Radiological anatomy of the shoulder joint

Dr. Paiman Jamal

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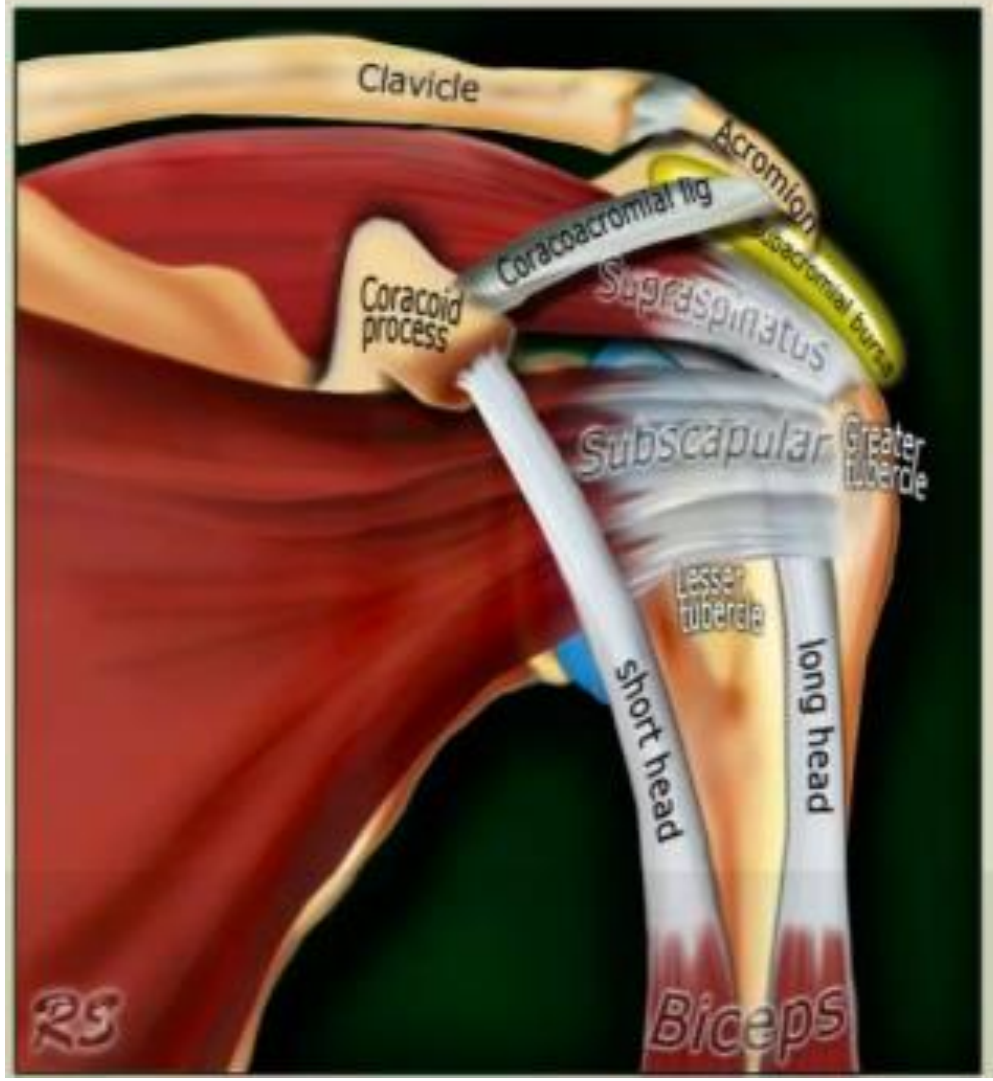
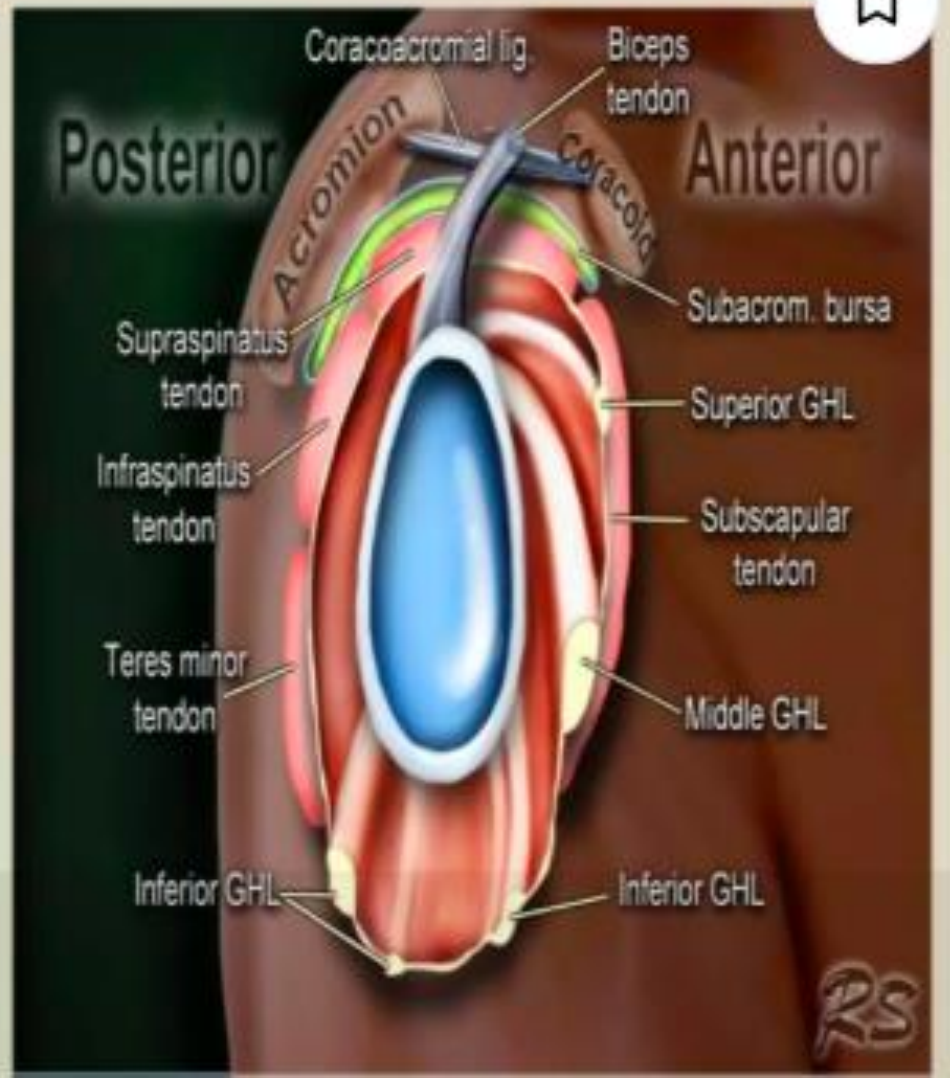




Shoulder (glenohumeral) joint

Synovial, multiaxial ball-and-socket joint between the hemispherical head of humerus and the shallow glenoid fossa of the scapula.

- Wide range of movement (flexion, extension, abduction, adduction, internal and external rotation and circumduction of the upper limb) but inherent lack of stability.
- On an AP radiograph, the articular surfaces of the humerus and glenoid form parallel arcs.

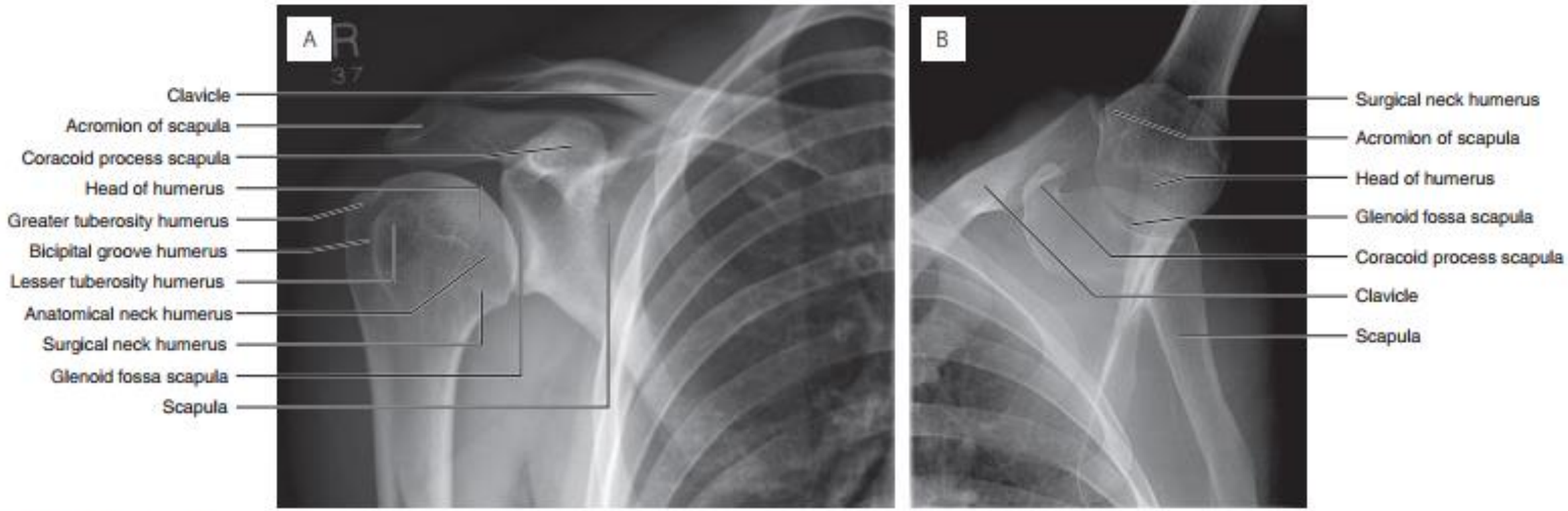


Fig. 15.3 (A) AP radiograph of the right shoulder and (B) axial radiograph of the right shoulder.

Sternoclavicular joint

synovial joint.

- Separated into two cavities by intervening disc of fibrocartilage which is attached to the joint capsule.
- Allows horizontal and vertical movement as well as some rotation.

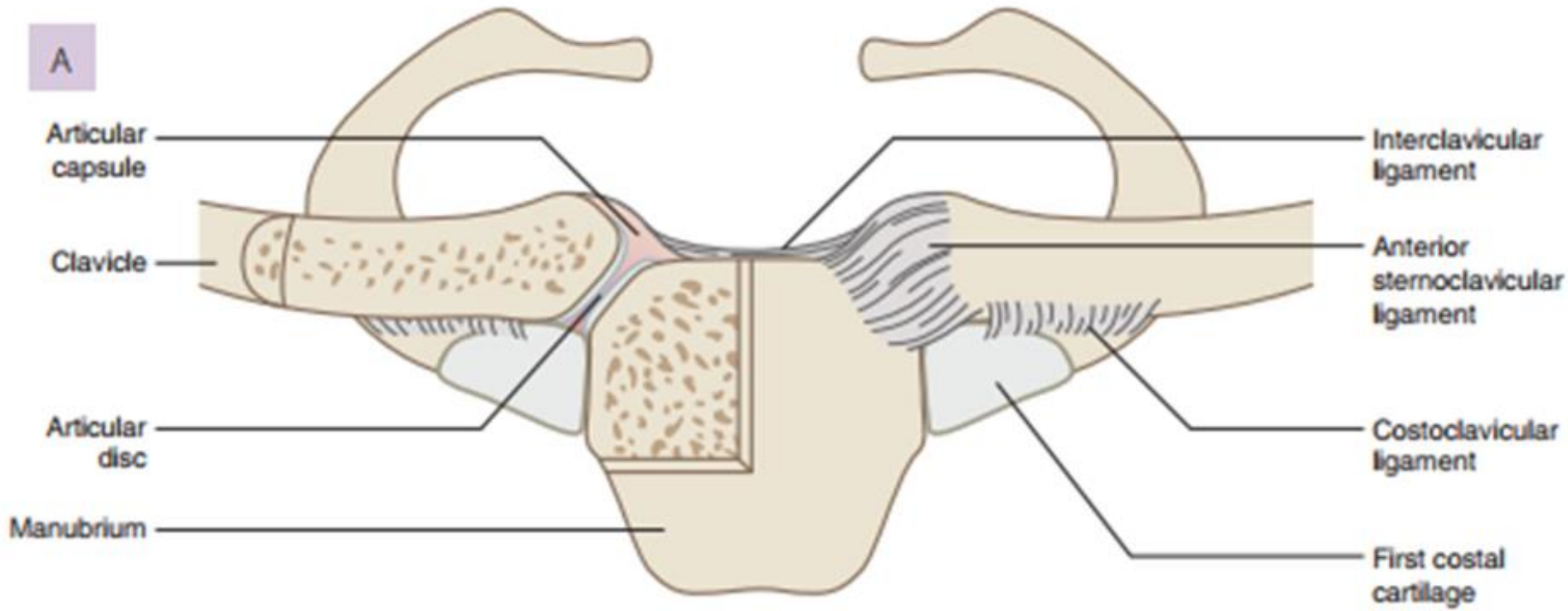
Enclosed by a joint capsule and strengthened by four

ligaments:

· anterior and posterior sternoclavicular ligaments

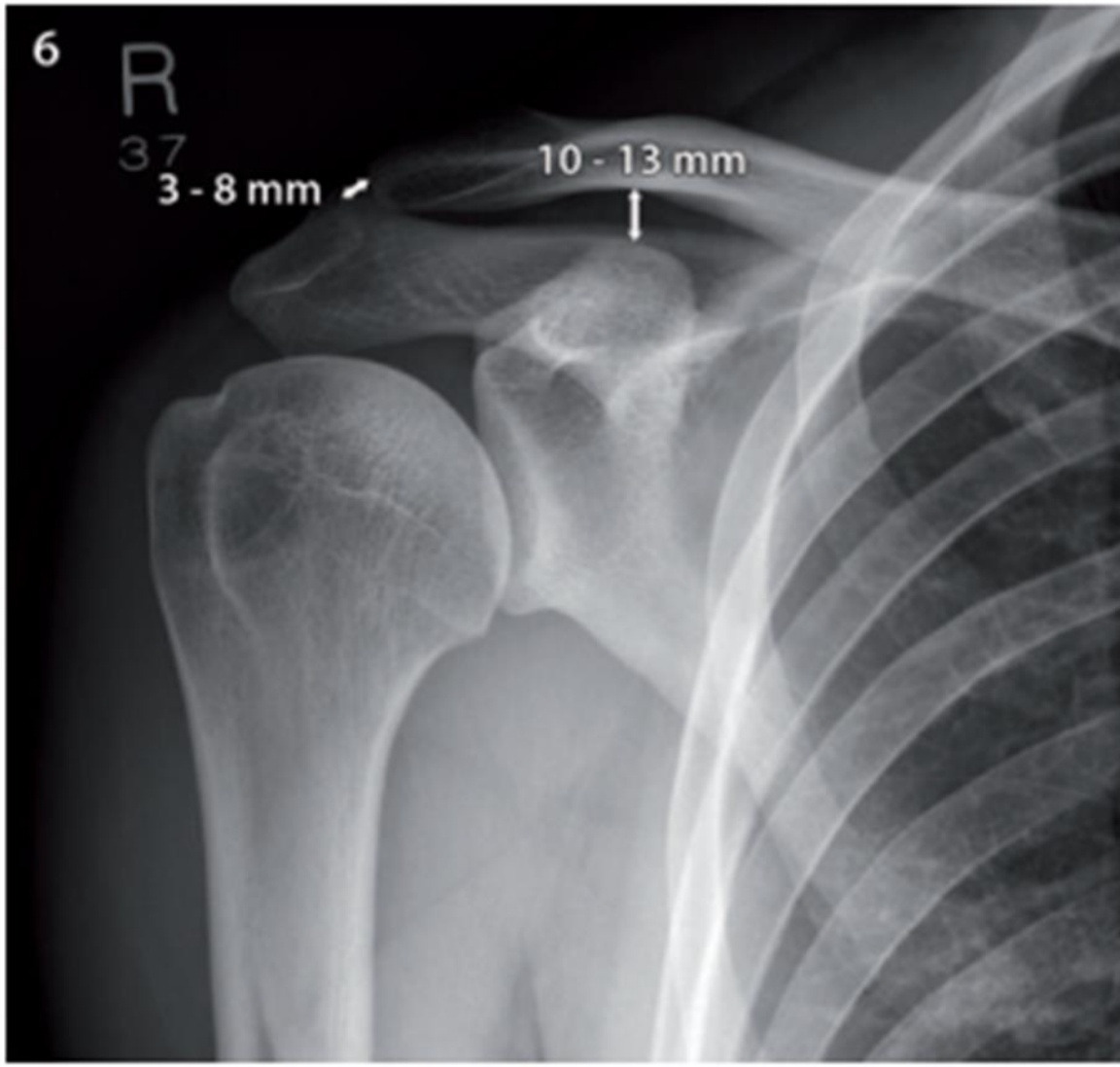
· interclavicular ligament ·

costoclavicular ligament

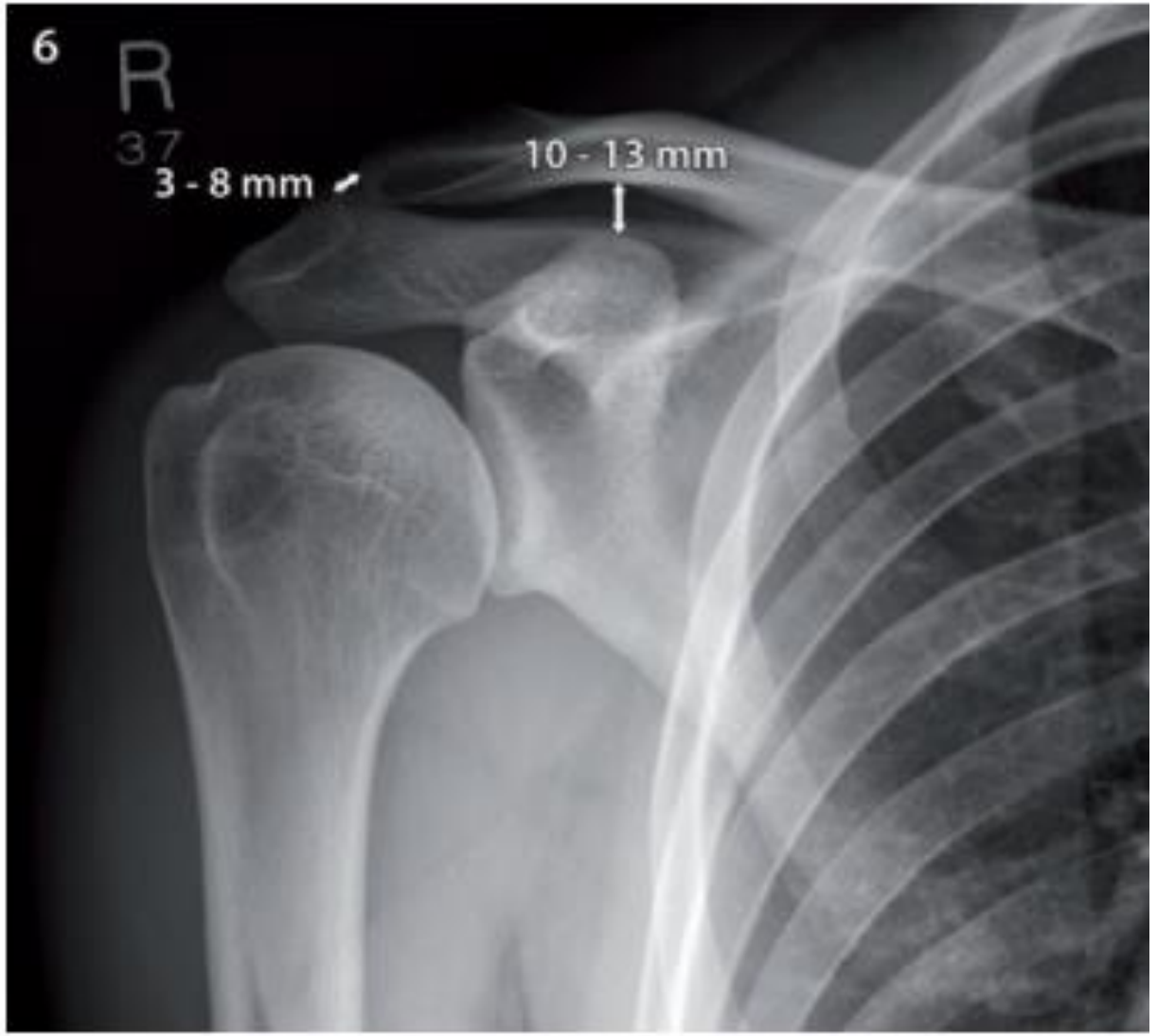

A
Articular capsule
Clavicle
Articular disc
Manubrium
Interclavicular ligament
Anterior sternoclavicular ligament
Costoclavicular ligament
First costal cartilage

Acromioclavicular joint

- Synovial plane joint.
- • An incomplete disc of fibrocartilage hangs down into the upper part of the joint cavity.
- • Allows horizontal and vertical movement as well as some rotation.

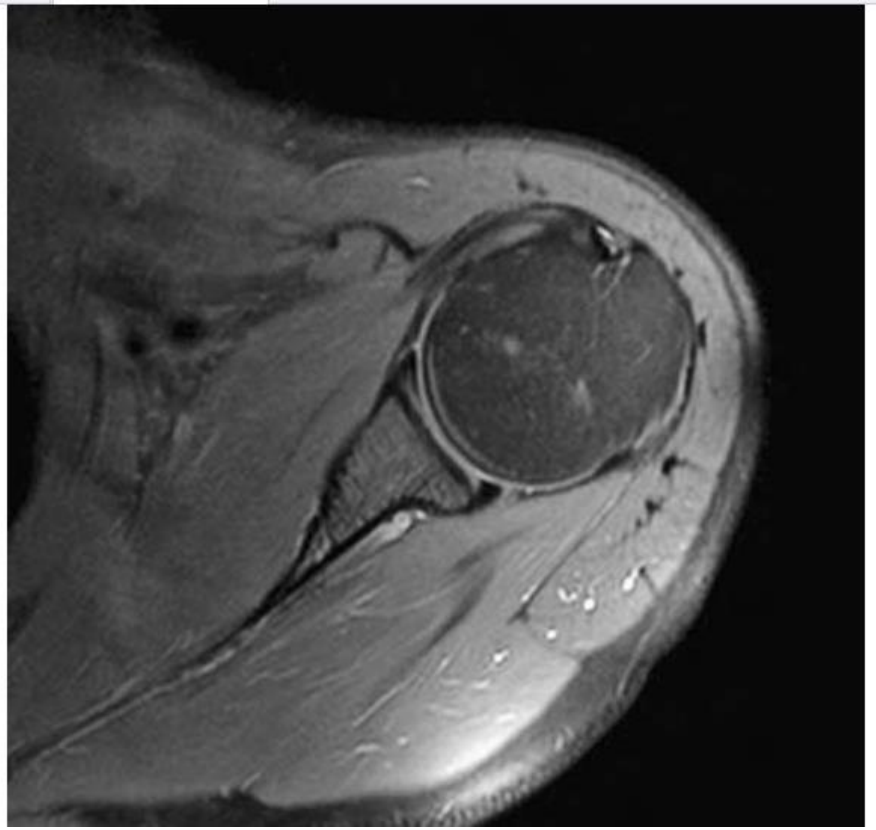


- • Strengthened by:
- · acromioclavicular ligament: the acromioclavicular distance is 3–8 mm in adults
- · coracoclavicular ligament: the normal coracoclavicular distance is 10–13 mm and the inferior aspects of the clavicle and acromion normally lie in a straight line



The glenohumeral joint

- The glenohumeral or shoulder joint is a synovial ball and socket joint.
- The shallow glenoid fossa is deepened by the glenoid labrum, a circumferential outer fibrocartilaginous ring



- The anterior portion of the joint capsule is strengthened by the three glenohumeral ligaments surrounding the shoulder joint.
- The capsule is lax inferiorly
- The tendon of the long head of biceps runs through the joint capsule, enclosed by the synovial membrane of the capsule, and can therefore be involved in diseases of the joint.
- The transverse humeral ligament is an accessory ligament of the shoulder joint; it bridges the intertubercular groove between the greater and lesser tuberosities, holding the long tendon of biceps in place

Bursae of the shoulder

- A bursa is a sac lined with a synovial membrane
- secretes lubricating synovial fluid.
- Bursas usually occur around joints and serve to reduce friction at sites where tendons or ligaments rub across bony structures.

- The glenohumeral joint is surrounded by several bursae.
- The most clinically significant of these is the large subacromial–subdeltoid bursa, which lies between the supraspinatus and the inferior surface of the coracoacromial arch. This bursa does not communicate with the joint capsule unless the supraspinatus tendon is ruptured.

- The standard plain radiographic views of the shoulder are the anteroposterior and axial projections.
- The axial view allows assessment of the congruity of the glenohumeral joint.

Ossification of the shoulder

- In the fetus, the skeleton consists initially of cartilage, which gradually turns to bone (ossification) during growth.
- • Each bone has a primary ossification centre (usually at the centre of the bone) and sometimes one or more secondary ossification centres (usually at the bone ends).
- • When the secondary ossification centre does not unite with the main bone an accessory ossicle (normal variant) is formed

Accessory ossicles and secondary ossification centres should not be mistaken for fractures.

- The os acromiale is an accessory ossicle occurring in 1–15% of the population.

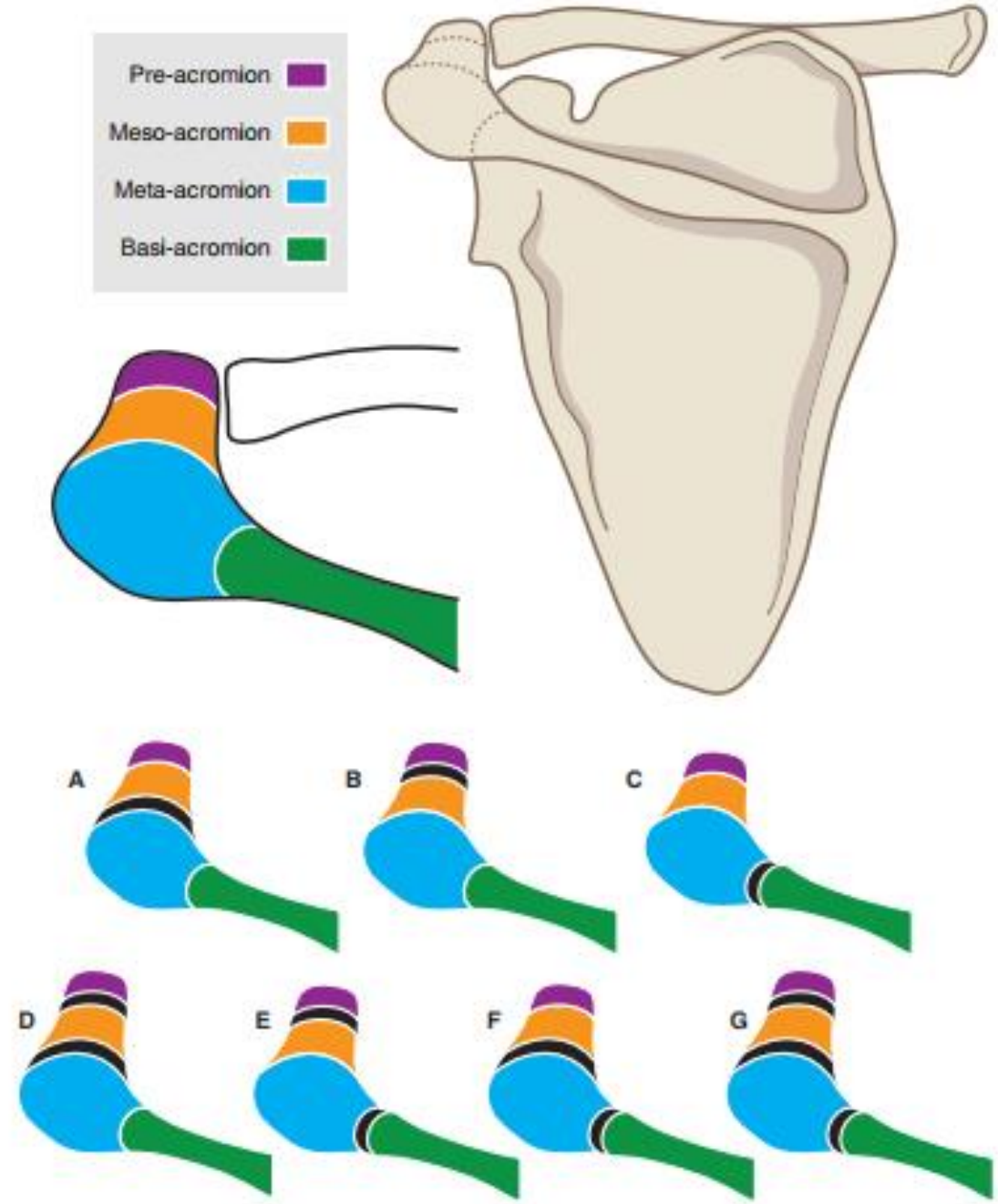
It can result in shoulder impingement by decreasing the space below the

coracoacromial arch.

There are up to three ossification centres in the acromion: preacromion, mesoacromion and metacromion.

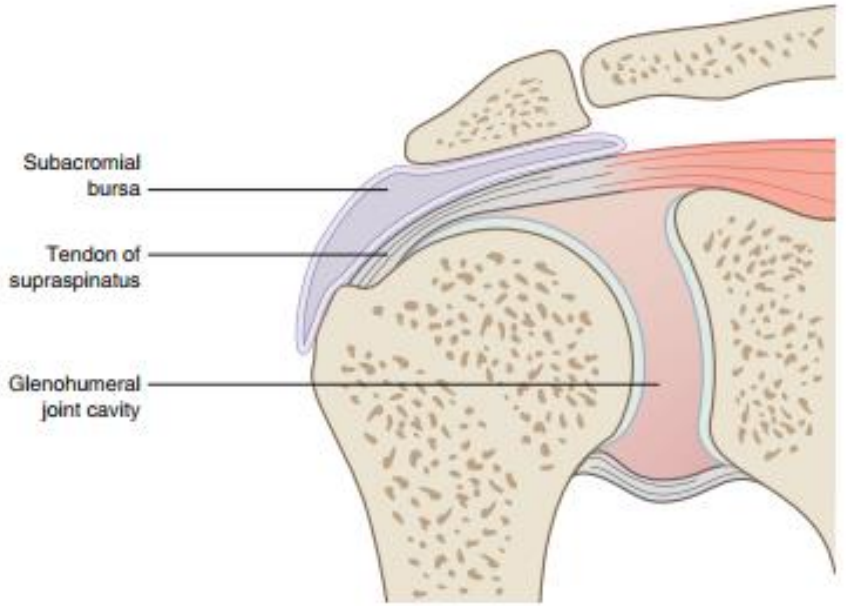
Depending on where failure of fusion occurs, this can result in seven types of os acromiale

The scapula is ossified from seven or more centres


Pre-acromion
Meso-acromion
Meta-acromion
Basi-acromion
A
B
C
D
E
F
G

Components of the shoulder joint

- Shoulder joint capsule
- Shoulder joint synovial membrane
- Glenoid labrum
- Shoulder joint ligaments
- Muscles of the shoulder most important being the rotator cuff muscles.
- They comprise the supraspinatus, infraspinatus, teres minor and subscapularis (SITS) and are important in providing stability to the shoulder joint, forming a protective ‘cuff ’ around it



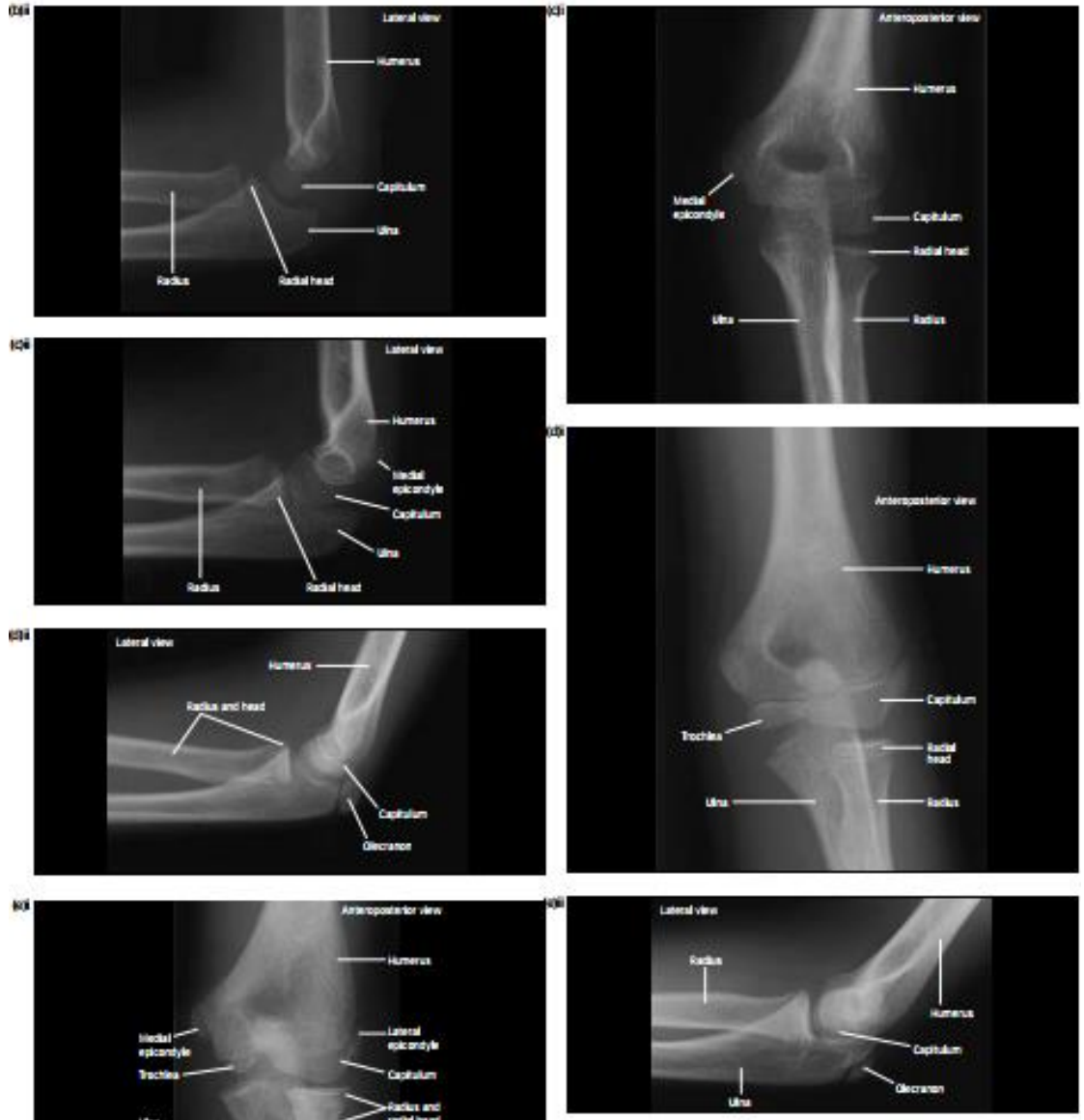


Fig. 12.11. *Continued*

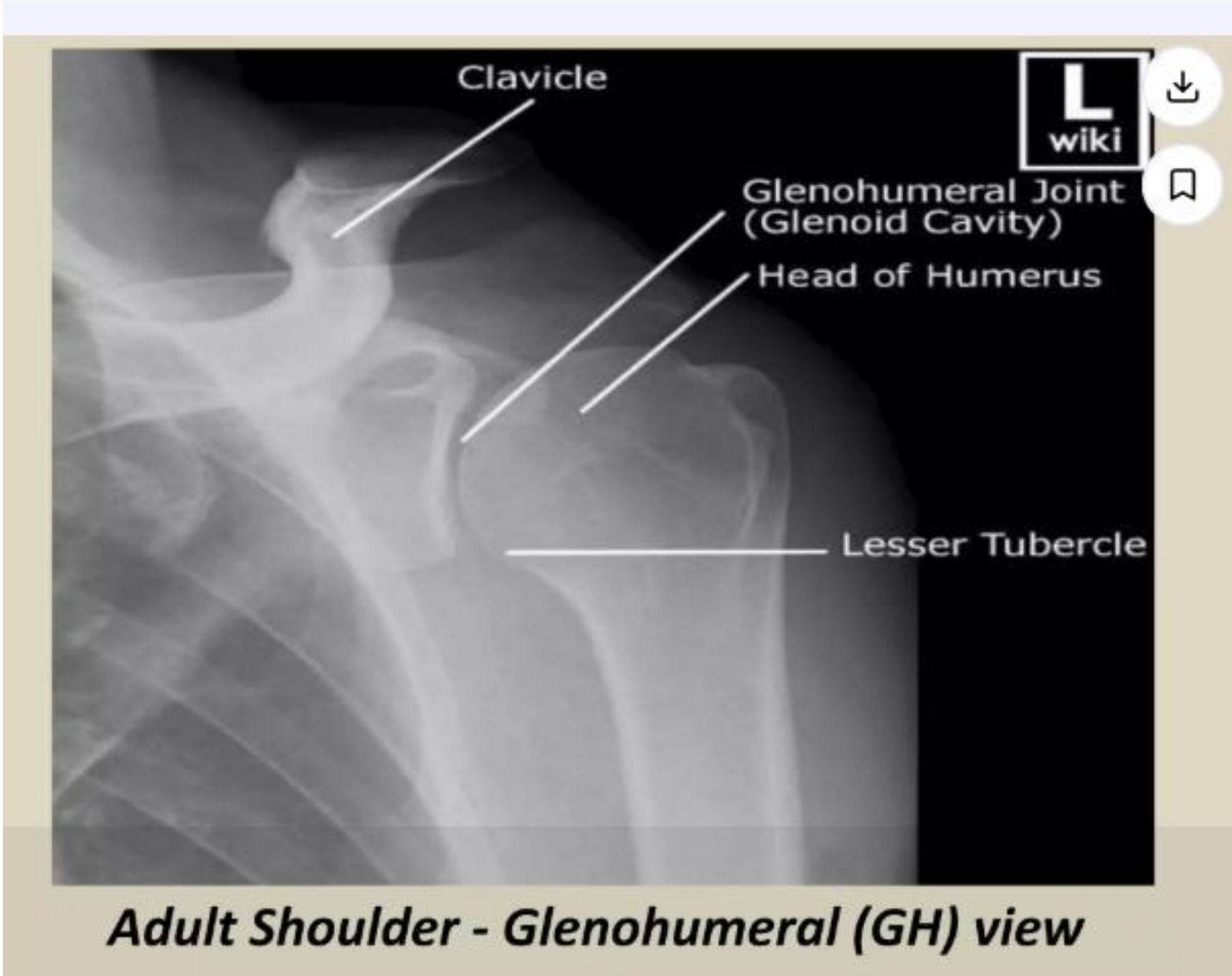

1st Rib
Superior Angle Scapula
Superior Border Scapula
Acromioclavicular Joint
Acromion Process
Head of Humerus
Clavicle
Anatomical Neck
Greater Tubercle
Intertubercular Groove
Lesser Tubercle
Surgical Neck
Coracoid Process
Sternoclavicular Joint
Glenoid Fossa
Medial Border Scapula
Lateral Border Scapula
Humerus
Inferior Angle Scapula
WIKI

1, Clavicle.
2, Acromion.
3, Greater tubercle.
4, Lesser tubercle.
5, Neck of the humerus
6, Humerus.
7, Coracoid Process.
8, Scapula
9, Rib.
Arrow, Glenohumeral joint space.

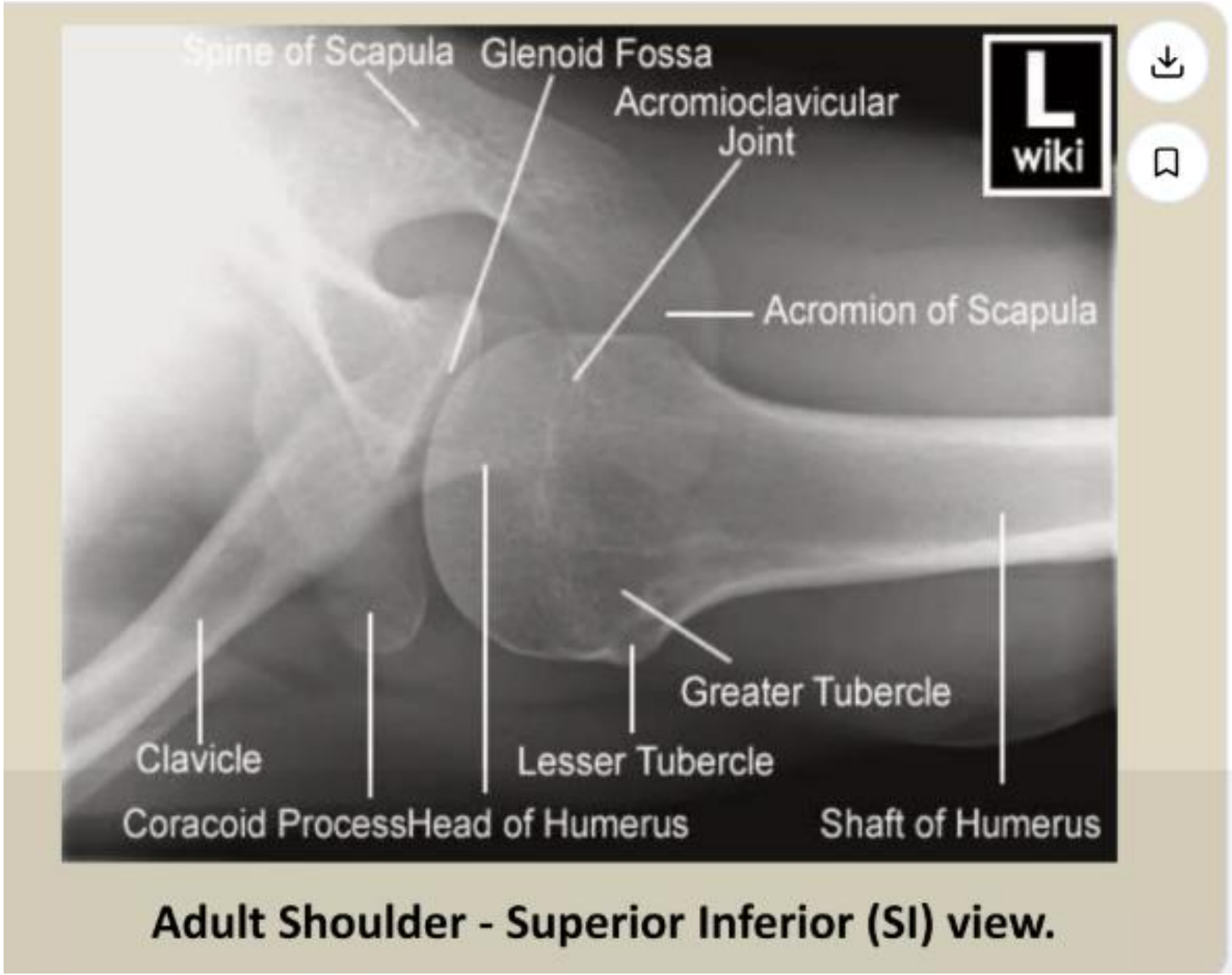
Shoulder X-ray, AP projection.

1 Coracoid Process.
2 Clavicle.
3 Acromion.
4 Humeral head.
5 Humerus.
6 Scapula (Axillary border of scapula).

Shoulder X-ray: lateral view



Adult Shoulder - Glenohumeral (GH) view



Adult Shoulder - Superior Inferior (SI) view.

Elbow joint

- The elbow joint consists of three articulations all enclosed by a common joint cavity, the radiocapitellar and ulnatrochlear joints (allowing 150° flexion-extension) and proximal radio-ulnar joint (allowing 90° pronation supination)

- Fat pads separate the fibrous joint capsule from the synovial
- membrane:

- · on a normal lateral radiograph, only the anterior fat pad can be seen, closely applied to the anterior distal humerus as a well defined lucent
- structure
- · an elbow joint effusion will displace the fat pads outwards, making the posterior fat pad visible and the anterior fat pad more prominent

Ossification at the elbow

- Although exact recall of the dates of ossification is not essential, it is important to remember the order of ossification (CRITOE)
- as any apparent change in this order usually signifies a fracture

Elbow joint ligaments

- The joint capsule is thickened to form the radial (lateral) and ulnar (medial) collateral ligament complexes.
- Radial collateral ligament complex:

· consists of radial collateral ligament, annular ligament, accessory collateral ligament and lateral ulnar collateral ligament.

- Ulnar collateral ligament complex:

· consists of three bundles: anterior, posterior and transverse .

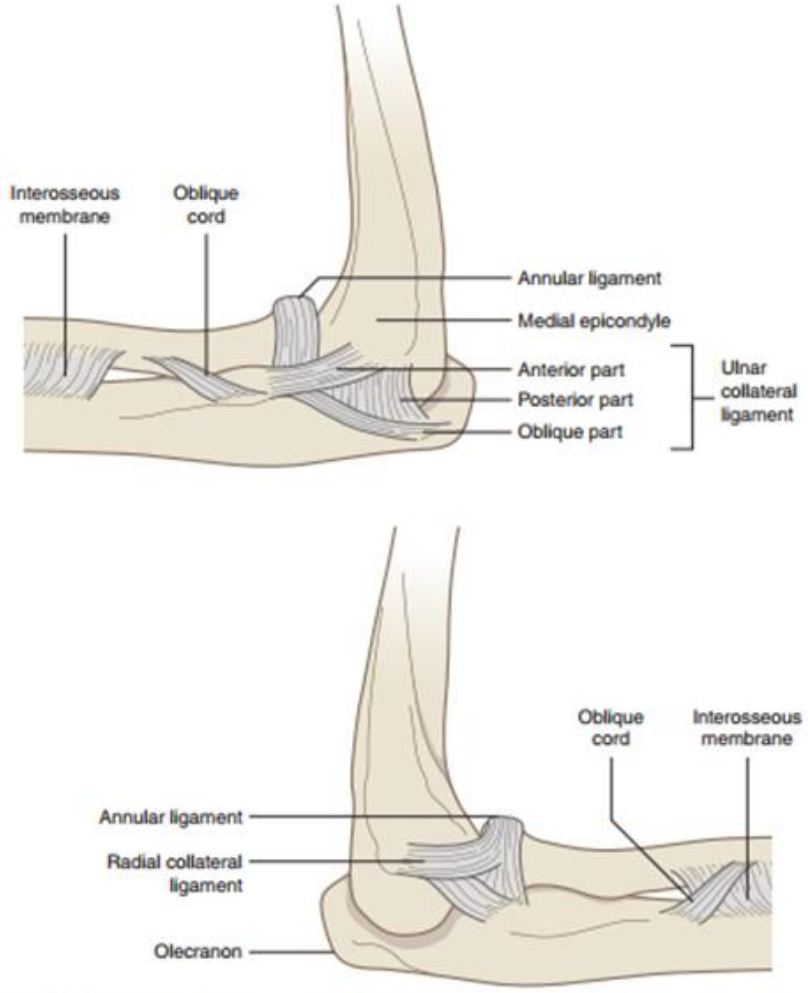
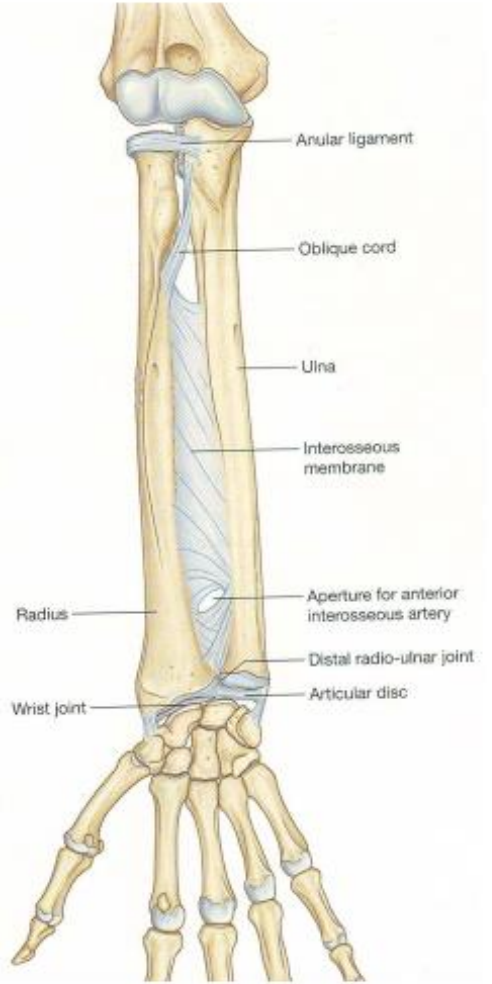
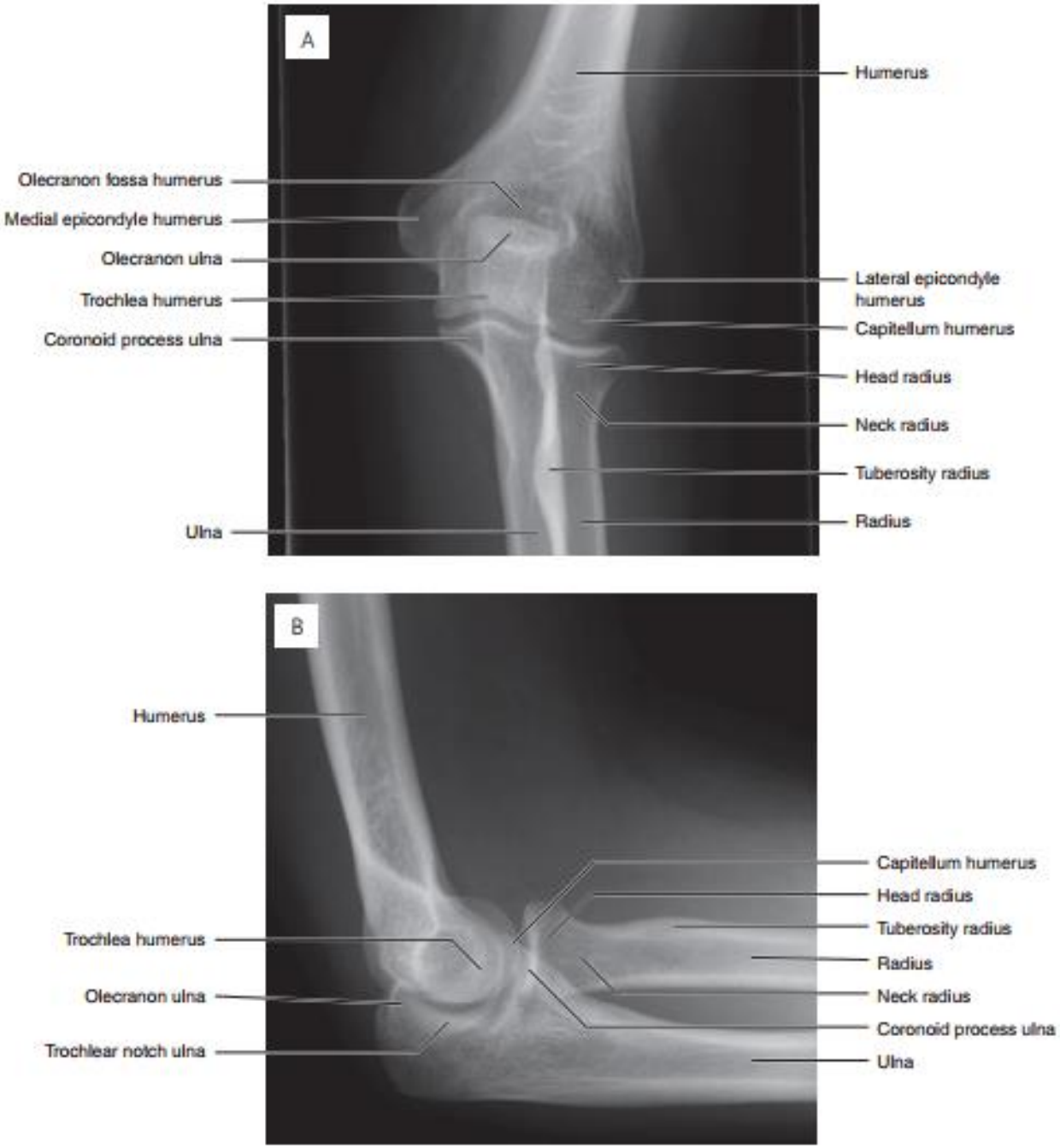


Fig. 15.31 Diagram showing the intrinsic ligaments of the elbow.

- The radius and ulna articulate
- by –
- • Synovial
- 1. Superior radioulnar joint
- 2. Inferior radioulnar joint
- • Non synovial
- Middle radioulnar union

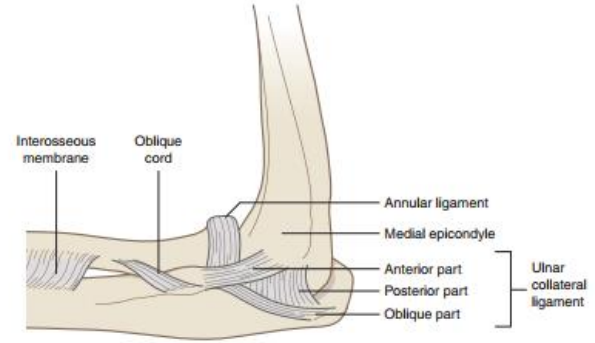


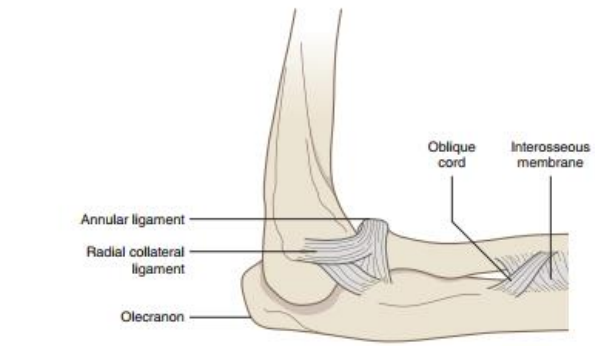


Order of ossification - CRITOE;

Capitellum	C
Radial head	R
Internal epicondyle	I
Trochlea	T
Olecranon	O
External epicondyle	E

:he normal ossification centres at the elbow.





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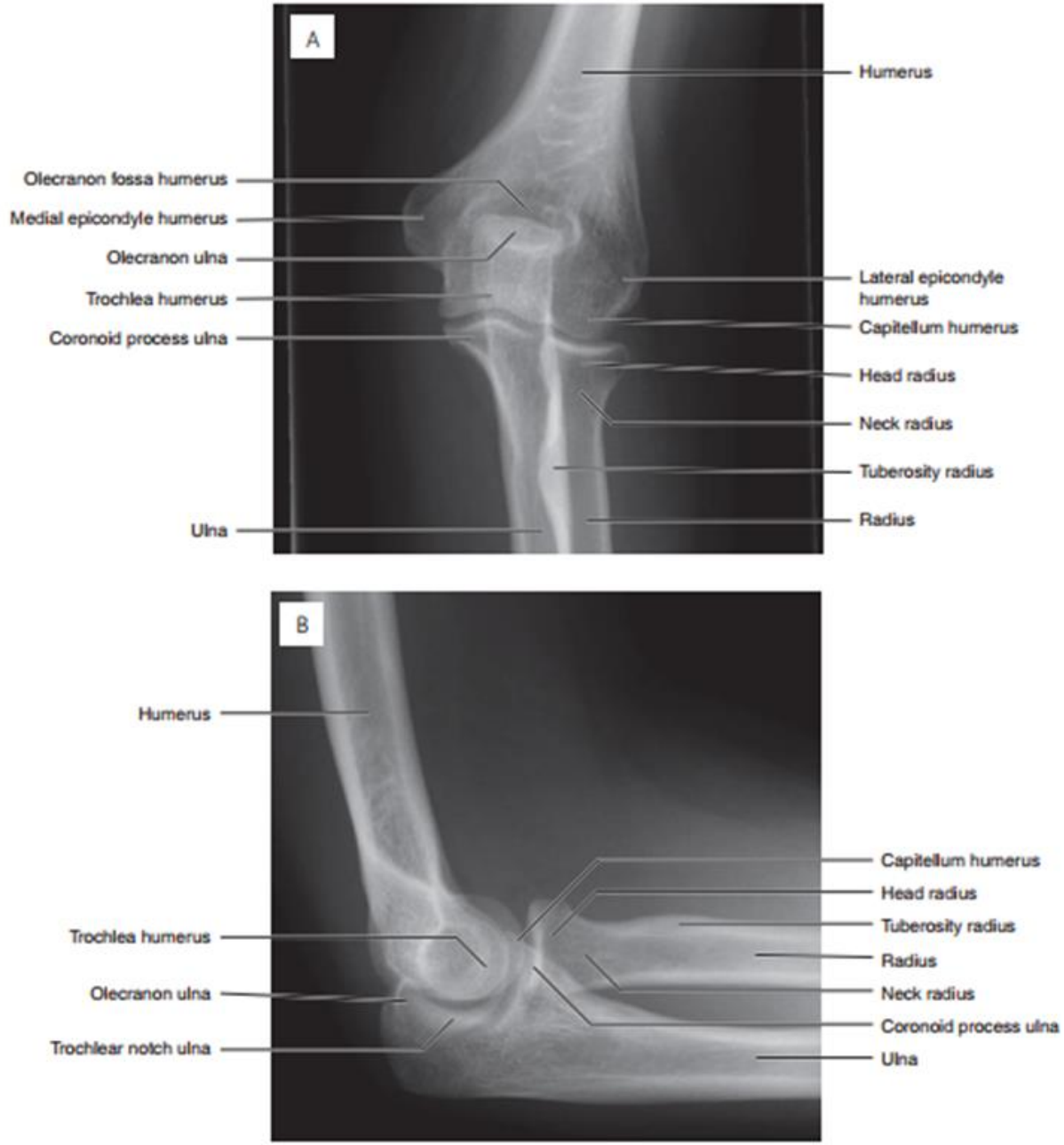
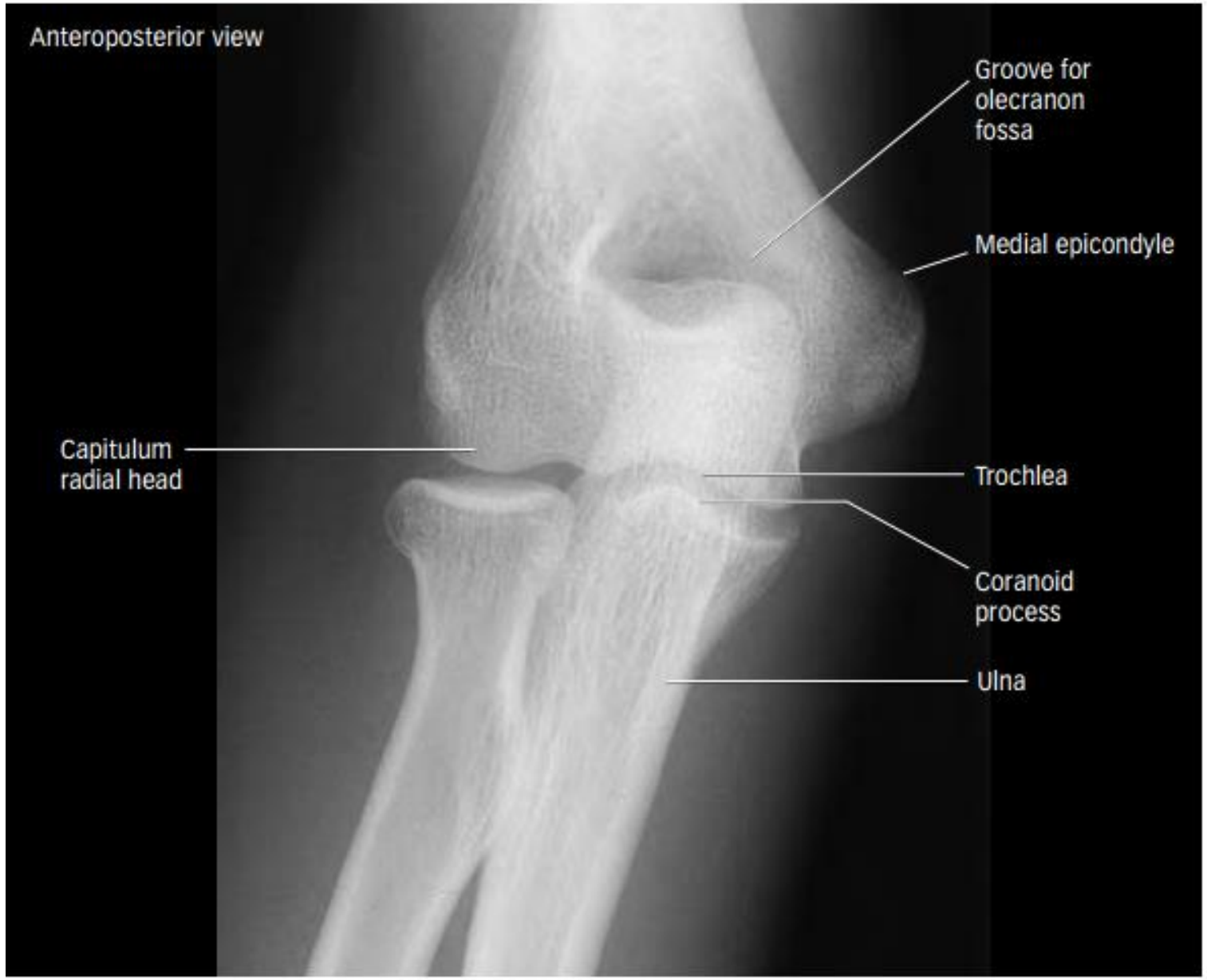

A
Humerus
Olecranon fossa humerus
Medial epicondyle humerus
Olecranon ulna
Trochlea humerus
Coronoid process ulna
Lateral epicondyle humerus
Capitellum humerus
Head radius
Neck radius
Tuberosity radius
Radius
Ulna
B
Humerus
Trochlea humerus
Olecranon ulna
Trochlear notch ulna
Capitellum humerus
Head radius
Tuberosity radius
Radius
Neck radius
Coronoid process ulna
Ulna


Anteroposterior view
Groove for olecranon fossa
Medial epicondyle
Capitulum radial head
Trochlea
Coranoid process
Ulna

Anterior subcoracoid shoulder dislocation

Fracture-dislocation—right humeral head