



Musculoskeletal System

Sub-System

Anatomy

Lecture Title

Joints of the upper limb 1

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▪ Shoulder Joint :

(1) It is structurally classified as a synovial ball and socket joint and functionally as a diarthrosis and multiaxial joint.

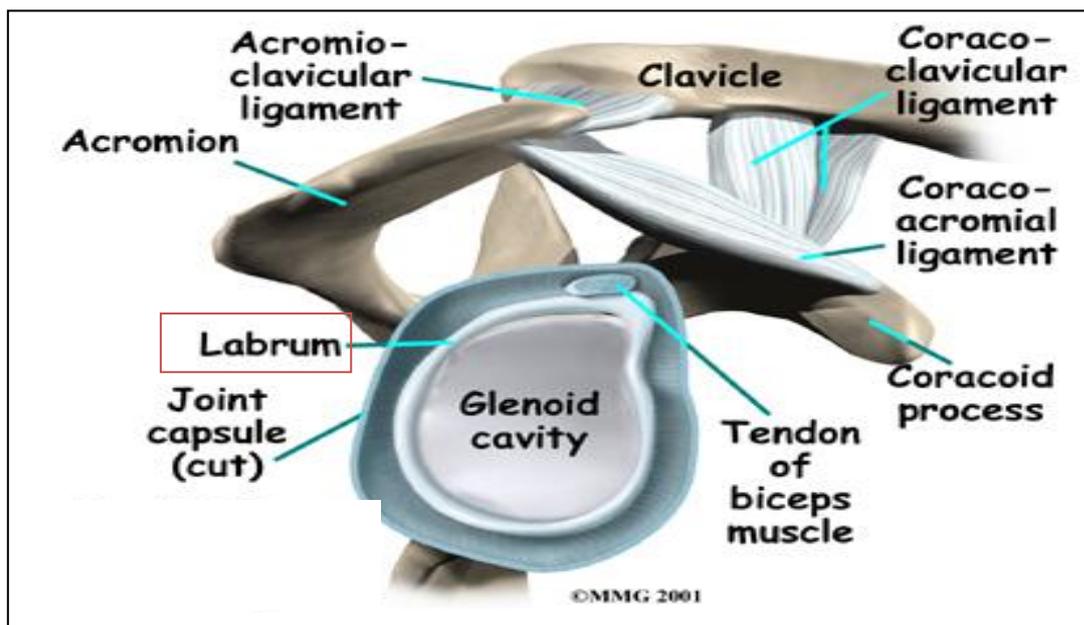
(2) A freely mobile joint that involves the articulation b/w the head of the humerus and the glenoid cavity of the scapula ; this gives rise to the alternate name for it → **Glenohumeral joint** .

(3) Considered to be as the most mobile joint of human body .

📌 Anatomy of the shoulder joint :

Like most synovial joints, the articulating surfaces are ***covered with hyaline cartilage***. The head of the humerus is **much larger than the glenoid fossa**, giving the joint a wide range of movement at the cost of inherent instability. To reduce the disproportion in surfaces, the glenoid fossa is ***deepened*** by a fibrocartilage rim (fibrocartilagenous ring), called the **glenoid labrum**.

(only 1/3 of the head articulated with the glenoid cavity)



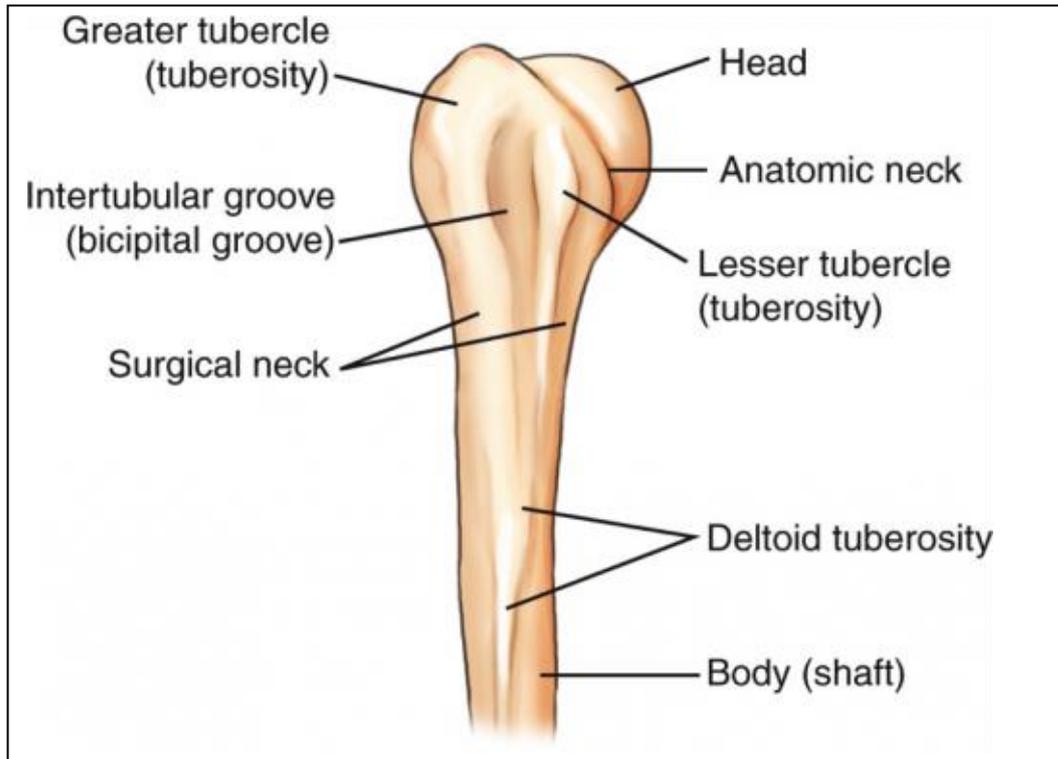
✓ Note :

The glenoid labrum is attached to the circumference of the cavity and it is **continuous with the tendon of the biceps brachii above**.

★ Recall of main proximal anatomical landmarks of the humerus :

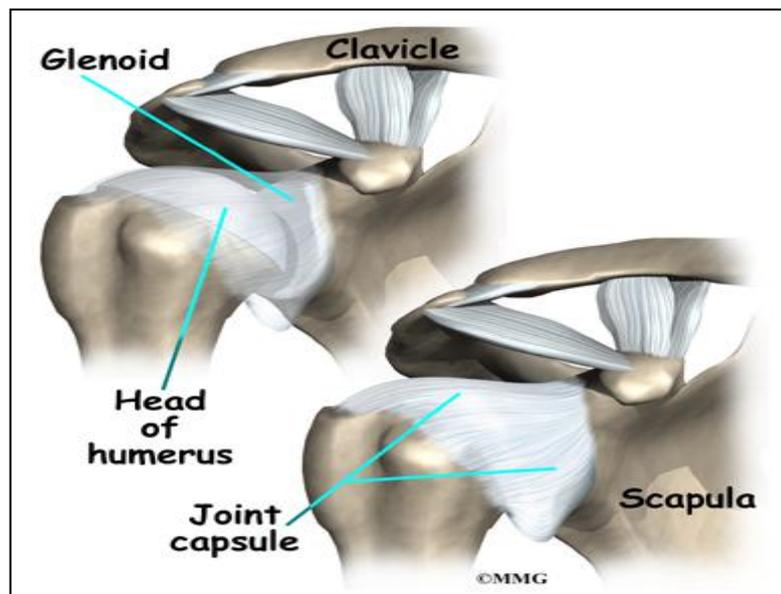
- (1) Head
- (2) Anatomical Neck
- (3) Surgical neck » Site of fractures
- (4) Greater tubercle
- (5) Lesser tubercle
- (6) Intertubercular sulcus/groove

► Note : Intertubercular groove is aka **Bicipital groove** as the tendon of the long head of the biceps brachii emerges from the shoulder joint and runs through this groove.



► Structures of the joint :

(1) Capsule ► generally , it is a tough fibrous tissue .**Inferiorly**,the joint capsule is lax, permitting greater mobility (particularly abduction). It extends 1-3mm over the neck of the humerus.



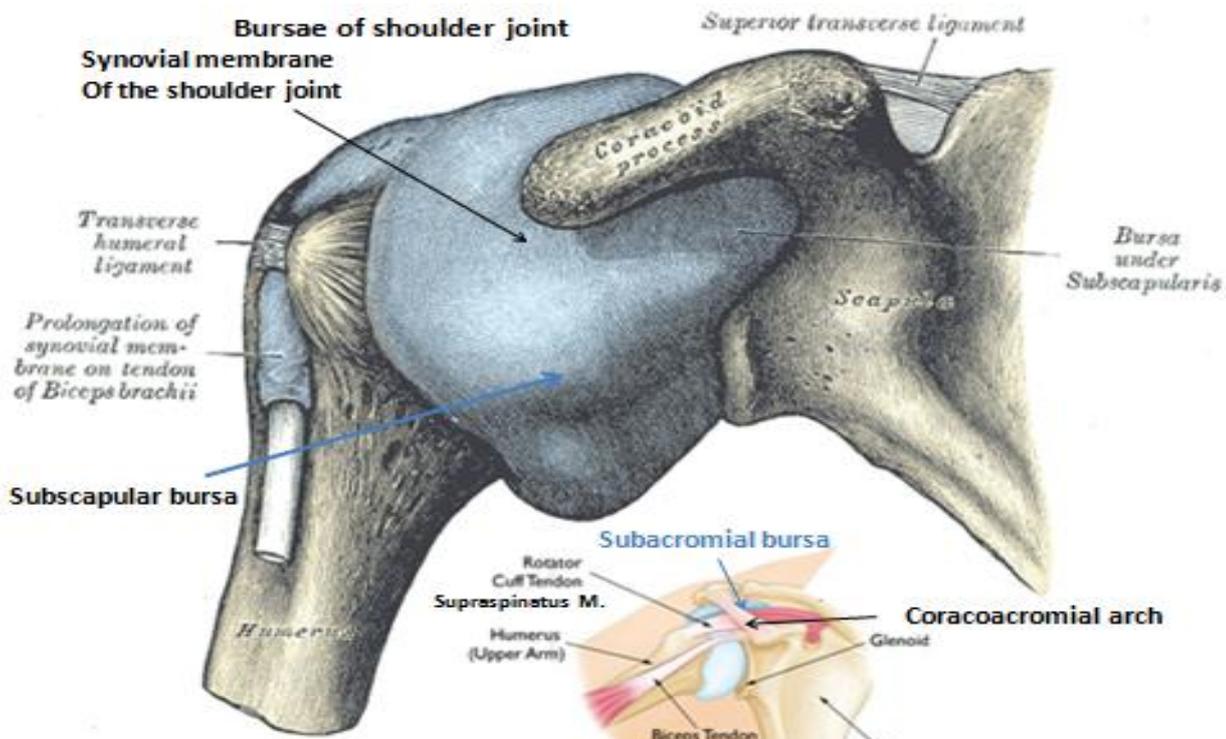
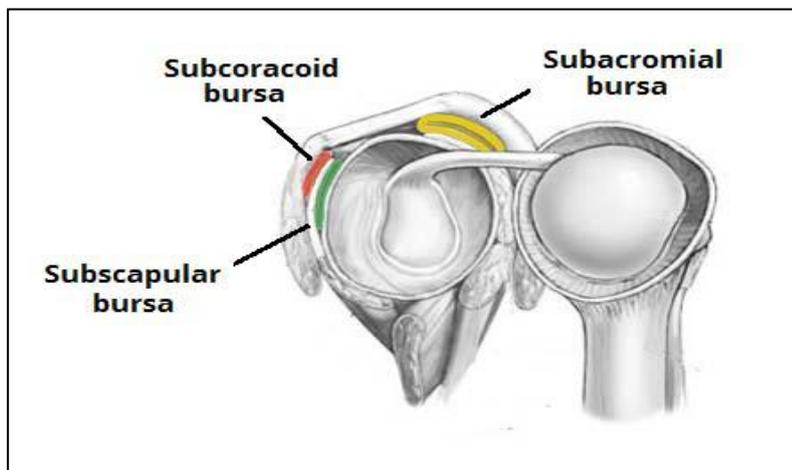
(2) Synovial Membrane ► lines the inner surface of the joint capsule ► produces synovial fluid ►dec friction b/w surfaces , importance for lubrication , cooling and nutrition .

It extends along the tendon of biceps muscle to the intertubercular groove and ends with the subscapular bursa.

(3) Synovial Bursae ► synovial fluid filled sac , which acts as a cushion b/w tendons and other joint structures .

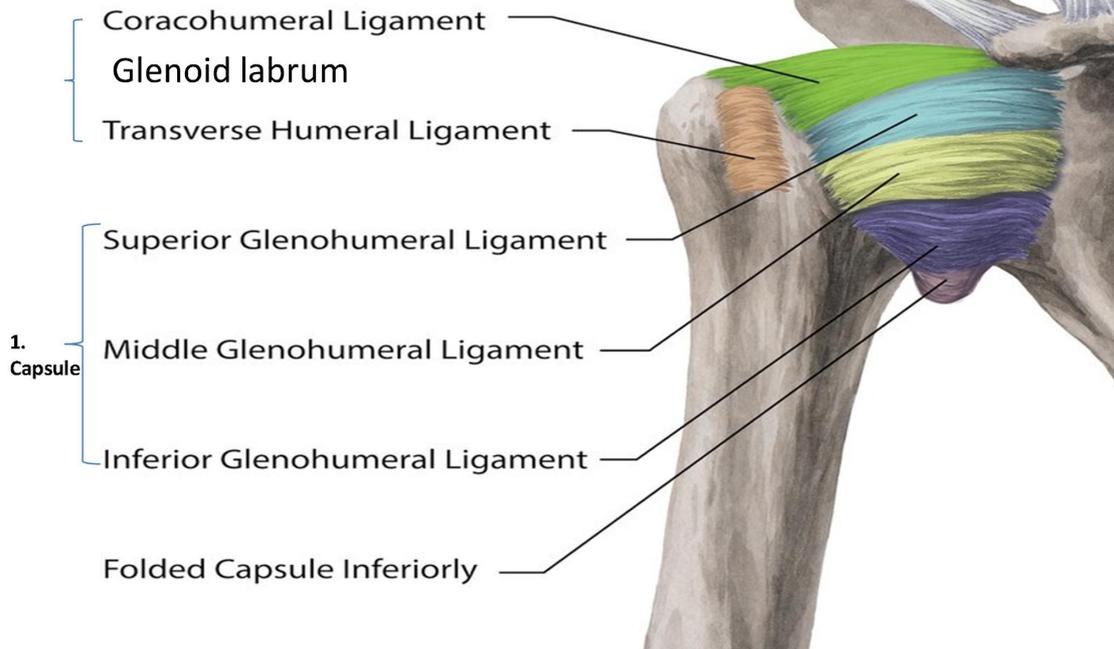
(++Table shows the bursae of shoulder joint)

subacromial bursa	B/w the capsule and the acromion . Found <u>above the supraspinatus muscle</u> and <u>below coracoacromial arch</u> and it separates them. It facilitates movement of the muscle.
subcoracoid bursa	B/w the capsule and the coracoid process
coracobrachial bursa	B/w the subscapularis muscle and the tendon of the coracobrachialis muscle
subscapular bursa	B/w the capsule and the tendon of the subscapularis muscle



Ligaments of the shoulder joint

2. Accessory ligaments



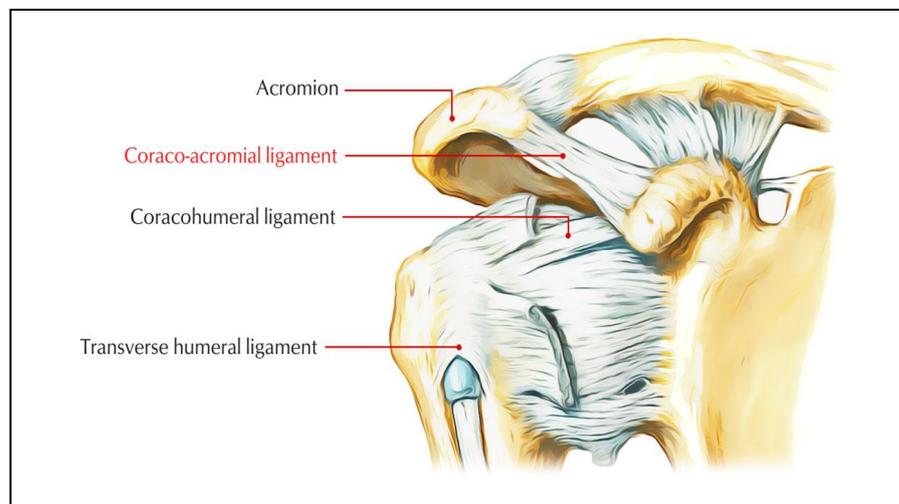
To make the joint more stable we have 3 capsular thickening/ligaments :

✓ **Capsular ligaments** :

1. Superior Glenohumeral ligament
2. Middle Glenohumeral ligament
3. Inferior Glenohumeral ligament

✓ **Superiorly** we have **coracohumeral ligament** ▶ Rectangular in shape, extends from the coracoid process to the greater tubercle which handles (stabilizes) the joint superiorly .

✓ **coracoacromial ligament** : located Between the coracoid process and acromion, is another ligament which handle the shoulder joint. (مش حول المفصل زي الباقيين)

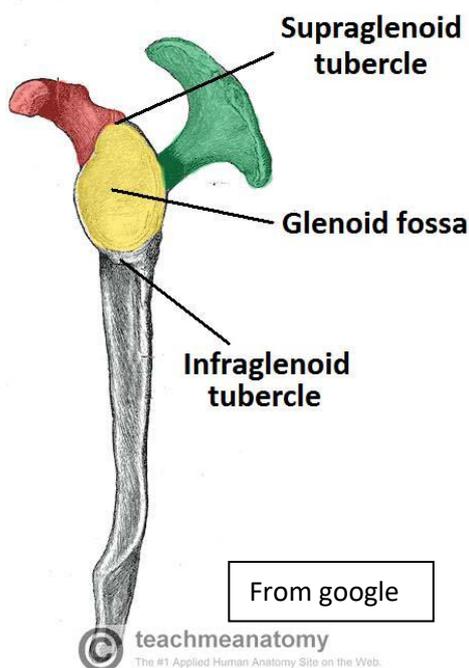


✓ **Transverse humeral ligament** : Between lesser and Greater tubercle , beneath it the tendon of biceps pass.

✓ **Accessory ligaments** :

- ❖ Coracohumeral lig.
- ❖ Transverse humeral lig.
- ❖ Glenoid labrum

▪ **Note** ▶▶ Long tendon of biceps penetrate the capsule and the synovial cavity, finally it reach and **attach to the supraglenoid tubercle**



Supraglenoid Tubercle :

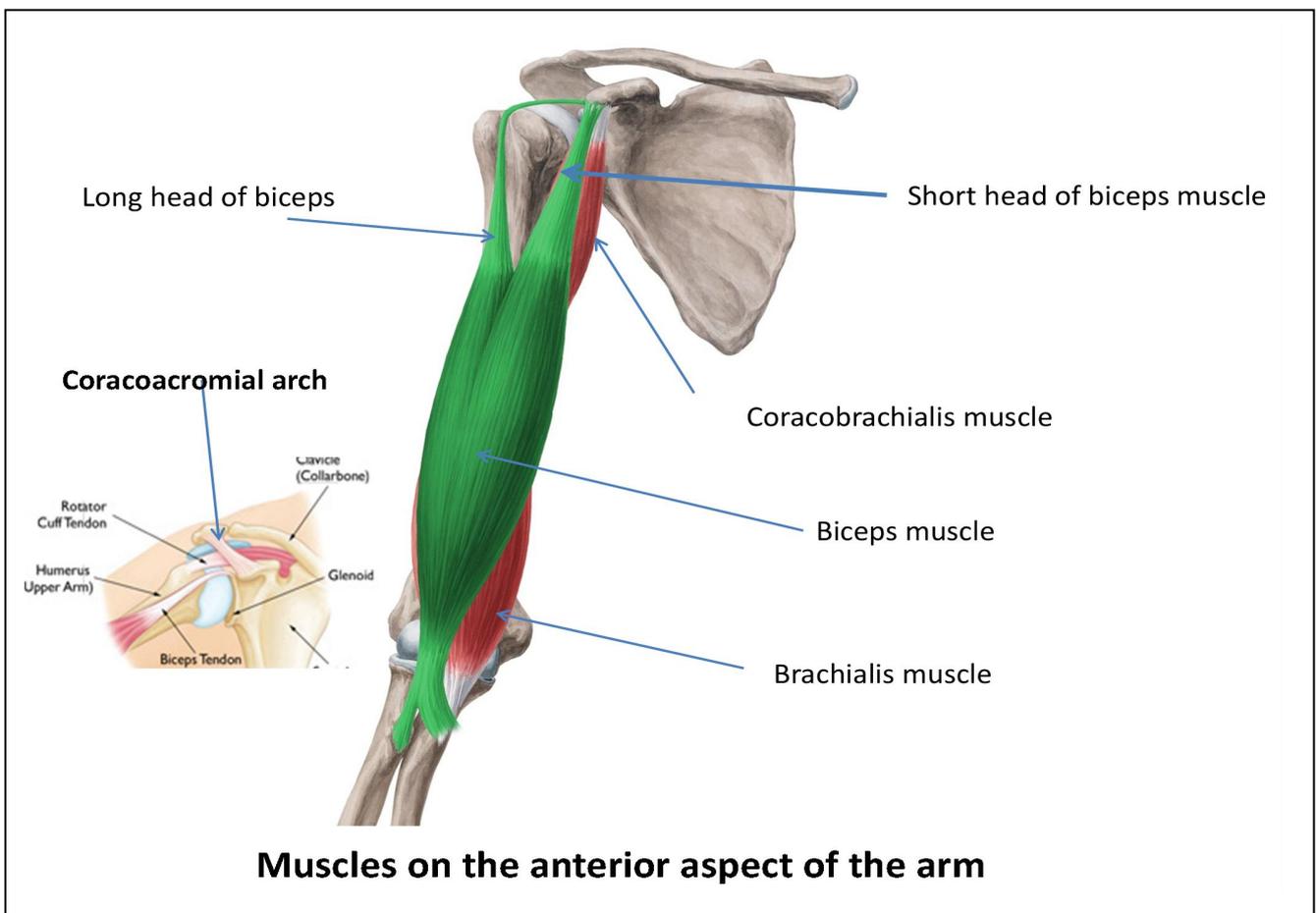
located above the Glenoid cavity the attachment is to the long head of the biceps.

Infraglenoid Tubercle : The attachment is to the long head of the Triceps Brachii.

▪ **Recall** :(See the figure in the next page)

Short head of Biceps muscle ▶▶ attached to coracoid procces

Long head of biceps muscle: bicipital groove ➔ inside joint ➔ supraglenoid tubercle of the scapulae



► Muscles of the shoulder joint :

4 Muscles form the shoulder joint : " Rotator cuff muscles "

1- Supraspinatus :

Origin : supraspinal fossa

Insertion of tendon : upper end of Greater tubercle.

2- Infraspinatus :

Origin : infraspinal fossa.

Insertion : Posteriorly to the Greater tubercle of humerus.

3- Teres Minor :

Origin : Lateral edge of scapula.

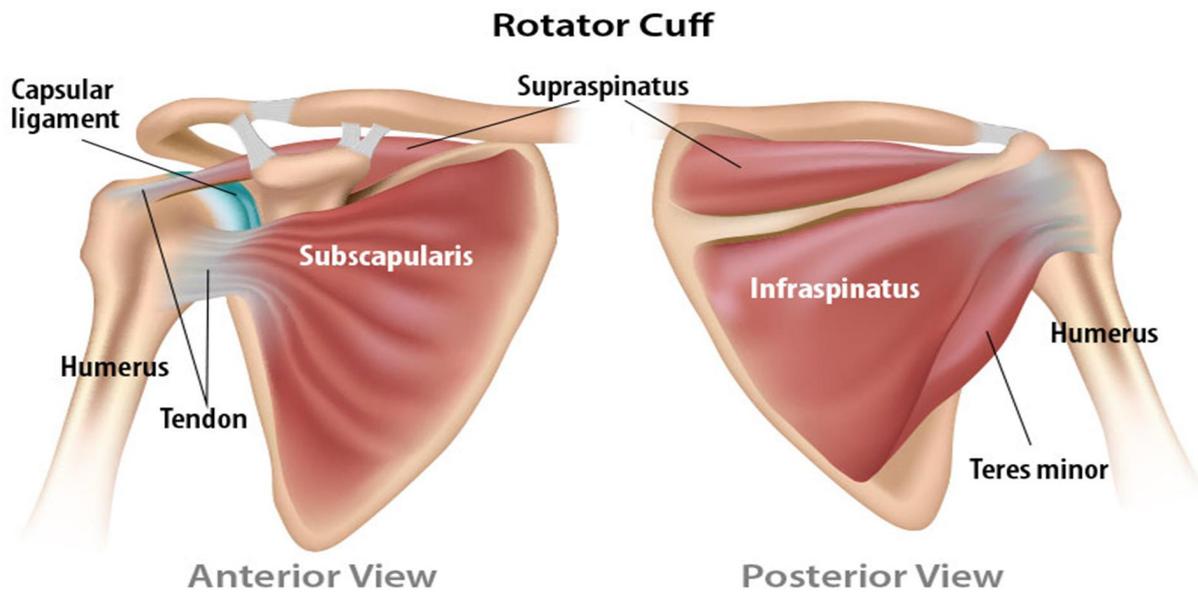
Insertion : Posteriorly to the Greater tubercle of humerus.

4- Subscapularis :

Origin : subscapularis fossa of scapula

Insertion : Lesser tubercle of humerus.

Function: Stability of the shoulder joint, rotation of humerus laterally and medially .



Stability of shoulder joint is by the Rotator cuff muscles (SISTER minor) And the shoulder ligaments

Relations:

1. **3 muscles Posterior:** infraspinatus / teres minor /supraspinatus(Superiorly).
2. **1 muscle Anterior:** subscapularis
3. Long head of biceps (**Superiorly**)
4. Long head of Triceps and Axillary nerve (**Inferiorly**).

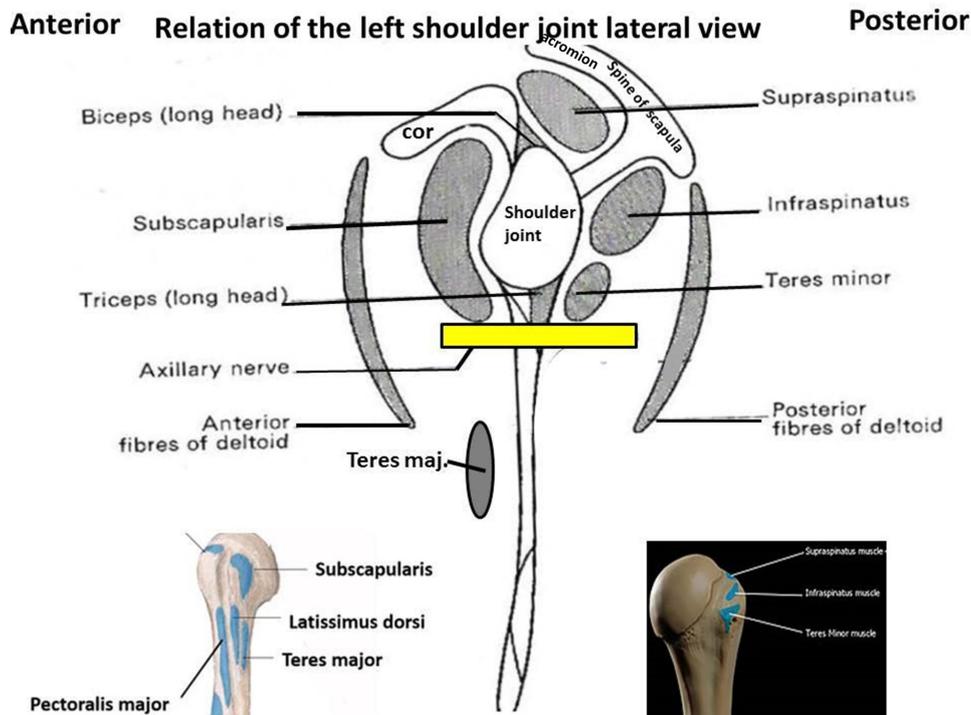
► Summary table of what we mentioned till now :

Articulation surfaces	Glenoid fossa (scapula), head of the humerus
Type	Synovial joint (the bones share synovial cavity)
Bursae	Subscapular bursa and Subacromial bursa
Ligaments	Superior glenohumeral, middle glenohumeral, inferior glenohumeral, coracohumeral, transverse humeral ligaments
Rotator cuff muscles	Supraspinatus, Infraspinatus, Teres minor, Subscapularis

Dislocations of humerus are easy because the inferior part of the shoulder joint is lax capsule whereas dislocations of hip joints are hard because of the acetabulum.

Rotator cuff muscles stabilize the shoulder joint and protect it from Dislocation.

Dislocation mostly **inferiorly/Downward** =because **No** muscle support the inferior part. When it happens it affects the **axillary nerve** which supply the **deltoid muscle**.



Movements of the shoulder joint

Flexion: pectoralis major, deltoid (prime); coracobrachialis, biceps brachii (accessory)

Extension: deltoid (prime); teres major, latissimus dorsi, long head of biceps (accessory)

Abduction: deltoid (prime); supraspinatus (accessory)

Adduction: pectoralis major, latissimus dorsi (prime); teres major, long head of triceps brachii (accessory)

Medial rotation: subscapularis (prime); pectoralis major, deltoid, teres major (accessory)

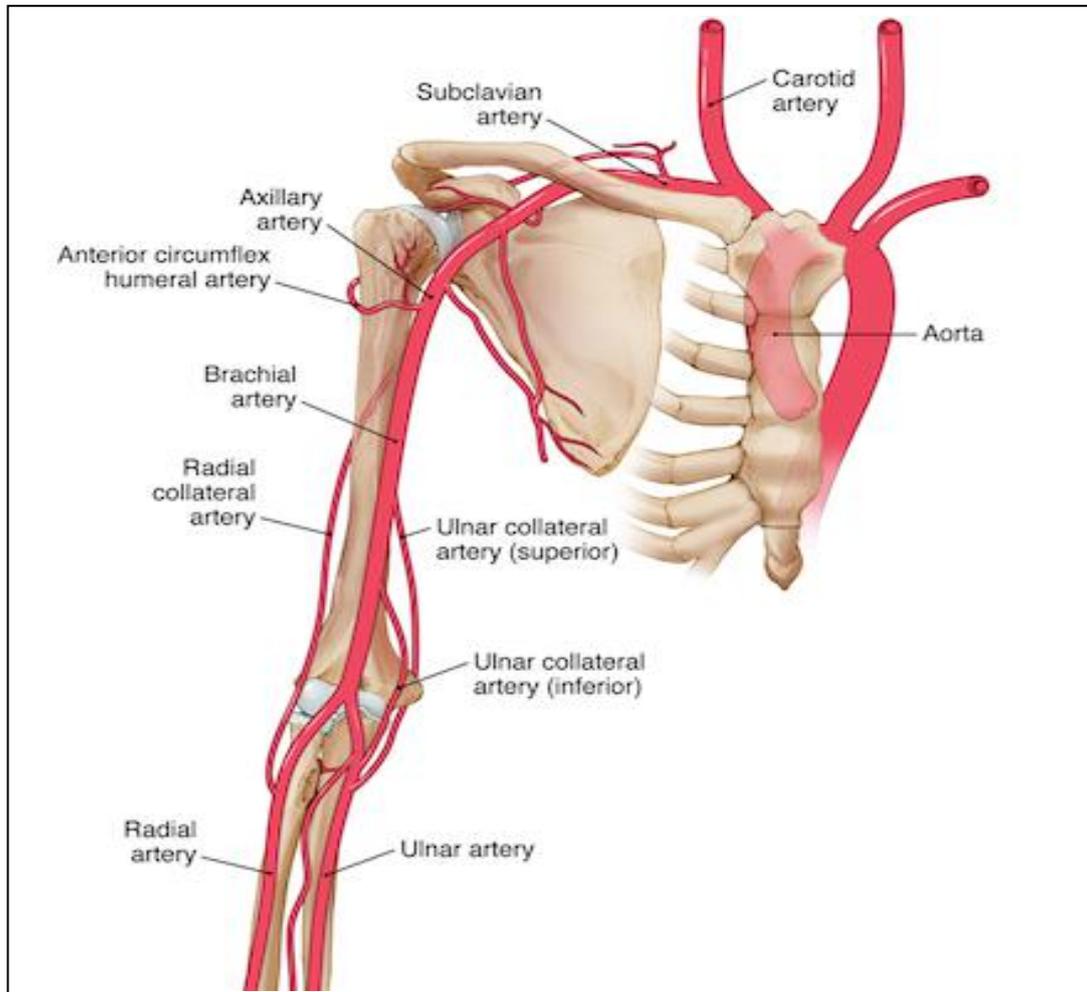
Lateral rotation: infraspinatus (prime); teres major, deltoid.

Circumduction: Combination of all movements

Blood supply

The shoulder joint is supplied with blood by:

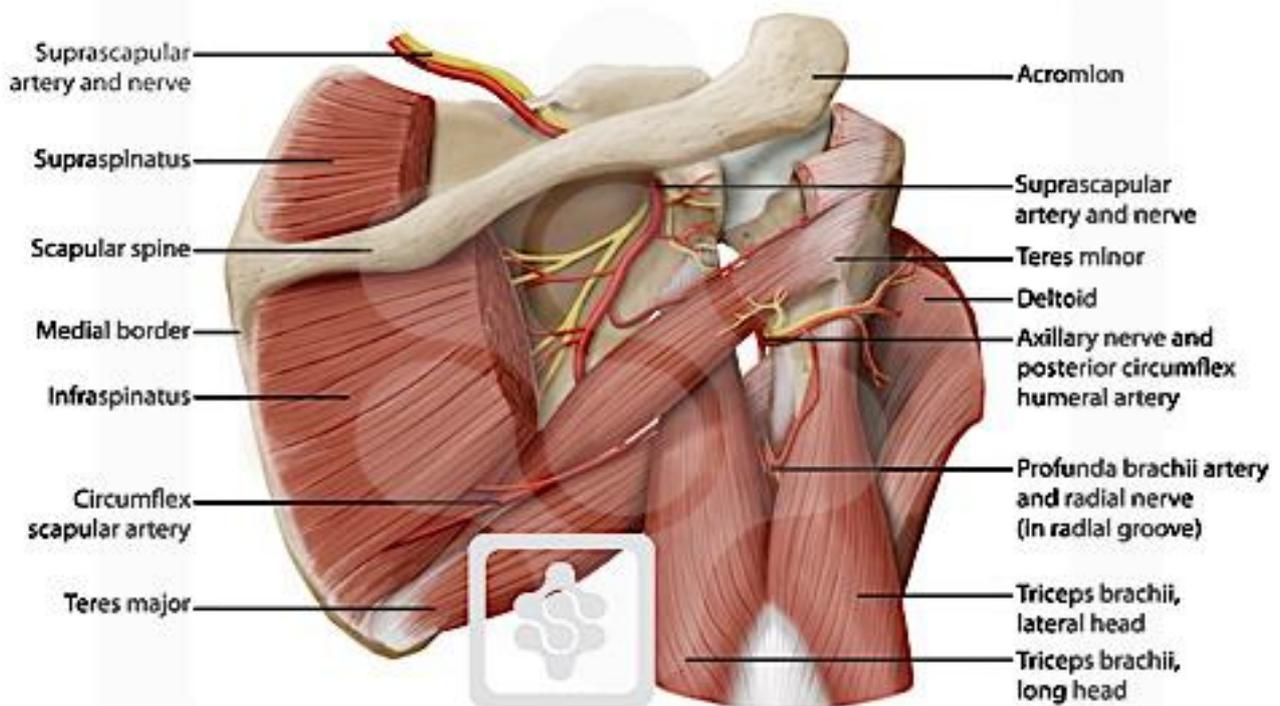
- ❖ Branches of the anterior and posterior circumflex humeral arteries(branch of the axillary A.)
- ❖ The suprascapular artery(a branch of the Thyrocervical artery-> “a branch of subclavian”)and the scapular circumflex artery.



Nerve supply:

Axillary Nerve and Supra Scapular (Upper trunk) Nerve.

Right shoulder, posterior view



Sternoclavicular joint

The Sternoclavicular Joint (SC joint) has features of ball and socket variety. It is formed from the **articulation of the medial aspect of the clavicle with the manubrium of the sternum and first costal cartilage**. **Costal of the 1st rib**

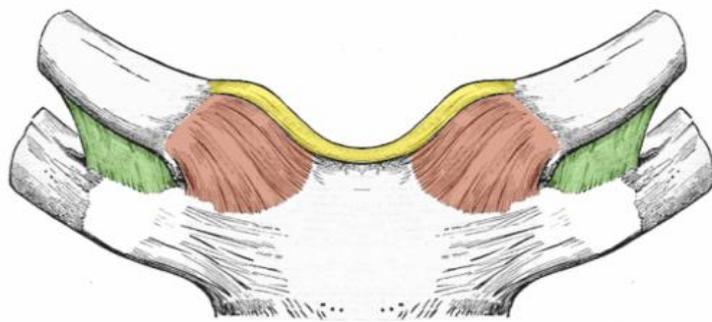
The SC joint is generally classified as a **plane style synovial joint, and has a fibrocartilage joint disk**. The ligamentous reinforcements of this joint are very strong, often resulting a fracture of the clavicle before a dislocation of the Joint.

Ligaments

- 1. Capsule: attached to the margins of the joint**
- 2: Anterior and posterior sternoclavicular ligaments, they are thickening in the capsule**
- 3: Accessory ligaments**
costoclavicular ligament, the interclavicular ligament and the intra-articular fibrocartilagenous disc

Note :

Sternoclavicular joint is b/w the manubrium of the sternum and the clavicle bone. It is structurally classed as a synovial saddle joint and functionally classed as a diarthrosis and multiaxial joint. **It is ball and socket joint**

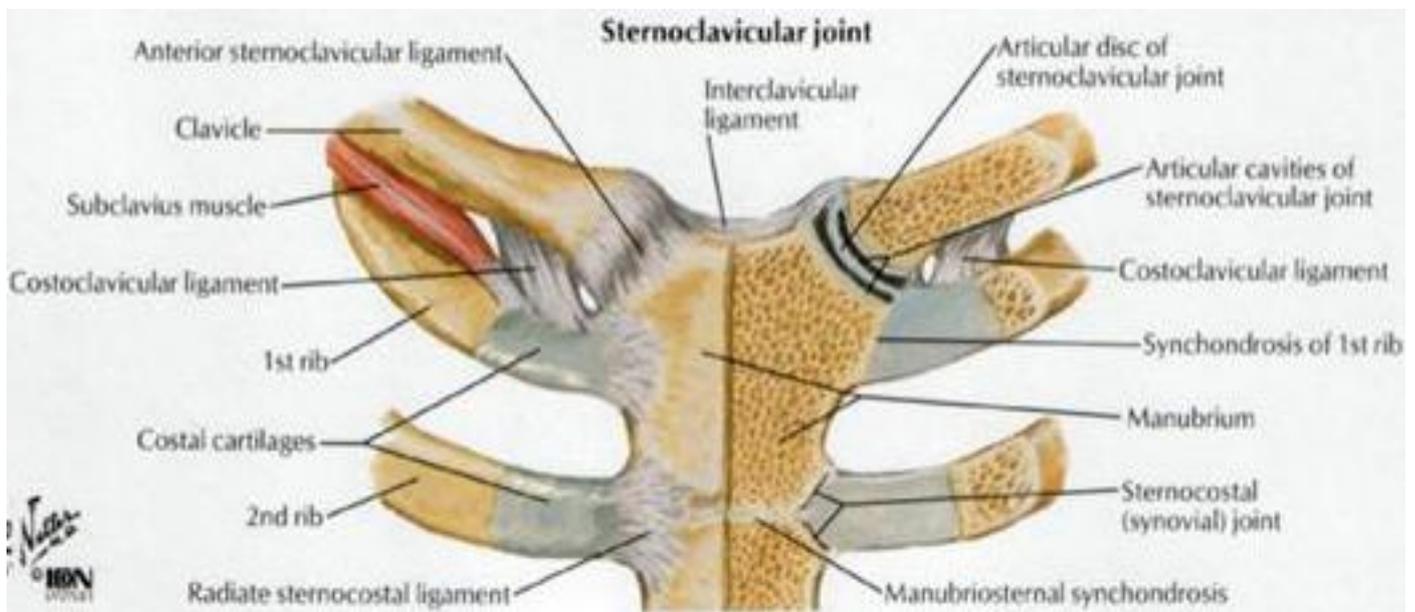


- Interclavicular lig.
- Anterior sternoclavicular lig.
- Costoclavicular lig.

Costoclavicular lig:

B/w costal cartilage of the 1st rib and clavicle

The fibrocartilaginous disc completely divides the joint cavity into medial and lateral compartments, each having its synovial membrane



Movements of the joint

The sternoclavicular joint allows movement of the clavicle in three planes, predominantly in the

anteroposterior movements

Vertical planes elevation and depression

Circumduction and axial rotation

Stability of the joint is maintained by the ligaments and the intra articular disc

Relation

Brachiocephalic vein is formed behind the joint

Acromioclavicular joint

The acromioclavicular joint is a synovial joint of a plane variety.

It consists of an articulation between the **lateral end of the clavicle** (a small oval facet) and **the medial side of the acromion** of the scapula. It is a subcutaneous joint.



Joint Capsule

The joint capsule consists of a loose **fibrous** layer which encloses the two articular surfaces. It also gives rise to **incomplete articular disc**

The joint capsule is lined internally by a **synovial membrane**. This secretes synovial fluid into the cavity of the joint.

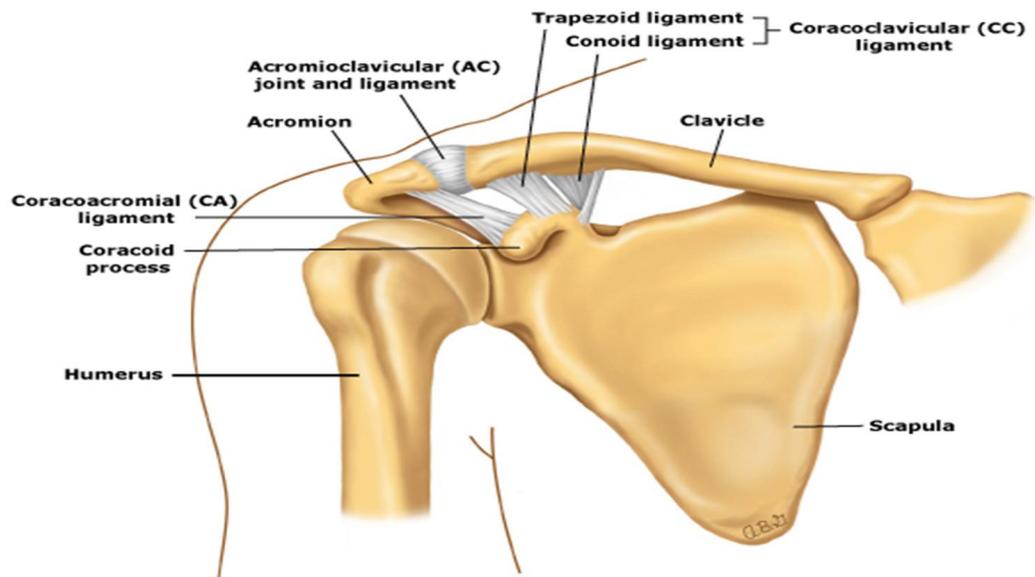
Accessory ligaments

1: Coracoclavicular ligament

Runs between the upper surface of the coracoid process of the scapula to the inferior surface of the lateral end of the clavicle. It is **a strong ligament** which transmit the weight of the upper limb to the clavicle

2. Acromioclavicular ligament

Quadrangular band Runs horizontally on the upper surface of the joint and uniting the acromion with the clavicle.



Movements

The acromioclavicular joint allows a degree of **axial rotation** and **anteroposterior** movement.

Stability of the joint

Is maintained mainly by the **coracoclavicular ligament**.