The Shoulder/Scapula/Clavicle

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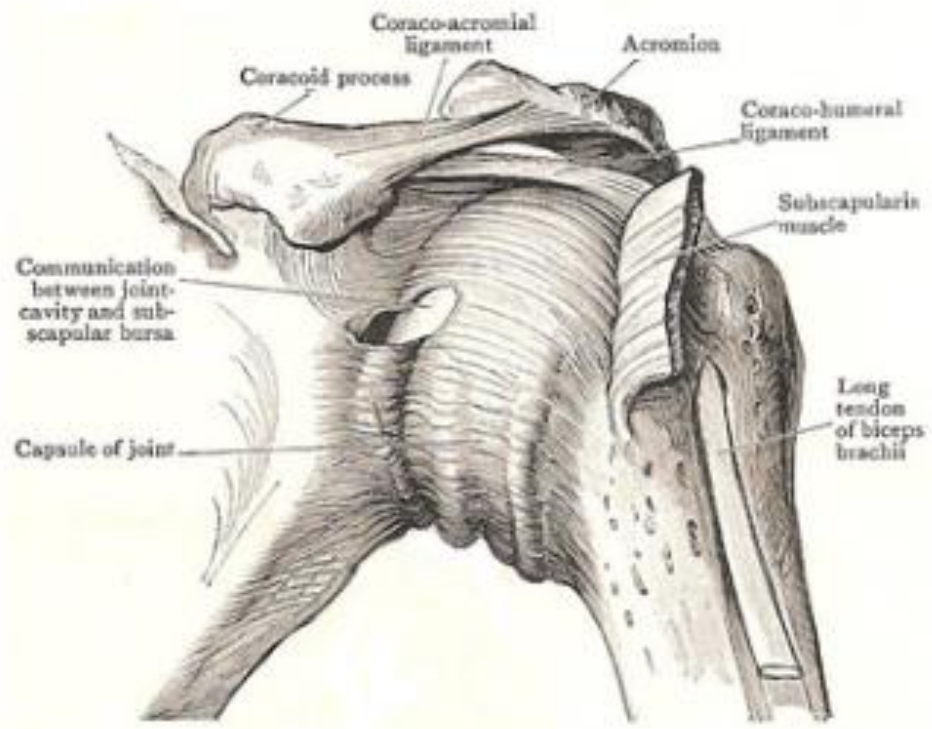
The shoulder (glenohumeral) joint

- The glenohumeral joint is a ball-and-socket synovial joint
- **Articular surfaces**
- These are as follows: • head of the humerus; and • the glenoid cavity of the scapula, which is made deeper by a fibrocartilaginous ring – the labrum glenoidale
- The articular surface of the humeral head is four times the area of the glenoid cavity

Capsule

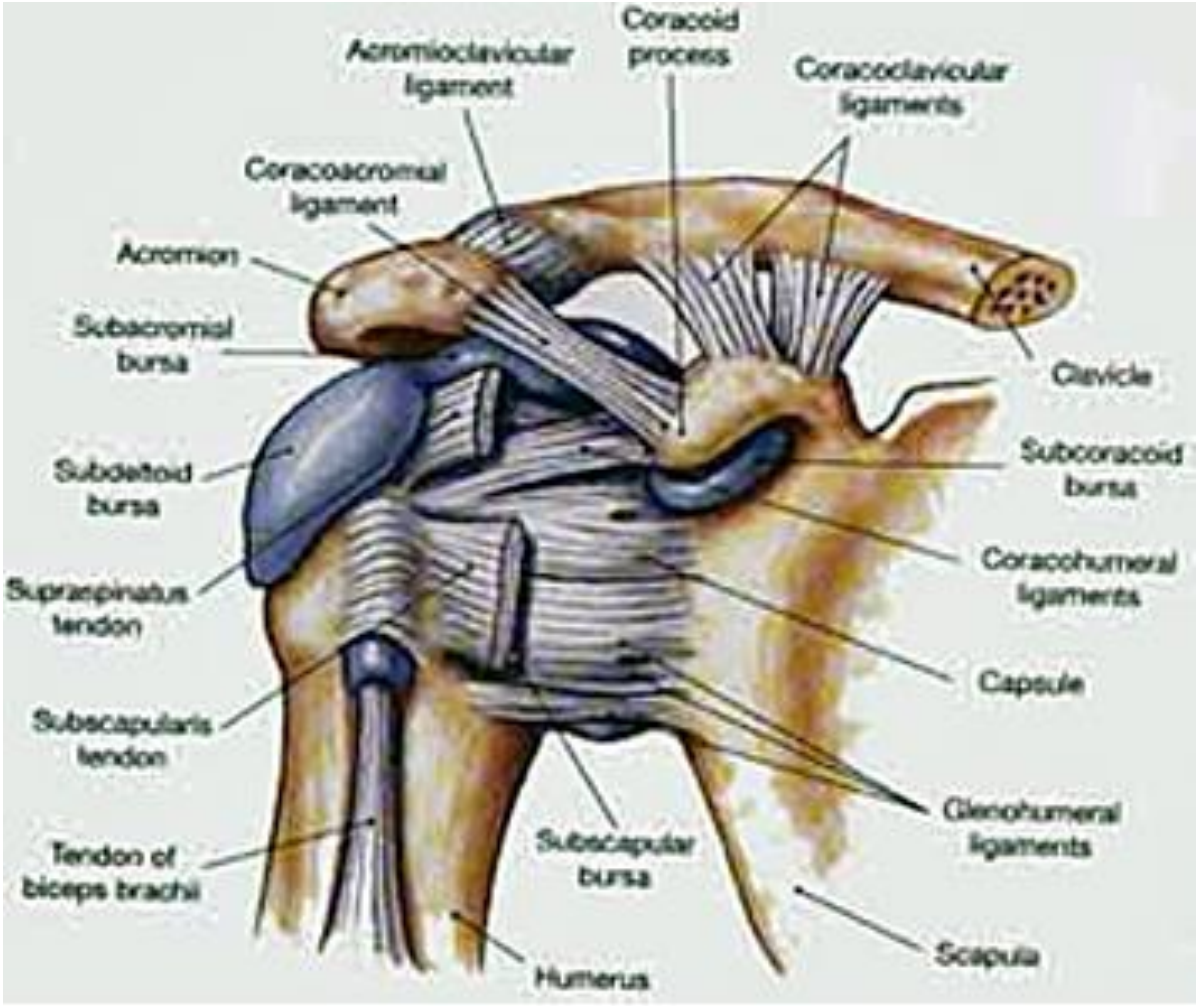
- This is attached to the epiphyseal line of glenoid and humerus, **except** inferiorly where it extends downwards on the medial aspect of the neck of the humerus as the axillary pouch



Right shoulder, front view.

Synovium

- In addition to lining the capsule of the joint, **the synovium** extends along the tendon of the long head of the biceps and beneath the tendon of subscapularis muscle as the **subscapular bursa**



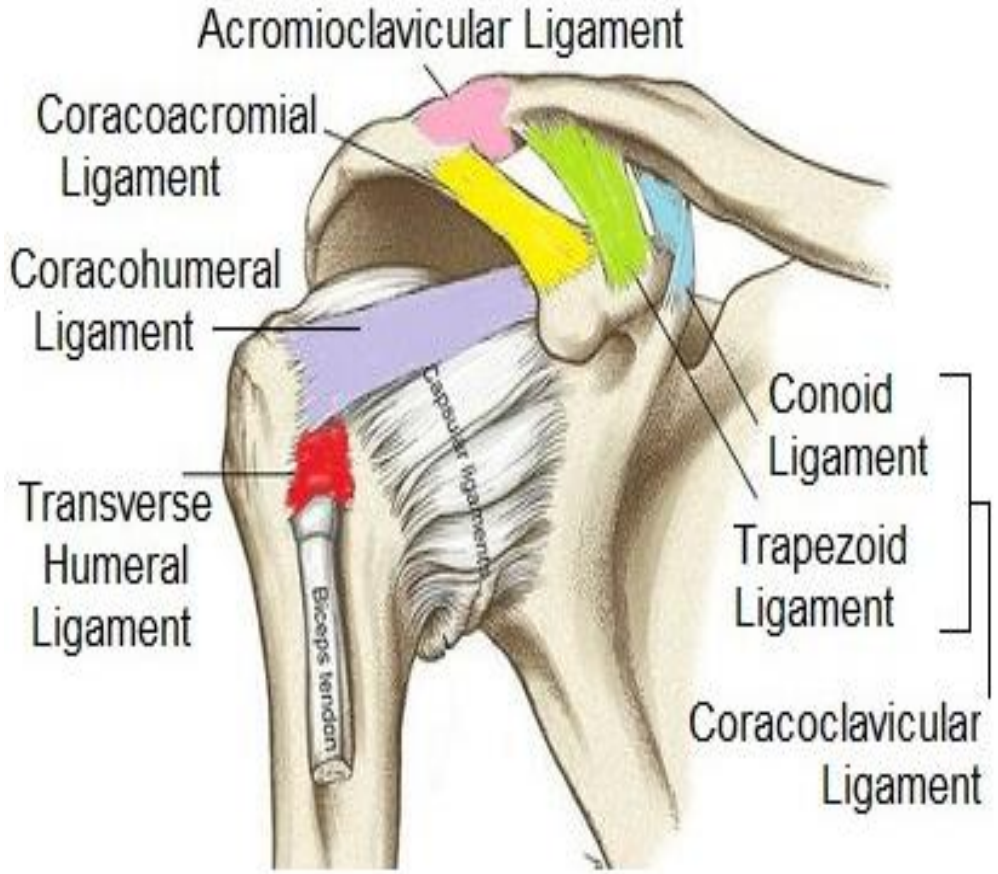
Ligaments

<u>Three glenohumeral ligaments:</u>

1. **<u>(3)</u>**<u>anterior</u> thickenings of the capsule passing from the upper part of the glenoid to the lesser tuberosity and the <u>inferior</u> part of the head of the humerus

2. The coracohumeral ligament

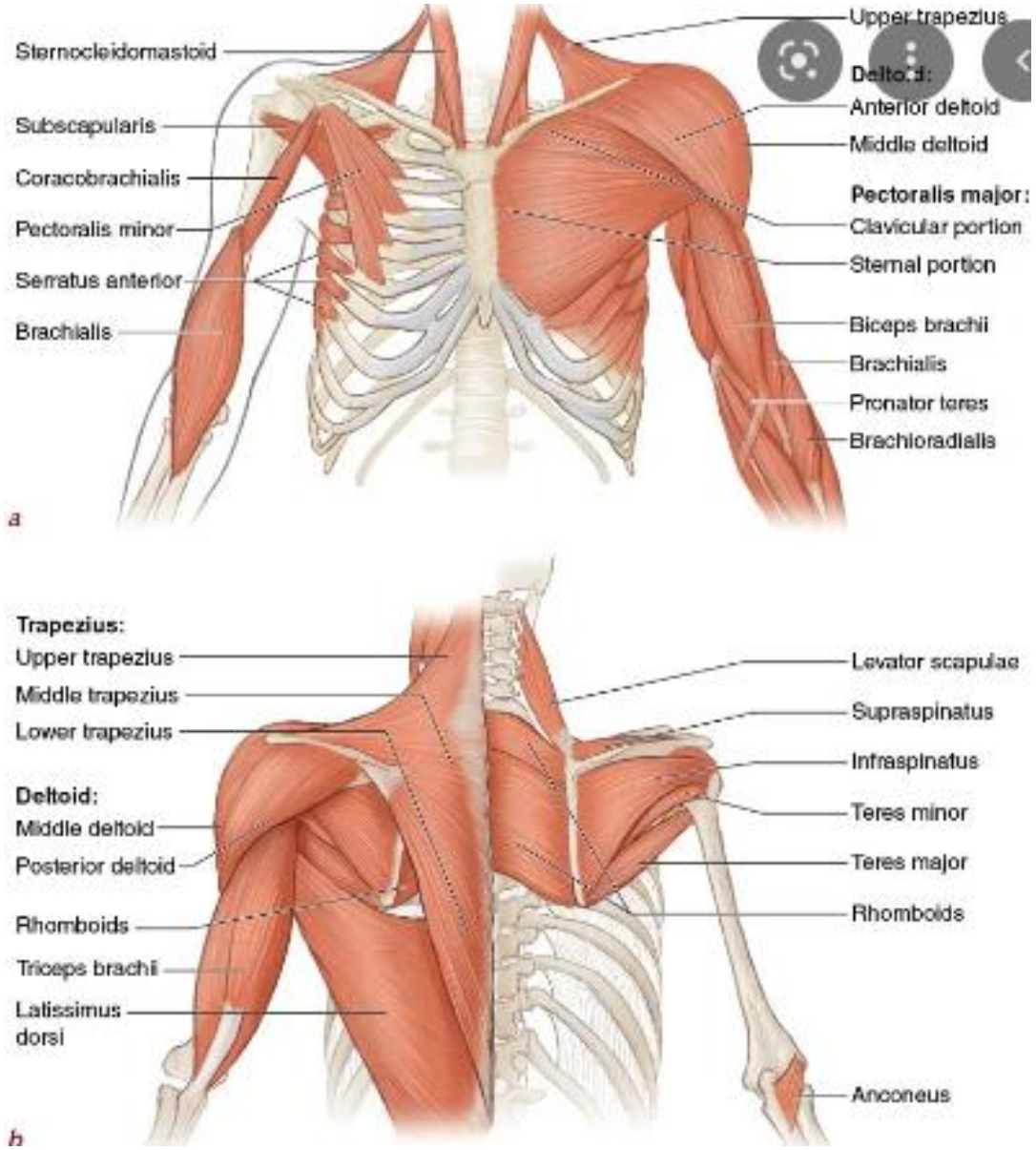
3. The transverse humeral ligament between the greater and the lesser tuberosities of the humerus which maintains the long head of biceps tendon within the bicipital groove



Stability

In addition to ligaments, the stability of the shoulder joint depends upon the surrounding muscles These are:

- the short muscles known as the rotator cuff muscles (i e subscapularis, infraspinatus and teres minor muscles); and
- the longer muscles, including the long head of biceps, pectoralis major, latissimus dorsi, teres major and deltoid muscles The inferior part of the joint is least well protected by either ligaments or muscles

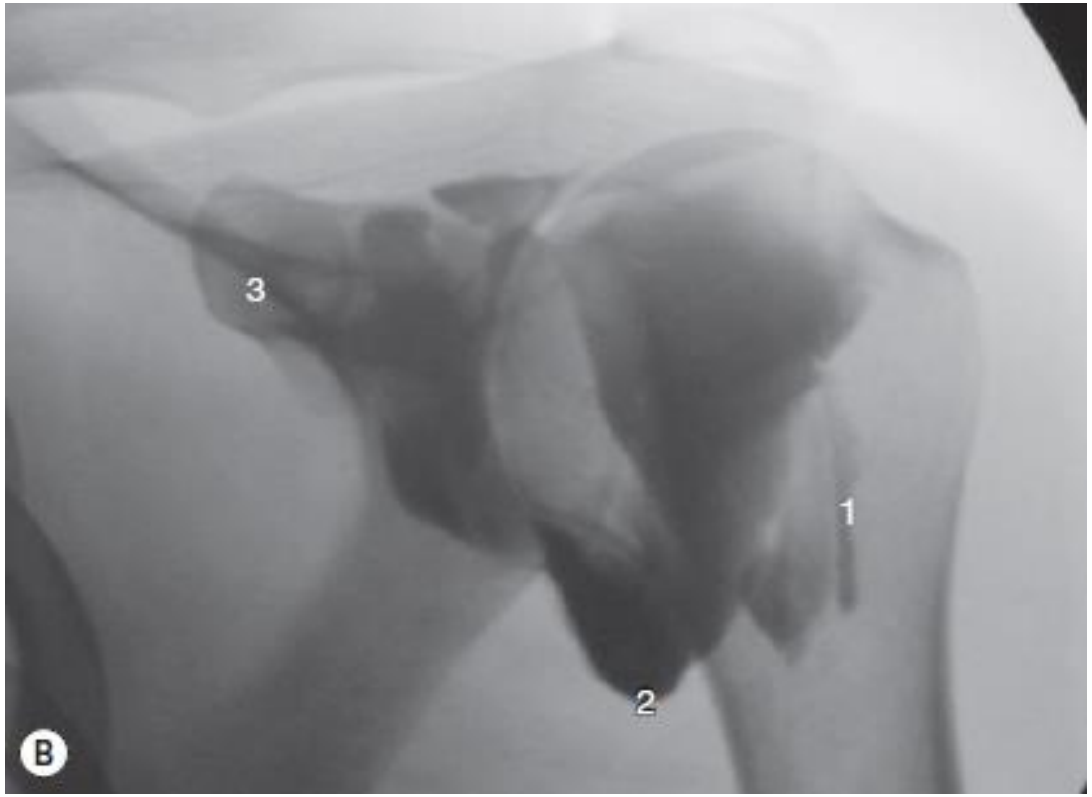


Radiological features of the shoulder joint

- The supraspinatus muscle passes on the superior aspect of the shoulder joint to the greater tuberosity of the humerus
- Calcification occurs in this muscle owing to degenerative change and may be visible on radiographs

Arthrography with or without CT

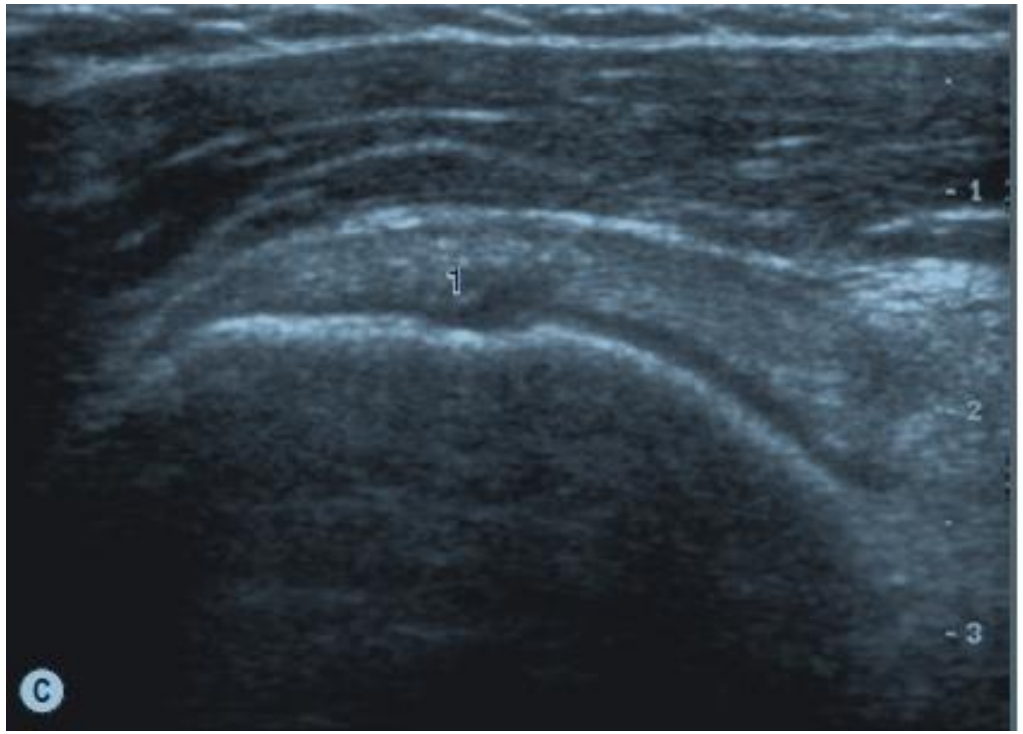
- In the shoulder joint, arthrography is achieved by injection of contrast into the joint below and lateral to the coracoid process.
- The axillary pouch can be seen inferior to the humeral head on external rotation of the arm, and the subscapular (subcoracoid) bursa can be seen on internal rotation of the arm The subacromial (subdeltoid) bursa is not filled unless the supraspinatus tendon is completely ruptured

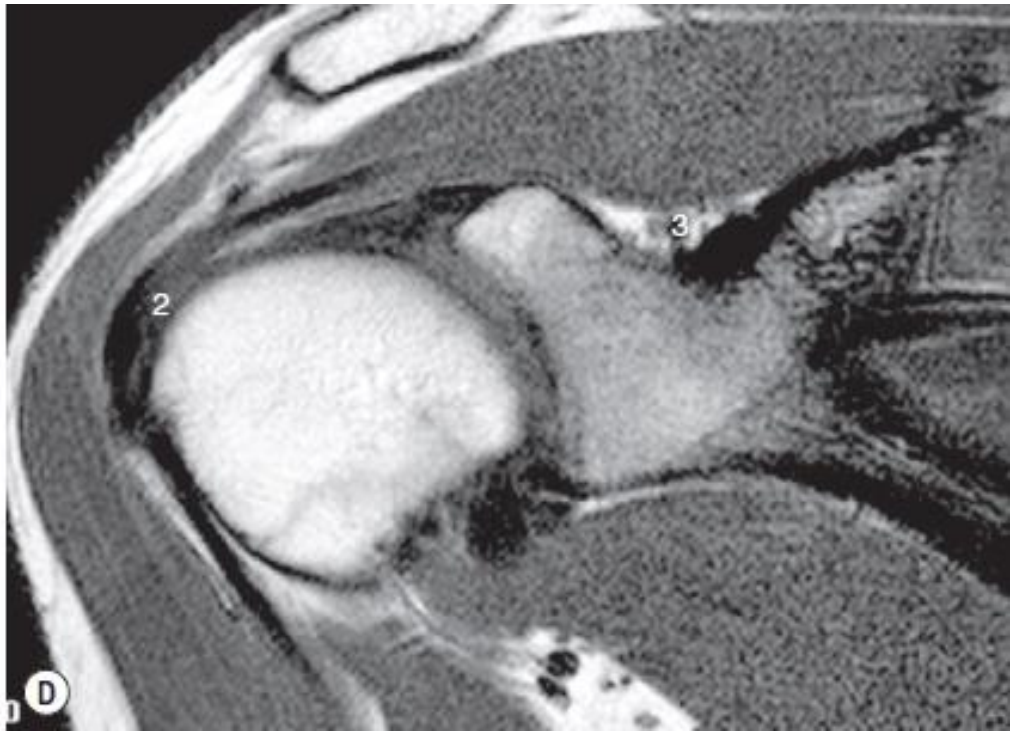


- 1. The biceps sheath 2. The axillary pouch 3. The subcoracoid recess

- Subacromial bursography is Contrast injection to the subacromial bursa with either ultrasound or fluoroscopic guidance is often followed by therapeutic injection of steroid and bupivacaine.
- Subacromial bursitis or inflammation of the bursa is most frequently secondary to impingement

- Ultrasound High-frequency linear probes are now often employed as an alternative to MRI to evaluate the rotator cuff
- Magnetic resonance imaging with surface coils is used increasingly to image the shoulder joint



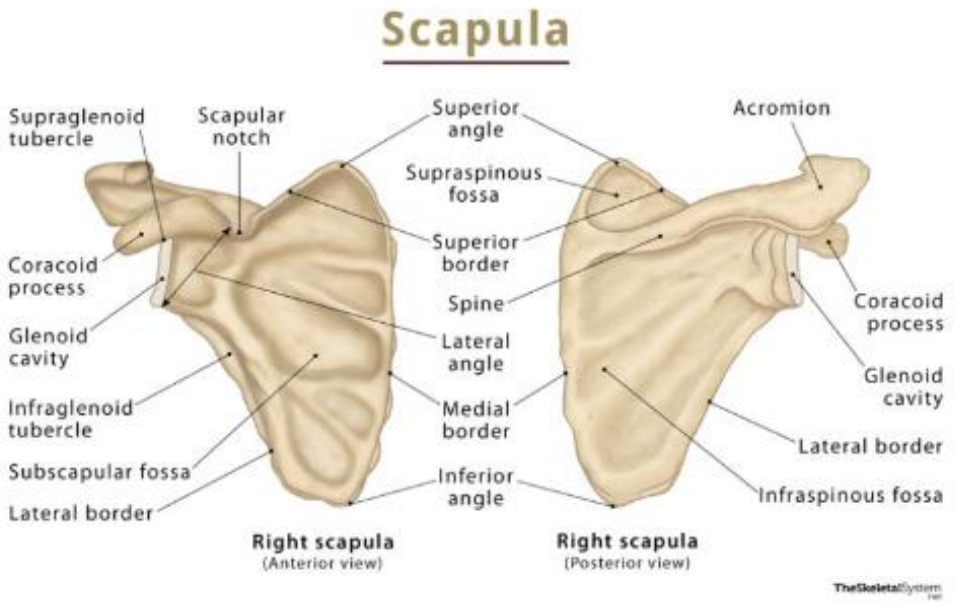


1. Supraspinatus tendon 2. Supraspinatus tendon attachment 3. The suprascapular notch

The Scapula

This flat triangular bone has three processes:

- **The glenoid process**, which is separated from the remainder by the neck of the scapula. The glenoid cavity forms part of the shoulder joint.
- **The spine**, which arises from the posterior surface of the scapula and separates the supraspinous and infraspinous fossae. The spine extends laterally over the shoulder joint as the acromion.
- **The coracoid process**, which projects anteriorly from the upper border of the neck of the scapula.

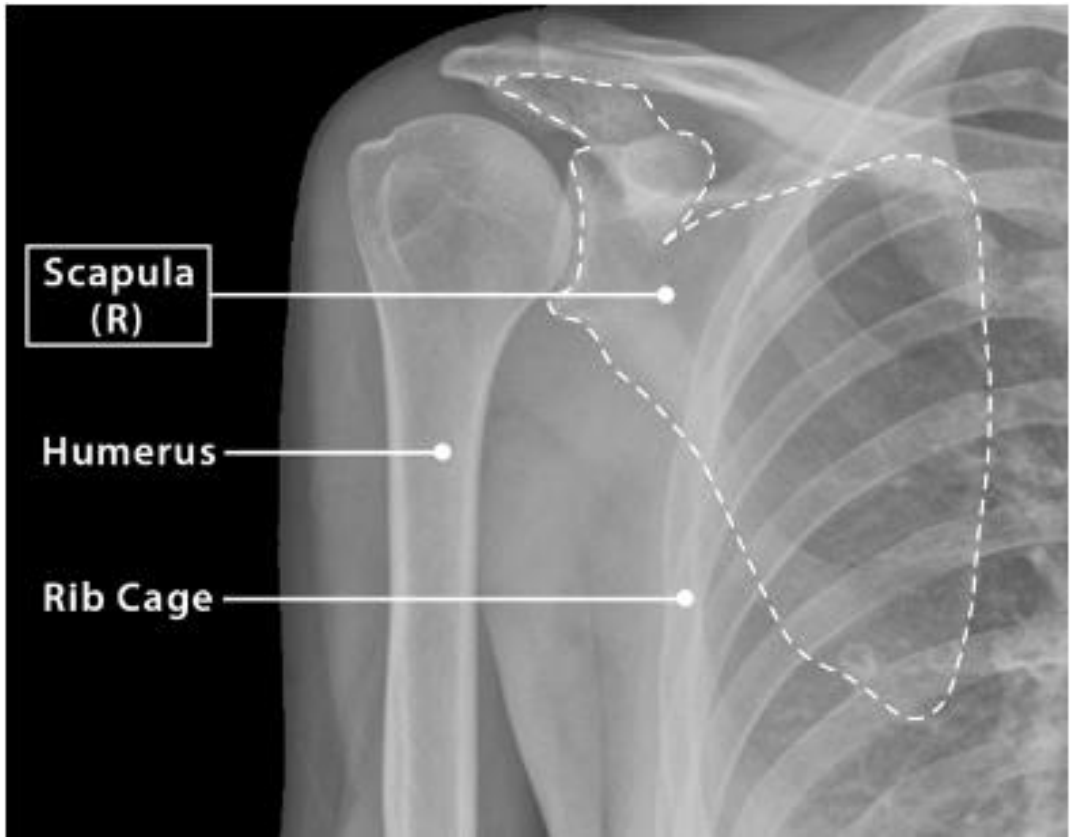


Parts of Scapula Labeled Diagram

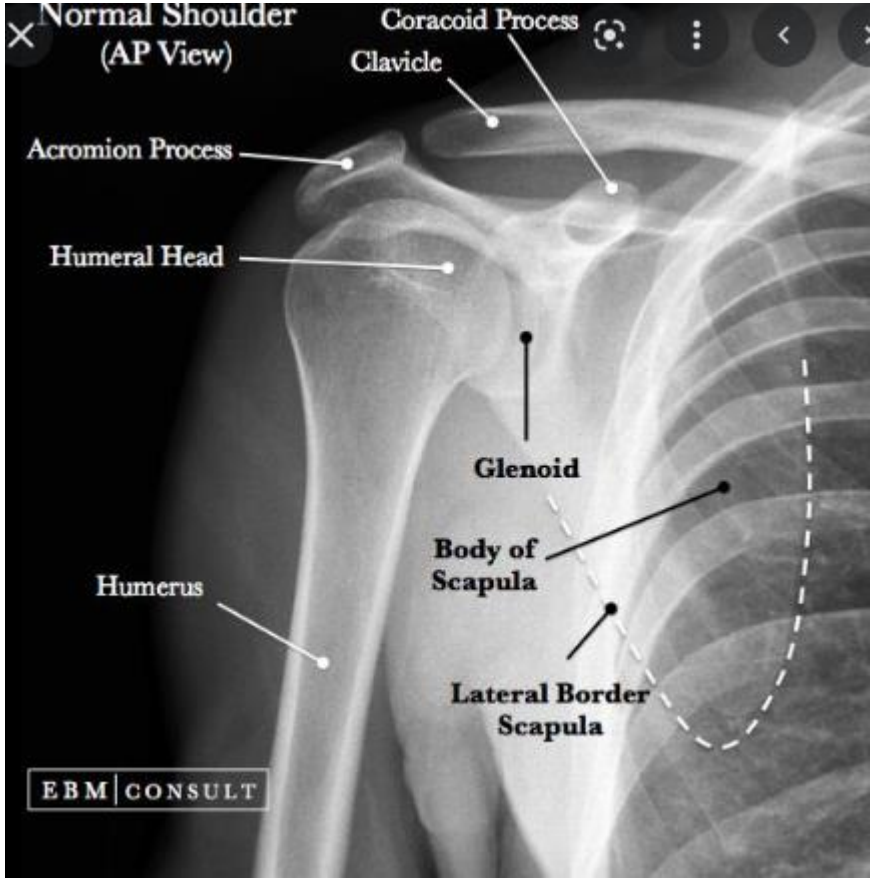
Radiological features of the scapula

Plain radiographs

- The inferior angle of the scapula lies over the seventh rib or interspace – this is a useful guideline in identifying ribs or thoracic vertebral levels.
- The scapula lies over the ribs and obscures some of the lung fields in PA chest radiographs unless the shoulders are rotated forwards.

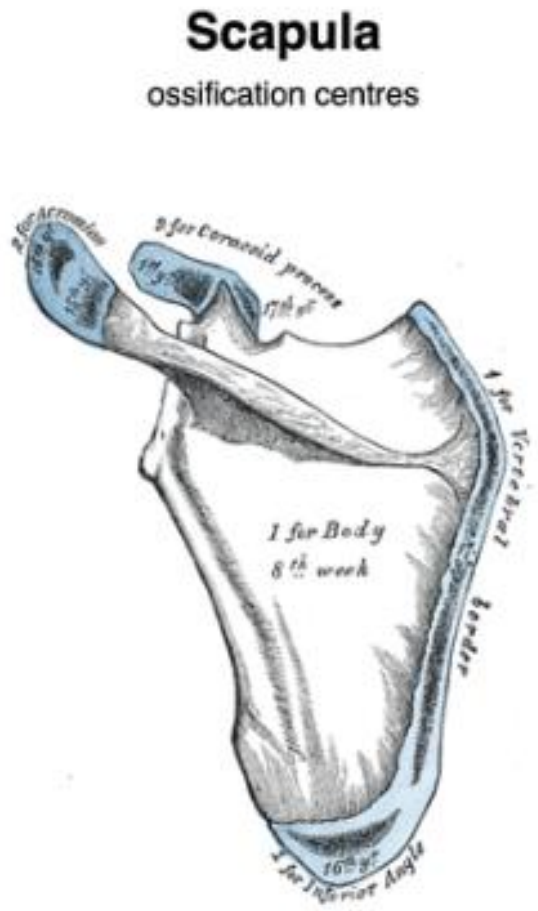


- In AP view of scapula the beam is centred over the head of the humerus to project the thoracic cage away from the scapula.
- In lateral chest radiographs, the lateral border of the scapula may be confused with an oblique fissure. The inferior angle of the scapula may be slightly bulbous and simulate a mass on this view.



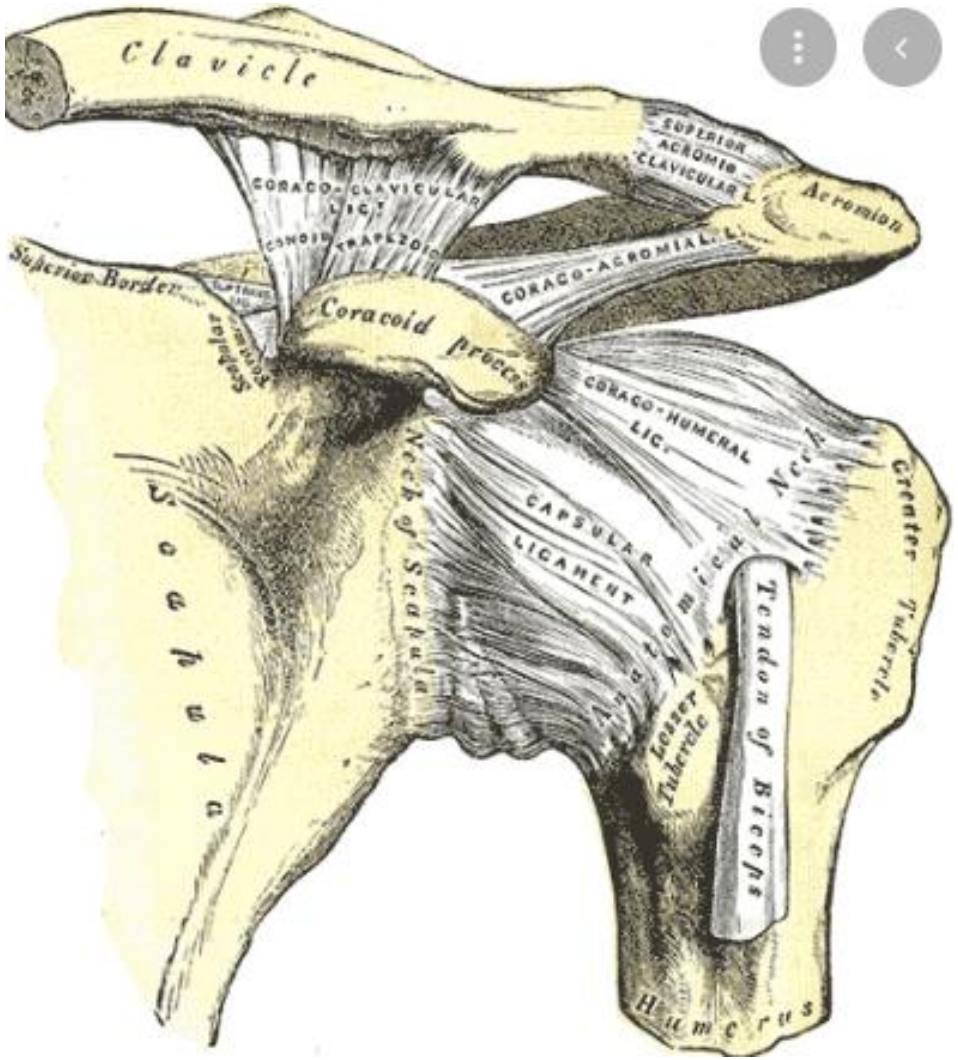
Ossification

- The scapula ossifies in the eighth week of fetal life.
- An **ossification centre** appears in the middle of the coracoid process in the first year of life and fuses at 15 years of age.
- **Secondary centres** appear in the root of the coracoid process, the medial border and the inferior angle of the scapula between 14 and 20 years, and fuse between 22 and 25 years of age.



The clavicle

- The clavicle lies almost horizontally between the sternoclavicular and the acromioclavicular joints.
- It is also attached to the first costal cartilage by the costoclavicular ligament.
- It is connected to the coracoid process by the coracoclavicular ligament .
- The subclavian vessels and the trunks of the brachial plexus pass behind its medial third



Radiological features of the clavicle

- **<u>Chest radiograph</u>**
- The clavicle overlies the apices of the lungs in chest radio graphs
- Apical or lordotic views are used to project the clavicles above the lungs to evaluate this area.
- On a chest radiograph, the distance between the medial end of the clavicle and the spine of the vertebrae is equal on both sides unless the patient is rotated

Ossification of the clavicle

- The clavicle begins to ossify before any other bone in the body
- It ossifies in membrane from two centres that appear at the **fifth and sixth fetal weeks**, and fuses in the **seventh week**
- A secondary centre appears at the sternal end at **15 years in females** and **17 years in males**, and fuses at **25 years** of age

- **Multislice CT** with reformatted images allows excellent tomographic assessment of the long axis of the clavicle.
- The articulation with the sternum is best visualized using **MRI** with a surface coil placed over the anterior chest wall

Clavicle fracture