NORMAL ANATOMY OF THE HUMERUS BONE RADIOLOGICAL FEATURES OF THE HUMERUS OSSIFICATION CENTER

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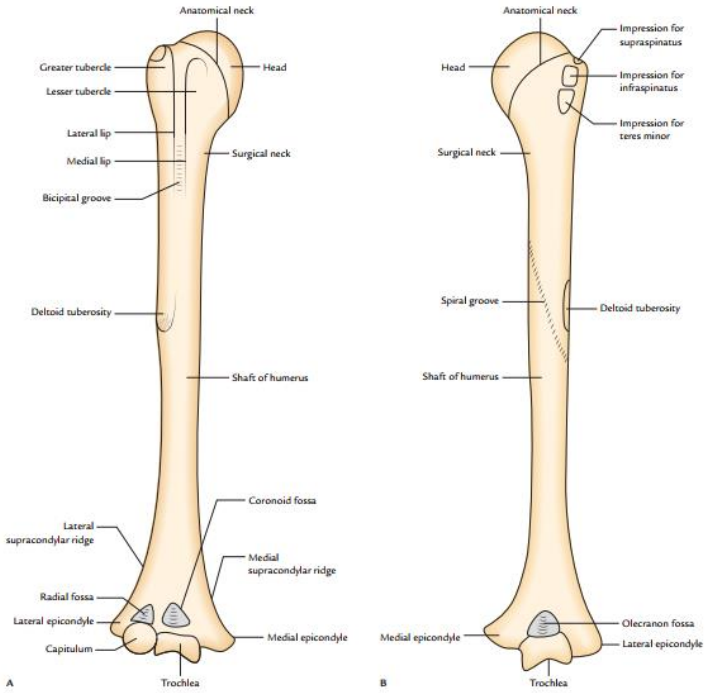
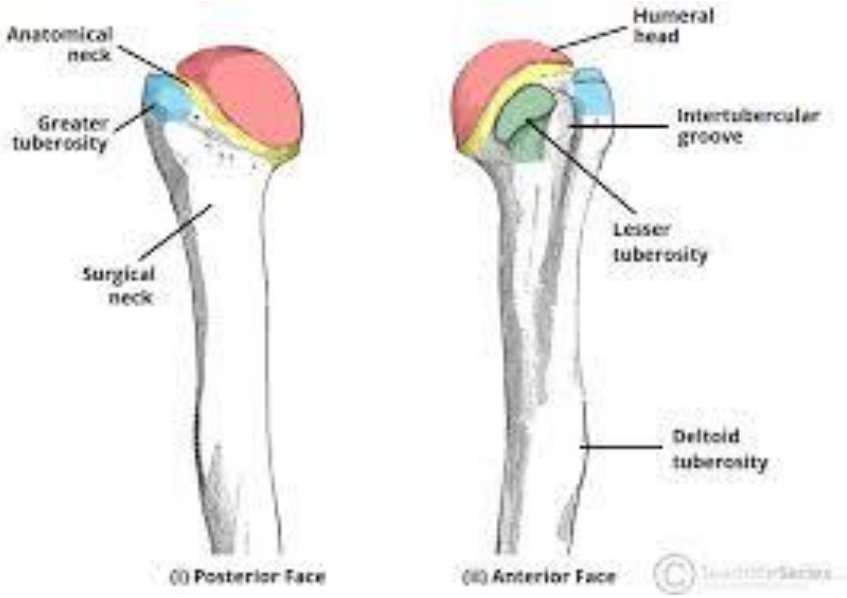
- The humerus is the largest bone of the upper extremity and defines the human brachium (arm).
- It articulates proximally with the glenoid via the glenohumeral (GH) joint and distally with the radius and ulna at the elbow joint
- The humerus has a rounded end where it meets the shoulder, a long shaft in the middle and a flatter end that forms the elbow joint. The upper end has a ball shape that fits into the shoulder socket

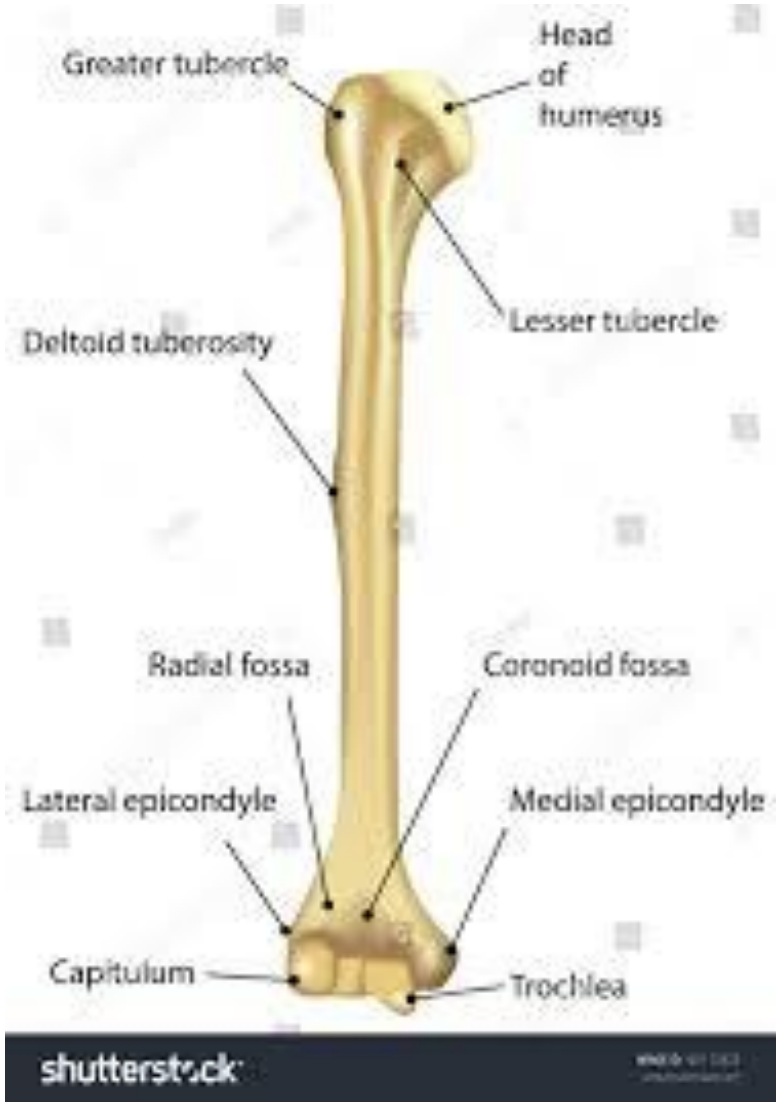


- Just inferior to the head of the humerus is the anatomical neck of the humerus, which divides the head of the humerus from the greater and lesser tubercles
- Following the tubercles is the surgical neck of the humerus, a site commonly susceptible to fractures.
- Articulation of the capitellum and trochlea of the humerus with the head of the radius bone and trochlear notch of the ulna forms the elbow joint, a synovial hinge joint.
- This joint is stabilized by the ulnar (medial) collateral ligament and radial (lateral) collateral ligament complexes.

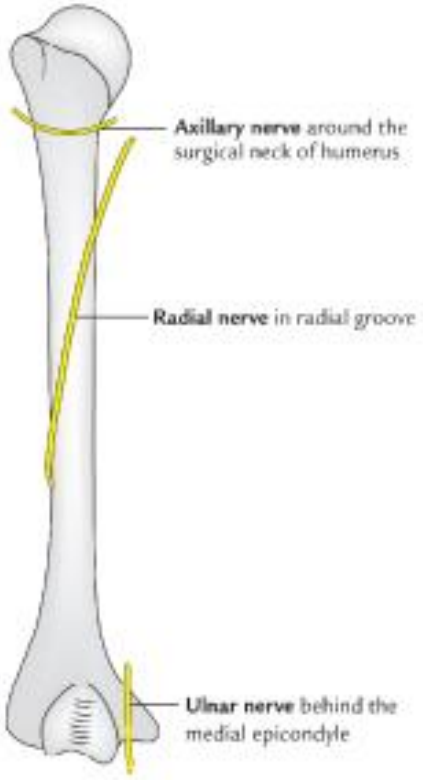


- The lateral aspect of the humeral head forms two tubercles, known as the greater and lesser tuberosities or tubercles, which are separated by the intertubercular or bicipital groove.

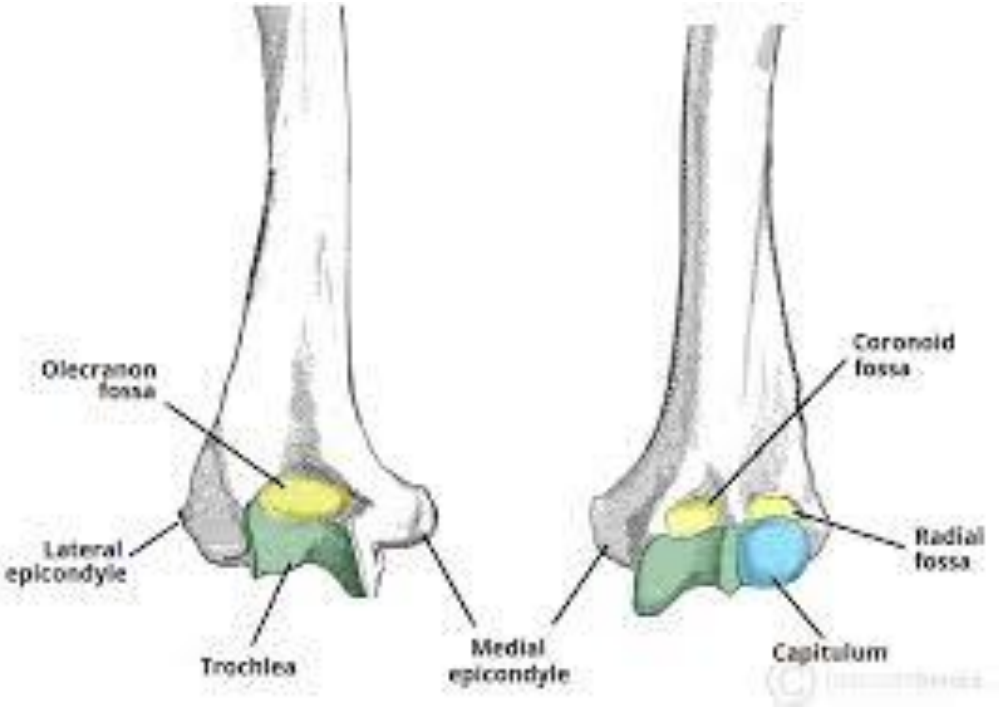
- The greater tuberosity lies posterior to the lesser tuberosity.
- Many of the tendons of the rotator cuff insert onto the humeral tubercles: supraspinatus, infraspinatus, and teres minor attach to the greater tuberosity and subscapularis to the lesser tuberosity.
- The long head of biceps lies within a vertical channel known as the bicipital groove.



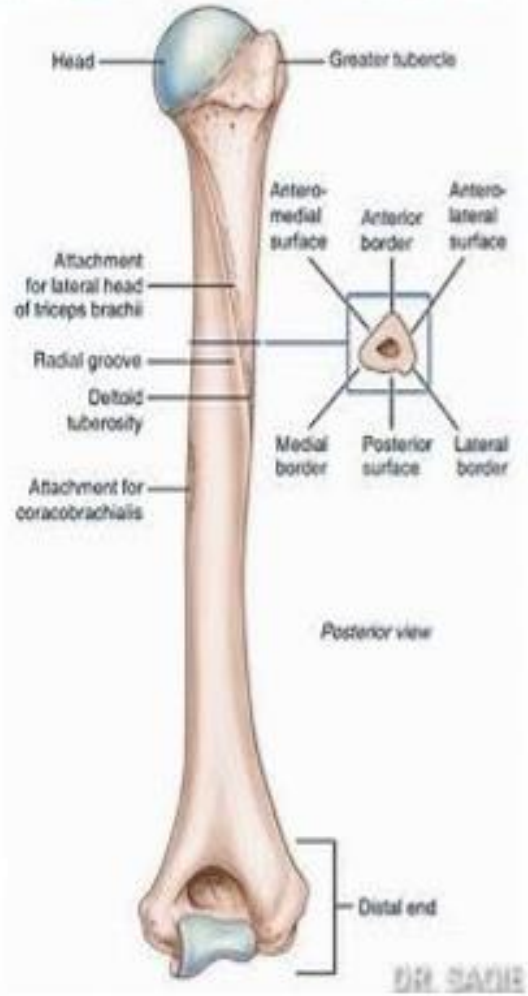
- A spiral groove along the posterior aspect of the shaft of the humerus accommodates the radial nerve.
- Deltoid inserts onto a small protrusion on the lateral aspect of the shaft known as the deltoid tuberosity, tricep attaches posteriorly and brachialis anteriorly.
- The neurovascular bundle of the median nerve, brachial artery, and basilic vein lies more superficially, medial to the humerus.

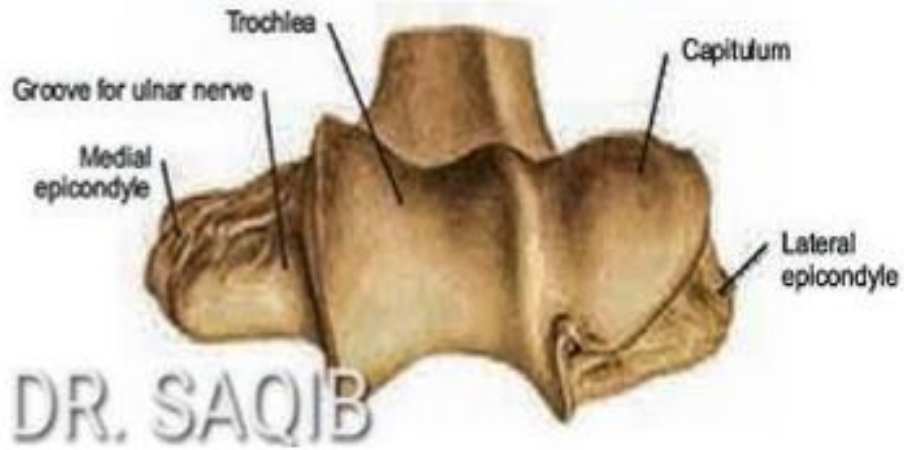


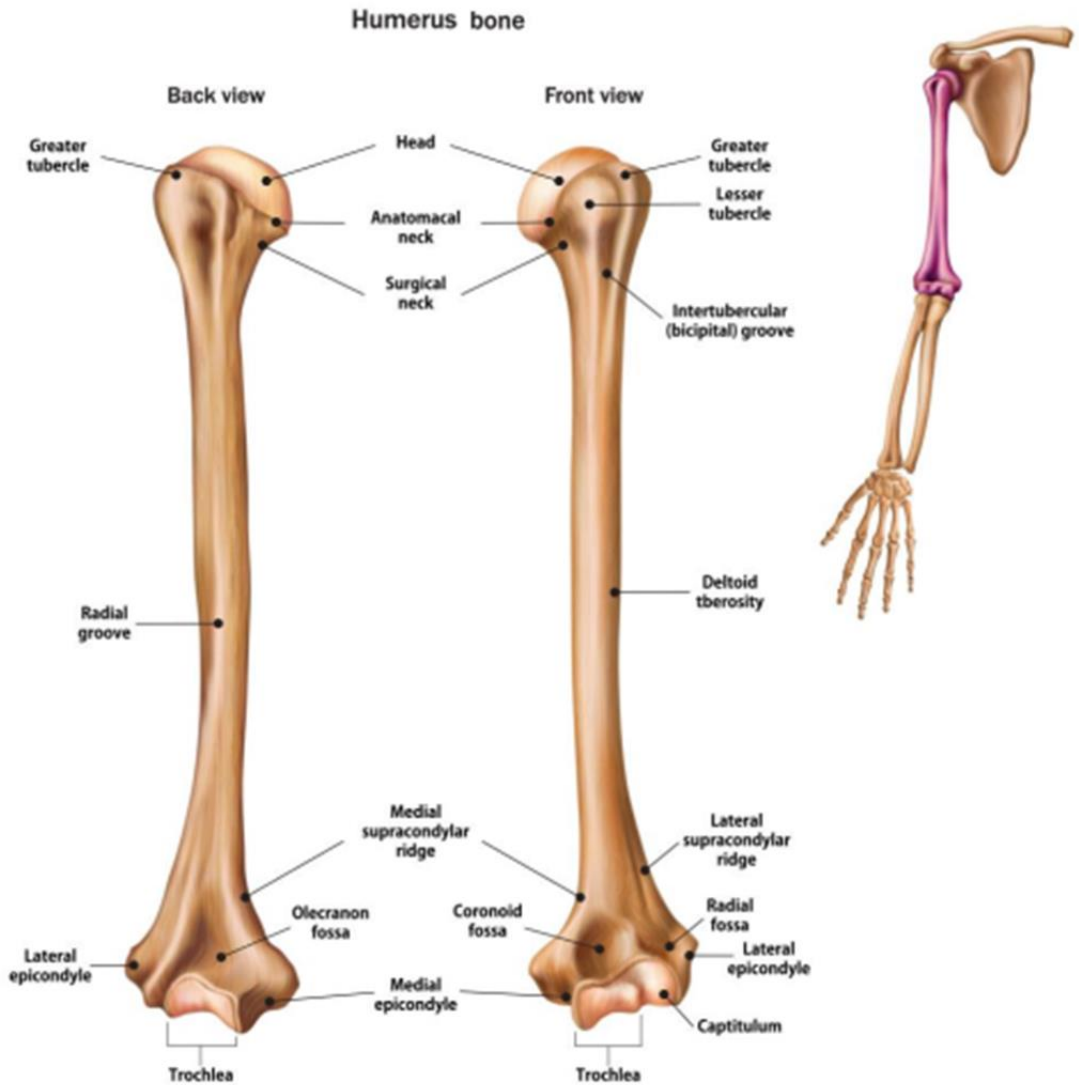
- At the elbow, the humerus form the medial and lateral supracondylar ridges and the medial and lateral epicondyles, from which the common flexor and extensor origins, respectively, arise.
- The lateral rounded capitellum and the medial trochlea form the articular surfaces of the humerus at the elbow.
- olecranon fossa posteriorly accommodates the olecranon process of the ulna during elbow flexion, and a similar fossa anteriorly accommodates the head of the radius.

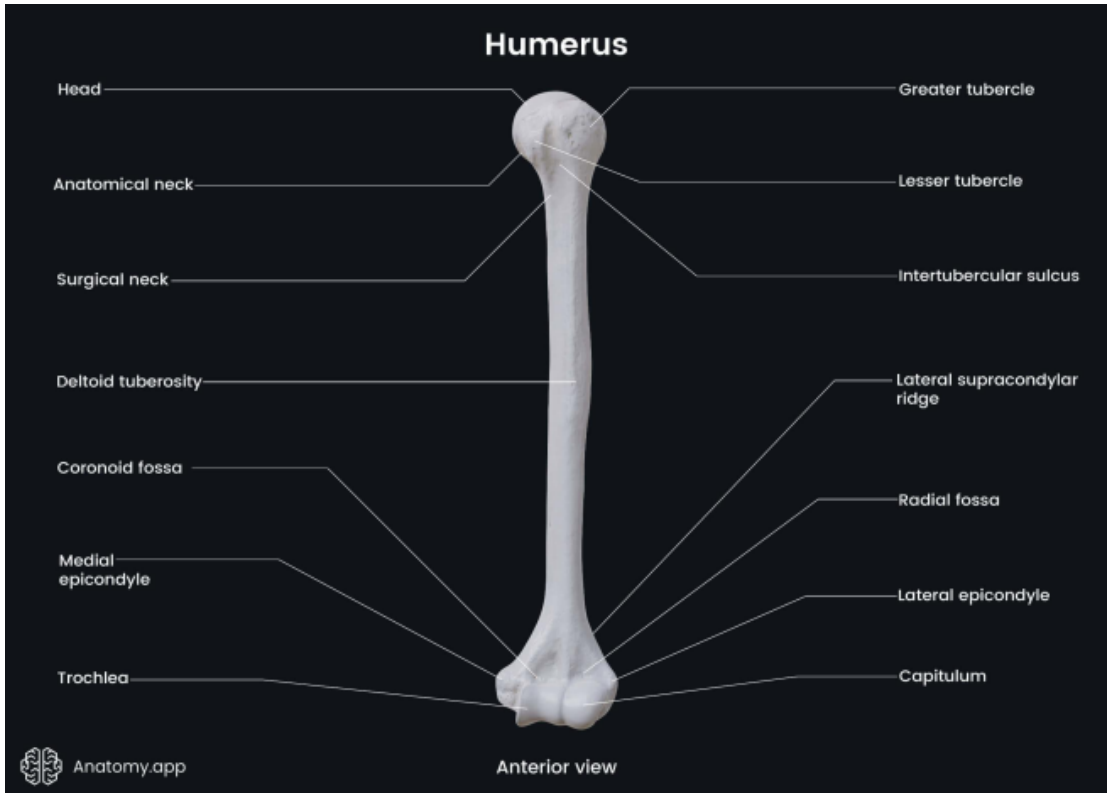


HUMERUS ANATOMY



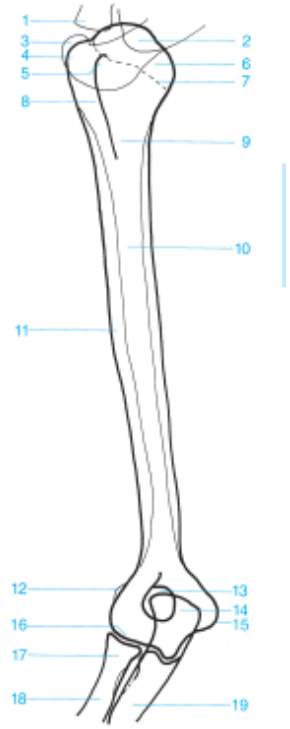



Humerus bone
Back view
Front view
Greater tubercle
Head
Greater tubercle
Lesser tubercle
Anatomacal neck
Surgical neck
Intertubercular (bicipital) groove
Deltoid tberosity
Radial groove
Medial supracondylar ridge
Lateral supracondylar ridge
Olecranon fossa
Coronoid fossa
Radial fossa
Lateral epicondyle
Lateral epicondyle
Medial epicondyle
Captitulum
Trochlea
Trochlea


Humerus
Head
Greater tubercle
Anatomical neck
Lesser tubercle
Surgical neck
Intertubercular sulcus
Deltoid tuberosity
Lateral supracondylar ridge
Coronoid fossa
Radial fossa
Medial epicondyle
Lateral epicondyle
Trochlea
Capitulum
Anatomy.app
Anterior view

Proximal part of the humerus

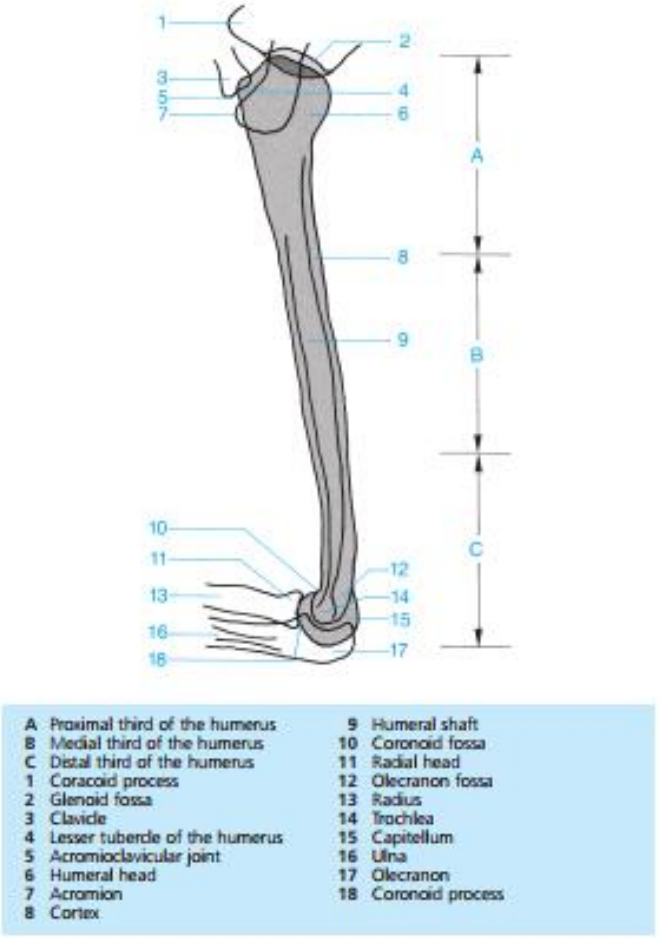
- The upper (proximal) end of your humerus connects to your shoulder joint. The proximal end (aspect) contains the
- 1-Head (sometimes called the humeral head or humeral ball)
- 2-Greater tuberosity
- 3-Lesser tuberosity
- 4-Intertubercular sulcus (biceps groove)
- 5-anatomical neck
- 6-surgical neck



1 Clavicle
2 Lateral process (neck) of the scapula
3 Acromion
4 Greater tubercle of the humerus
5 Lesser tubercle of the humerus
6 Humeral head
7 Anatomical neck
8 Bicipital groove
9 Surgical neck
10 Humerus
11 Deltoid tuberosity
12 Lateral epicondyle
13 Olecranon fossa
14 Olecranon
15 Medial epicondyle
16 Trochlea
17 Radial head
18 Radius
19 Ulna

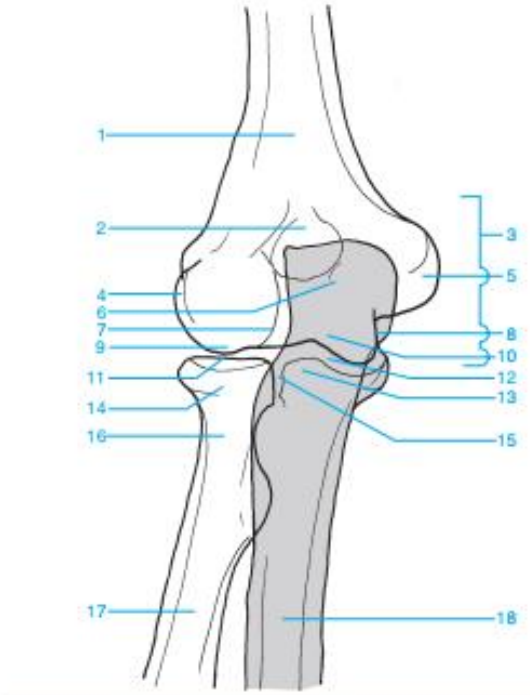
Humerus shaft

- The shaft is the long middle portion of the humerus that
- supports the weight of the upper arm and gives it its shape.
- It’s slightly rounded at the top near the shoulder and flatter at
- the bottom near your elbow. The shaft of the humerus
- includes the
- 1-deltoid tuberocity
- 2-Radial groove



Distal part of the humerus

- he lower (distal) end of your humerus forms the top of your
- elbow joint. It meets the forearm bones (radius and ulna). It
- includes the
- 1-Supracondylar ridges medial and lateral
- 2-Epicondyles medial and lateral
- 3-Trochlea
- 4-Capitulum
- 5-Coronoid fossa
- 6-olecranon fossa
- 7-radial fossa



1 Humerus
2 Olecranon fossa
3 Medial epicondyle of the humerus
4 Lateral epicondyle of the humerus
5 Apex of the medial epicondyle of the humerus
6 Olecranon
7 Lateral margin of the trochlea
8 Medial margin of the trochlea
9 Capitellum
10 Trochlea
11 Humeroradial joint
12 Humeroulnar joint
13 Coronoid process
14 Radial head
15 Proximal radioulnar joint
16 Radial neck
17 Radius
18 Ulna

OSSIFICATION CENTERS

- here are eight ossification centers that begin
- ossification in the following order:
- diaphysis: 8th week in utero
- • head: 1-6 months
- • capitellum: 2-24 months
- • greater tubercle: 1 year
- • lesser tubercle: 3-5 years
- • medial epicondyle: 4-7 years
- • trochlea: 8-10 years
- • lateral epicondyle: 10-13 years

Radiological features of the humerus

- **Plain radiographs**
- The lower epiphysis of the humerus lies at a 25 ° angle to the shaft so that a vertical line down the front of the shaft on a lateral radiograph – the anterior humeral line – bisects the capitellum
- An olecranon foramen may replace the olecranon fossa

Avulsion of the medial epicondyle

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- The flexor muscles of the forearm arise from the medial epicondyle of the humerus Repeated contractions or a single violent contraction of these muscles in a child can result in avulsion of the apophysis (a secondary ossification center occurring outside a joint) of the medial epicondyle

Ossification

- The primary center for the humerus appears at the eighth week of fetal life Secondary centers appear in the head of the humerus at 1 year, the greater tuberosity at 3 years, and the lesser tuberosity at 5 years of age These fuse with one another at 6 years and with the shaft at 20 years of age Secondary centers appear in the capitellum at 1 year, the radial head at 5 years, the internal epicondyle at 5 years, trochlea at 10 years, olecranon at 10 years and external epicondyle at 10 years (CRITOE) These fuse at 17 – 18 years of age

Shoulder—ossification and union

- Sequence of Ossification and Union at the Shoulder Appearance
- 1st year - Head of humerus
- 2nd year - Greater tuberosity
- 5th year - Lesser tuberosity (not visible)
- 6th year - Fusion of the epiphyses of upper end of humerus into one mass.
- Fusion
- 20th year - Fusion of upper end of humerus with shaft

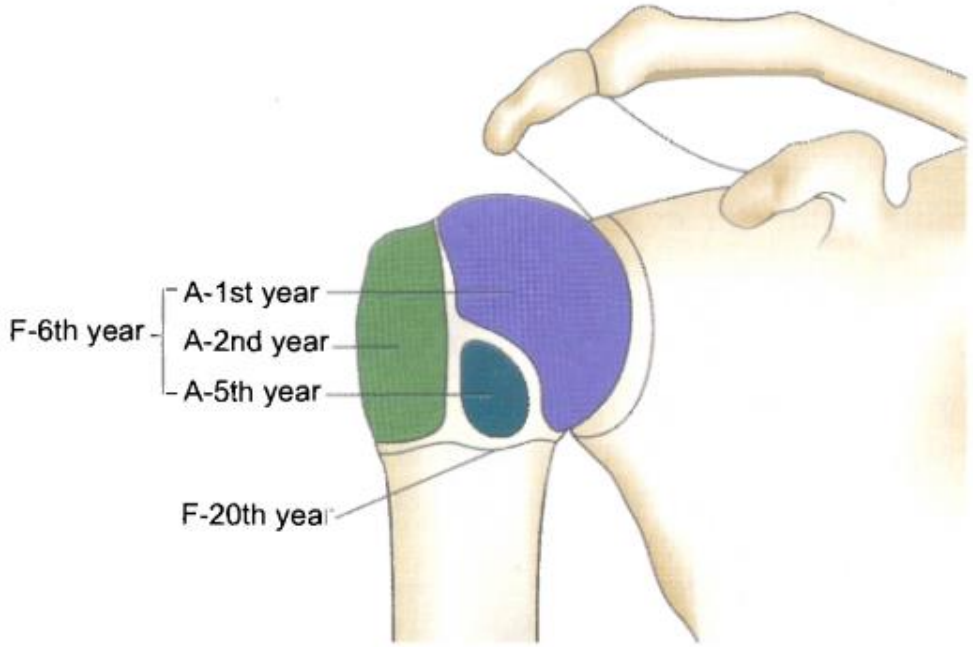

Fig. 9.2a: Shoulder—ossification and union

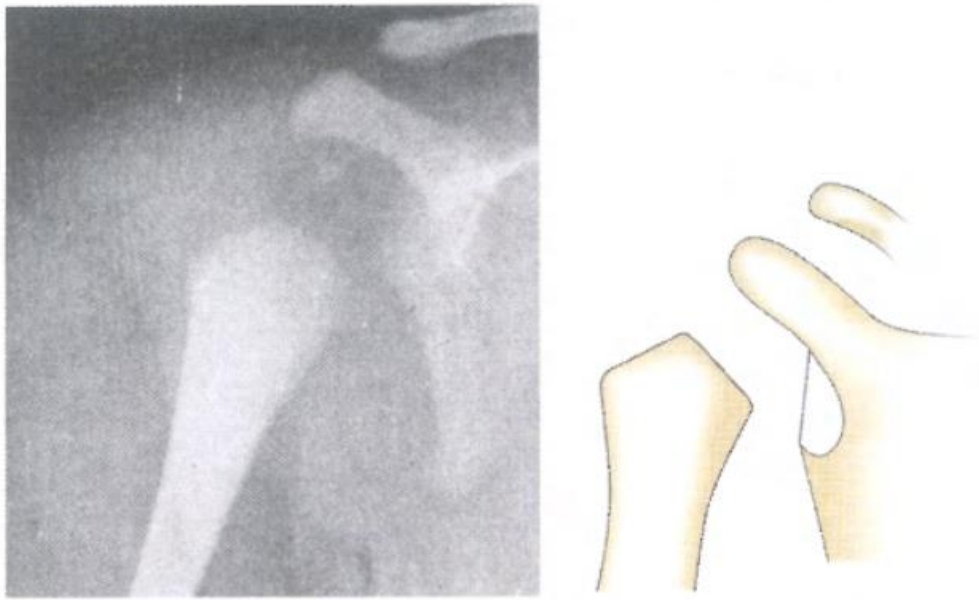

Fig. 9.2b: At birth epiphysis head humerus absent

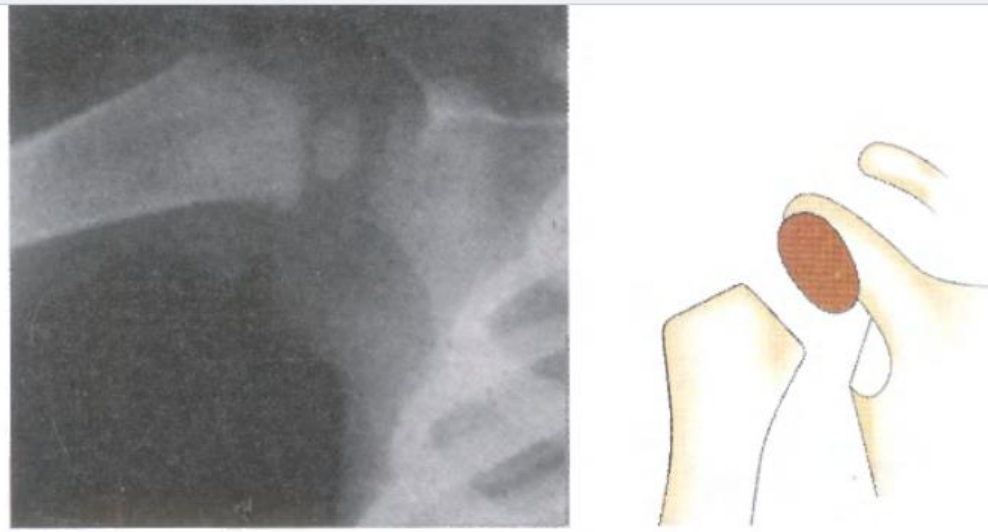

Fig. 9.2c: Age above 1 year (epiph head humerus present) below 2 absent)

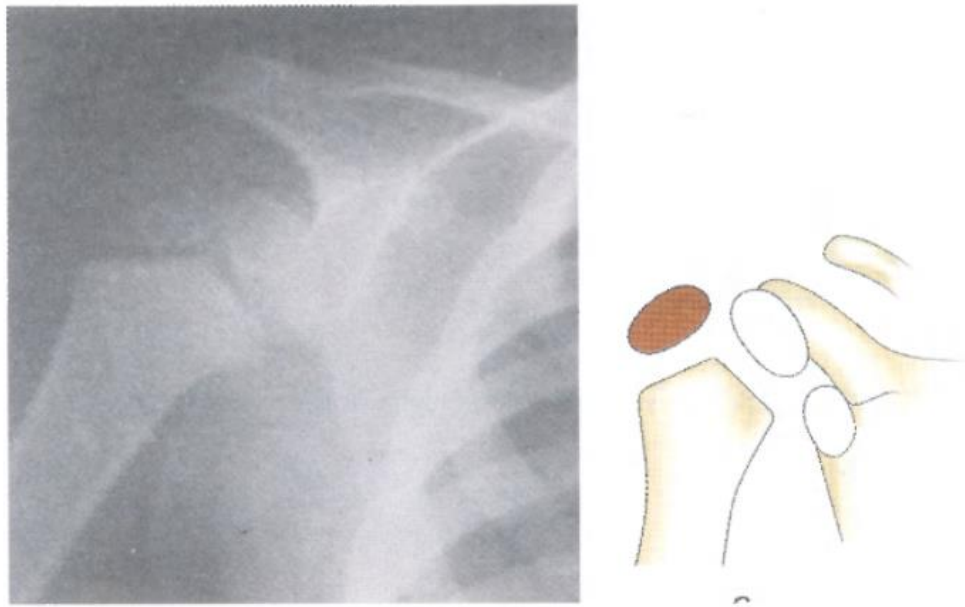

Fig. 9.2d: Age above 2 years (epiph. gt. tub. present) below 6 years (epiph not fused)

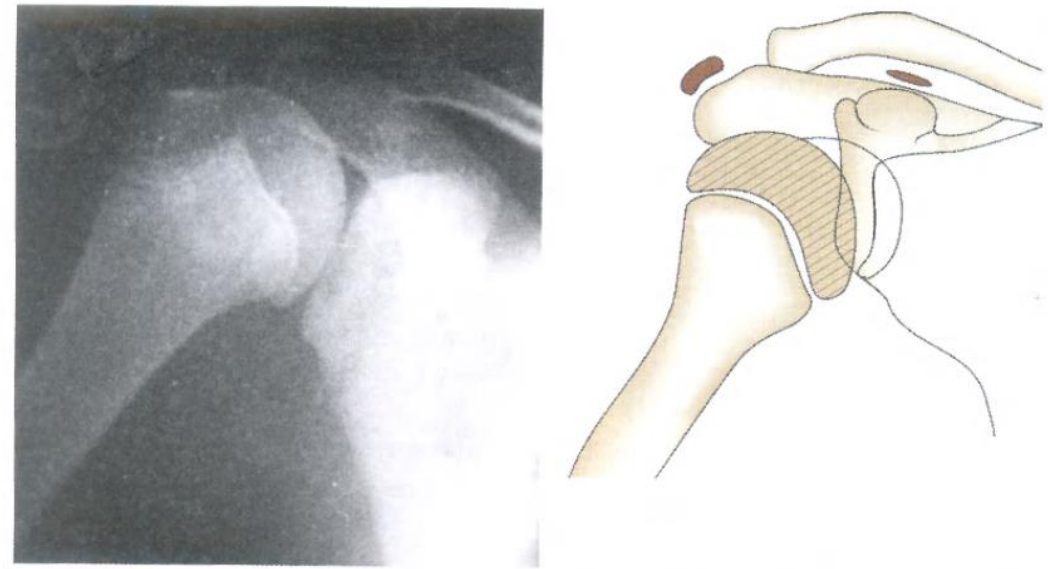

Fig. 9.2e: Age above 6 years (epiph. head and gt. tub, fused) below 20 years (epiph not fused with shaft)

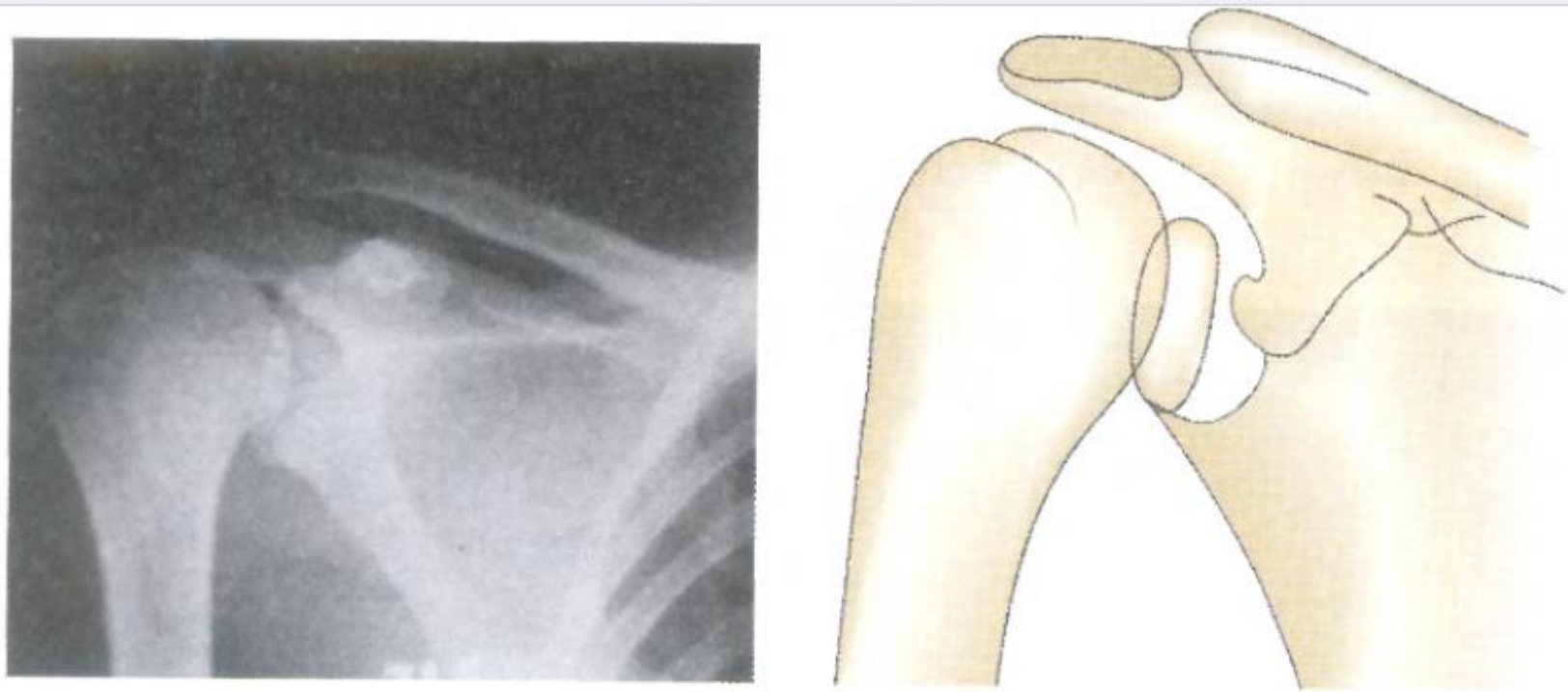

Fig. 9.2f: Age above 20 years (epiph. head united with shaft)