Joints of the upper limb I

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Shoulder joint

is structurally classified as a synovial ball and socket joint and functionally as a diarthrosis and multiaxial joint. It involves articulation between the glenoid cavity of the scapula and the head of the humerus. Due to the very loose joint capsule, it is the most mobile joint of the human body.

Components of the shoulder joint

The shoulder joint is a ball and socket joint, the socket of the glenoid cavity of the scapula is quite shallow and is made deeper by the addition of the glenoid labrum. The glenoid labrum is a fibrocartilaginous ring attached to the circumference of the cavity. This ring is continuous with the tendon of the biceps brachii above.

Capsule

The shoulder joint has a very loose joint capsule known as the articular capsule of the humerus and this can sometimes allow the shoulder to dislocate.
The long head of the biceps brachii muscle travels inside the capsule from its attachment to the supraglenoid tubercle of the scapula. Because the tendon of the long head of the biceps brachii is inside the capsule, it requires a tendon sheath to minimize friction.

**Ligaments**

1. Superior, middle and inferior glenohumeral ligaments (capsular ligaments)
2. Coracohumeral ligament
3. Transverse humeral ligament
4. Coraco-acromial ligament
Bursae around the shoulder joint
A number of small fluid-filled sacs known as **synovial bursae** are located around the capsule to aid mobility:

1- Between the joint capsule and the deltoid muscle is the **subdeltoid bursa**.
2- Between the capsule and the acromion is the **subacromial bursa**.
3- Between the capsule and the coracoid process is the **subcoracoid bursa**.
4- Between the subscapularis muscle and the tendon of the coracobrachialis muscle is the **coracobrachial bursa**.
5- Between the capsule and the tendon of the subscapularis muscle is the **subscapular bursa**.
6- **Supra-acromial bursa** does not normally communicate with the shoulder joint.
Bursae in the Shoulder

1. subdeltoid bursa
2. subacromial bursa
3. subcoracoid bursa
4. Coracobrachialis bursa
5. subscapularis
6. Supra acromial bursa

Coracobrachialis muscle

humerus

acromion process

Coracobrachialis muscle
Muscles
The shoulder joint is a muscle-dependent joint as it lacks strong ligaments. The primary stabilizers of the shoulder include the biceps brachii and tendons of the rotator cuff; which are fused to all sides of the capsule except the inferior margin.

The tendon of the long head of the biceps brachii passes through the bicipital groove on the humerus and inserts on the superior margin of the glenoid cavity to press the head of the humerus against the glenoid cavity.

The tendons of the rotator cuff and their respective muscles (supraspinatus, infraspinatus, subscapularis and teres minor) (sister minor) stabilize and fix the joint.
The supraspinatus, infraspinatus and teres minor muscles aid in external rotation of the shoulder.
The subscapularis aids in internal rotation of the humerus
Circumflex Scapular artery

Dorsal surface of shoulder
Quadrangular space
above/superior: the teres minor (inferior margin).
below/inferior: the teres major (superior margin)
medially: the long head of the triceps brachii (lateral margin)
laterally: the surgical neck of the humerus
anteriorly: the subscapularis

Triangular space
Inferior: the superior border of the teres major;
Lateral: the long head of the triceps;
Superior: Teres minor or Subscapularis
Innervation
The nerves supplying the shoulder joint all arise in the brachial plexus. They are the suprascapular nerve, the axillary nerve and the lateral pectoral nerve.

Blood supply
The shoulder joint is supplied with blood by branches of the anterior and posterior circumflex humeral arteries, the suprascapular artery and the scapular circumflex artery.

Function
The shoulder joint is the most mobile joint in the body. It can move up till 120 degrees of unassisted flexion; the movement of the scapula across the rib cage helps to achieve a further range of movement. Flexion is carried out by the anterior fibres of the deltoid, pectoralis major and the coracobrachialis.
**Extension**: is carried out by the *latissimus dorsi* and *posterior fibres of the deltoid*

**Abduction**: the **first 15 degrees** is carried out by the *supraspinatus muscle*, then the *deltoid muscle* takes over to take the abduction to the **90 degrees**. **From 90-180** degrees it is the *trapezius* and the *serratus anterior*.

**Adduction**: is carried out by the *pectoralis major, latissimus dorsi, teres major* and the *subscapularis*

**Medial rotation**: is carried out by the *anterior fibres of the deltoid, teres major, subscapularis, pectoralis major* and the *latissimus dorsi*.

**Lateral rotation** is carried out by the *posterior fibres of the deltoid, infraspinatus and the teres minor*.

**Circumduction of the shoulder** (a combination of flexion/extension and abduction/adduction).
Sternoclavicular joint

is the joint between 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. It is composed of two portions separated by an **articular disc of fibrocartilage**. The bone are **the medial end of the clavicle** and a shallow concavity formed by the **manubrium sterni and the first costal cartilage**. The articular surface of the clavicle is much larger than that of the sternum, and is invested with a layer of cartilage, which is considerably thicker than that on the sternum. A fibrocartilaginous disc present at the joint increases the range of movement.
Ligaments

1- Capsule: attached to the articular margins of the joint

2- Capsular thickening: includes Anterior sternoclavicular ligament and Posterior sternoclavicular ligament

3- Accessory ligaments: includes
   a. Costoclavicular ligament
   b. Interclavicular ligament

Interacapsular structure:
A fibrocartilaginous disc dividing the joint into medial and lateral compartments each having its own synovial membrane

Stability of the joint is kept by these ligaments and the articular disc
Function of the sternoclavicular joint
The sternoclavicular joint allows movement of the clavicle in three planes, predominantly in the anteroposterior (forward and backward) and vertical (elevation and depression) and some rotation. Muscles don't directly act on this joint, although almost all actions of the shoulder girdle or the scapula will cause some motion at this articulation.

Articular disk found at the junction of the clavicular head and manubrium allows for movement between the clavicle and the disk during elevation and depression of the scapula. During protraction and retraction of the scapula, the motion takes place between the manubrium and the disk.
Acromioclavicular joint

It is the junction between the medial side of the acromion and a small oval facet on the lateral aspect of the clavicle. It is a plane synovial joint.

**Ligaments**

1. **Capsule** attached to the articular margins
2. **Accessory ligaments**
   a. Acromioclavicular ligament (superior and inferior)
   b. Coracoclavicular ligament
   c. Coracoacromial ligament

Intra articular disc is sometimes found but is rarely complete.

Stability of the joint is mainly by the Coracoclavicular ligament.
Function

Slight gliding and rotation are possible and these are always associated with scapular movements about the clavicle
Thank You