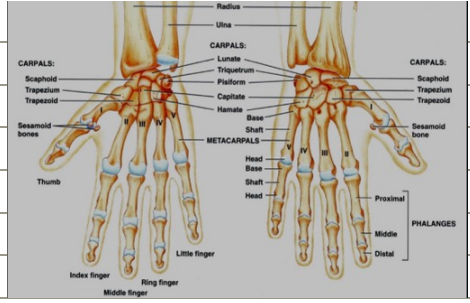


Lower end: shows head and styloid process of ulna.

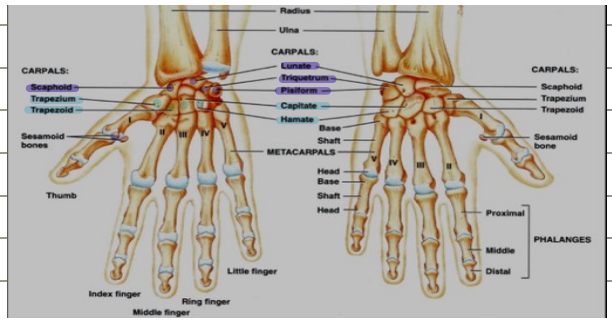




Bones of Hand



3 types of bones



1)The Carpal Bones (Carpus): short bones

a) eight bones
b) arranged in a proximal and a distal row
c) held firmly together by ligaments.

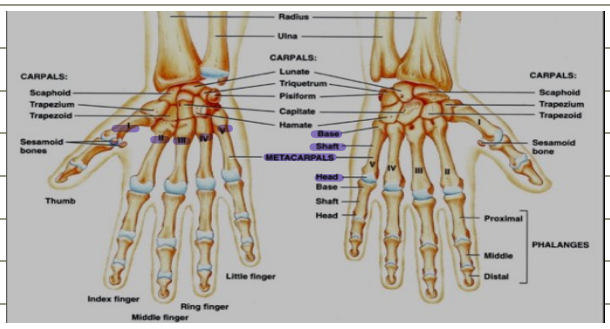
A. Proximal row: Is formed by the following bones (from lateral to medial): scaphoid, lunate, triquteral, and pisiform.

B. Distal row:Is formed by the following bones (from lateral to medial): trapezium, trapezoid, capitate, and hamate.

2)The Metacarpal Bones: short long bones

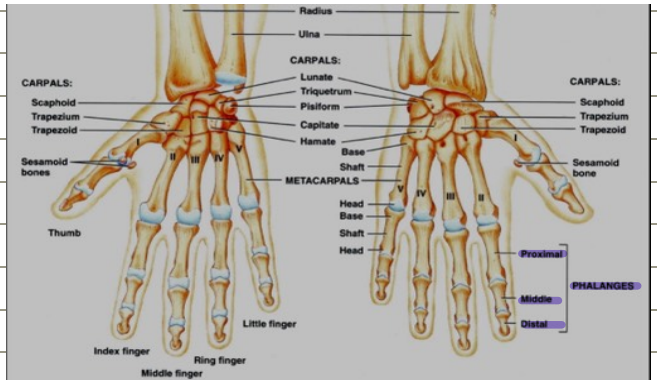
a) five metacarpal bones:the 1st one is that of the thumb

b)Each metacarpal has: proximal base, a body, and a distal head.



3)The Phalanges:short long bones

a)There are two phalanges in the thumb and three in each of the medial four digits.
b)Each phalanx has: a proximal base, a body, and a distal head except the thumb it only has proximal base and distal head



Done by: Lina Imar

Quiz

1)This is the anterior bone that articulates with the manubrium Of the sternum at sternoclavicular joint :
A)Scapula B)Clavicle C)Xiphoid D)Sternum

2)Which of the following is found anteriorly On the scapula:
A)Infraspinous fossa B)Supraspinous fossa C)Acromion D)Subscapular fossa

3)Which of the following is true : *
A)There are 5 carpals, 8 metacarpals and 14 phalanges
B)There are 8 carpals, 6 metacarpals and 14 phalanges
C)There are 8 carpals, 5 metacarpals and 12 phalanges
D)There are 8 carpals, 5 metacarpals and 14 phalanges

4)The lesser tubercle of the humerus: *
A)Articulates with ulna B)Articulates with radius C)Is found in the gleno humeral joint
D)Projects anteriorly

5)In the lateral end of superior border of scapula we found :
A)Coronoid fossa. B)Olecranon fossa C)Coracoid process D)Radial fossa

6)The deltoid tuberosity of humerus is found :
A)At the distal end B)At the proximal end C)At the midpoint of the shaft D)At the epiphyseal plate

7)All of these are correct about scapula except :
A)The scapula is the posterior bone of pectoral girdle
B)It lies On the posterior wall of thorax
C)It is large, long, triangular
D)It has two surfaces

8)The capitulum is concave surface laterlly and it articulates with the radius
A)True B)False

9) Choose the incorrect one :
A)Olecranon - above trochlea posteriorly
B)Coronoid - above trochlea posteriorly
C)Acromion - found in the end of spine

10)Which of these are correct arrangment: (from medial to lateral)
A)Scaphoid, lunate, pisiform, triquteral
B)Pisiform, triquteral, scaphoid, lunate
C)Scaphoid, lunate, triquteral, pisiform
D)Pisiform, triguteral, lunate, scaphoid

11)Which of these is crossed On its posterior surface by ulna nerve :
A)Lateral condyle B)Medial condyle C)Medial epicondyle D)Lateral epicondvle

12)All of these are correct about ulna except :
A)It has A sharp medial border
B)lower end shows head and styloid process of ulna
C)Medial bone of the forearm

13)Coronoid process which forms the prominence of elbow:
A)True B)False

14) the girdle that connect upper limp with axial skeleton is pectoral girdle and consist from 2 bones clavicle and scapula
A)true B)false

15) Long bones: have 2 ends & a shaft as bones of proximal & intermediate & distal segments of the limbs (humerus, radius, carpal, ulna, femur, tibia & fibula)
A)True B)False

16) in primary center of ossification the shaft & the 2 ends became completely ossified but still separated by a plate of cartilage (epiphyseal plate)
A)True B)False

17) the importance of presence air-filled spaces in skull bones like (paranasal sinuses) :
A)reduce friction over bony surface
B)reduce weight of skull
C)help in resonance of voice
D) warm air
E) there are more than one answer

18)Which type of bone is the pisiform:
A)Long B)Sesamoid C)Irregular D)Pneumatic

19)regarding sesamoid Bones, all the following statements are true except :
A)Usually appear as small nodules
B)They develop within tendons of muscles
C)Patella is one of its examples
D)They help in resonance of voice and warm air

20)The presence of epiphyseal plate indicates that the bone is :
A)Increasing in length
B)Increasing in diameter
C)Decresing in diameter
D)Stopped increasing in length

Answers
1)B
2)D
3)D
4)D
5)C
6)C
7)C
8)B
9)B
10)D
11)C
12)A
13)B
14)A
15)B
16)B
17)E
18)B
19)D
20)A

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