

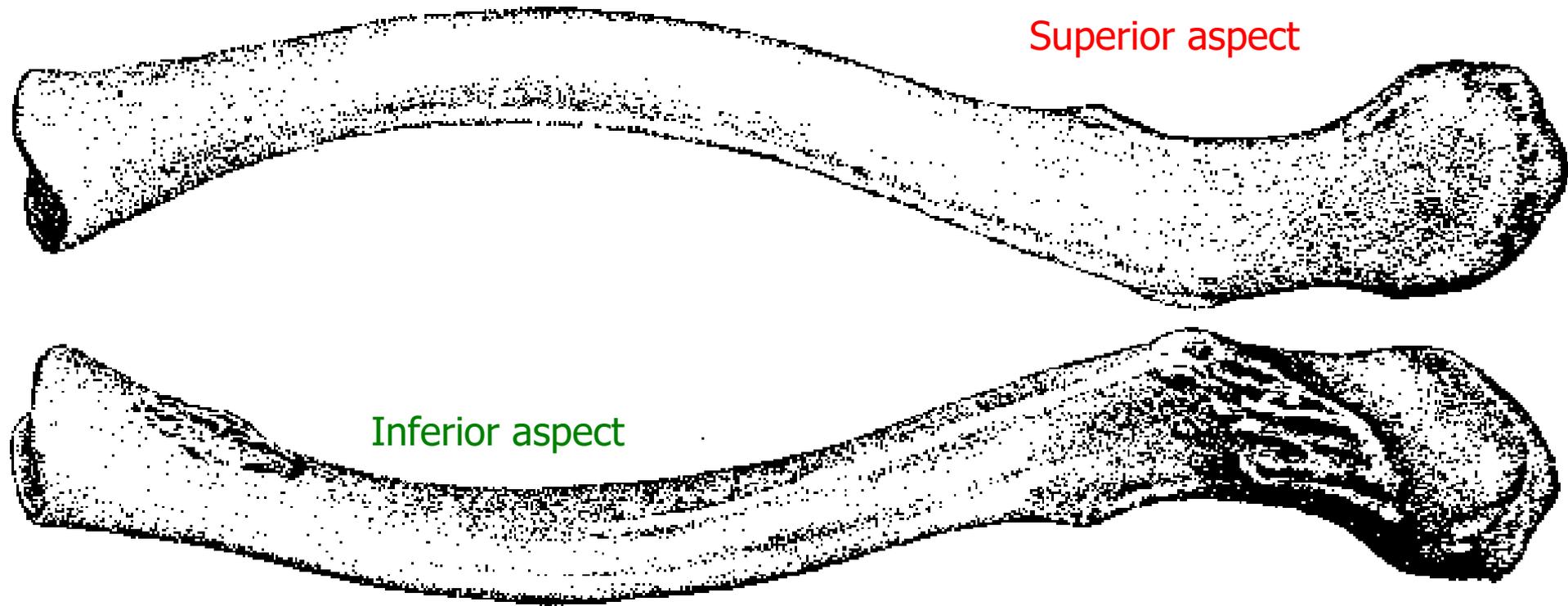
Osteology of Upper Limb

Dr Zaid Saad Al Nasrawi
Trauma and orthopedics surgeon

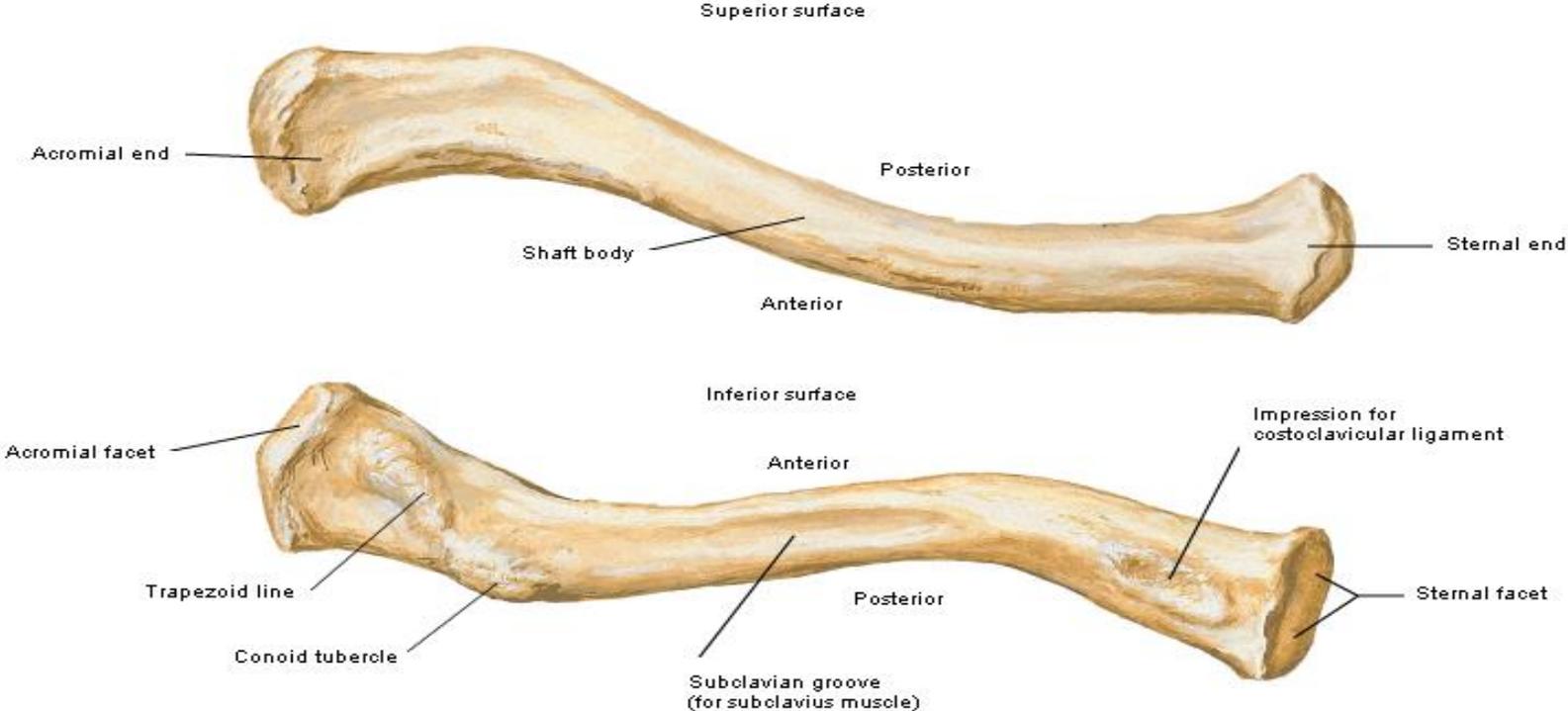
The clavicle

Superior aspect

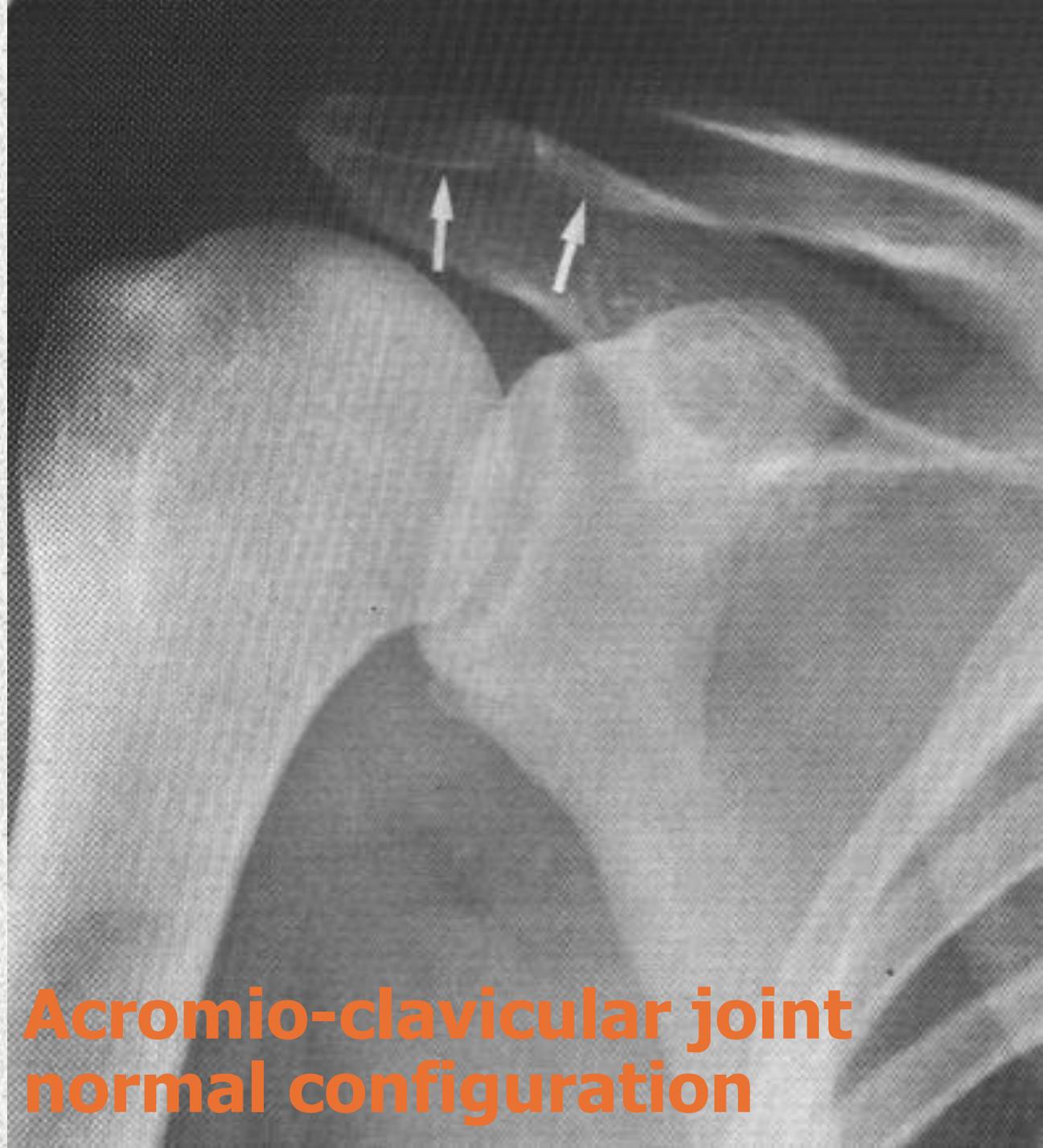
Inferior aspect



Right Clavicle - Features

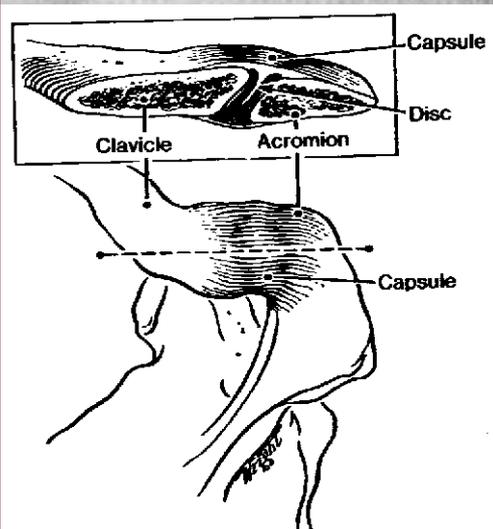


- **In most normal individuals the inferior aspect of the clavicle is at the same level as the inferior aspect of the acromion**



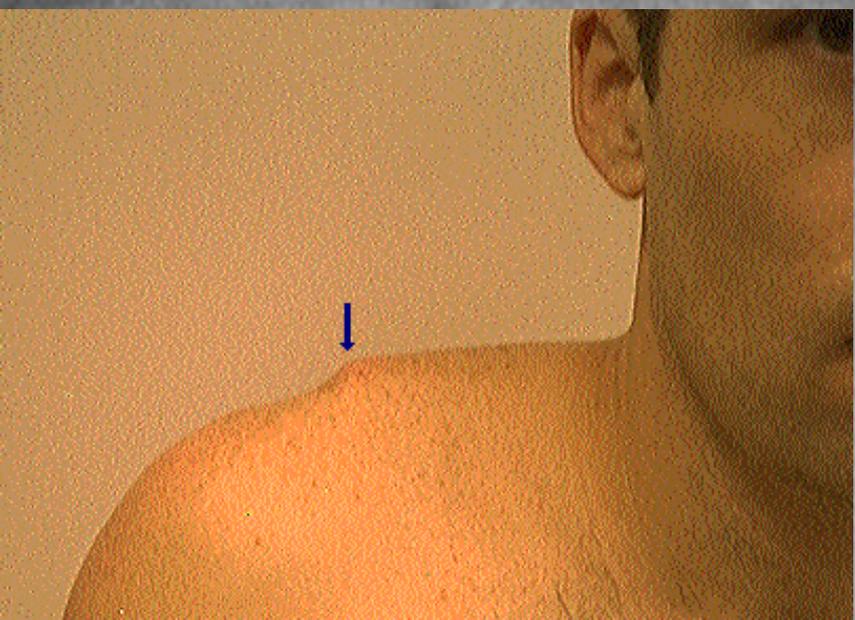
Acromio-clavicular joint normal configuration

Acromio-clavicular joint anomalous configuration



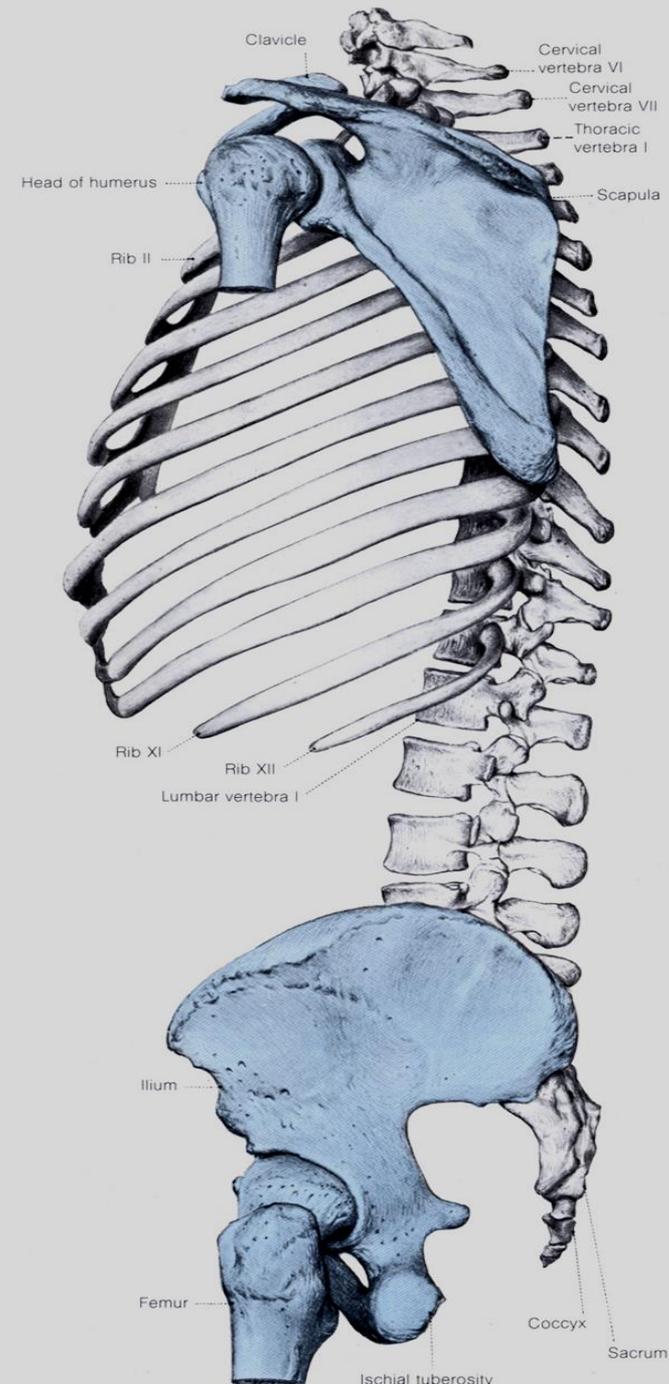
- In a small percentage of normal individuals the distal end of the clavicle lies above or below the acromion (in this case above) and might be interpreted as acromioclavicular separation

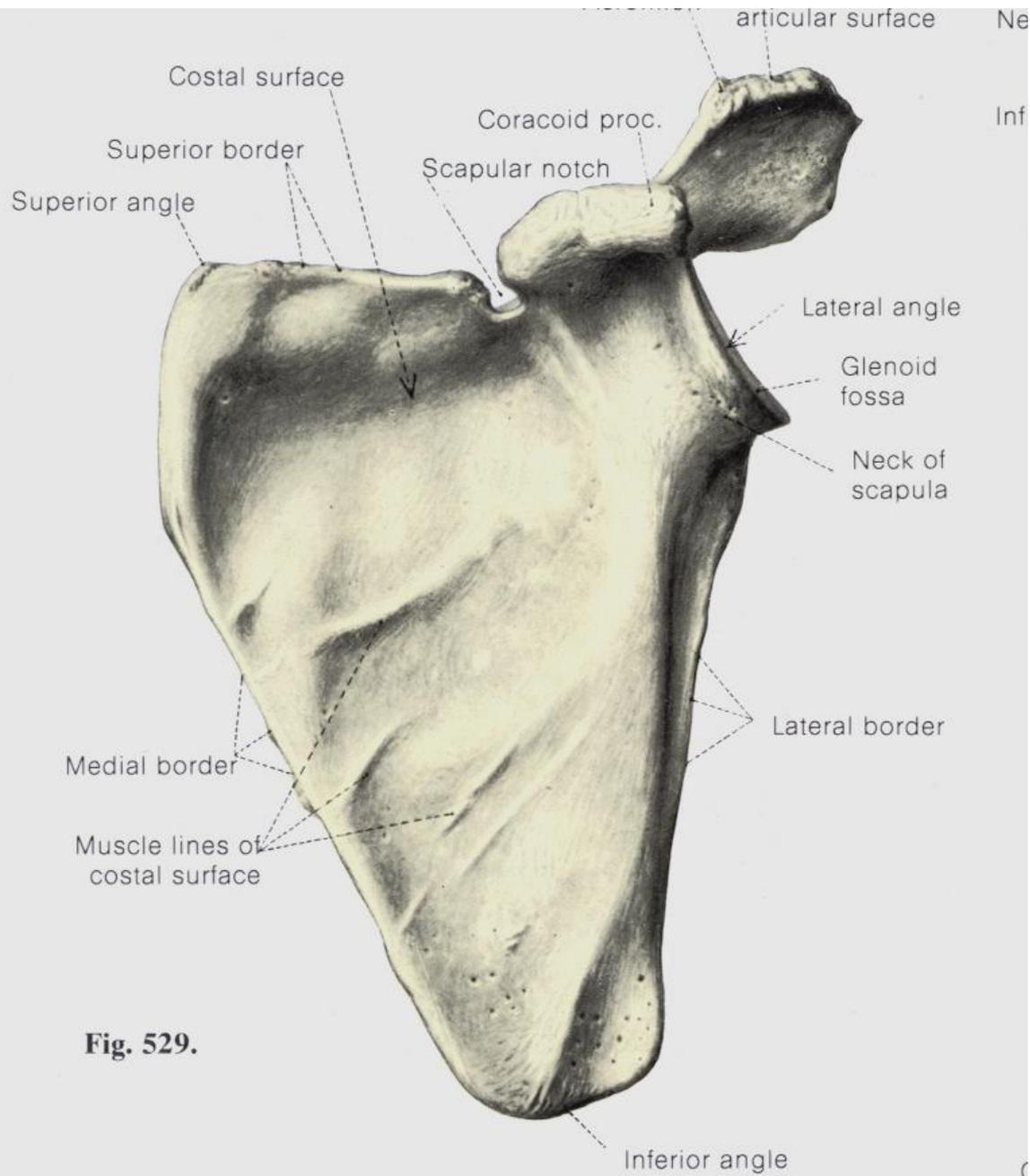
Acromioclavicular dislocation



Scapula

- Large, flat, triangular bone
- Overlaps in part 2-7 ribs on posterolateral thoracic aspect



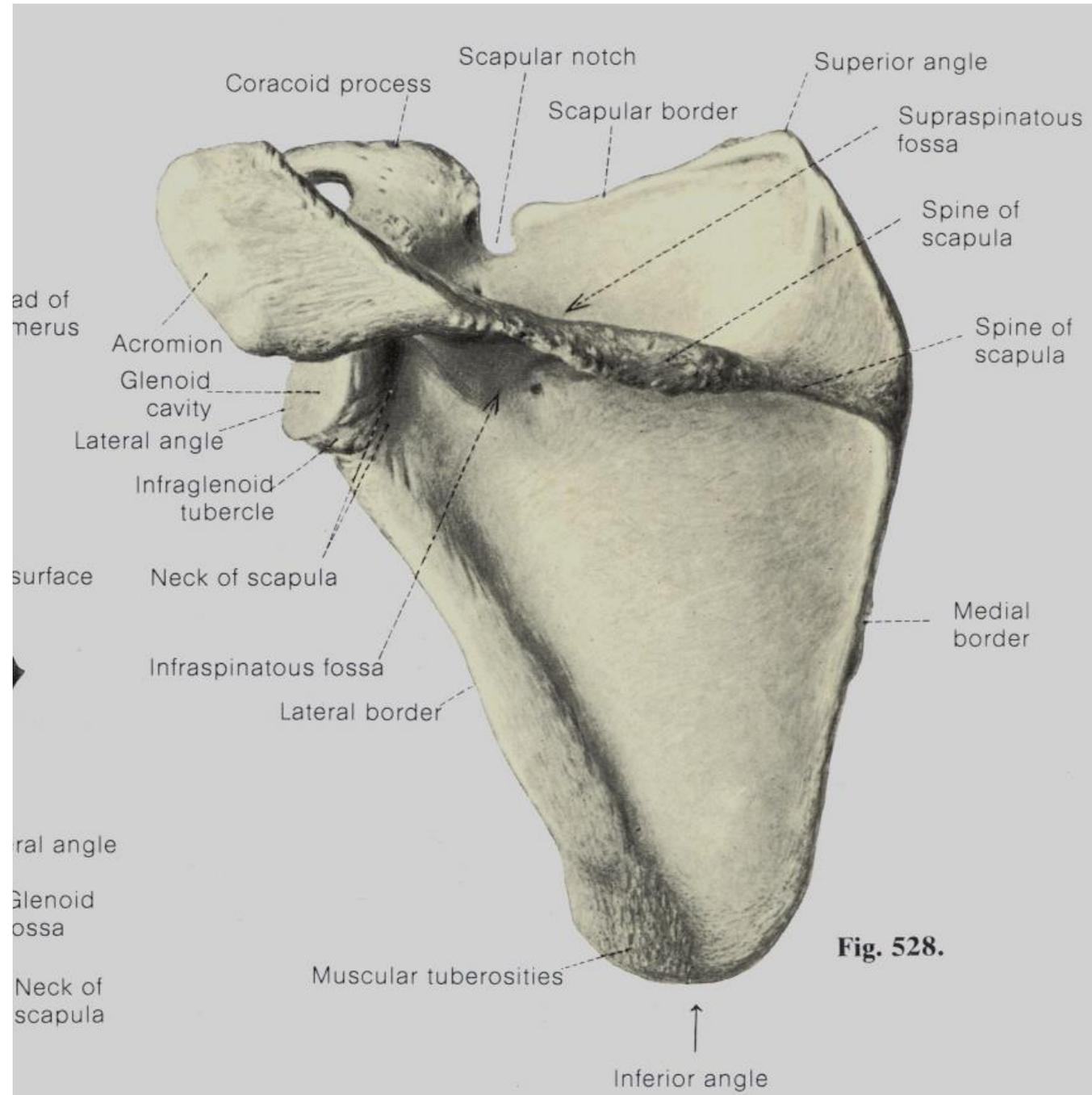


- Costal surface
- Dorsal surface
- Sup, lat, med borders
- Inf, sup, lat angles

Fig. 529.

Processes

- Spinous
- Acromial
- Coracoid



Humerus

- Longest & largest bone of upper limb
- Expanded ends
- Shaft
- Proximal end
 - Head
 - Neck
 - Greater tubercle
 - Lesser tubercle

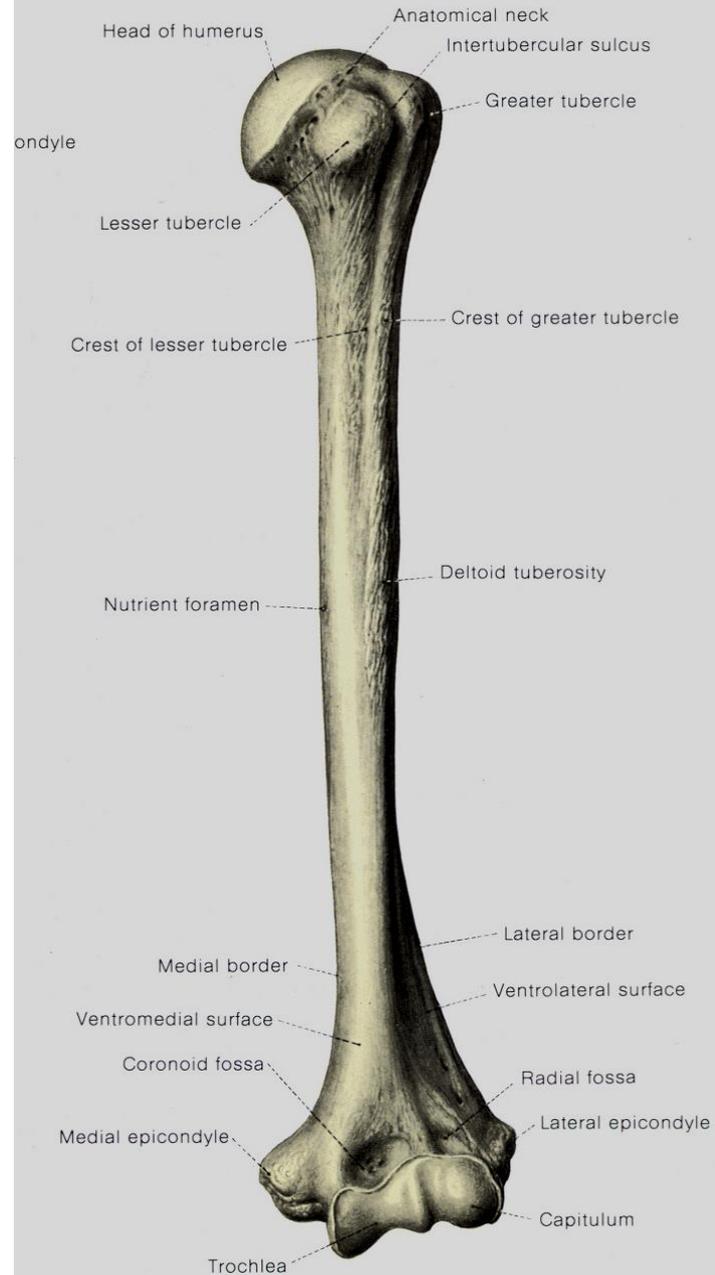


Fig. 545.

Shaft

- Cylindrical proximally
- Prismatic distally
- Not palpable
- Ant, med, lat borders
- Ant border; descends from front of greater tubercle, almost to distal end
- Surfaces:
 - anterolat (deltoid tuberosity)
 - behind (radial groove)
 - anteromed
 - posterior

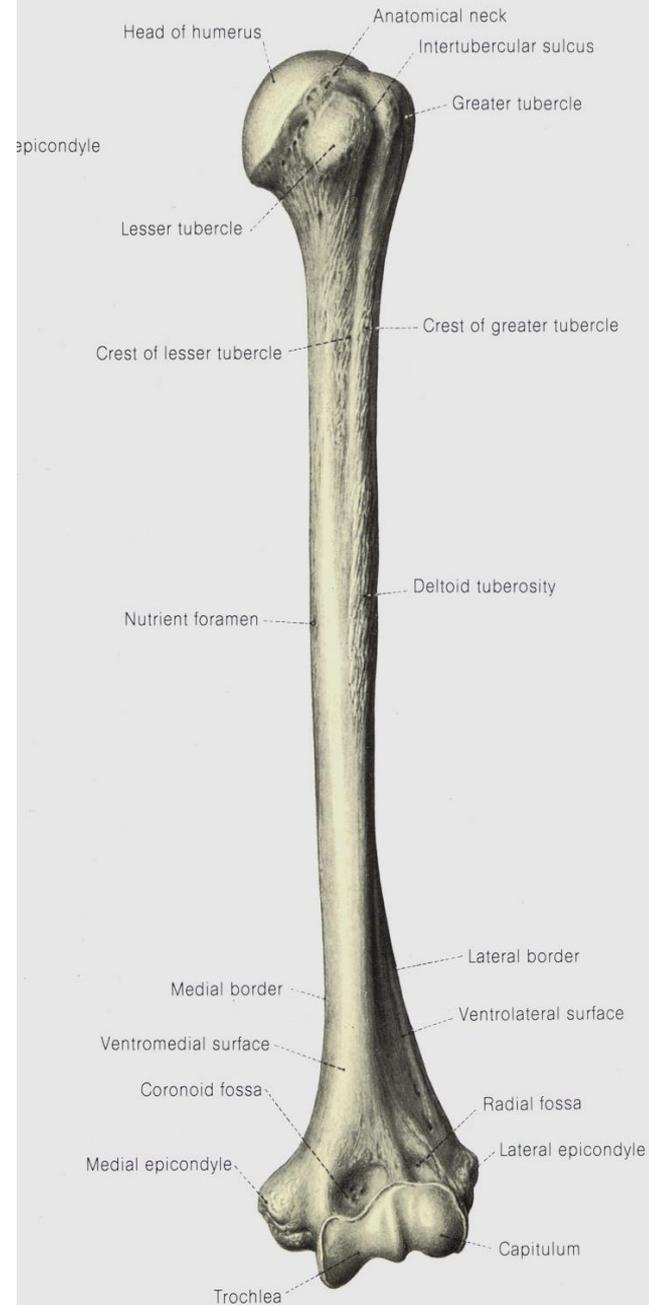
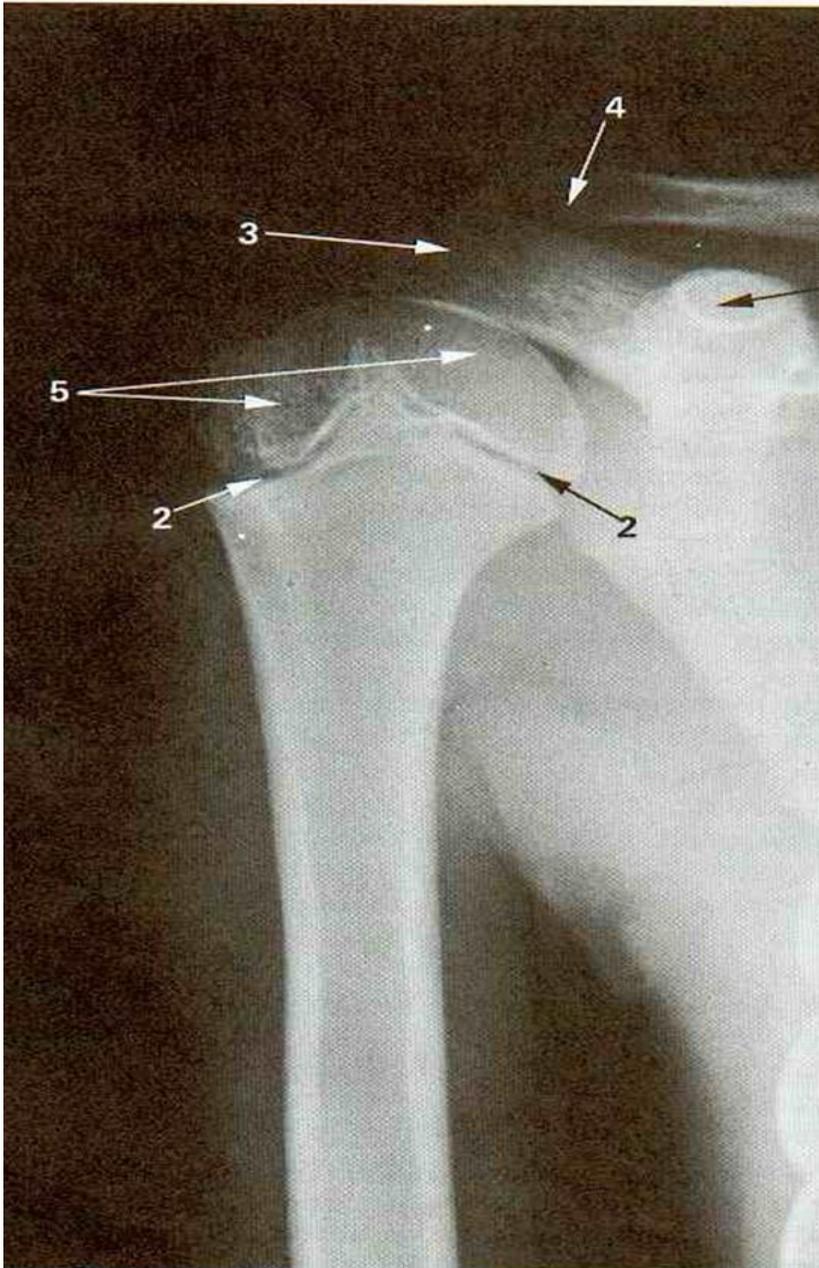


Fig. 545.



Name the numbered arrows?

Radius

- Lat in forearm
- Expanded prox & distal ends (distal much broader)
- Shaft widens rapidly towards distal end
- Proximal end
- Shaft
- Distal end

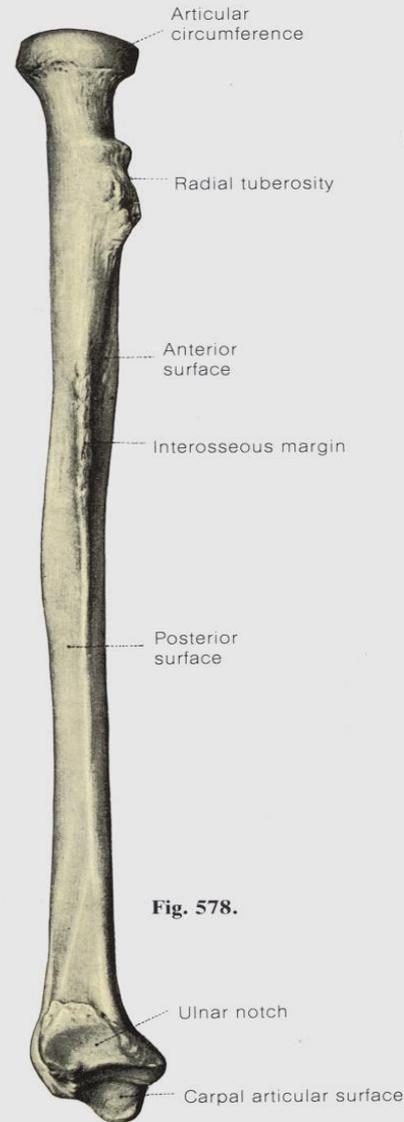


Fig. 578.

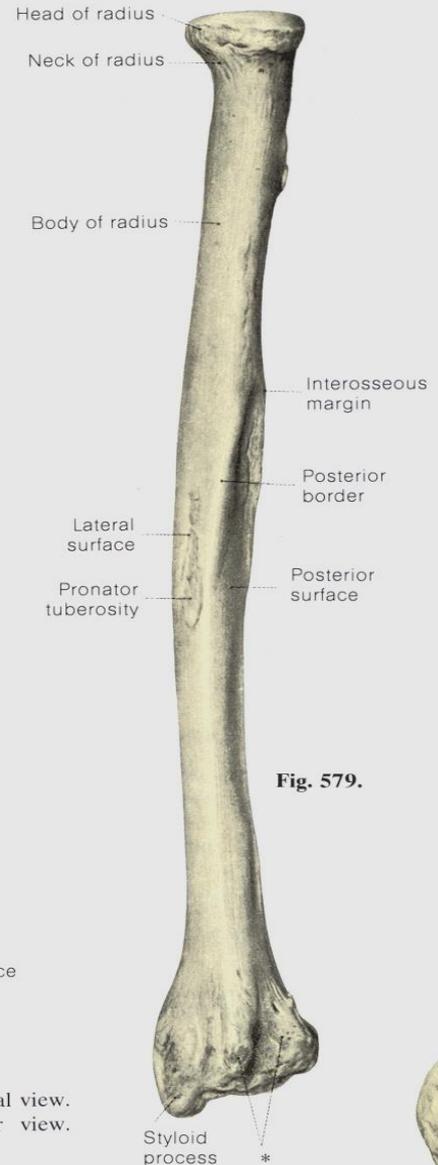
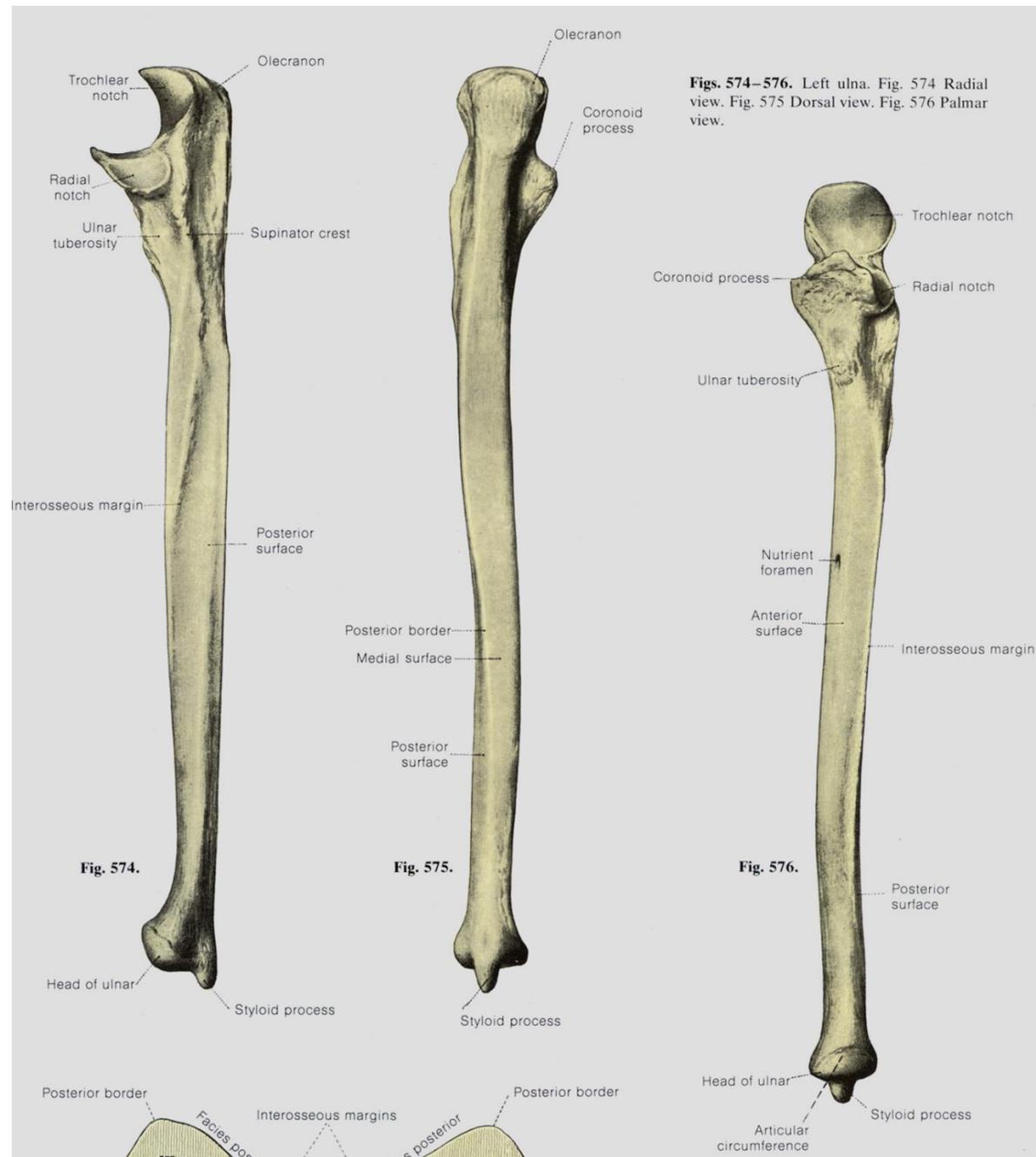


Fig. 579.

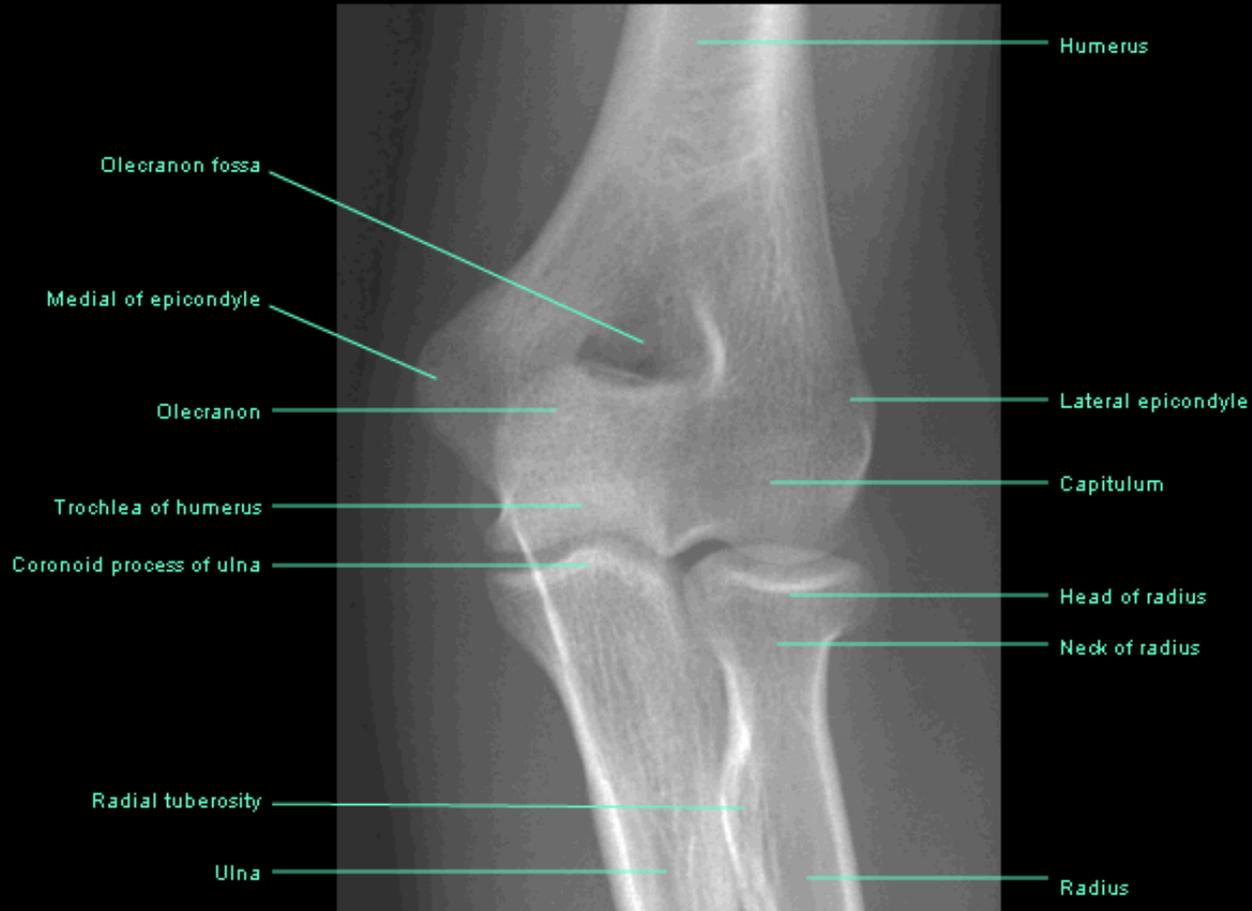
Figs. 578–580. Left radius. Fig. 578 Medial view. Fig. 579 Dorsal view. Fig. 580 Palmar view. * Grooves and crests for extensor tendons.

Ulna

- In supinated forearm; medial to radius
- Slightly convex posteriorly
- Olecranon enters humeral olecranon fossa (extension)
- Extension; olecranon can be felt near a line joining humeral epicondyles
- Flexion; olecranon descends \Rightarrow 3 points form isosceles triangle



Elbow: Anteroposterior radiograph





3.193 (above) Lateral radiograph of forearm of a girl of 11 years semiflexed at the elbow. Note following epiphyses and adjacent radiolucent growth cartilages: 1. Olecranon. 2. Proximal radial. 3. Distal radial. 4. Distal ulnar.

Wrist and Hand

- Carpus
- Metacarpus
- Phalanges



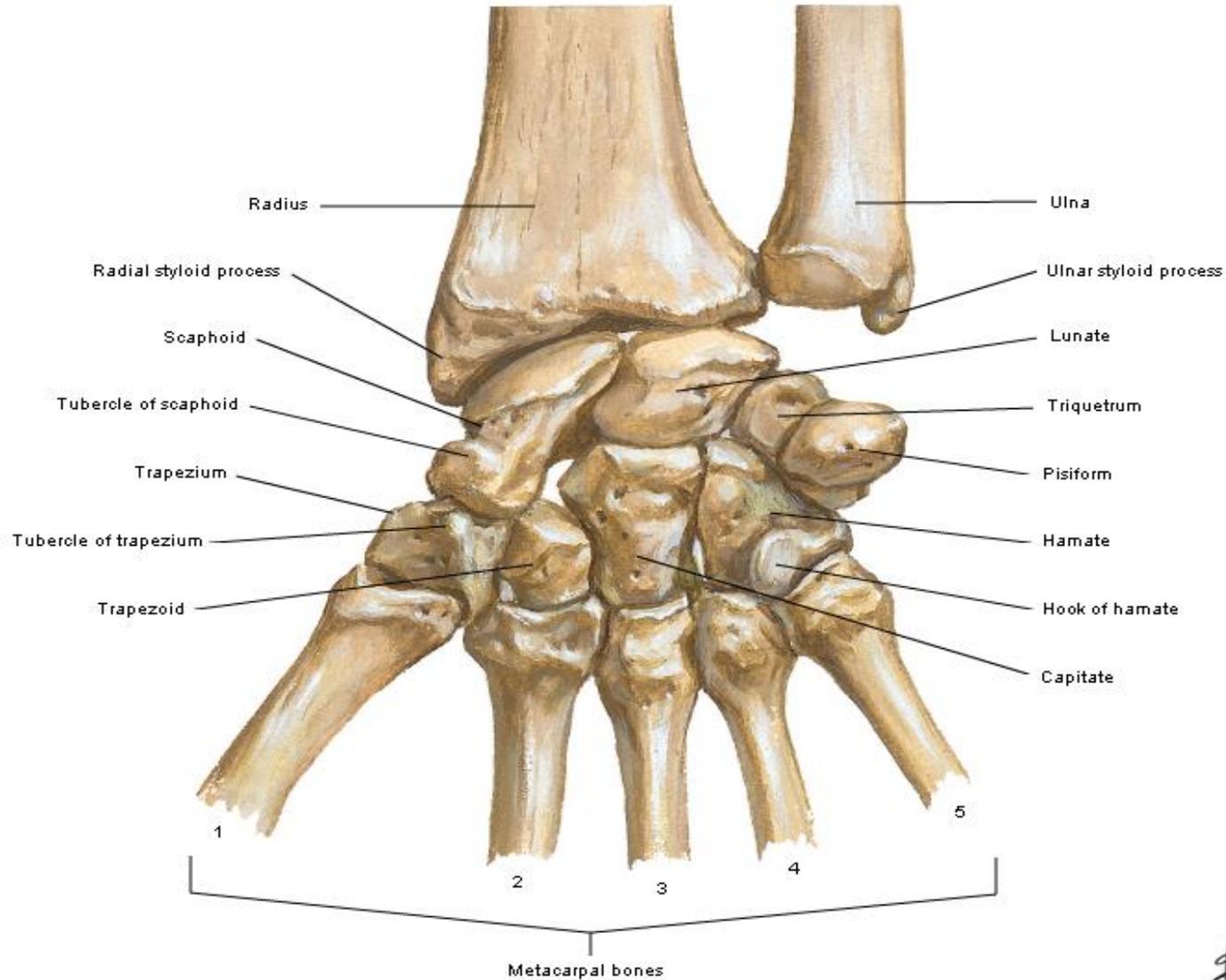
Carpus

- 8 bones; 4 prox row, 4 distal row
- Prox: Scaphoid, lunate, triquetral, pisiform
- Distal: Trapezium, trapezoid, capitate, hamate
- Pisiform articulates with palmar surface of triquetral
- Dorsal carpal surface; convex
- Palmar carpal surface forms carpal groove (deeply concave)



Carpal Bones

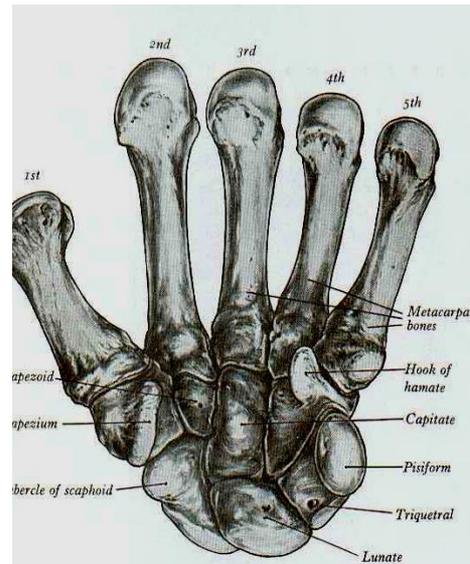
Anterior (Palmar) View



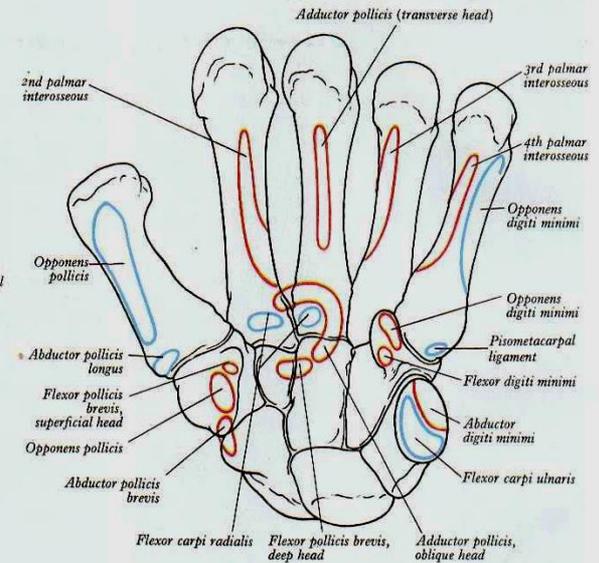
J.

Metacarpus

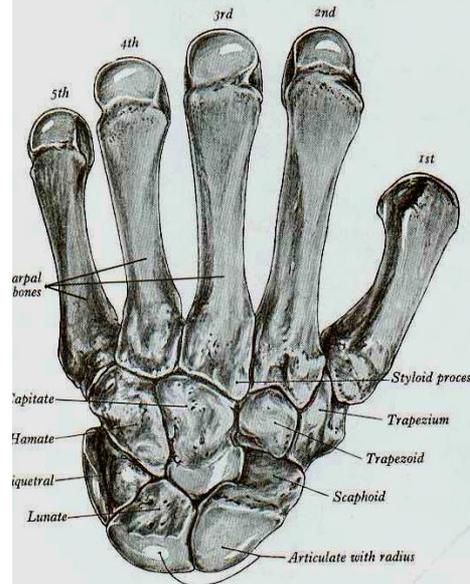
- 5 in number
- Distal head, shaft, expanded base
- Rounded heads articulate with prox. phalanges
- Metacarpal bases articulate with distal carpal row



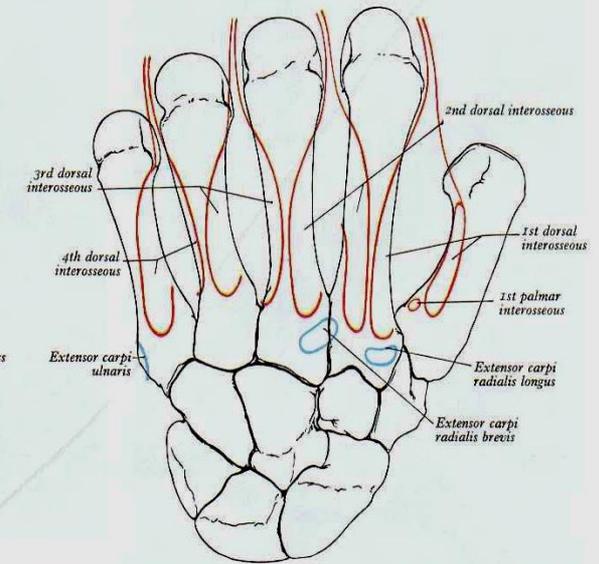
3.194A The carpal and metacarpal bones of the left hand: palmar aspect.



3.194B Muscle attachments to the carpal and metacarpal bones of the left hand: palmar aspect. Dorsal interossei not shown.



416 3.195A The carpal and metacarpal bones of the left hand: dorsal aspect.



3.195B Muscle attachments to the carpal and metacarpal bones of the left hand: dorsal aspect.

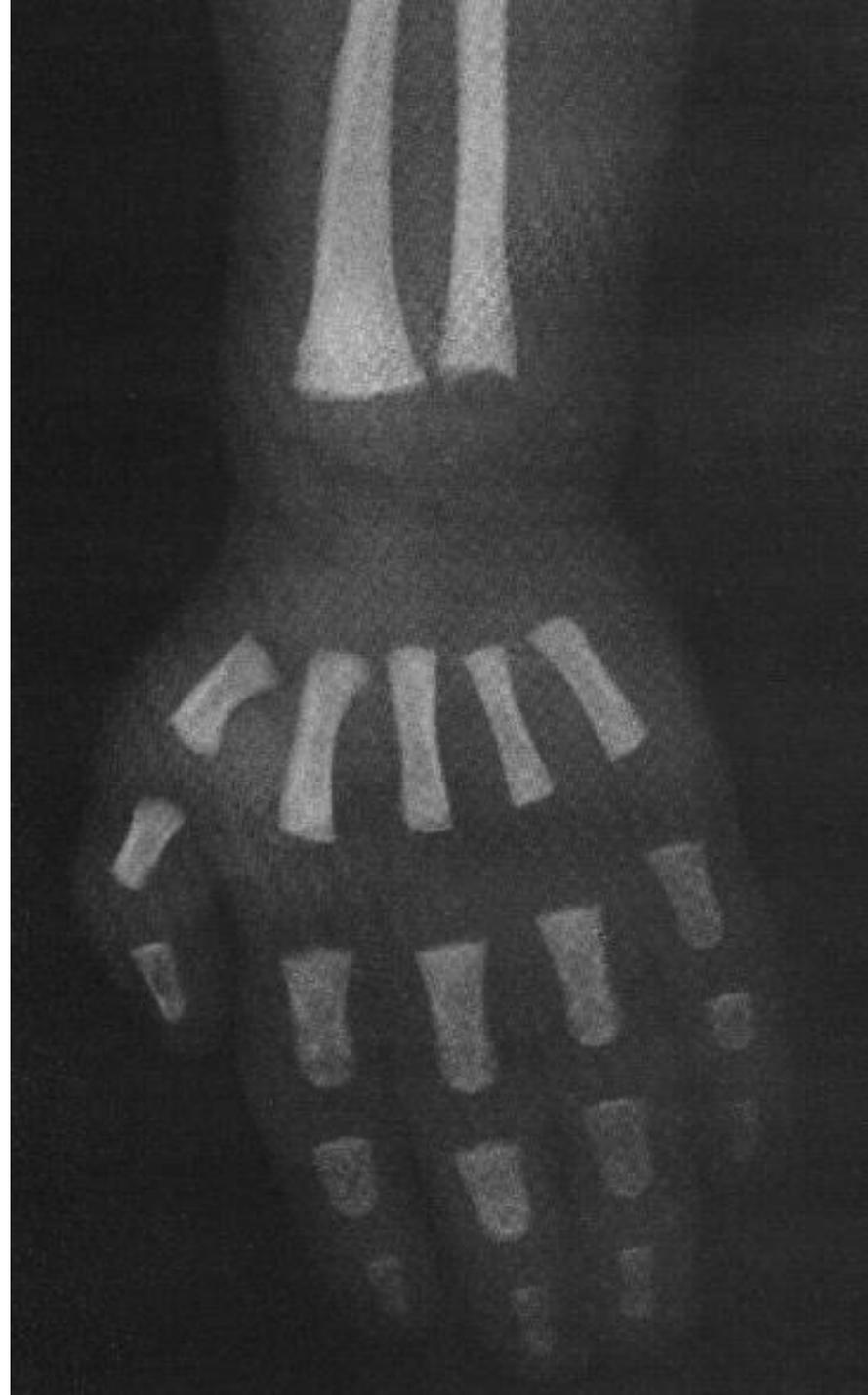
Phalanges

- 14 in number
- 3 in each finger, 2 in thumb
- Head
- Shaft
- Proximal base



Carpal bones ossification

- All are cartilaginous at birth



- **Ossification of the capitate and hamate by the second year**
- **The lunate is more usually preceded by the triquetral**



2 years

- All the carpus except the sesamoid pisiform is ossified in the 7th year

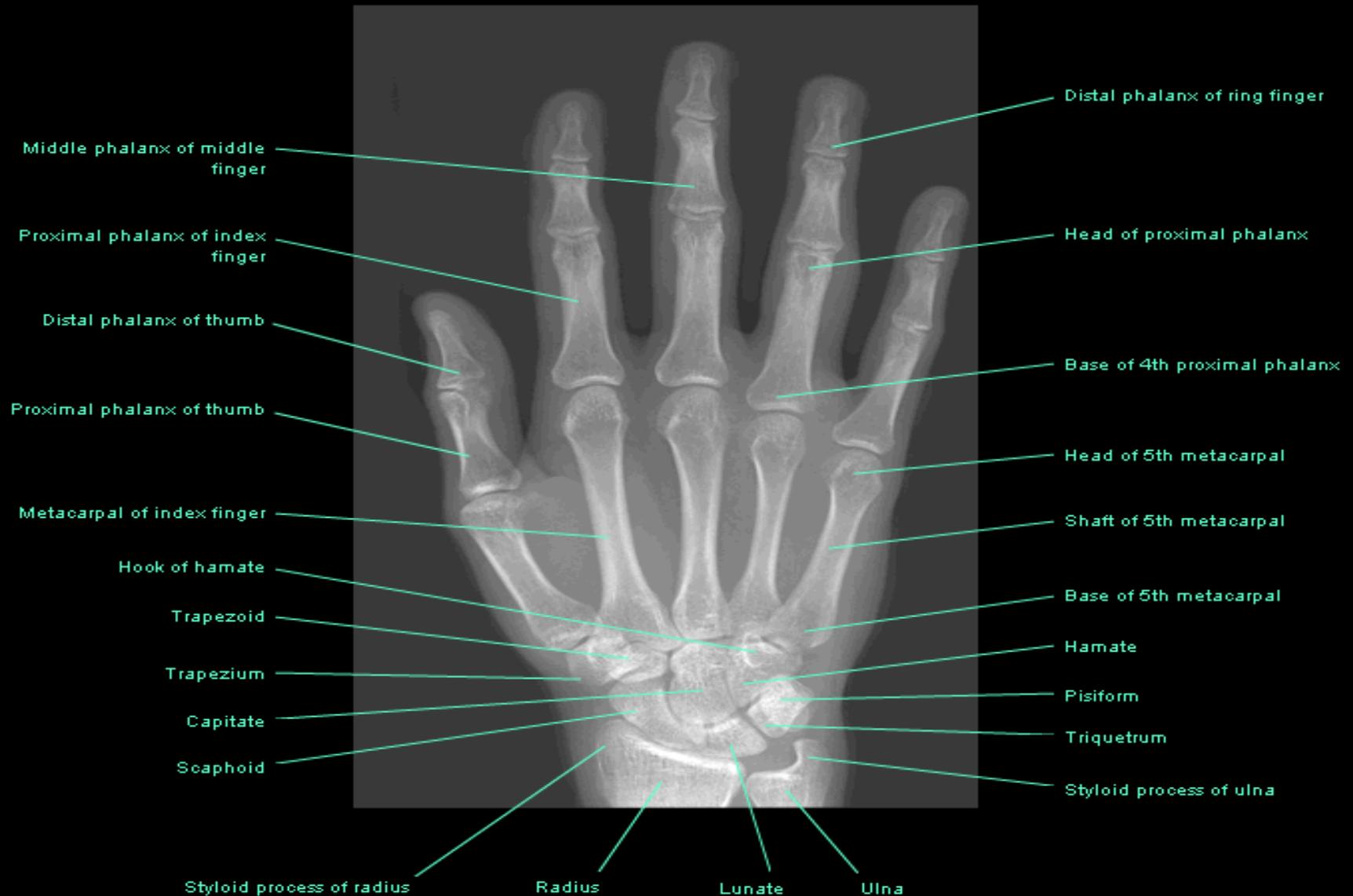


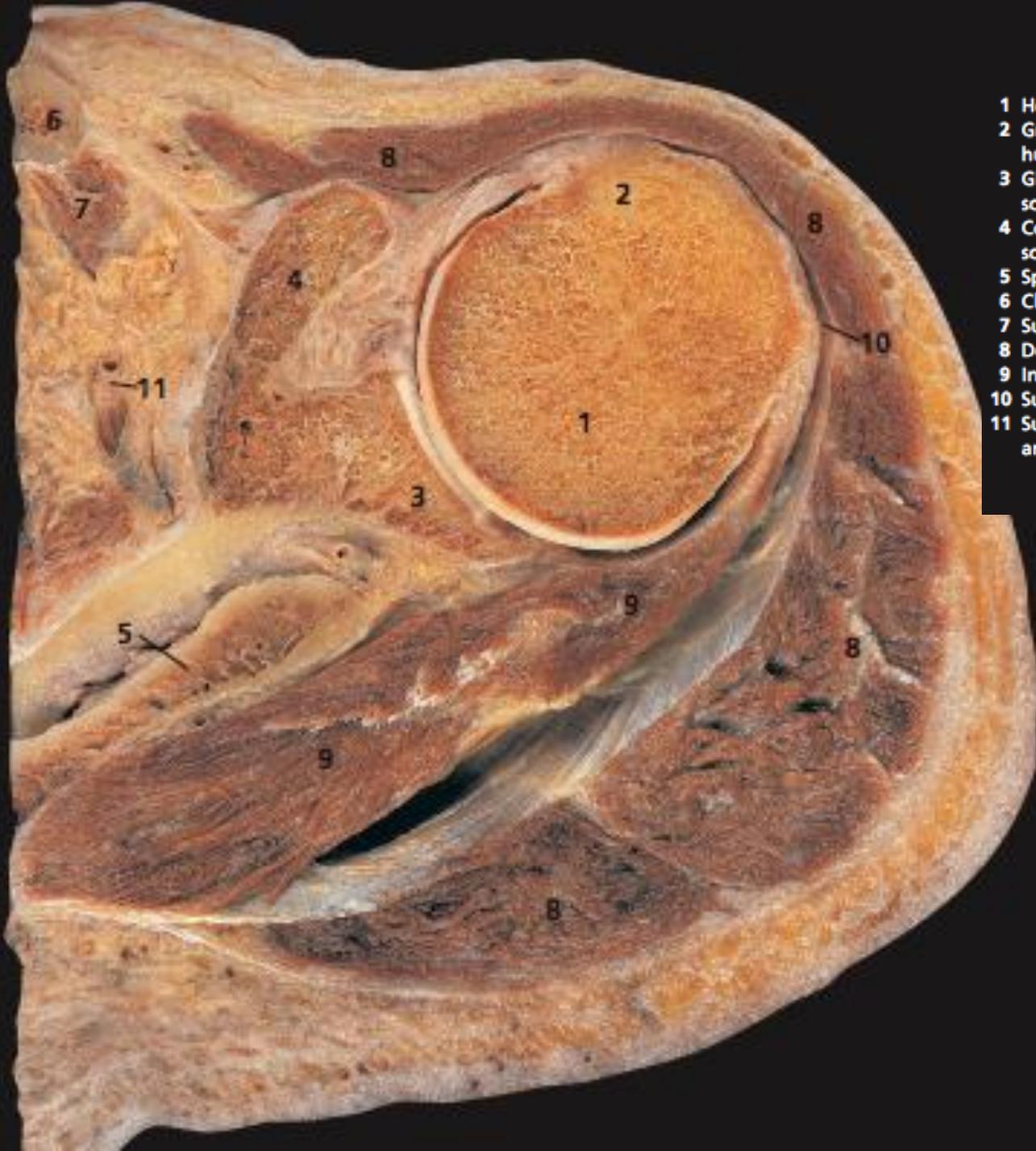
- **The sesamoid (pisiform), ossifies last (12 years)**



13 years

Wrist and Hand: Anteroposterior Radiograph

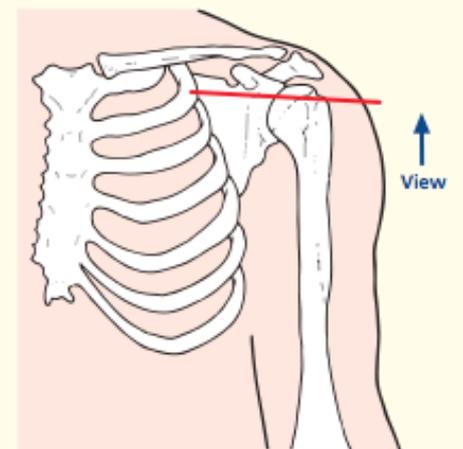


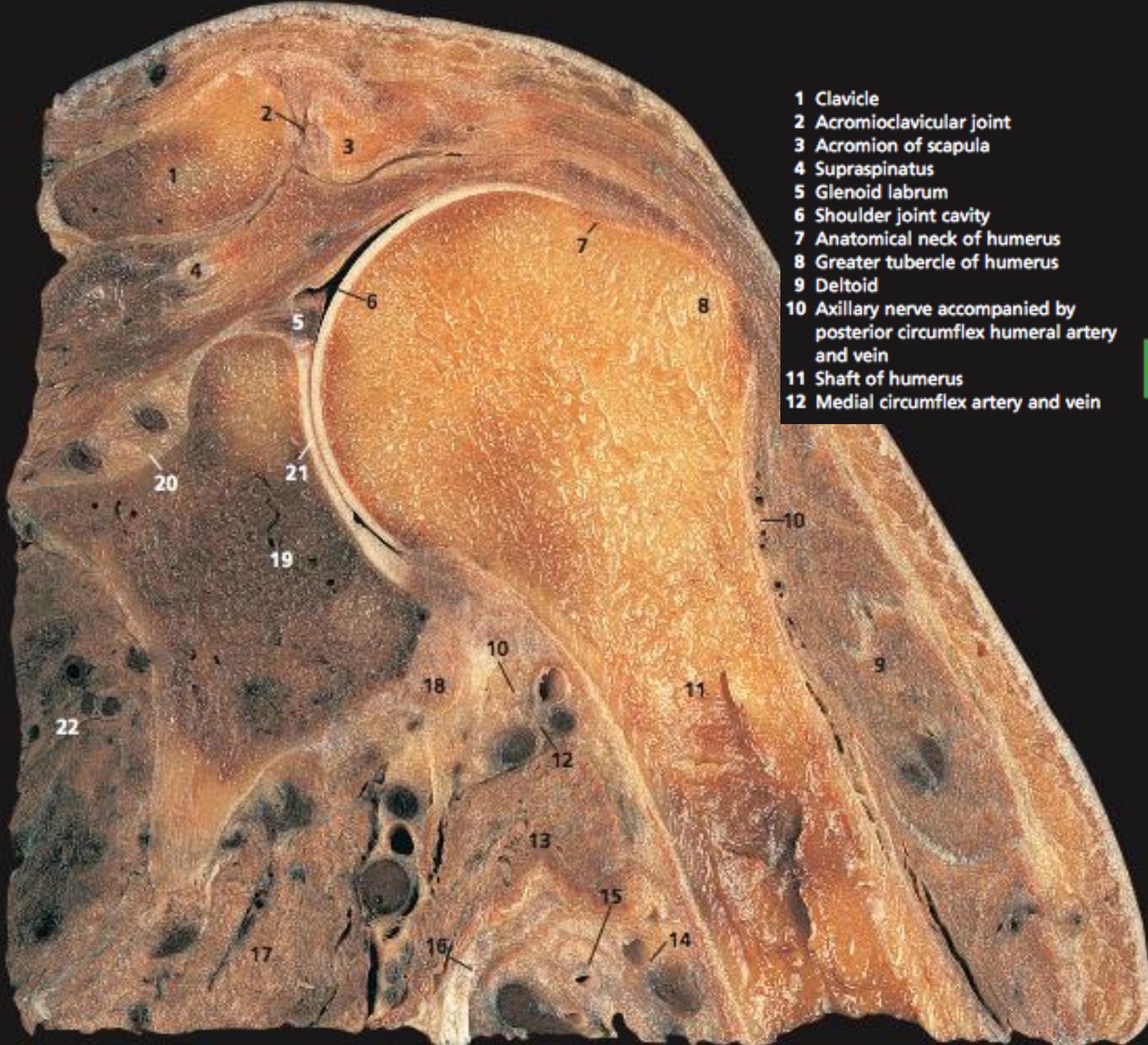


- 1 Head of humerus
- 2 Greater tubercle of humerus
- 3 Glenoid fossa of scapula
- 4 Coracoid process of scapula
- 5 Spine of scapula
- 6 Clavicle
- 7 Subclavius
- 8 Deltoid
- 9 Infraspinatus
- 10 Subdeltoid bursa
- 11 Suprascapular artery and vein

- 12 Labrum of glenoid
- 13 Subscapularis tendon
- 14 Middle glenohumeral ligament
- 15 Long head of biceps tendon in bicipital groove (intertubercular groove)
- 16 Attachment of coraco-acromial and coraco-humeral ligaments
- 17 Lesser tubercle of humerus
- 18 Transverse humeral ligament

Section level

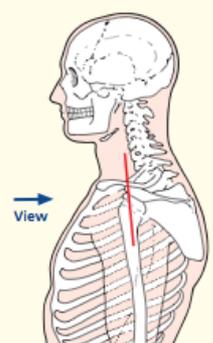




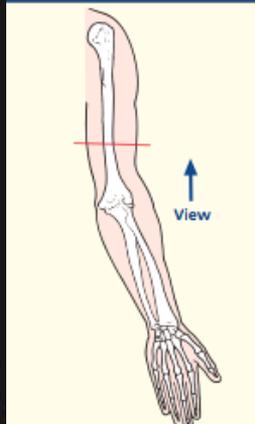
- 1 Clavicle
- 2 Acromioclavicular joint
- 3 Acromion of scapula
- 4 Supraspinatus
- 5 Glenoid labrum
- 6 Shoulder joint cavity
- 7 Anatomical neck of humerus
- 8 Greater tubercle of humerus
- 9 Deltoid
- 10 Axillary nerve accompanied by posterior circumflex humeral artery and vein
- 11 Shaft of humerus
- 12 Medial circumflex artery and vein

- 13 Latissimus dorsi
- 14 Brachial artery and vein
- 15 Nerves of brachial plexus
- 16 Tendon of teres major
- 17 Teres minor
- 18 Long head of triceps
- 19 Head of scapula
- 20 Neck of scapula
- 21 Glenoid fossa of scapula
- 22 Subscapularis
- 23 Long head of biceps tendon
- 24 Surgical neck of humerus

Section level

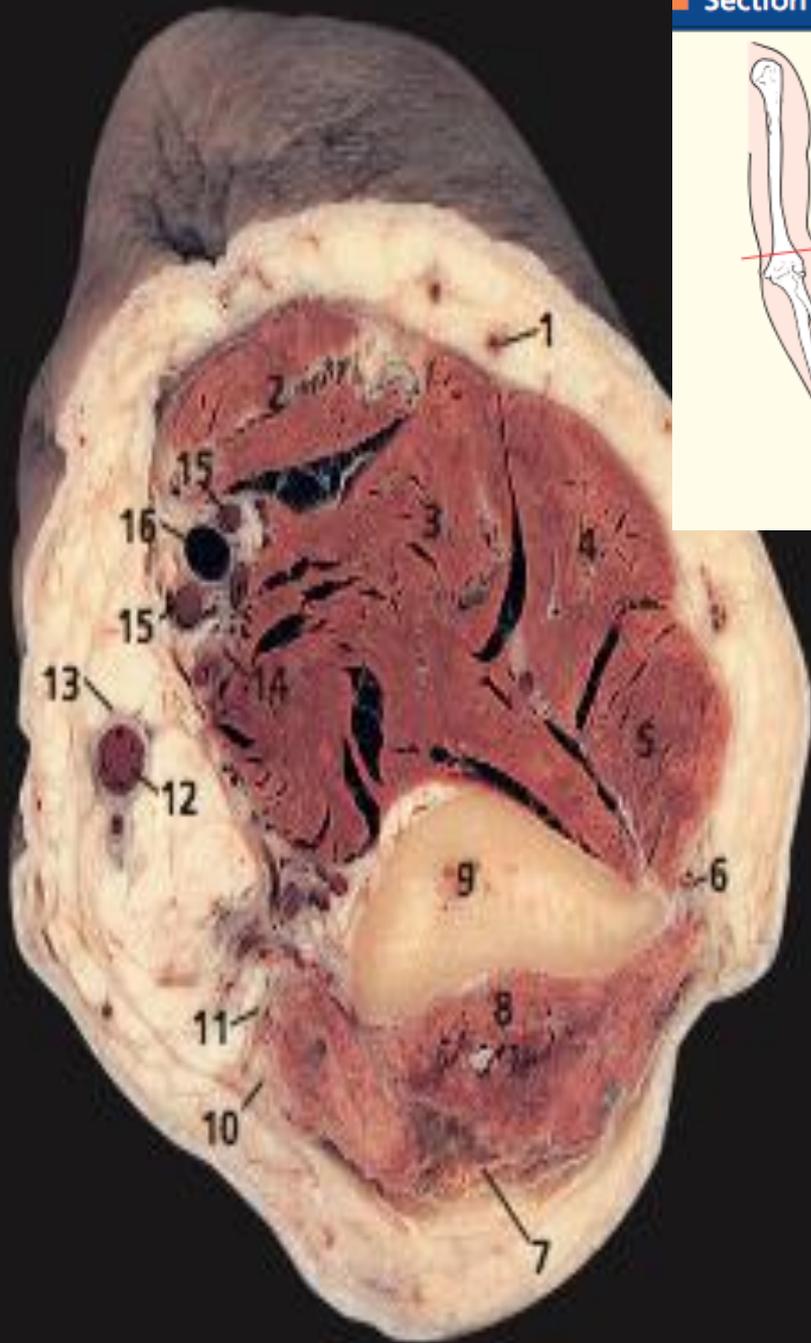
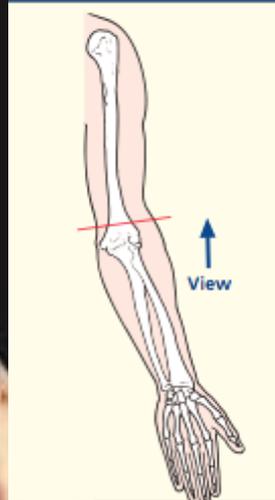


Section level

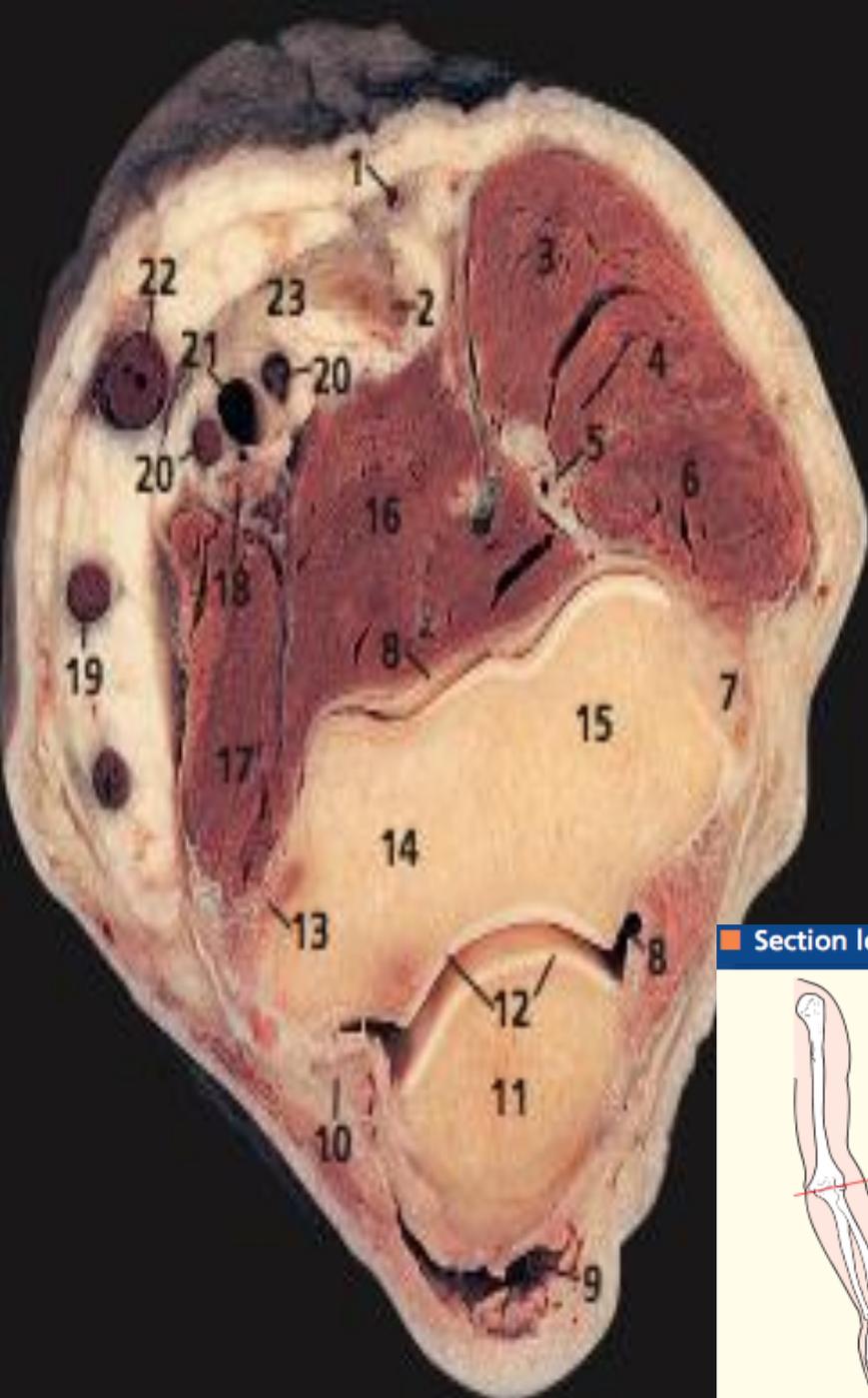


- | | |
|---|--|
| 1 Deep fascia of arm | 10 Medial intermuscular septum |
| 2 Biceps | 11 Ulnar nerve |
| 3 Cephalic vein | 12 Basilic vein |
| 4 Brachialis | 13 Superior ulnar collateral artery and vein |
| 5 Lateral intermuscular septum | 14 Humerus shaft |
| 6 Radial nerve, with profunda brachii artery and vein | 15 Median nerve |
| 7 Triceps – lateral head | 16 Musculocutaneous nerve |
| 8 Triceps – medial head | 17 Venae comitantes of brachial artery |
| 9 Triceps – long head | 18 Brachial artery |

Section level



- | | |
|----------------------------------|--|
| 1 Cephalic vein | 10 Ulnar nerve |
| 2 Biceps | 11 Medial intermuscular septum |
| 3 Brachialis | 12 Basilic vein |
| 4 Brachioradialis | 13 Medial cutaneous nerve of forearm |
| 5 Extensor carpi radialis longus | 14 Median nerve |
| 6 Lateral intermuscular septum | 15 Venae comitantes of brachial artery |
| 7 Triceps tendon | 16 Brachial artery |
| 8 Triceps | |
| 9 Humerus | |

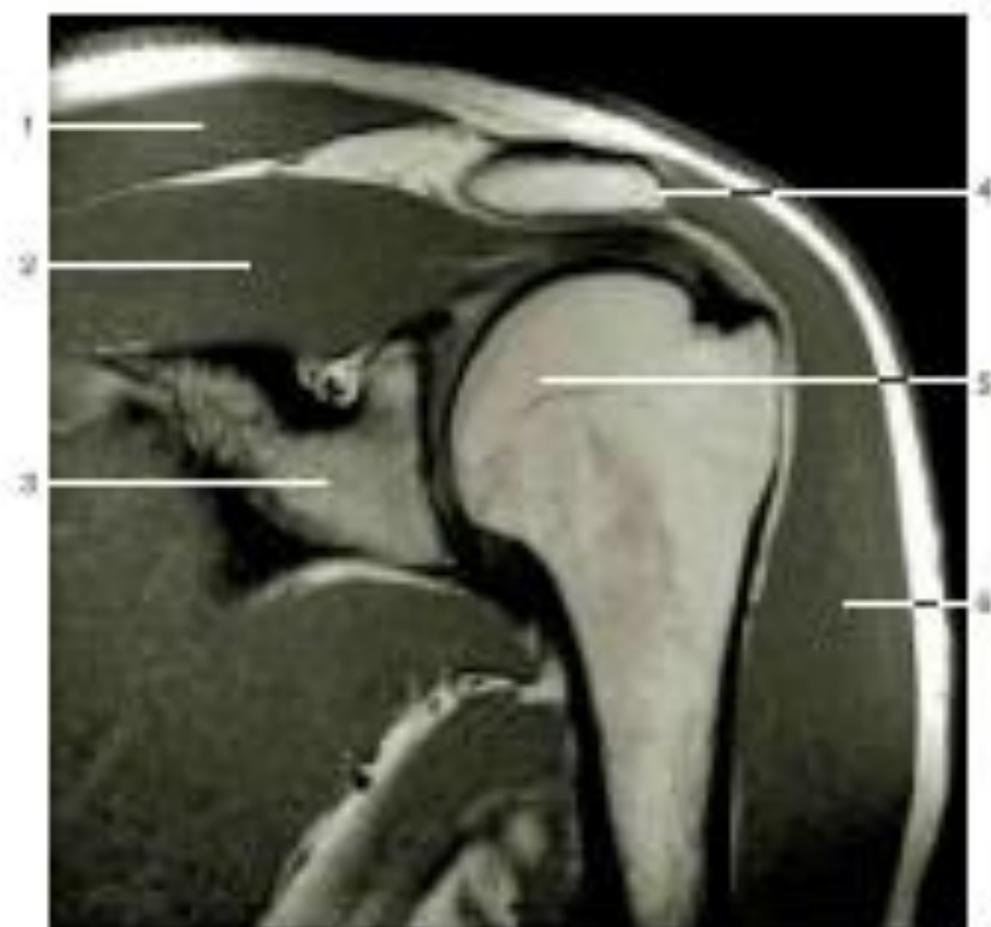


Section level



- 1 Cephalic vein
- 2 Biceps tendon
- 3 Brachioradialis
- 4 Extensor carpi radialis longus
- 5 Radial nerve with profunda brachii artery and vein
- 6 Common extensor origin
- 7 Lateral collateral ligament of elbow
- 8 Joint capsule of elbow
- 9 Olecranon bursa
- 10 Ulnar nerve
- 11 Olecranon process of ulna
- 12 Articular cartilage
- 13 Medial collateral ligament of elbow
- 14 Trochlea of humerus
- 15 Capitulum of humerus
- 16 Brachialis
- 17 Common flexor origin
- 18 Median nerve
- 19 Basilic vein
- 20 Venae comitantes of brachial artery
- 21 Brachial artery
- 22 Median cubital vein
- 23 Bicipital aponeurosis

24 Anconeus



Shoulder joint (MRI scan, coronal section) (from Heuck et al., MRT-Atlas, 2009).



Shoulder joint (X-ray, a.-p. direction) (courtesy of Dr. Heilk, Spandorf).

- | | |
|---------------------------|----------------------------|
| 1 Coracoacromial ligament | 6 Deltoid muscle |
| 2 Supraspinatus muscle | 7 Cavity of shoulder joint |
| 3 Scapula | 8 Articular cartilage |
| 4 Acromion | 9 Articular cavity |
| 5 Head of humerus | 10 Humeral neck |