

# *Upper limbs*

Dr.Khalid A.H. Al Khazraji

# Lecture one

Objectives:

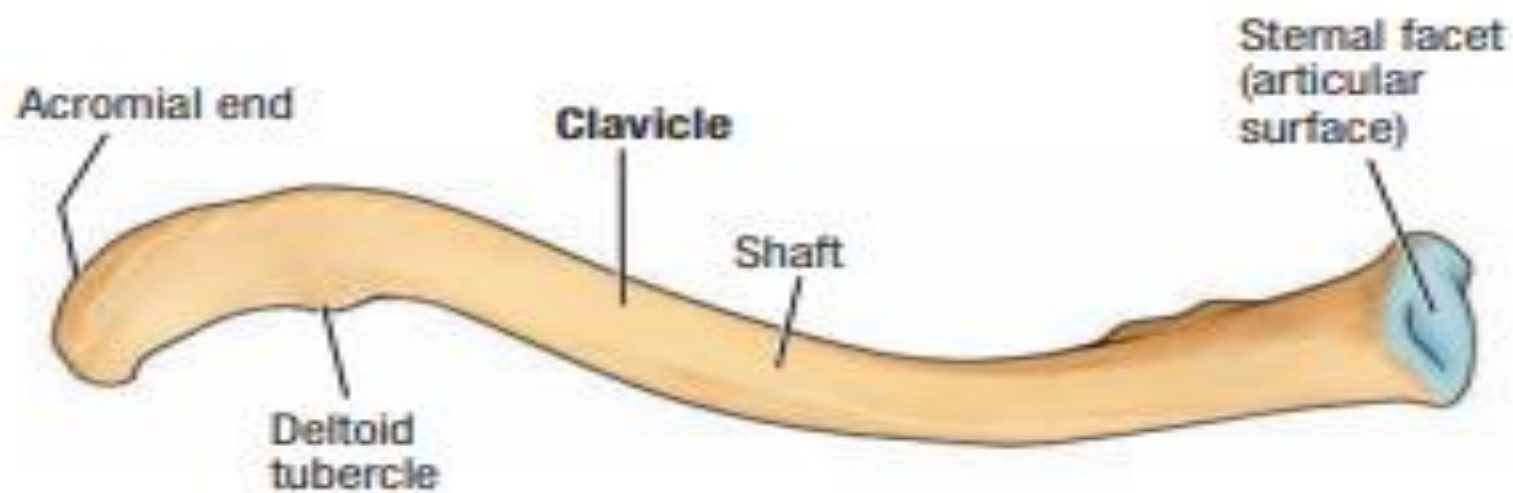
1-identify bones of the upper limbs.

2-identify different boney landmarks of the upper limb bones.

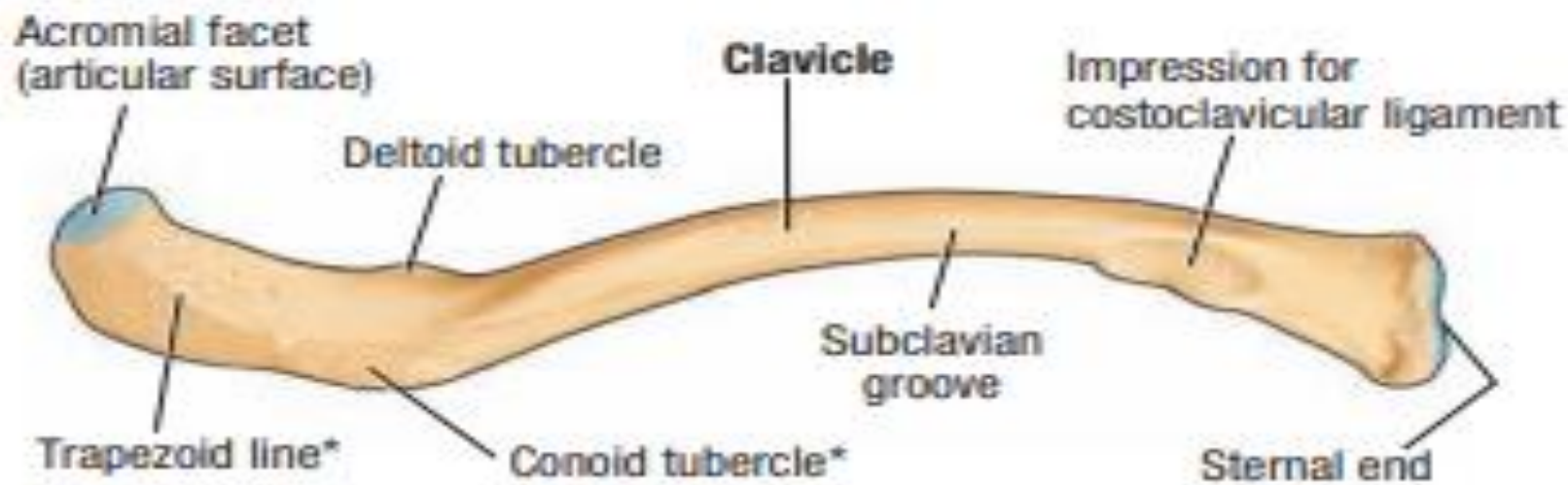
# I. BONES OF THE SHOULDER GIRDLE (Figure 2-1)

## A. Clavicle (Collarbone)

- Is a **commonly fractured bone** that forms the **pectoral (shoulder) girdle** with the **scapula**, which connects the upper limb to the sternum (axial skeleton), by articulating with the sternum at the sternoclavicular joint and with the acromion of the scapula at the acromioclavicular joint.
- Is **the first bone to begin ossification** during fetal development, but it is **the last one to complete ossification**, at approximately 21 years of age.
- Is the only long bone to be **ossified intramembranously**.

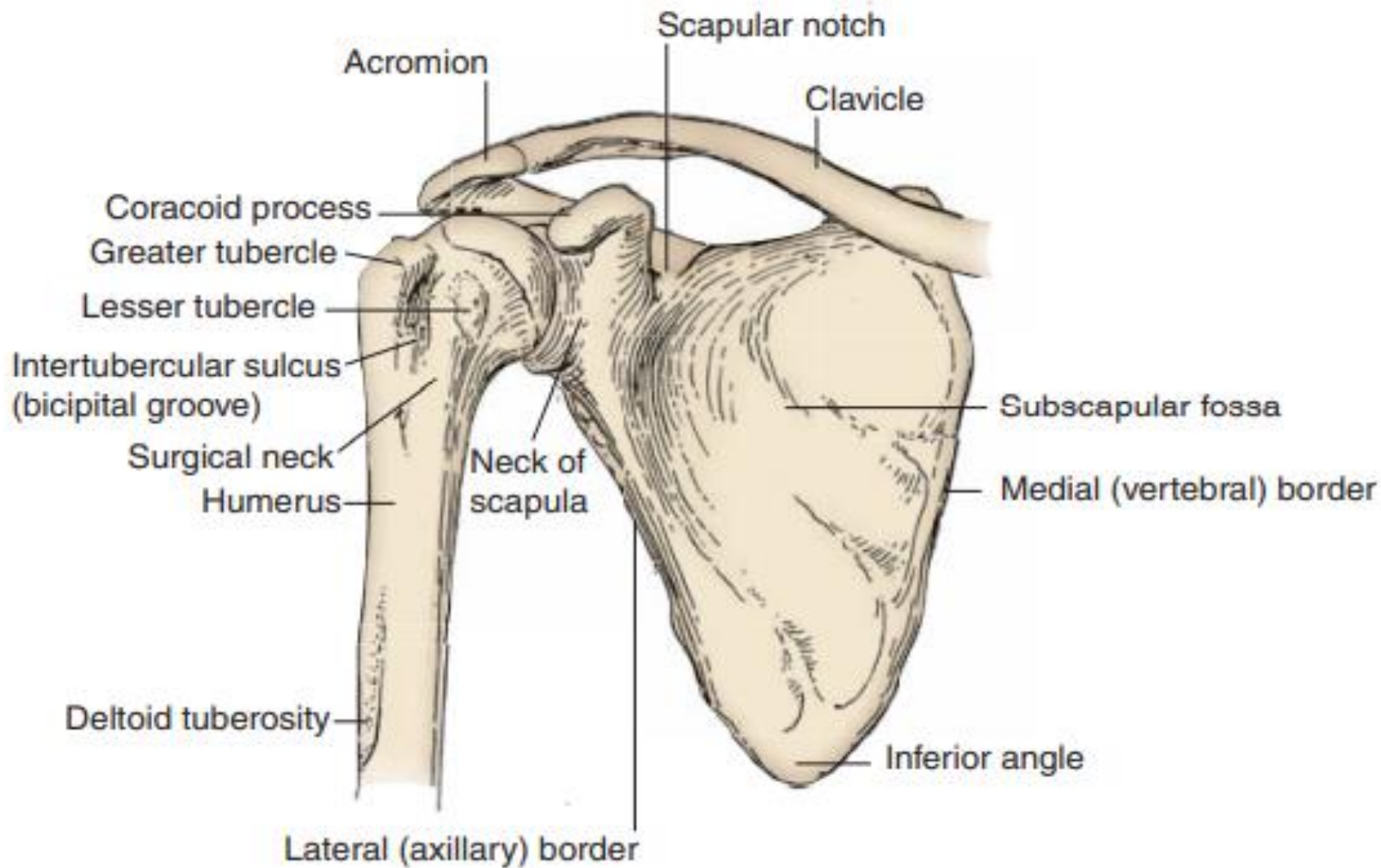


**A. Superior Surface**

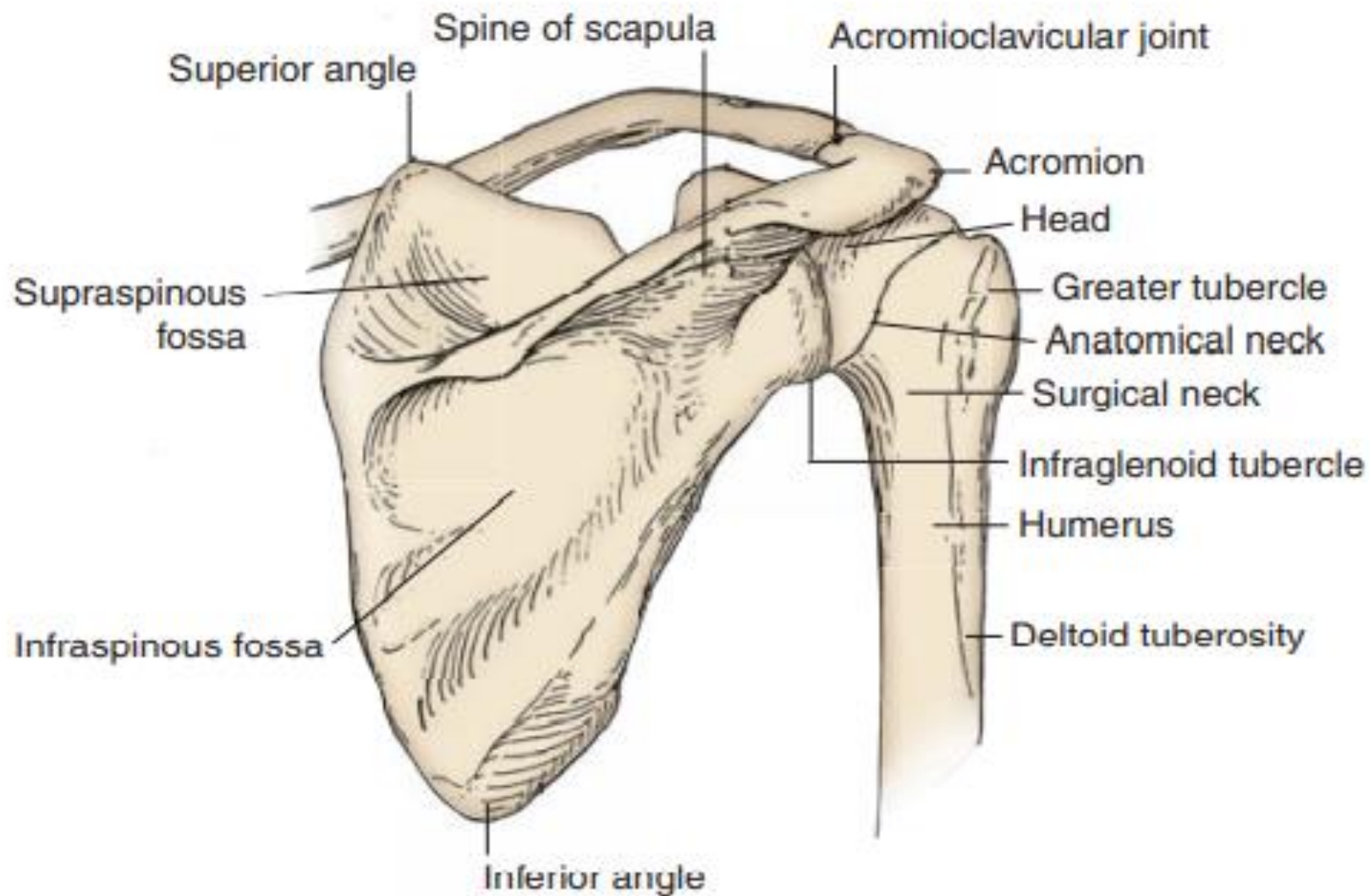


**B. Inferior Surface**

\*Tuberosity for coracoclavicular ligament (conoid and trapezoid parts)



**Anterior view**



**Posterior view**

**FIGURE 2-1.** Pectoral girdle and humerus.

## B. Scapula (Shoulder Blade)

### 1. Spine of the Scapula

- Is a triangular-shaped process that continues laterally as the **acromion**.
- Divides into the upper **supraspinous** and lower **infraspinous fossae**, and also provides an origin for the deltoid and an insertion for the trapezius.

### 2. Acromion

- Is the lateral end of the spine and articulates with the clavicle.
- Provides an origin for the deltoid and an insertion for the trapezius.

### 3. Coracoid Process

- Provides the origin of the coracobrachialis and biceps brachii, the insertion of the pectoralis minor, and the attachment site for the coracoclavicular, coracohumeral, and coracoacromial ligaments and the costocoracoid membrane.

## 4. Scapular Notch

- Is bridged by the superior transverse scapular ligament and converted into a foramen that transmits the **suprascapular nerve**.



## 5. Glenoid Cavity

- Is deepened by the **glenoid labrum** for the head of the **humerus**.

## 6. Supraglenoid and Infraglenoid Tubercles

- Provide origins for the tendons of the long heads of the biceps brachii and triceps brachii muscles, respectively.

# II. BONES OF THE ARM AND FOREARM

## A. Humerus (See Figure 2-1)

### 1. Head

- Articulates with the scapula at the **glenohumeral joint**.

### 2. Anatomic Neck

- Is an indentation distal to the head and provides an attachment for the fibrous joint capsule.

### 3. Greater Tubercle

- Lies just lateral and distal to the anatomic neck and provides attachments for the supraspinatus, infraspinatus, and teres minor muscles.

#### 4. Lesser Tubercle

- Lies on the anterior medial side of the humerus, just distal to the anatomic neck, and provides an insertion for the subscapularis muscle.

#### 5. Intertubercular (Bicipital) Groove

- Lies between the greater and lesser tubercles, lodges the tendon of the long head of the biceps brachii muscle, and is bridged by the **transverse humeral ligament**.
- Provides insertions for the pectoralis major on its **lateral lip**, the teres major on its **medial lip**, and the latissimus dorsi on its **floor**.

#### 6. Surgical Neck

- Is a narrow area distal to the tubercles that is a **common site of fracture** and is in contact with the axillary nerve and the posterior humeral circumflex artery.

#### 7. Deltoid Tuberosity

- Is a rough triangular elevation on the lateral aspect of the midshaft that marks the insertion of the deltoid muscle.

#### 8. Spiral Groove

- Contains the radial nerve, separating the origin of the lateral head of the triceps above and the origin of the medial head below.

## 9. Trochlea

- Is a spool-shaped medial articular surface and articulates with the **trochlear notch of the ulna**.

## 10. Capitulum

- Is the lateral articular surface, globular in shape, and articulates with the **head of the radius**.

## 11. Olecranon Fossa

- Is a posterior depression above the trochlea of the humerus that houses the **olecranon** of the ulna on full extension of the forearm.

## 12. Coronoid Fossa

- Is an anterior depression above the trochlea of the humerus that accommodates the **coronoid process** of the ulna on flexion of the elbow.

### 13. Radial Fossa

- Is an anterior depression above the capitulum that is occupied by the **head of the radius** during full flexion of the elbow joint.

### 14. Lateral Epicondyle

- Projects from the capitulum and provides the origin of the supinator and extensor muscles of the forearm.

### 15. Medial Epicondyle

- Projects from the trochlea and has a groove on the back for the ulnar nerve and superior ulnar collateral artery.
- Provides attachment sites for the ulnar collateral ligament, the pronator teres, and the common tendon of the forearm flexor muscles.

## B. Radius (Figure 2-2)

- Is shorter than the ulna and is situated lateral to the ulna.
- Is characterized by displacement of the hand dorsally and radially when fractured at its distal end (**Colles's fracture**).

### 1. Head (Proximal End)

- Articulates with the **capitulum** of the humerus and the **radial notch** of the ulna and is surrounded by the **annular ligament**.

### 2. Distal End

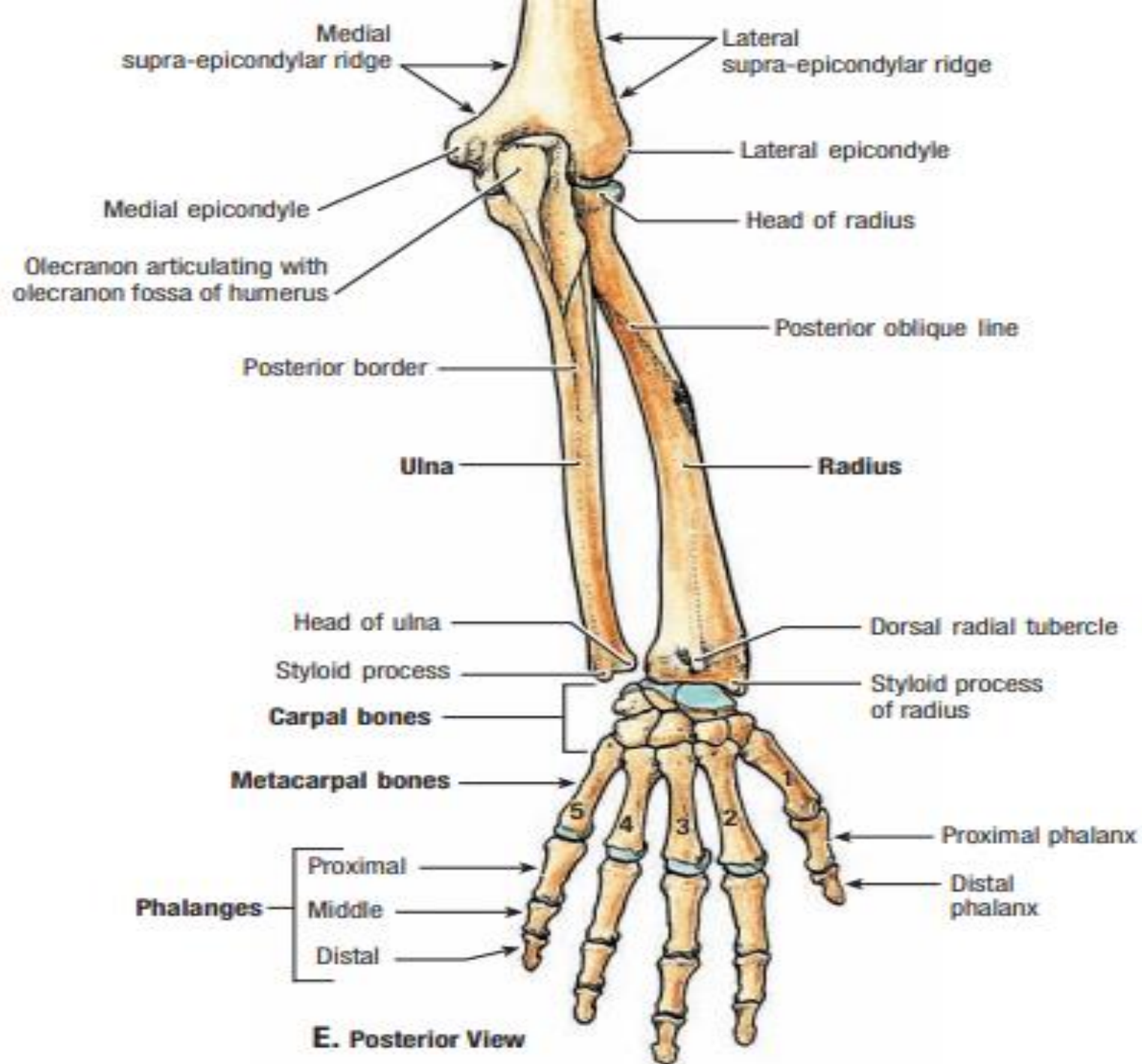
- Articulates with the **proximal row of carpal bones**, including the scaphoid, lunate, and triquetral bones but excluding the pisiform bone.

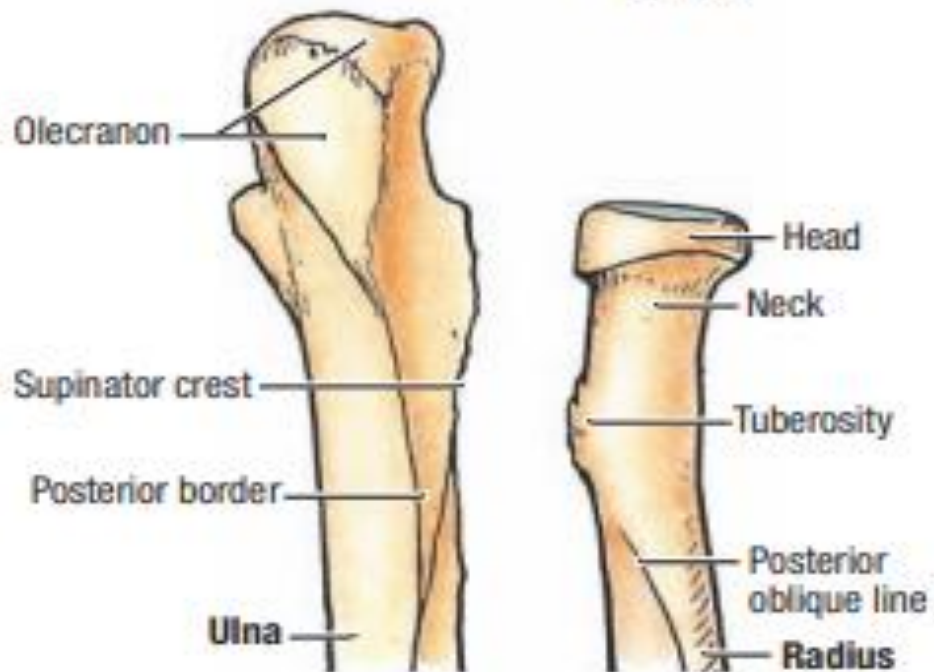
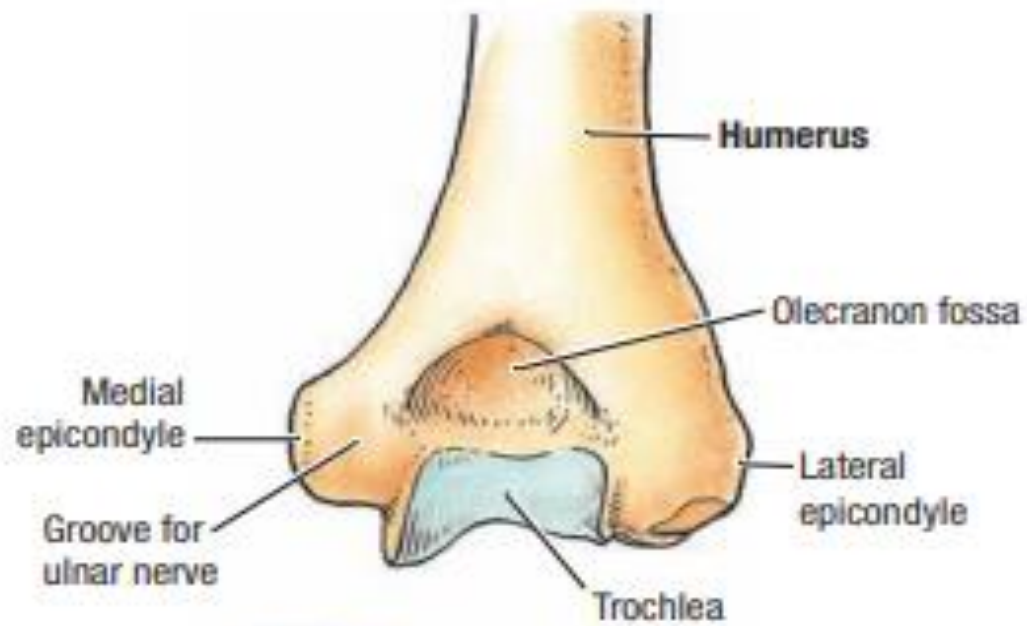
### **3. Radial Tuberosity**

- Is an oblong prominence just distal to the neck and provides an attachment site for the biceps brachii tendon.

### **4. Styloid Process**

- Is located on the distal end of the radius and is approximately 1 cm distal to that of the ulna and provides insertion of the brachioradialis muscle.
- Can be palpated in the proximal part of the anatomic snuffbox between the extensor pollicis longus and brevis tendons.





**G. Posterior View**



## C. Ulna (See Figure 2-2)

### 1. Olecranon

- Is the curved projection on the back of the elbow that provides an attachment site for the triceps tendon.

## 2. Coronoid Process

- Is located below the trochlear notch and provides an attachment site for the brachialis.

## 3. Trochlear Notch

- Receives the trochlea of the humerus.

## 4. Ulnar Tuberosity

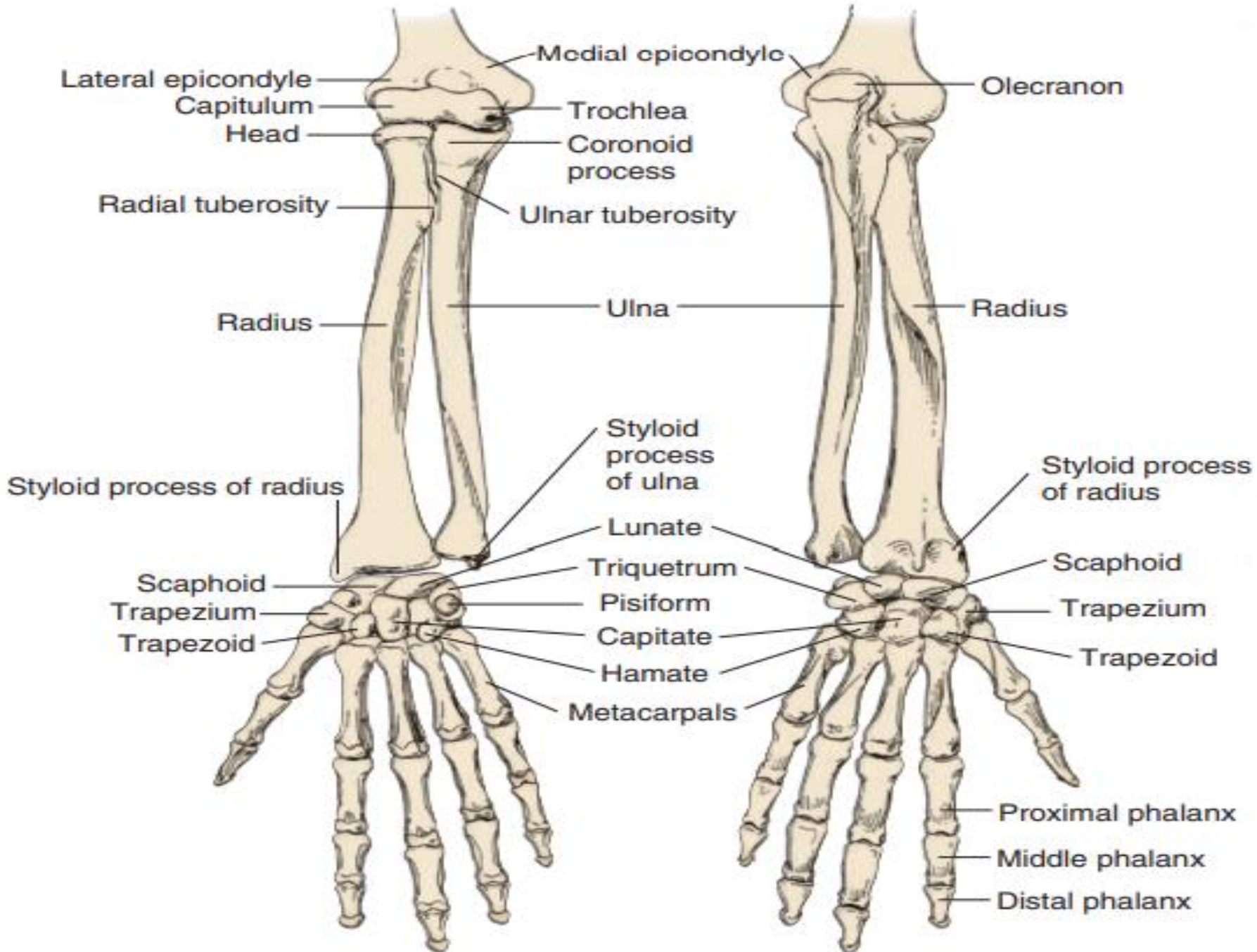
- Is a roughened prominence distal to the coronoid process that provides an attachment site for the brachialis.

## 5. Radial Notch

- Accommodates the head of the radius at the proximal radioulnar joint.

## 6. Head (Distal End)

- Articulates with the articular disk of the **distal radioulnar joint** and has a styloid process.



**Anterior view**

**Posterior view**

# I. BONES THE HAND

## Carpal Bones (See Figure 2-2)

- Are arranged in two rows of four (lateral to medial): scaphoid, lunate, triquetrum, pisiform, trapezium, trapezoid, capitate, and hamate (mnemonic device: Sandra Likes to Pat Tom's Two Cold Hands). (Trapezium precedes trapezoid alphabetically.)

## **1. Proximal Row (Lateral to Medial): Scaphoid, Lunate, Triquetrum, and Pisiform**

- Except for the pisiform, articulates with the radius and the articular disk (the ulna has no contact with the carpal bones). The pisiform is said to be a sesamoid bone contained in the flexor carpi ulnaris tendon.

## **2. Distal Row (Lateral to Medial): Trapezium, Trapezoid, Capitate, and Hamate**

## B. Metacarpals

- Are miniature long bones consisting of **bases** (proximal ends), **shafts** (bodies), and **heads** (distal ends). Heads form the knuckles of the fist.

## C. Phalanges

- Are miniature long bones consisting of **bases, shafts, and heads**. The heads of the proximal and middle phalanges form the knuckles.
- Occur in fingers (three each) and thumb (two).

**THE END**





