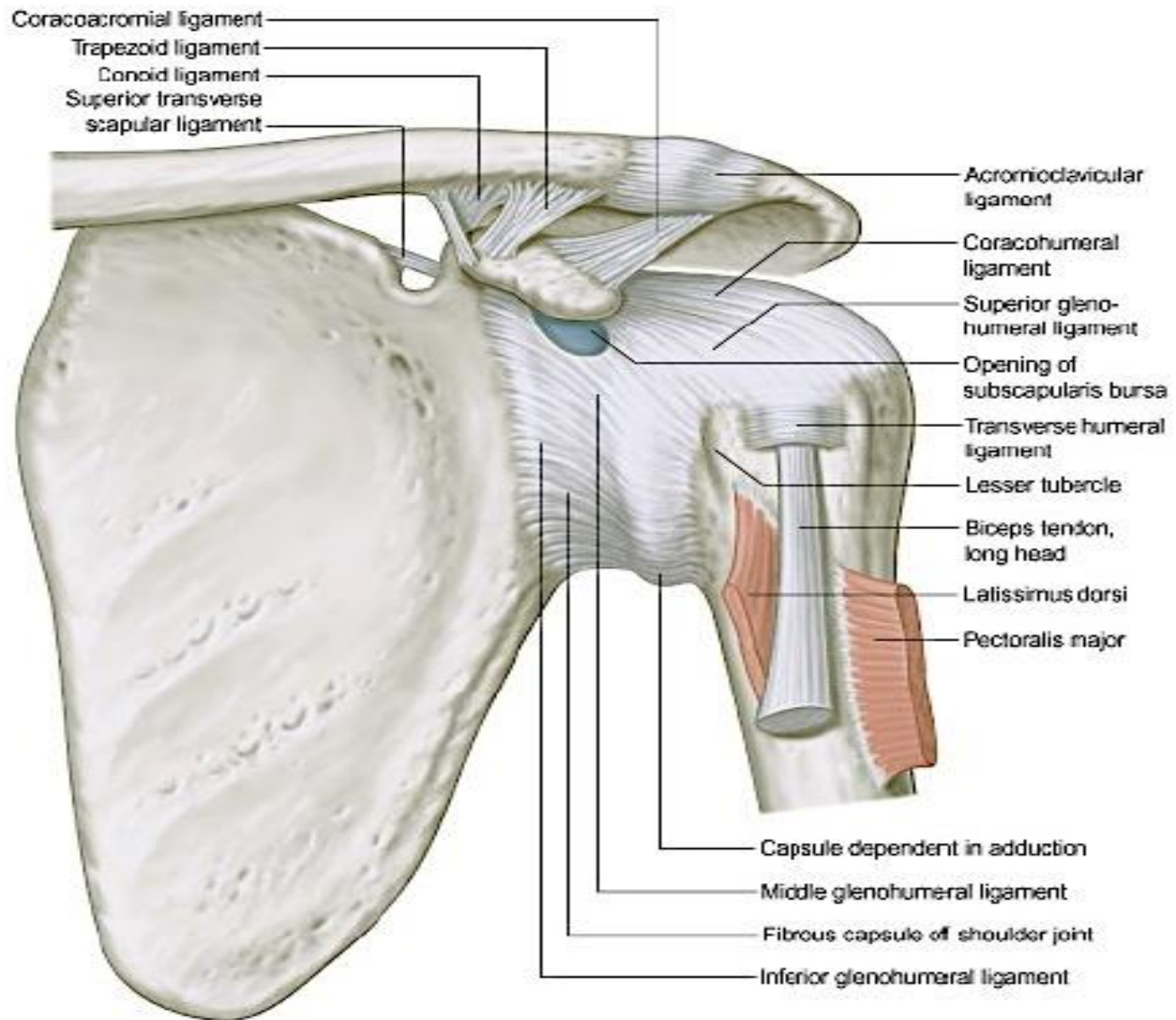


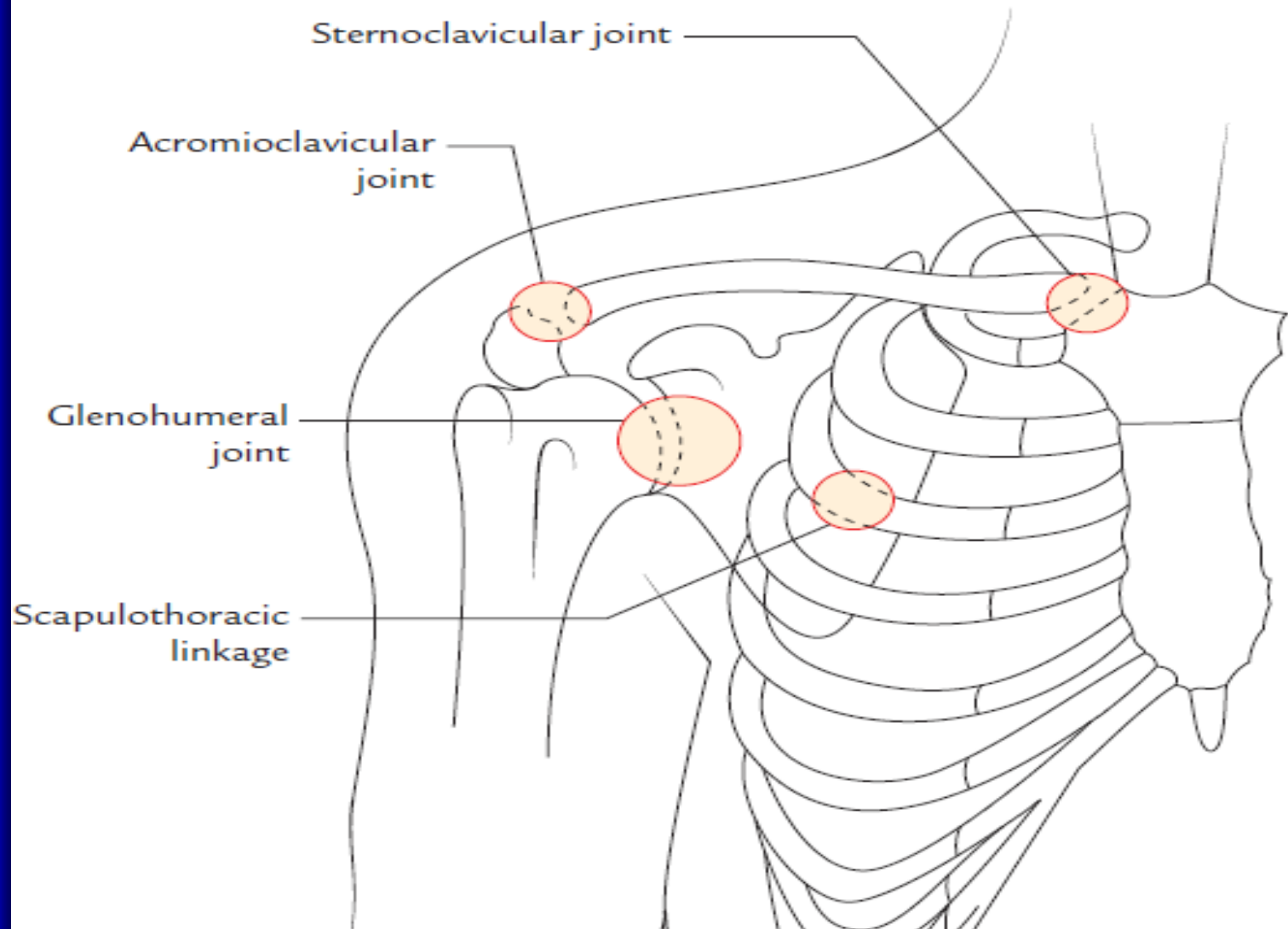
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Shoulder Joint Complex (Joints of Shoulder Girdle)



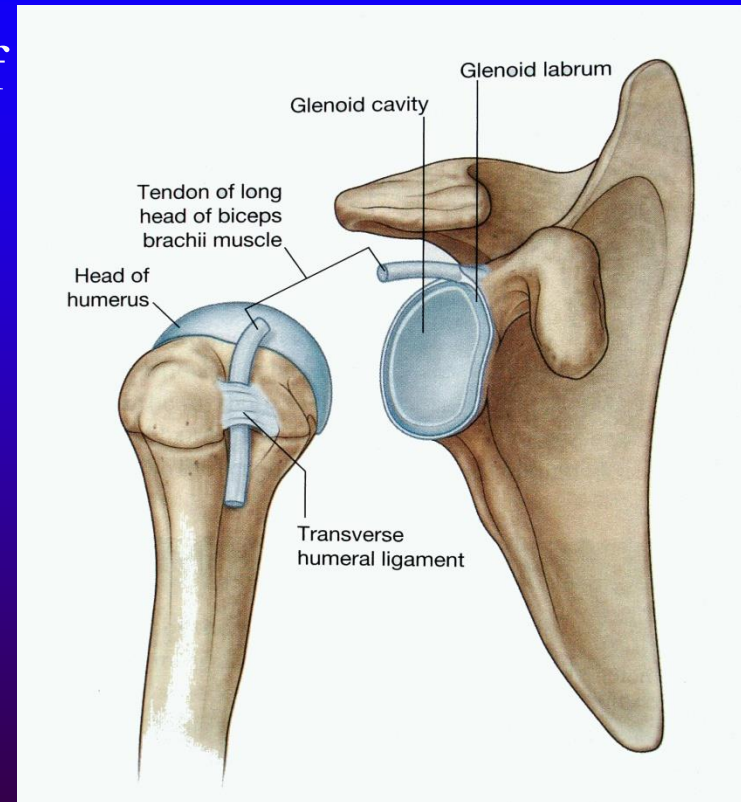
Shoulder Joint Complex (Joints of Shoulder Girdle)

- It consists of four basic articulations, they are:
 1. Glenohumeral joint.
 2. Acromioclavicular joint.
 3. Sternoclavicular joint.
 4. Scapulothoracic articulation/ scapulothoracic linkage (functional linkage between the scapula and thorax).
- The impairment of any one of these joints leads to functional defect of the whole complex.

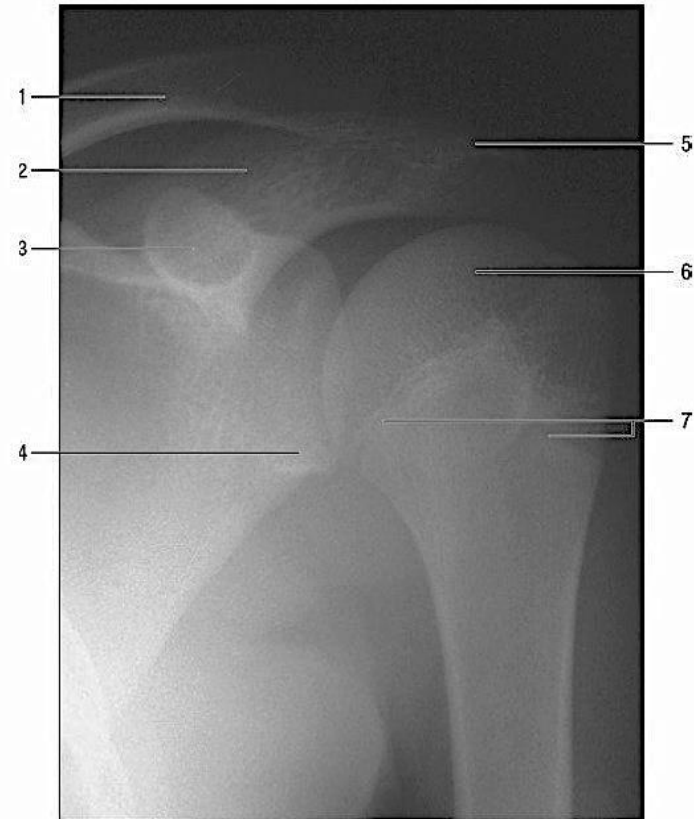
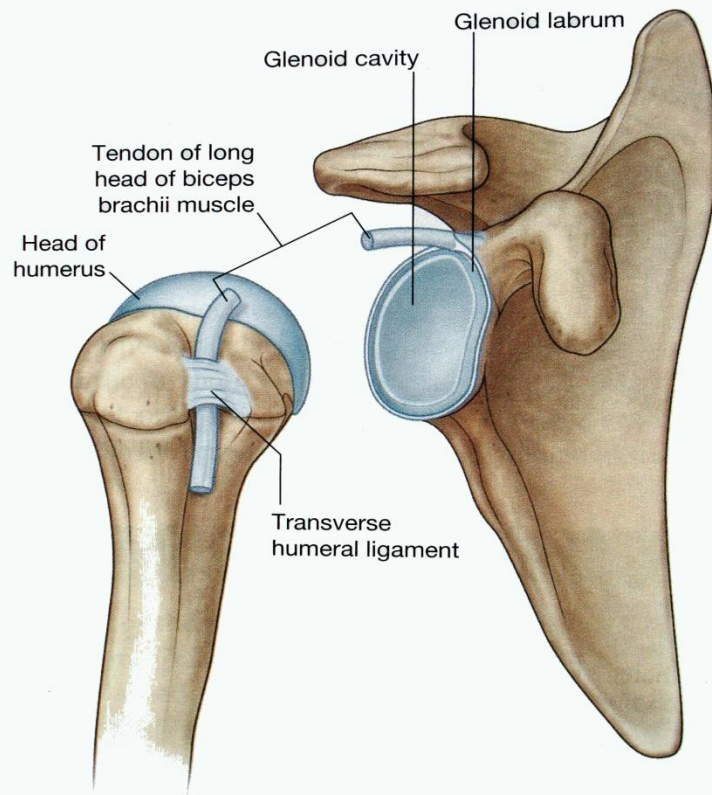


SHOULDER JOINT (GLENOHUMERAL JOINT)

- Joint between the head of humerus and glenoid cavity of the scapula.
- the most movable joint of the body and consequently one of the least stable.
- It is most common joint to dislocate and to undergo recurrent dislocations.
- It is a ball-and-socket type of synovial joint



SHOULDER JOINT



Articular surfaces

- The shoulder joint is formed by articulation of large round **head of humerus** with the relatively shallow **glenoid cavity of the scapula**.
- The glenoid cavity is deepened slightly but effectively by the fibrocartilaginous ring called **glenoid labrum**.

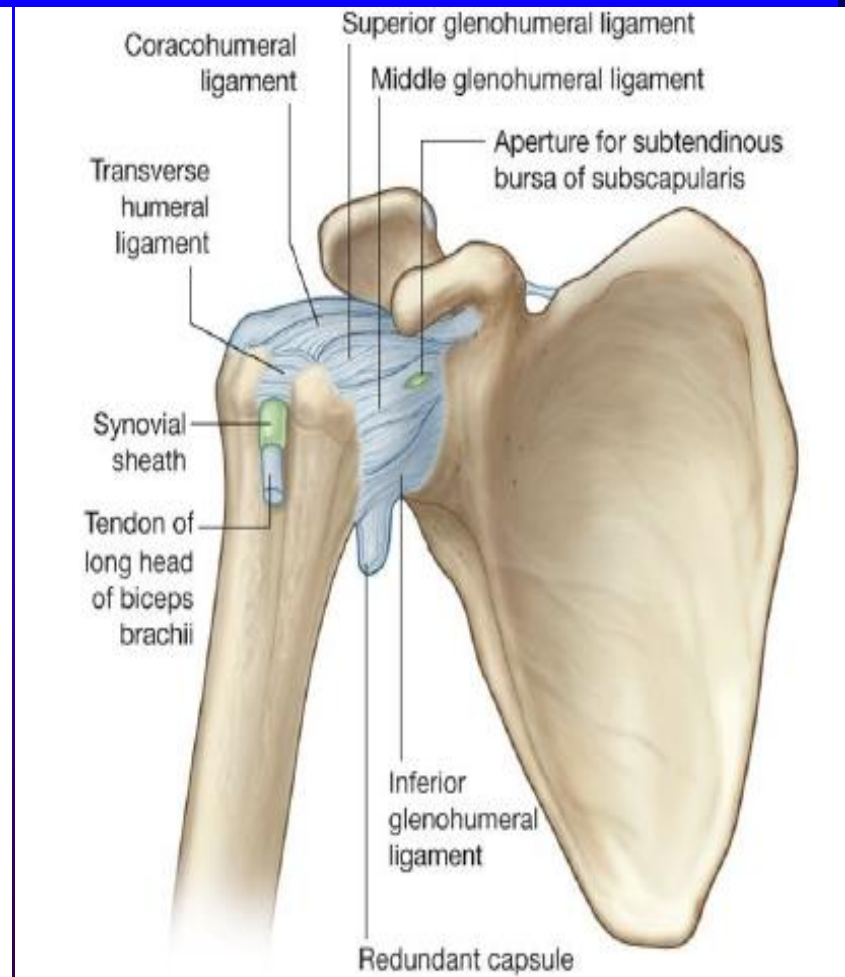
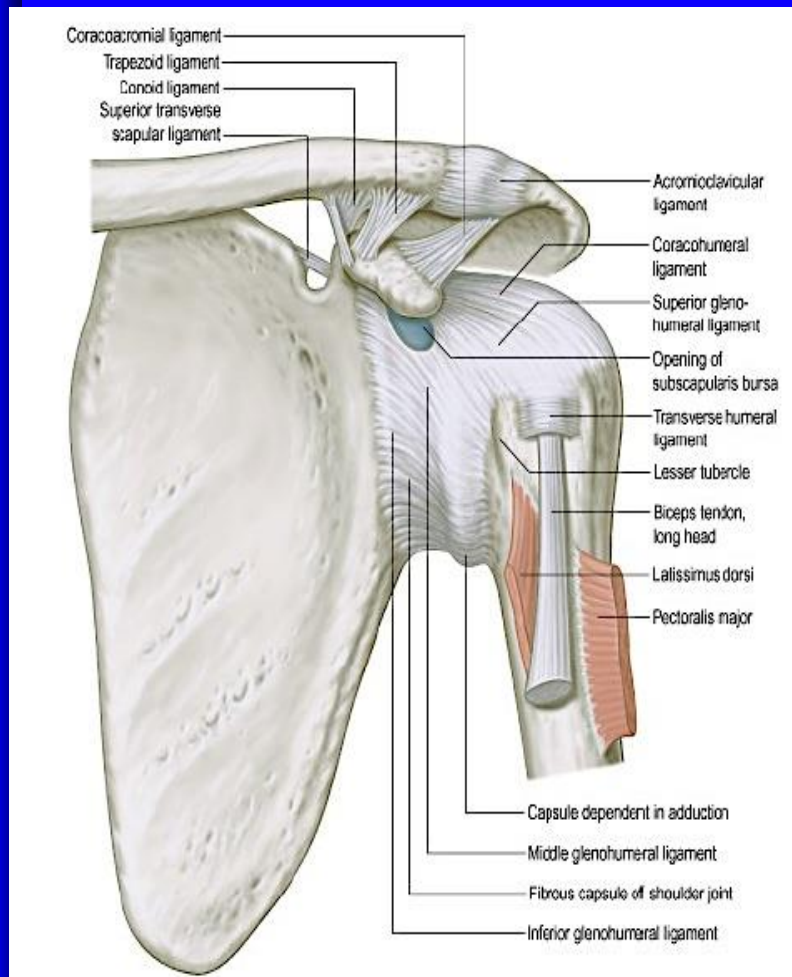
Ligaments

- The ligaments of the shoulder joint are following:
 1. **Capsular ligament (joint capsule).**
 2. **Glenohumeral ligaments.**
 3. **Coracohumeral ligament.**
 4. **Transverse humeral ligament.**

Accessory ligaments

1. **Coracoacromial ligament.**
2. **Coracoacromial arch**

Ligaments



Capsular ligament (joint capsule)

- The thin fibrous layer of the joint capsule surrounds the glenohumeral joint.
- attached medially to the margins of the glenoid cavity beyond the **glenoid labrum** and laterally to the anatomical neck of the humerus, except inferiorly where it extends downwards 1.5 cm or more on the surgical neck of the humerus.
- Medially the attachment extends beyond the supraglenoid tubercle thus enclosing the long head of biceps brachii within the joint cavity.

Glenohumeral ligaments:

- three thickenings in the anterior part of the fibrous capsule. These are called; *superior, middle, and inferior glenohumeral ligaments*.
- *Visible only from interior of the joint.*
- A defect exists between superior and middle glenohumeral ligaments.

Coracohumeral ligament

- Strong band of fibrous tissue.
- Passes from the base of the coracoid process to the anterior aspect of the greater tubercle of the humerus.

Transverse humeral ligament

- a broad fibrous band.
- Which bridges the bicipital groove between the greater and lesser tubercles.
- This ligament converts the groove into a canal that provides passage to the tendon of long head of biceps surrounded by a synovial sheath.

Coracoacromial ligament

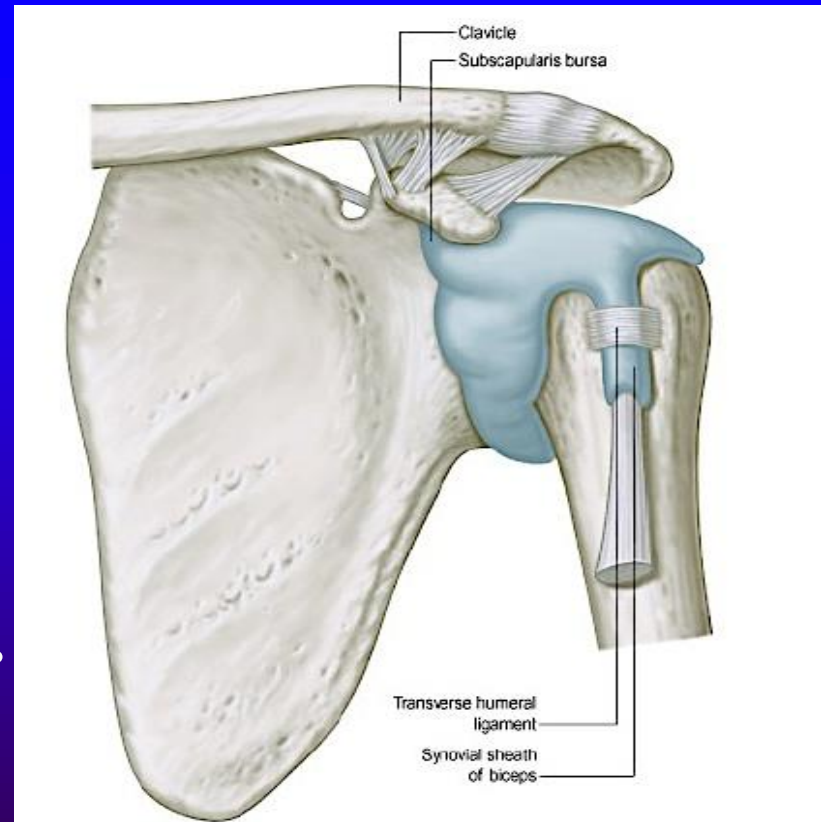
- Extends between coracoid and acromion processes.
- Protects the superior aspect of the joint.

Coracoacromial arch

- Formed by coracoid process, acromion process, and coracoacromial ligament between them.
- Osseoligamentous structure forms a protective arch for the head of humerus above and prevents its superior displacement above the glenoid cavity.
- **Supraspinatus muscle** passes under this arch and lies deep to the deltoid where its tendon blends with the joint capsule.
- Large **subacromial bursa** lies between the arch superiorly and tendon of supraspinatus and greater tubercle of humerus inferiorly.

Bursae related to the joint

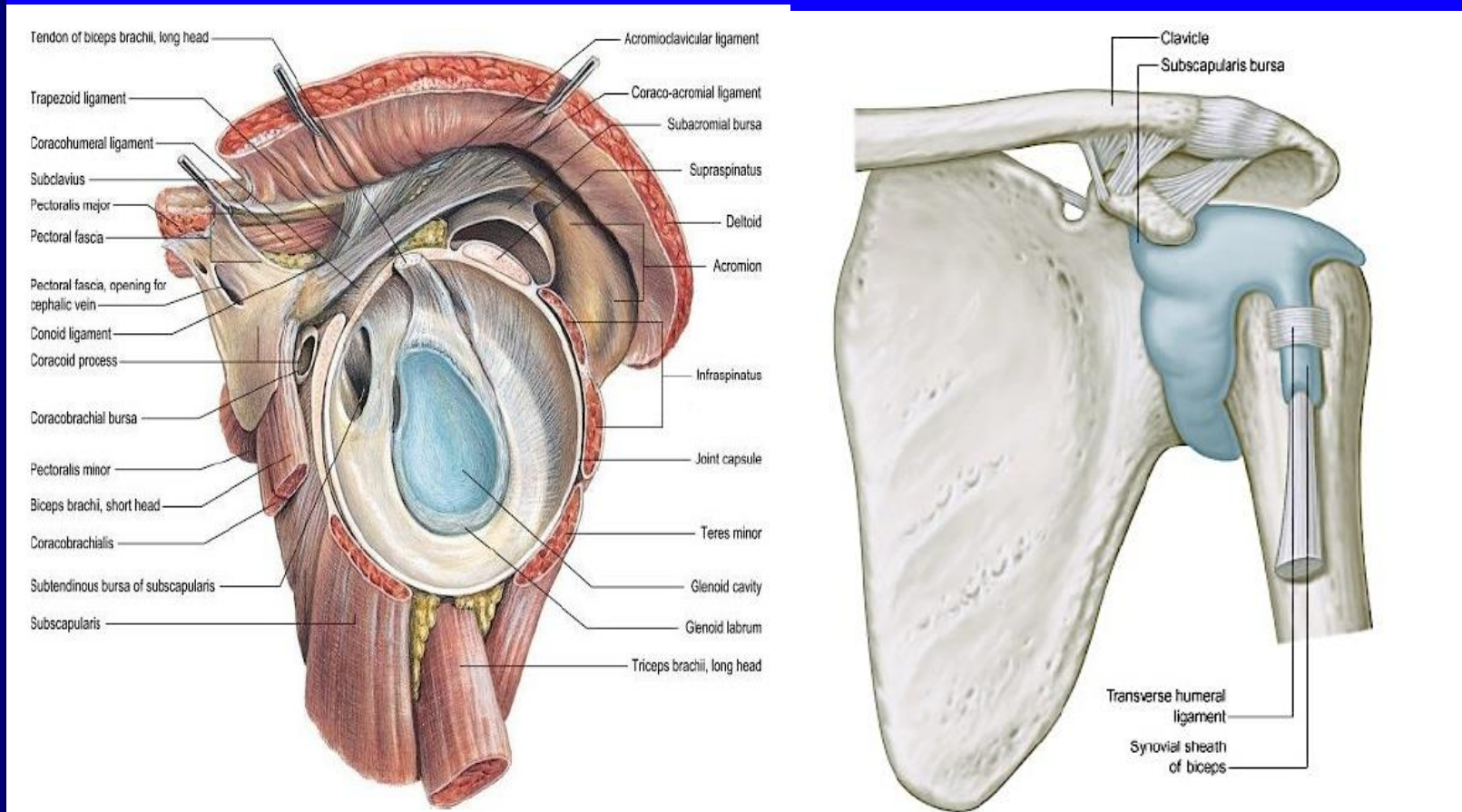
- Several bursae are related to the shoulder joint but important ones are following;
 1. **Subscapular bursa.**
 2. **Subacromial bursa.**
 3. **Infraspinatus bursa.**



Subscapular bursa

- Lies between the tendon of subscapularis and the neck of the scapula.
- Protects the tendon from friction against the neck.
- Usually communicates with the joint cavity.

Shoulder Joint



Subacromial bursa

- Largest synovial bursa in the body.
- Lies between;
 - Above: the coracoacromial ligament and acromion process.
 - Below: Supraspinatus tendon and joint capsule.
- Continues downwards beneath the deltoid, hence it is also referred to as *subdeltoid bursa*.
- Facilitates the movements of supraspinatus tendon under the coracoacromial arch.

Infraspinatus bursa

- Lies between the tendon of infraspinatus and posterolateral aspect of the joint capsule.
- May sometime communicate with the joint cavity.

Relations of the shoulder joint

Superiorly:

Coracoacromial arch.

Subacromial bursa.

Supraspinatus muscle, and

Deltoid muscle.

Inferiorly:

Long head of triceps.

Axillary nerve

Posterior circumflex humeral vessels.

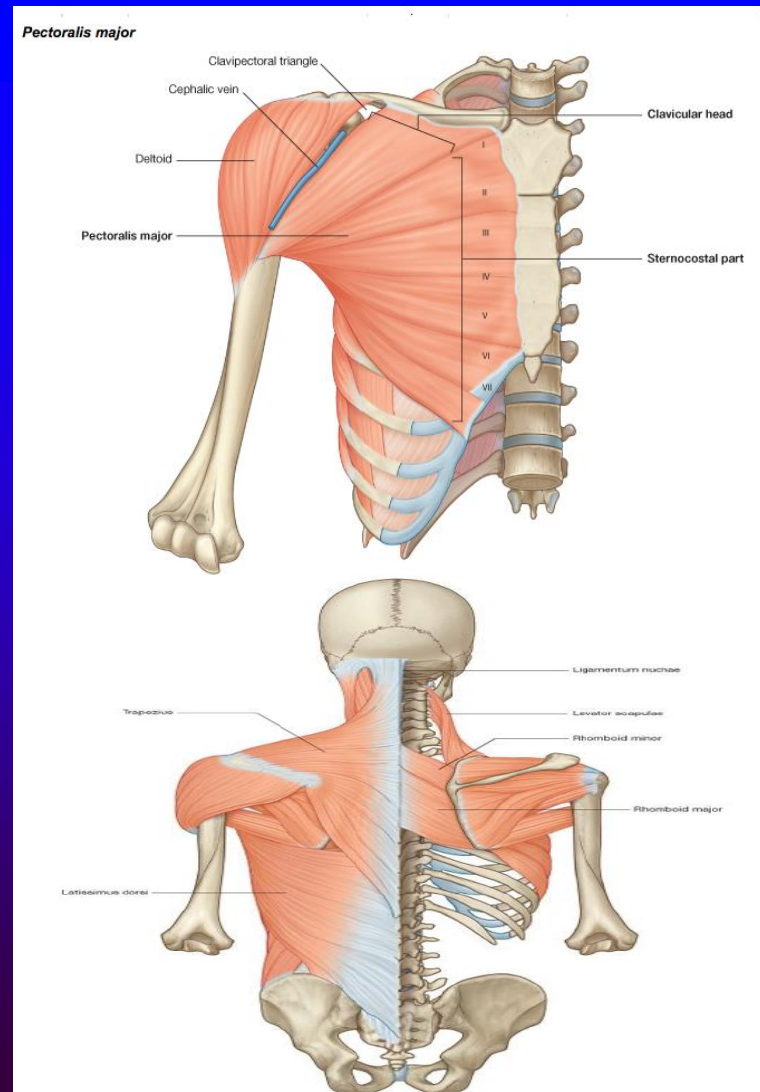
Relations of the shoulder joint

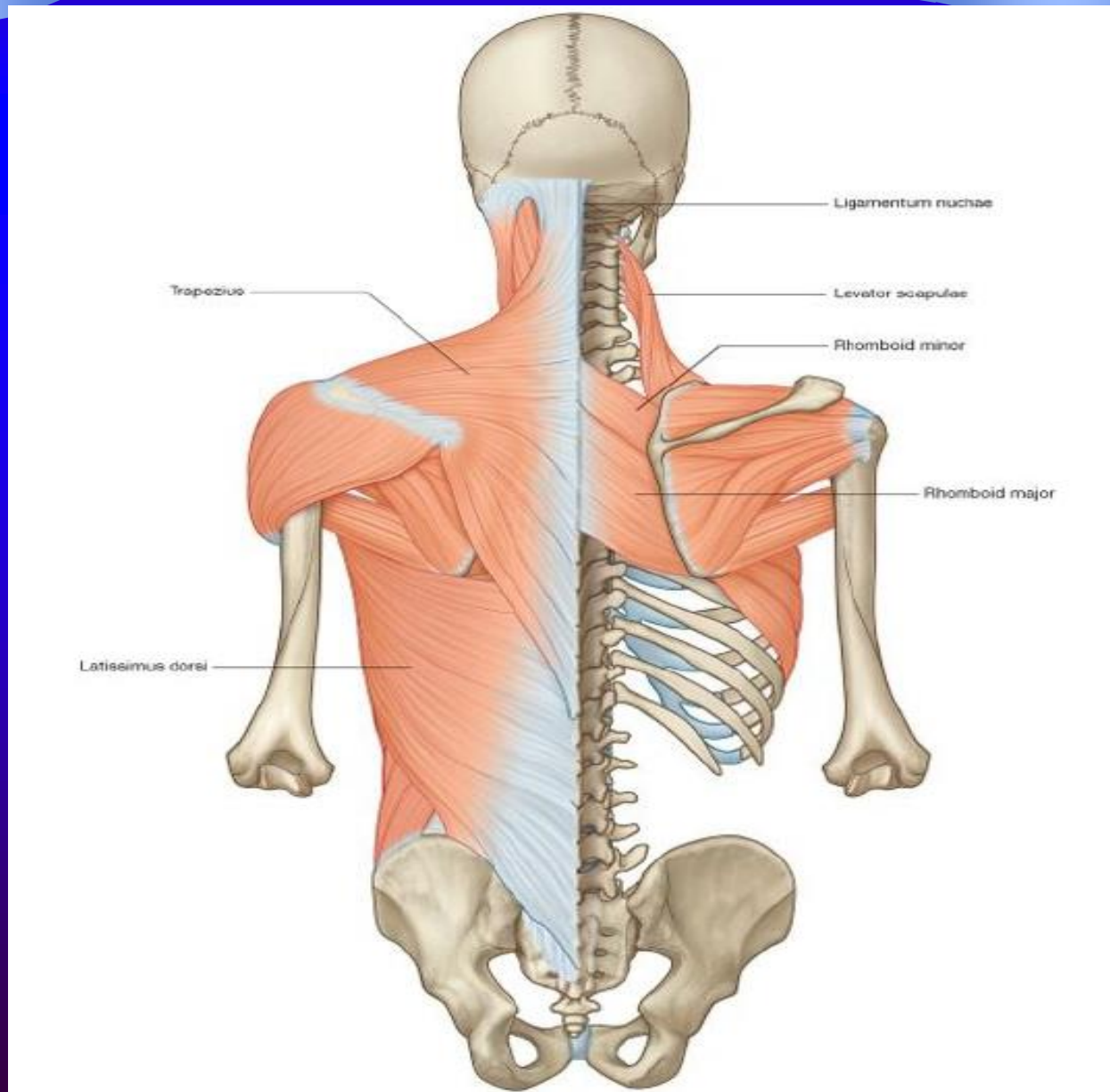
Anteriorly:

- Subscapularis.
- Subscapular bursa
- Coracobrachialis.
- Short head of biceps brachii, and
- Deltoid muscle.

Posteriorly:

- Infraspinatus.
- Teres minor.
- Deltoid muscle.





Arterial supply

1. Anterior and posterior circumflex humeral arteries.
2. Suprascapular artery.
3. Subscapular artery.

Nerve supply

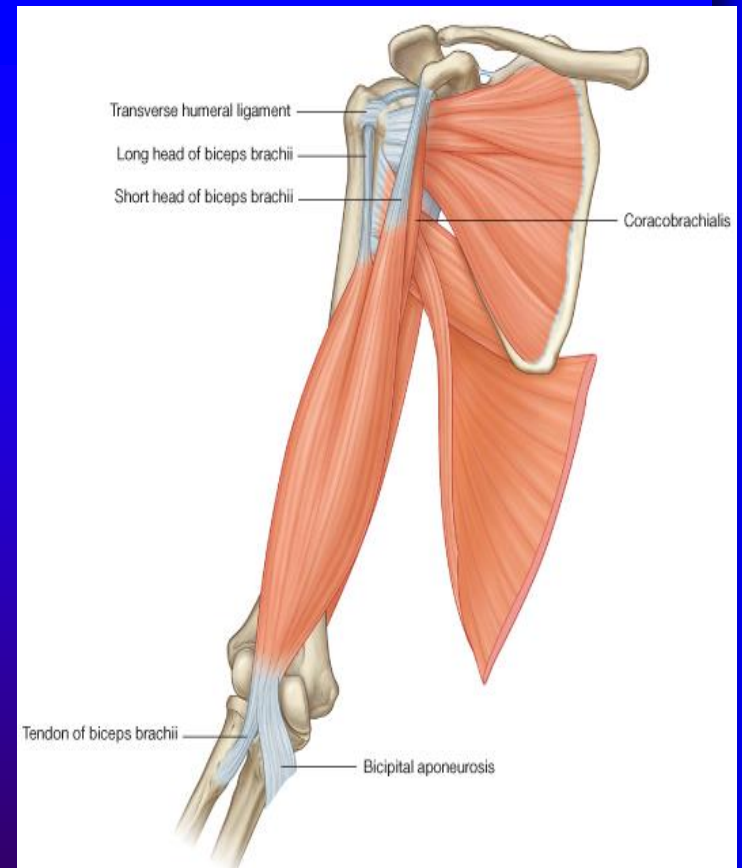
1. Axillary nerve.
2. Suprascapular nerve.
3. Musculocutaneous nerve.

Factors responsible for stability to the joint.

1. Rotator cuff (musculotendinous cuff).
2. Coracoacromial arch.
3. Long head of biceps tendon.
4. Glenoid labrum.

Rotator cuff/ musculotendinous cuff

- Formed by the blending together of the tendons of **subscapularis, supraspinatus, infraspinatus**, and **teres minor** around the joint capsule.
- The *tone of rotator cuff muscles grasp* the head of humerus and pull it medially to hold it against the smaller and shallow glenoid cavity.
- Also helps the head of humerus rotating against the glenoid fossa during joint motion.



Coracoacromial arch

- Forms, the **secondary socket of the glenohumeral joint** and protects the joint from the above and prevents the upward dislocation of the head of humerus.

Long head of biceps brachii

- Passes above the head of humerus intracapsular, hence prevents its upward displacement.

Glenoid labrum

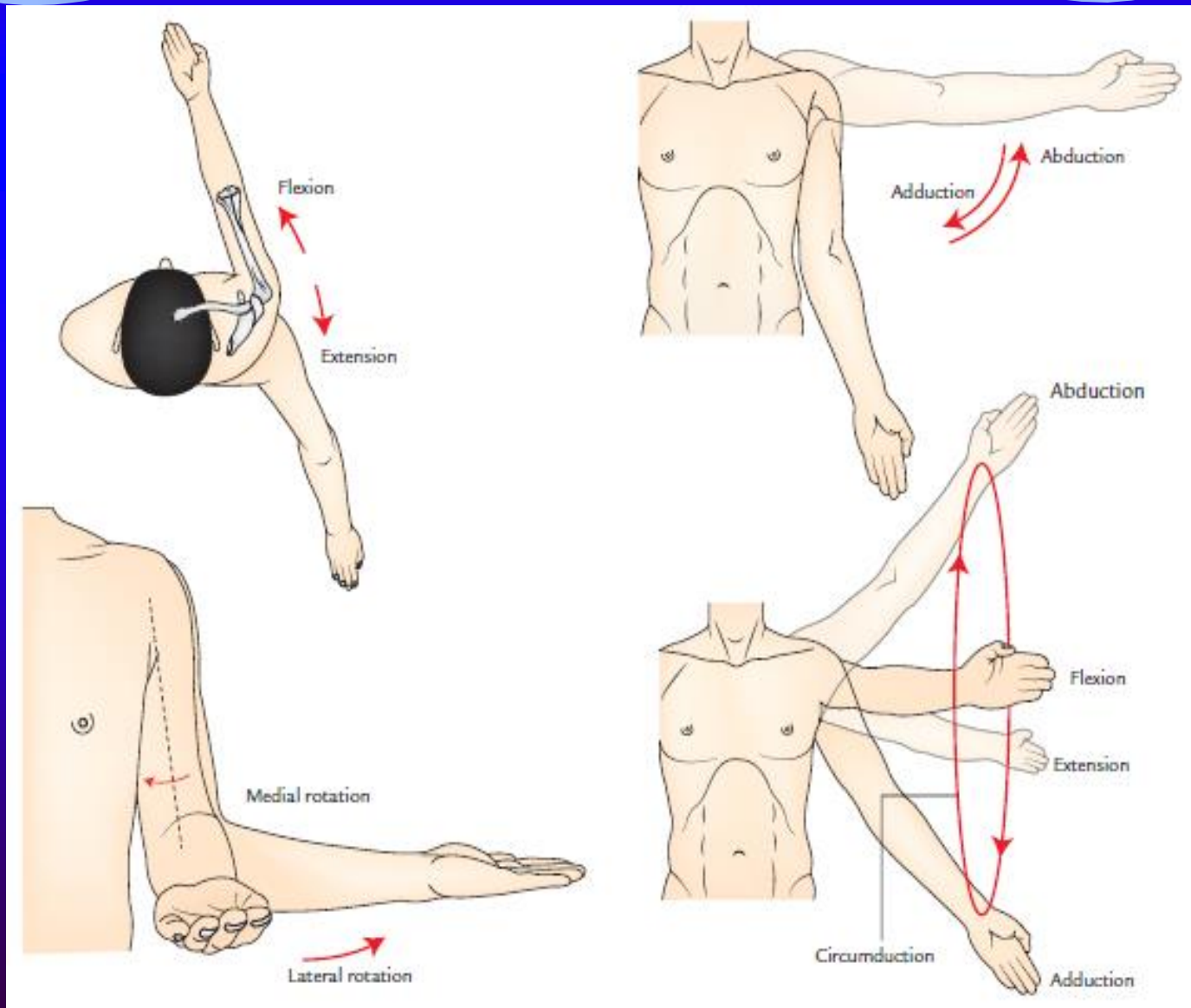
- Provides protection by deepening the shallow glenoid cavity.

Movements of the shoulder joint

- It has more freedom of mobility than any other joint in the body, due to the following factors:
 1. Laxity of joint capsule.
 2. Articulation between relatively large humeral head and smaller and shallow glenoid cavity.

Movements of the shoulder joint

1. Flexion and extension.
 2. Abduction and adduction.
 3. Medial and lateral rotation.
 4. Circumduction.
- The **flexion** and **extension**/hyperextension occur in sagittal plane around the frontal axis.
 - The **abduction** and **adduction** occur in frontal plane around the sagittal axis.
 - The **medial** and **lateral rotation** occur in transverse plane around the vertical axis.
 - The circumduction is really only a combination of all above movements.



Flexion and extension

- During flexion, the arm moves forwards and medially, and during extension it moves backwards and laterally.
- Movements take place parallel to the plane of glenoid cavity (i.e., midway between the coronal and sagittal plane).

Abduction and adduction

- During abduction, the arm moves anterolaterally away from the trunk and during adduction the arm moves posteromedially towards the trunk.
- The movements occur at right angle to the plane of flexion and extension (i.e., in the plane of the body of the scapula).

Medial and lateral rotation

- Best demonstrated in midflexed elbow.
- The hand moves medially in medial rotation and laterally in lateral rotation.
 - **Circumduction**
- an orderly sequence of flexion, abduction, extension and adduction or the reverse.
- During this movement the upper limb moves along a circle.

Mechanism of Abduction

- It is a complex movement.
- Range-180°.
- Abduction up to 90° occurs at the glenohumeral joint.
- Abduction from 90° to 120° can occur only if the humerus is rotated laterally.
- Abduction from 120° to 180° can occur if the scapula rotates forwards on the chest wall.

Movements at the shoulder joint and muscles producing them

Movements	Main muscles (prime movers)	Accessory muscles (synergists)
Flexion	<ul style="list-style-type: none"> • Pectoralis major (clavicular part) • Deltoid (anterior fibres) 	<ul style="list-style-type: none"> • Biceps brachii (short head) • Coracobrachialis • Sternocostal head of pectoralis major
Extension	<ul style="list-style-type: none"> • Deltoid (posterior fibres) • Latissimus dorsi 	<ul style="list-style-type: none"> • Teres major • Long head of triceps
Adduction	<ul style="list-style-type: none"> • Pectoralis major (sternocostal part) • Latissimus dorsi 	<ul style="list-style-type: none"> • Teres major • Coracobrachialis • Short head of biceps • Long head of triceps
Abduction	<ul style="list-style-type: none"> • Deltoid (lateral fibres) • Supraspinatus 	<ul style="list-style-type: none"> • Serratus anterior • Upper and lower fibres of trapezius
Medial rotation	<ul style="list-style-type: none"> • Subscapularis 	<ul style="list-style-type: none"> • Pectoralis major • Latissimus dorsi • Deltoid (anterior fibres) • Teres major
Lateral rotation	<ul style="list-style-type: none"> • Deltoid (posterior fibres) 	<ul style="list-style-type: none"> • Infraspinatus • Teres minor

Applied anatomy

❑ Dislocation of the shoulder joint:

- mostly occurs inferiorly because the joint is least supported on this aspect.
- injures the axillary nerve because of its close relation to the inferior part of the joint capsule.

❑ Frozen shoulder (adhesive capsulitis):

❑ Rotator cuff disorders:

References

- Gray's Anatomy for students-3rd edition.
- Moore Clinically Oriented Anatomy-8th edition