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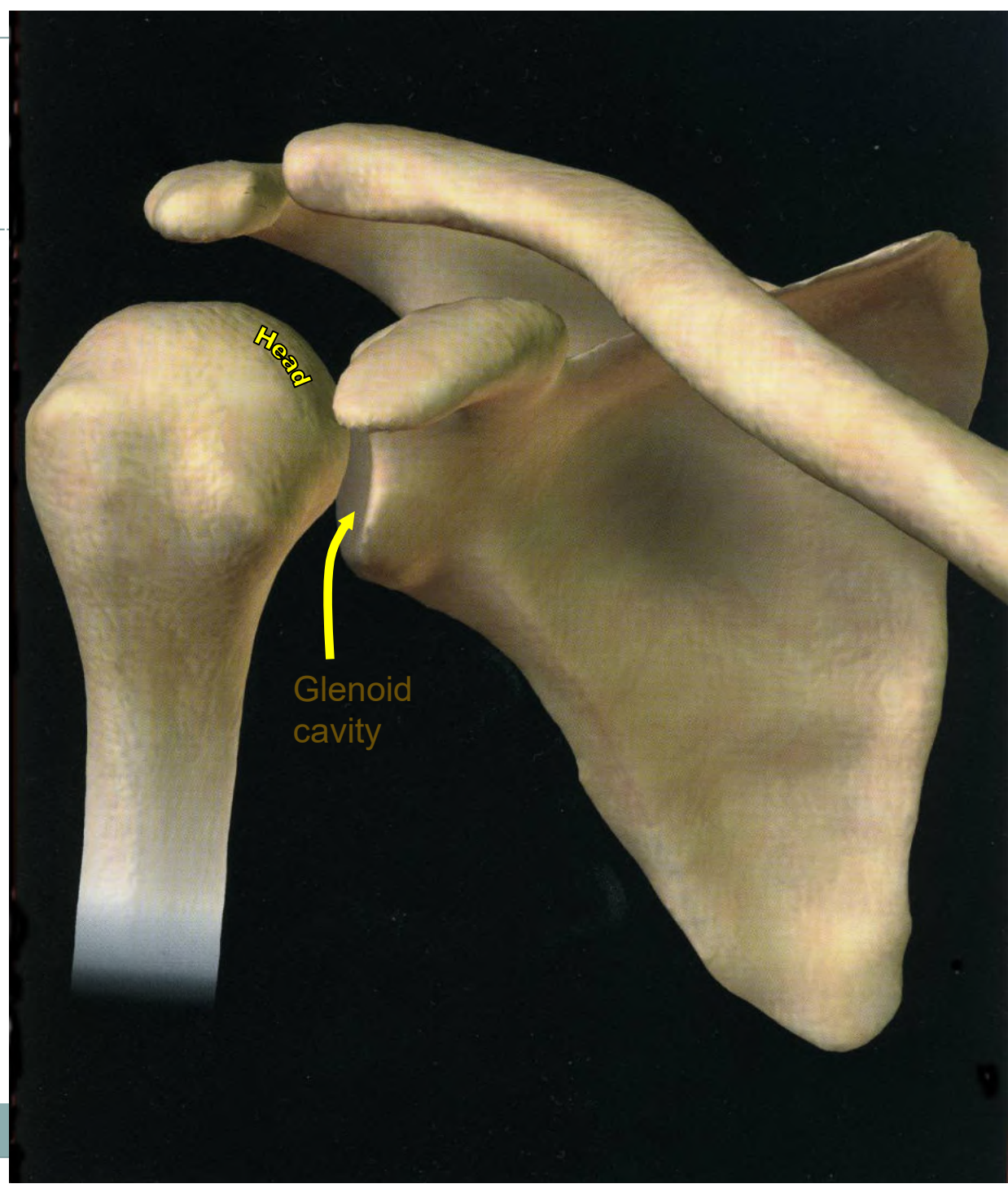
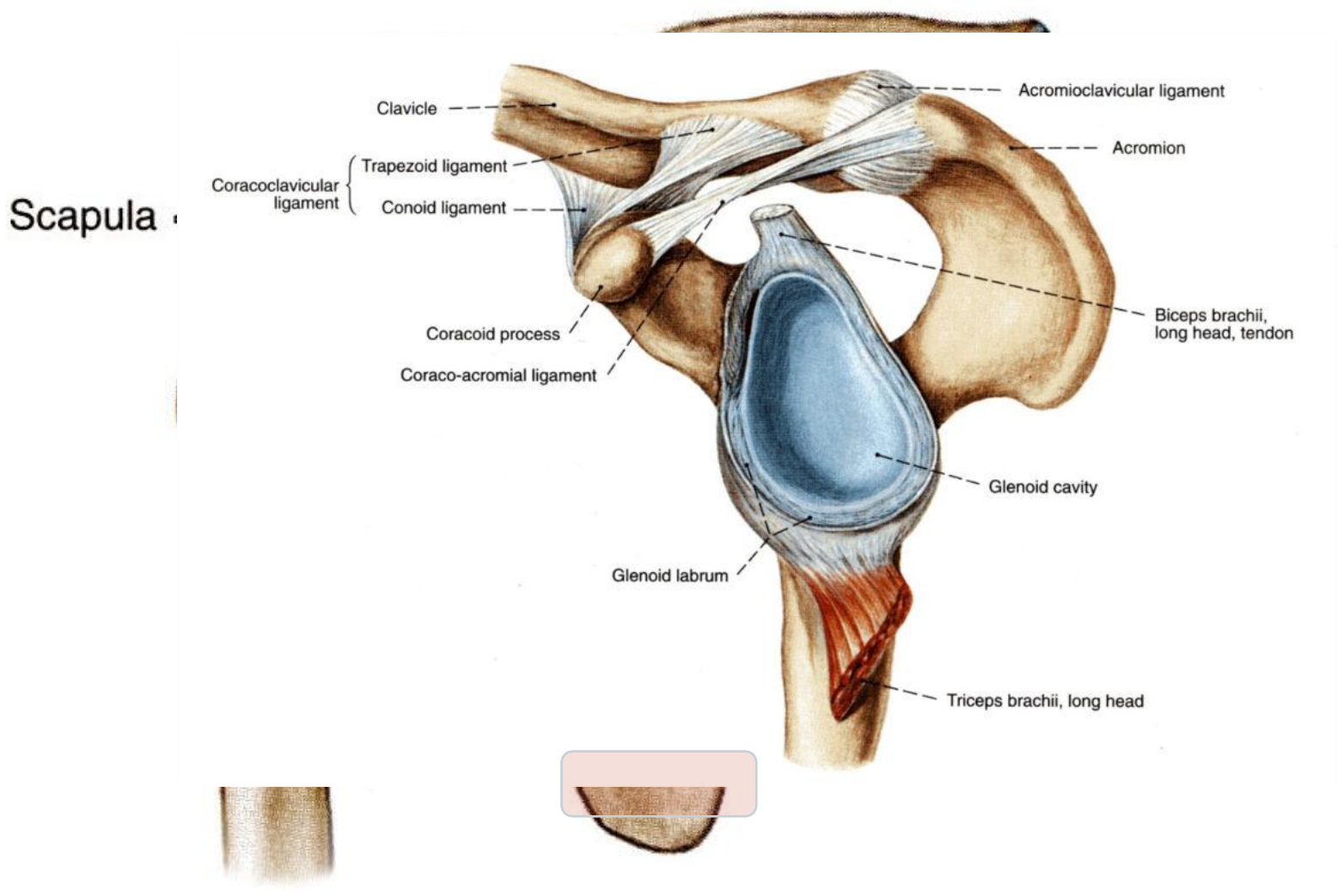


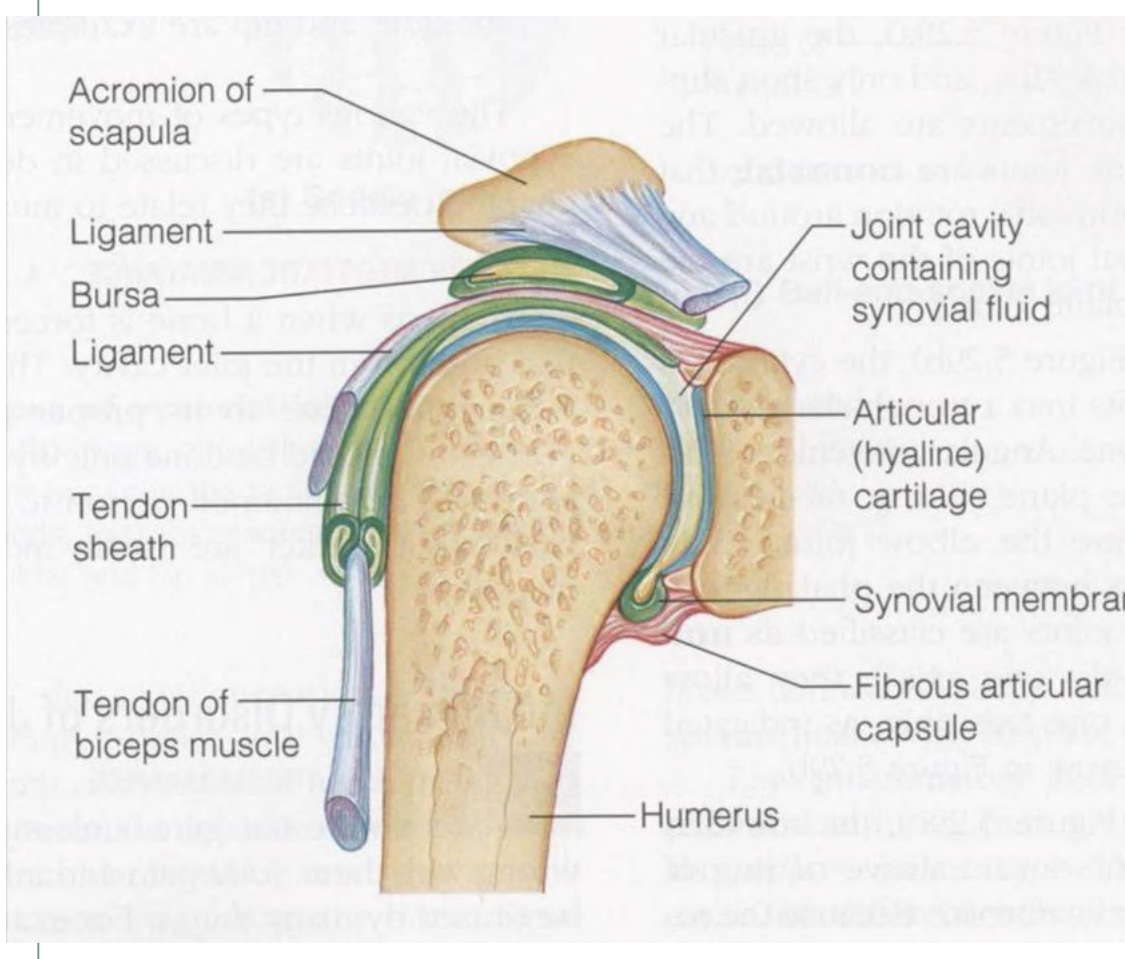
Articulation is between:

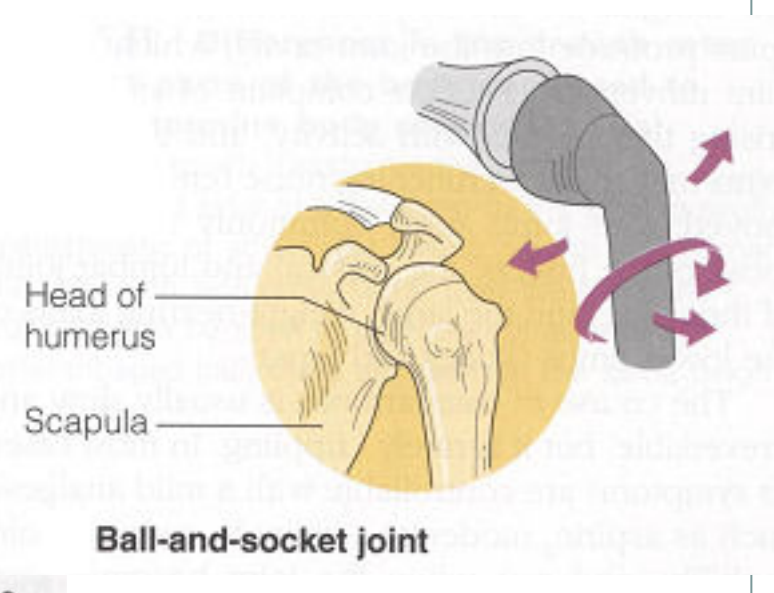
- The rounded **head of the humerus** and
- The shallow, pear-shaped **glenoid cavity** of the scapula.



- The articular surfaces are covered by ***hyaline cartilage.***
- The glenoid cavity is deepened by the presence of a ***fibrocartilaginous rim*** called the **glenoid labrum**.

TYPE





- Synovial
- Ball-and-socket joint

FIBROUS CAPSULE

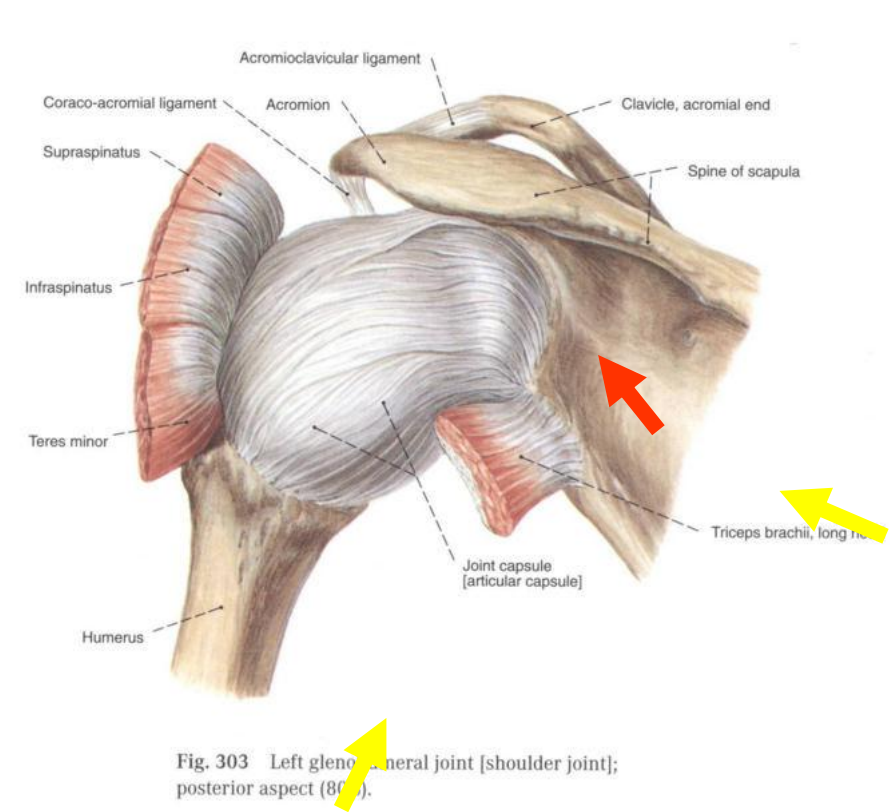
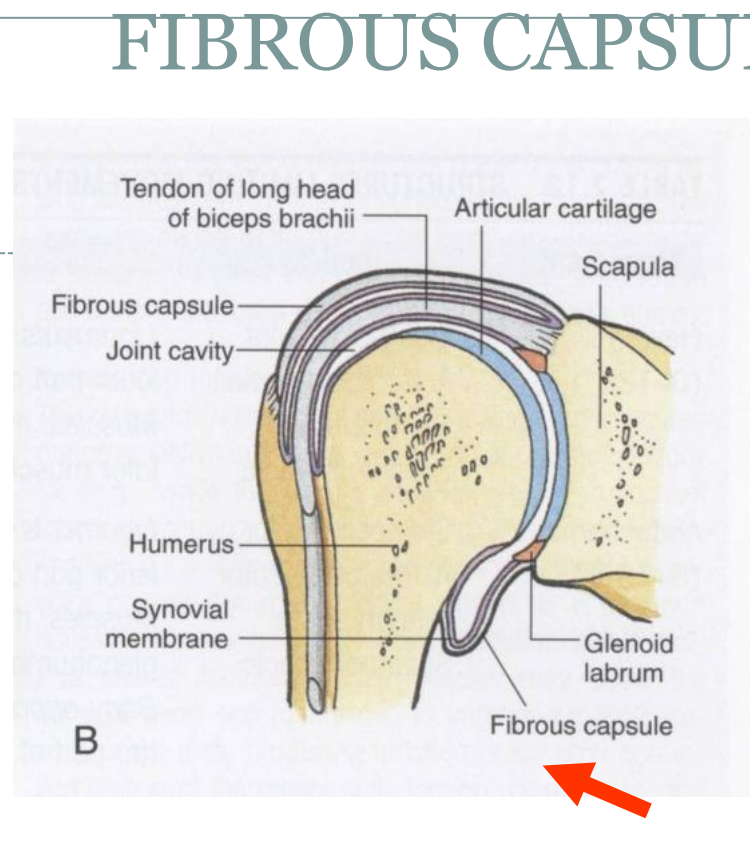


Fig. 303 Left glenohumeral joint [shoulder joint]; posterior aspect (60°).



- The fibrous capsule surrounds the joint and is attached:
  Medially to the margin of the glenoid cavity outside the labrum;
  Laterally to the anatomic neck of the humerus.
- The capsule is **thin and lax**, allowing a wide range of movement.

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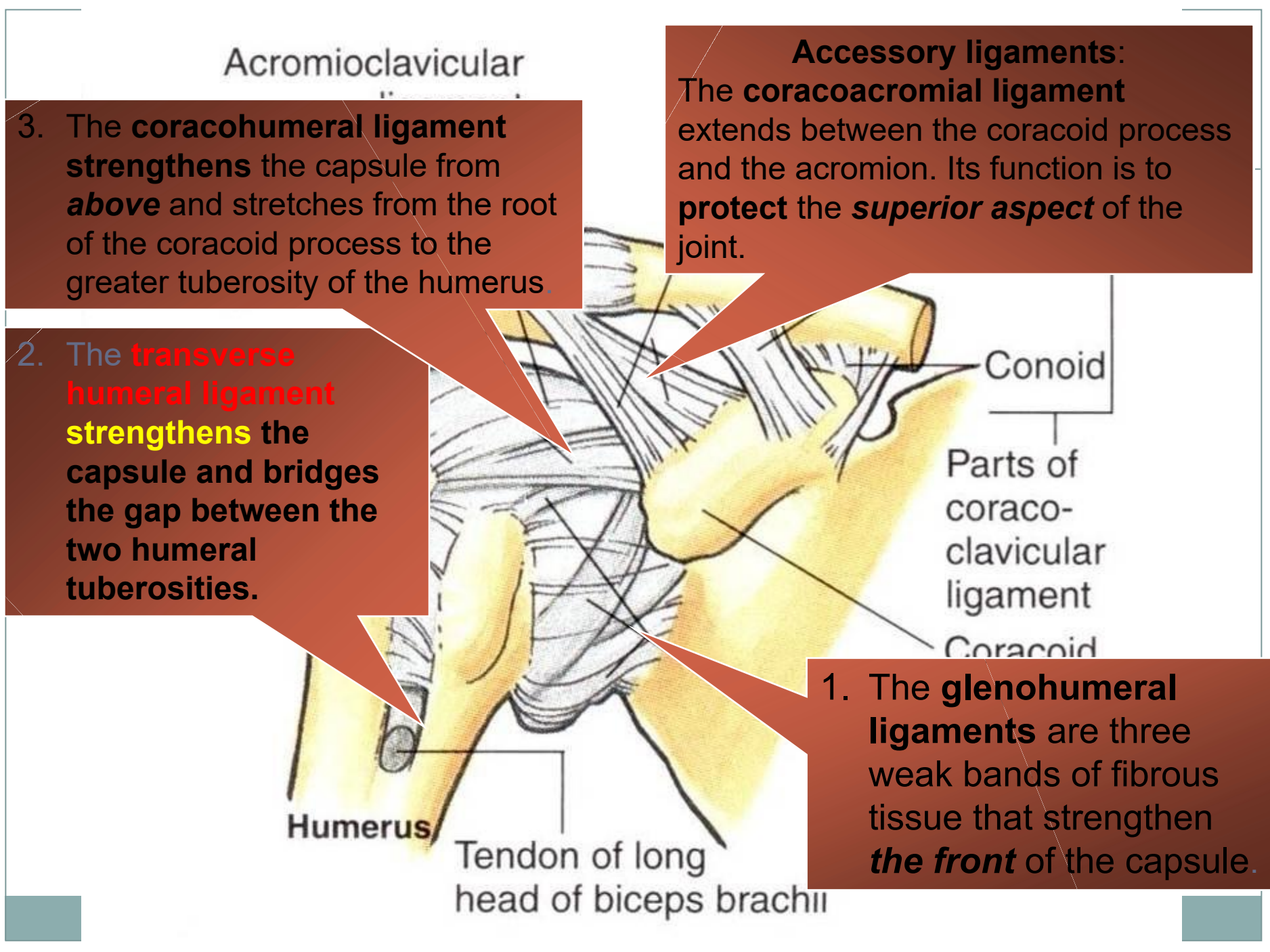


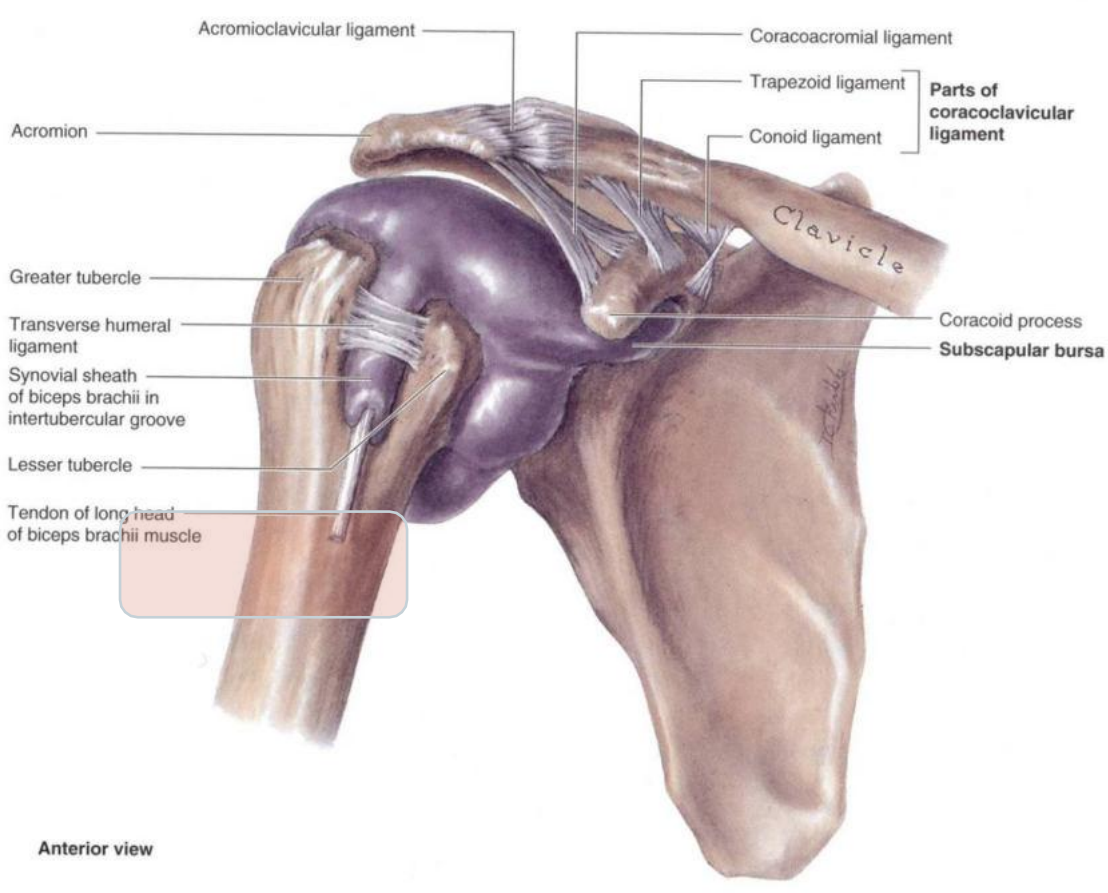
Accessory ligaments: The **coracoacromial ligament** extends between the coracoid process and the acromion. Its function is to **protect** the ***superior aspect*** of the joint.

3. The **coracohumeral ligament strengthens** the capsule from ***above*** and stretches from the root of the coracoid process to the greater tuberosity of the humerus

2. The **transverse humeral ligament strengthens the capsule and bridges the gap between the two humeral tuberosities.**

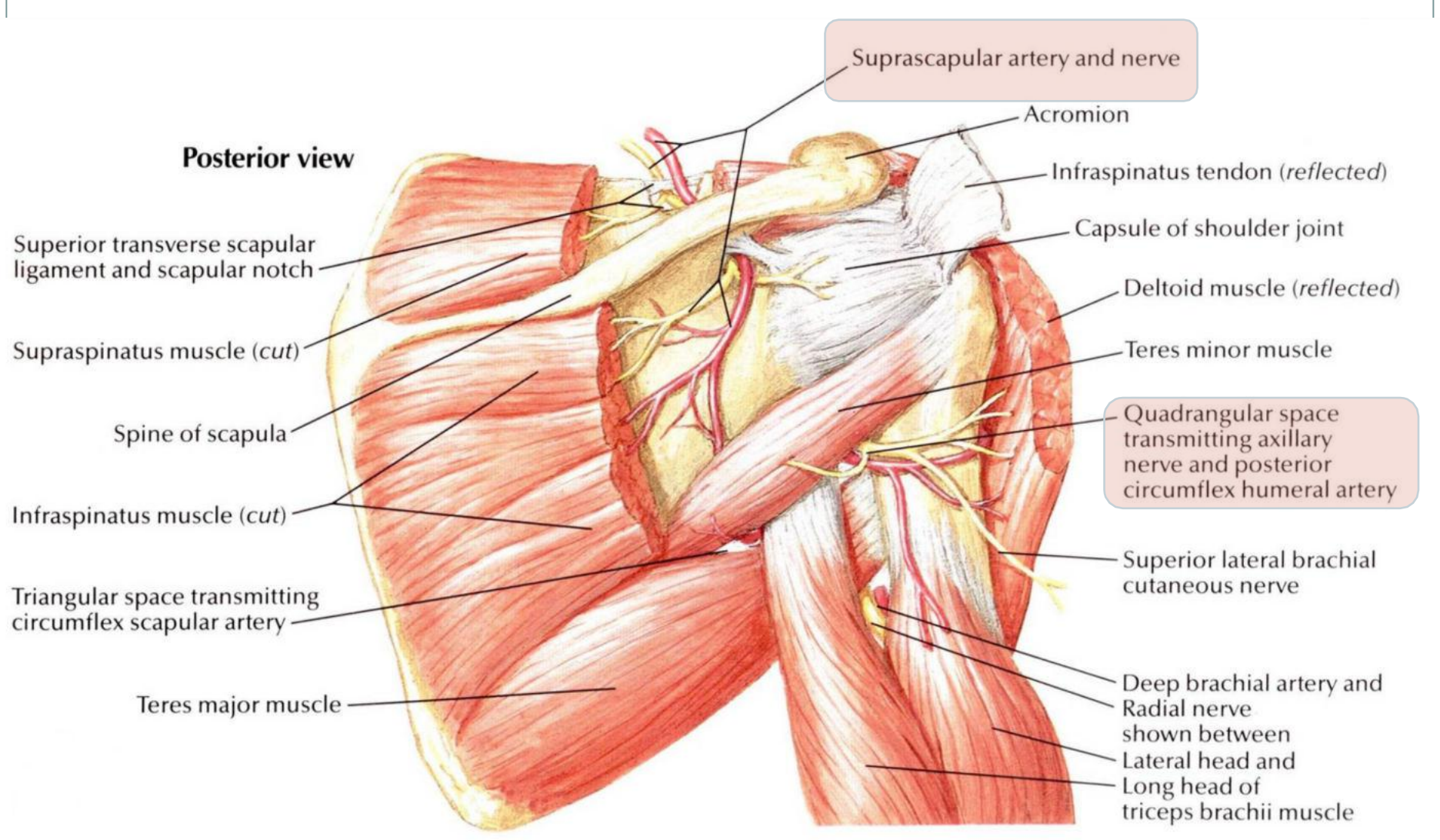
1. The **glenohumeral ligaments** are three weak bands of fibrous tissue that strengthen ***the front*** of the capsule.

SYNOVIAL MEMBRANE



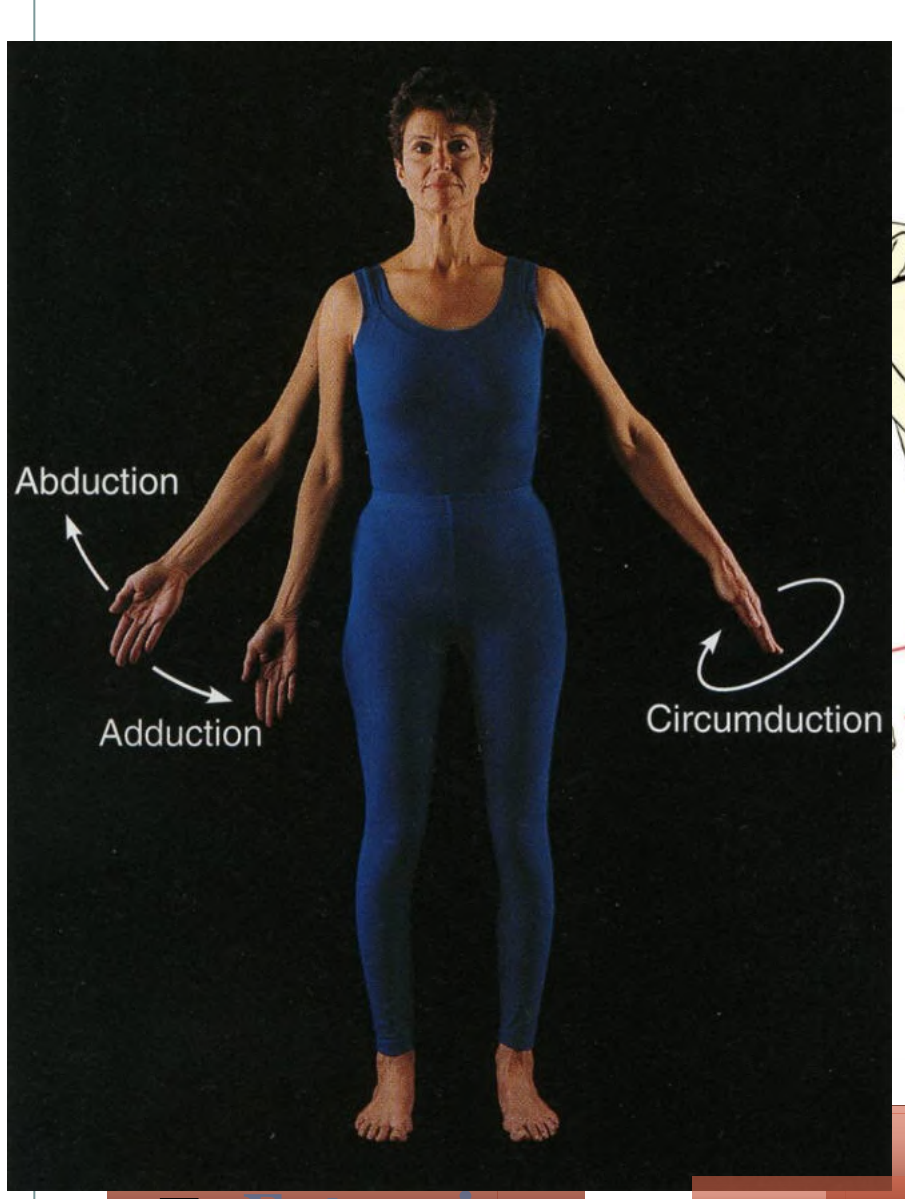
- It lines the fibrous capsule.
- ***It is attached to the margins of the cartilage*** covering the articular surfaces.
- It forms a **tubular sheath** around the tendon of the long head of the biceps brachii.
- ***It extends through the anterior wall of the capsule*** to form the **subscapularis bursa** beneath the subscapularis muscle.

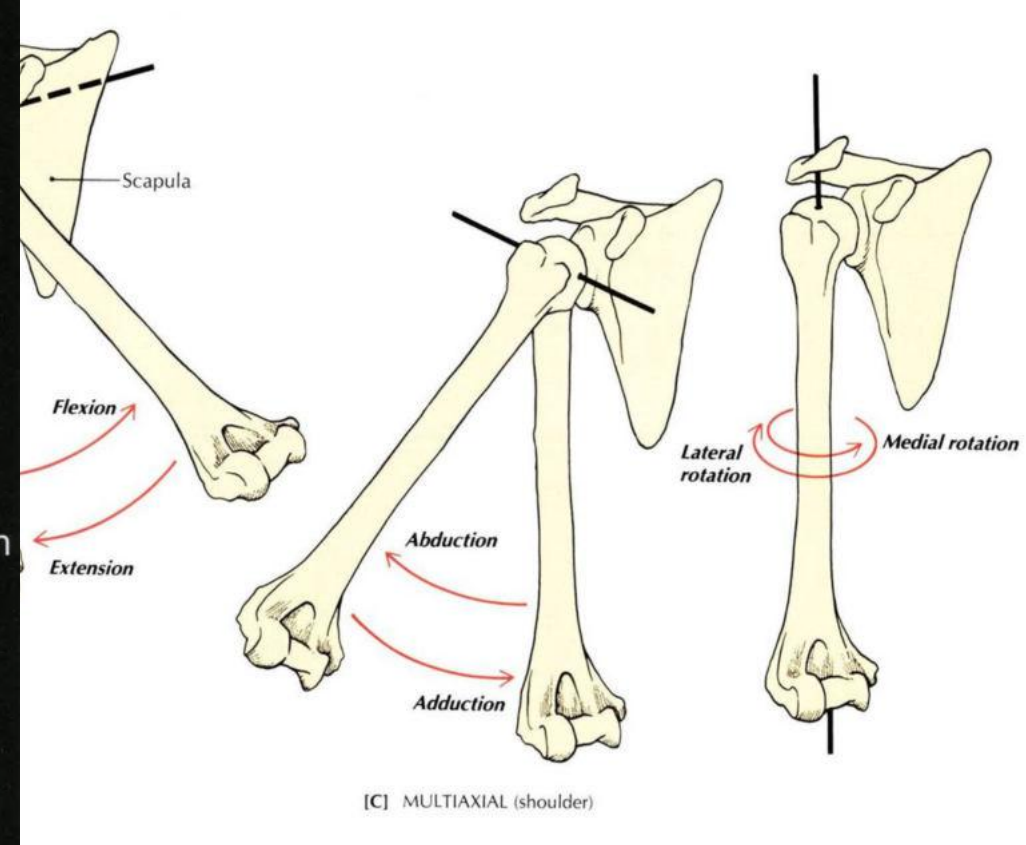
NERVE SUPPLY



Articular branches of the **axillary** & the **suprascapular nerves**

The following movements are possible:





- Extension
- Abduction
- Circumduction
- Lateral rotation
- Medial rotation

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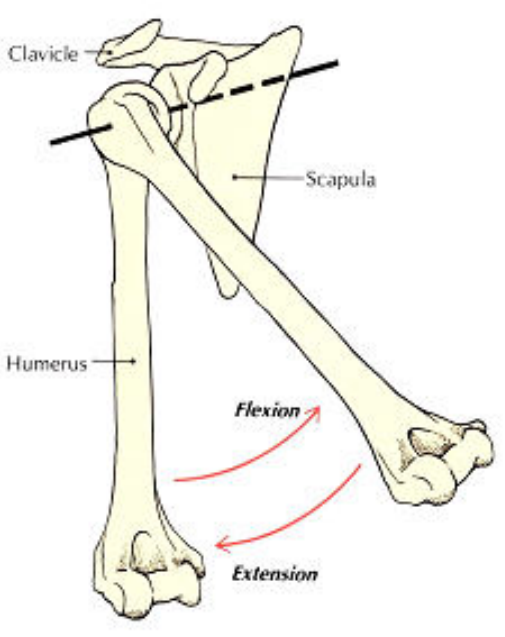
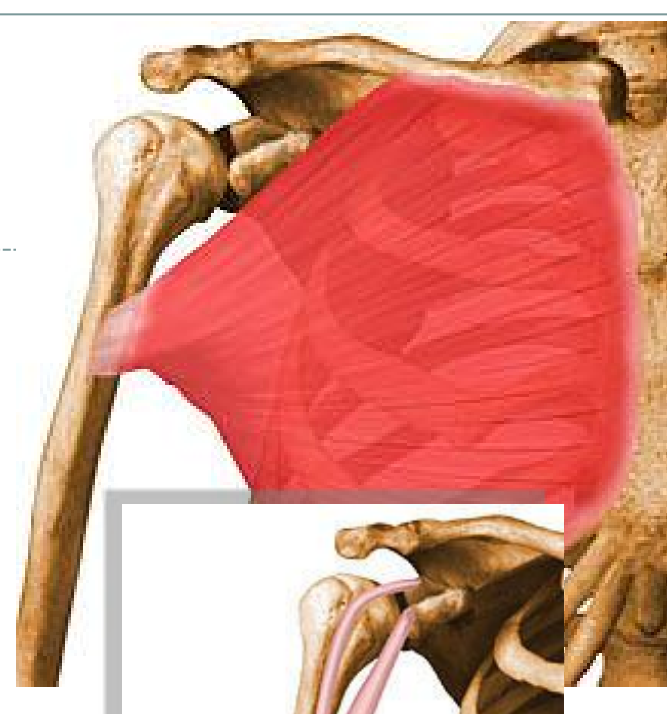
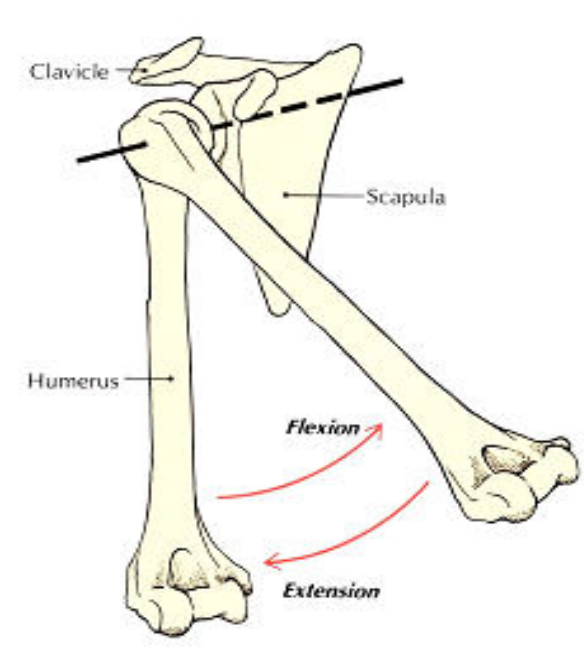
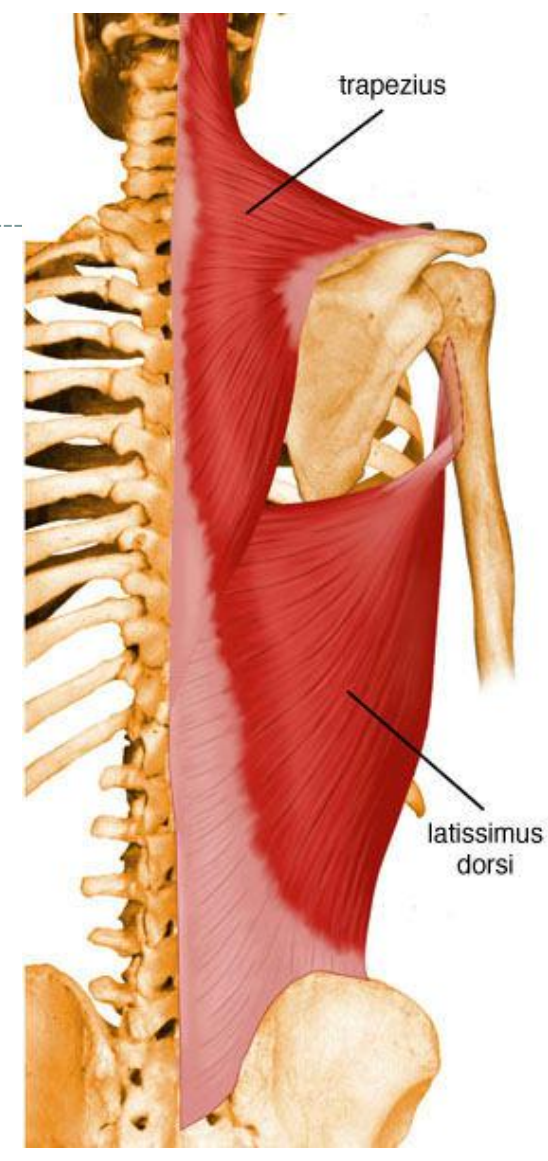


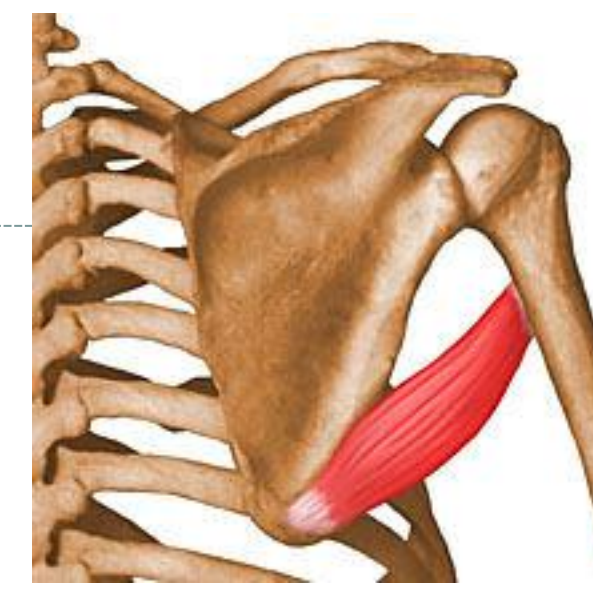


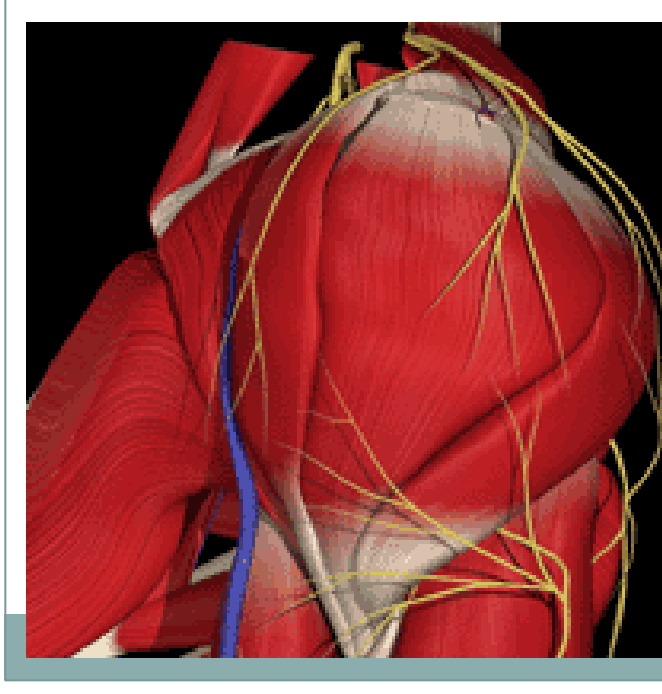
Flexion

- Normal flexion is about 90°
- It is performed by the:
  1. ***Anterior fibers*** of the deltoid
  2. Pectoralis major
  3. Biceps brachii
  4. Coracobrachialis



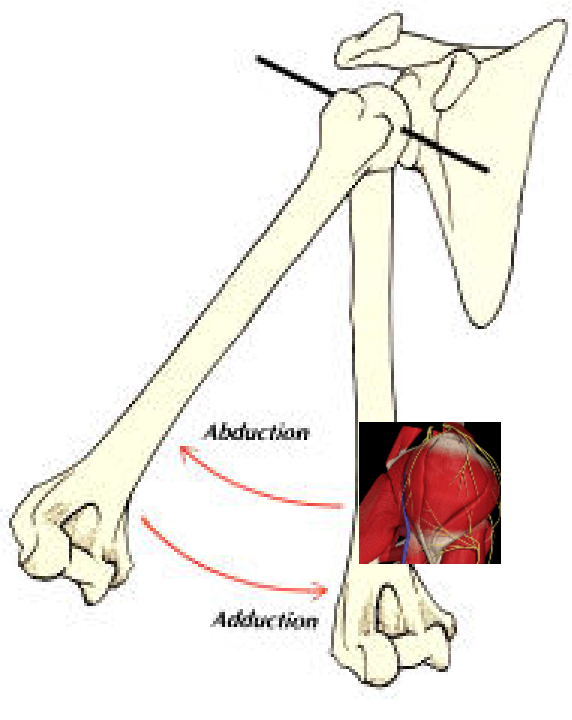


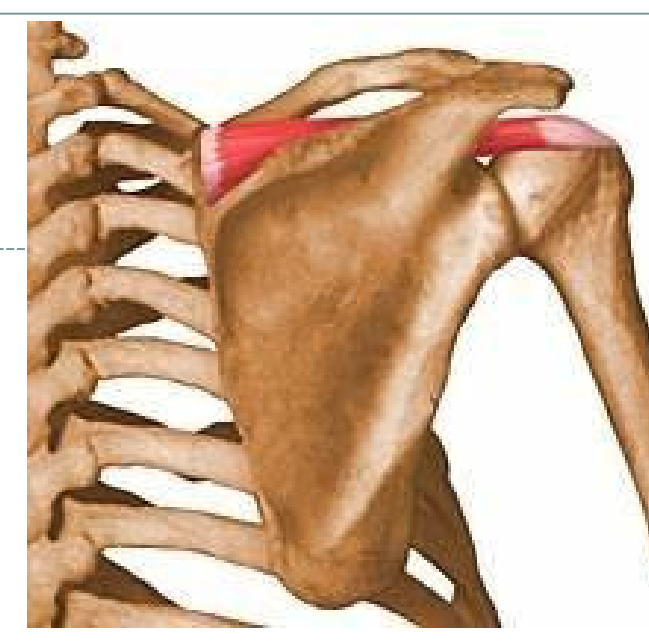




Extension:

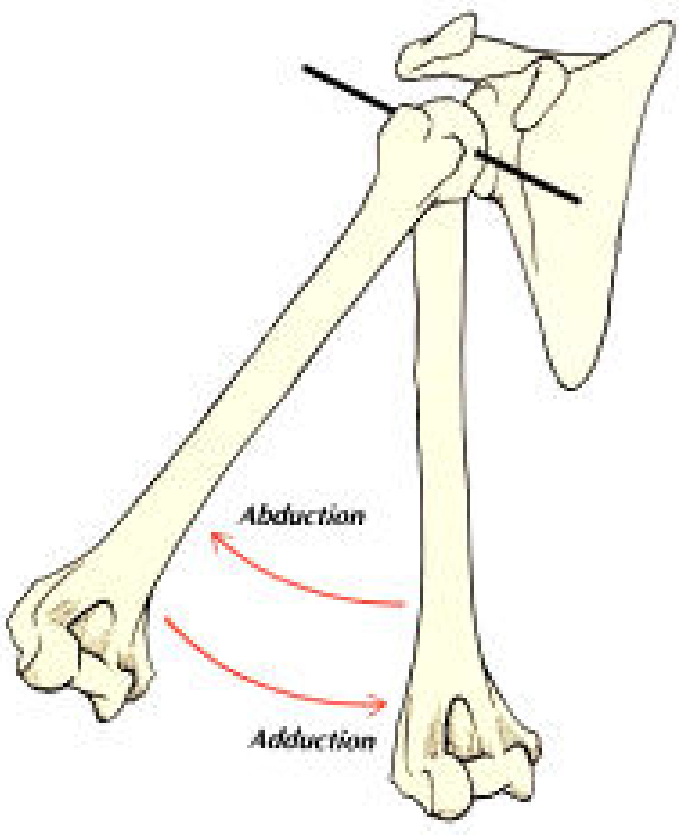
- Normal extension is about 45°
- It is performed by the:
  1. ***Posterior fibers*** of the deltoid,
  2. Latissimus dorsi
  3. Teres major

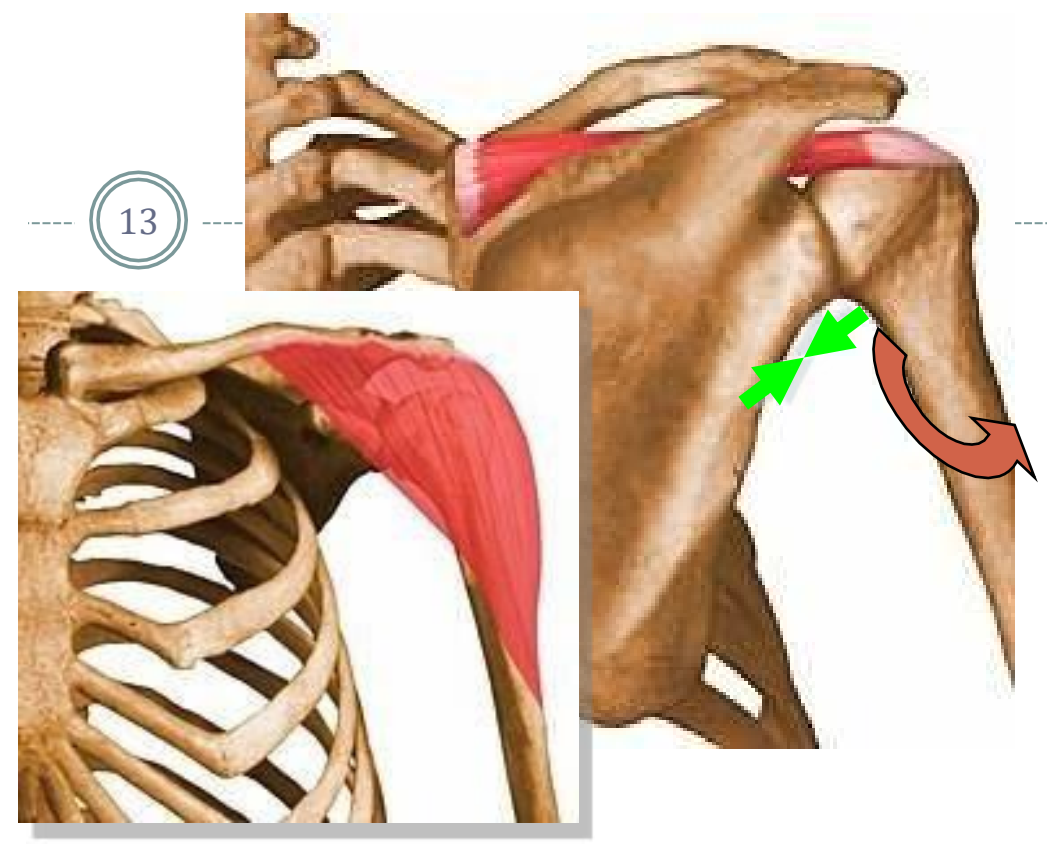




Abduction:

- Abduction of the upper limb occurs both at the shoulder joint and between the scapula and the thoracic wall.
- It is initiated by supraspinatus from 0 to 18
- Then from 19 to 120 by the ***middle fibers*** of the deltoid.
- Then above 90 by rotation of the scapula by 2 muscles (Trapezius & S.A..)





- The supraspinatus muscle:
  - ***initiates*** the movement of abduction(from 0 to 19) and
  - ***holds the head of the humerus*** against the glenoid fossa of the scapula
- This latter function of the supraspinatus **allows** the deltoid muscle to contract and abduct the humerus at the shoulder joint.

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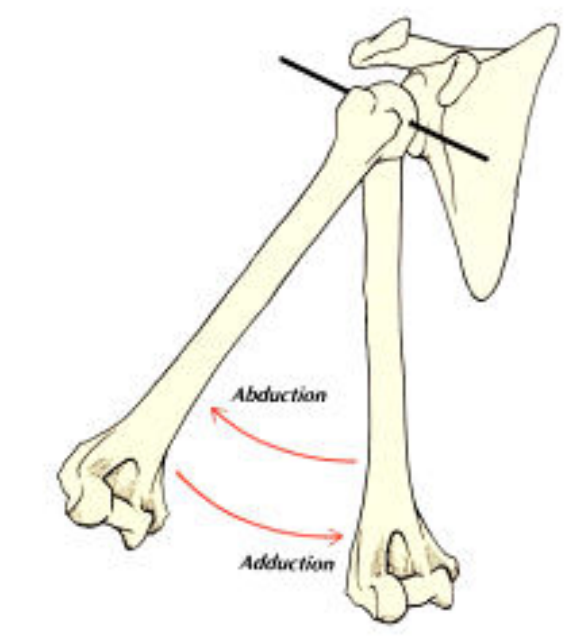
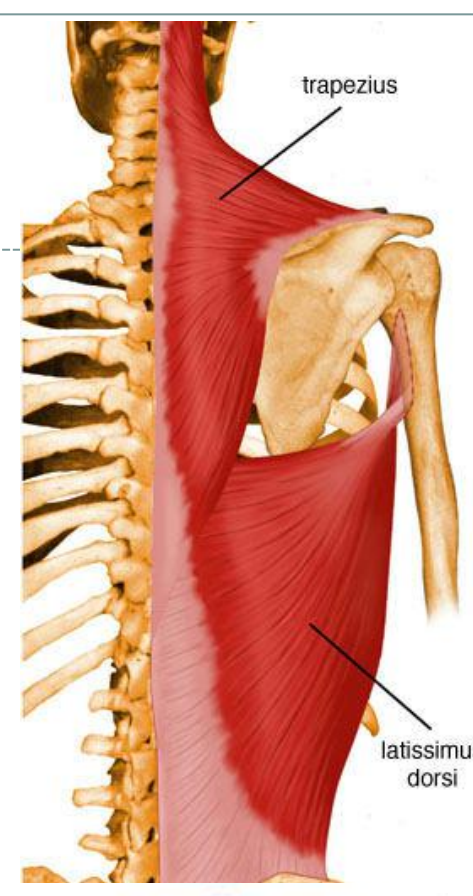
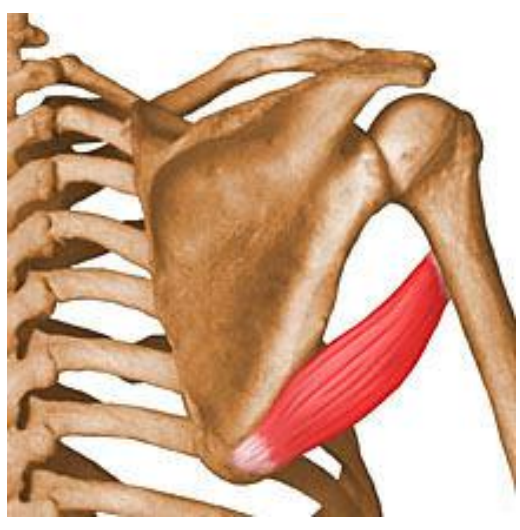
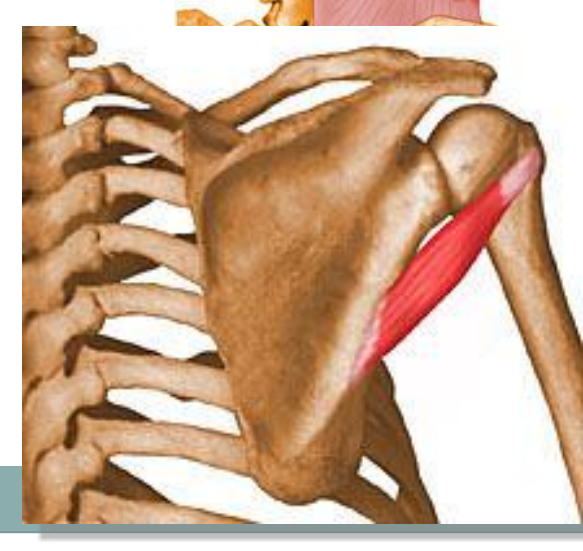


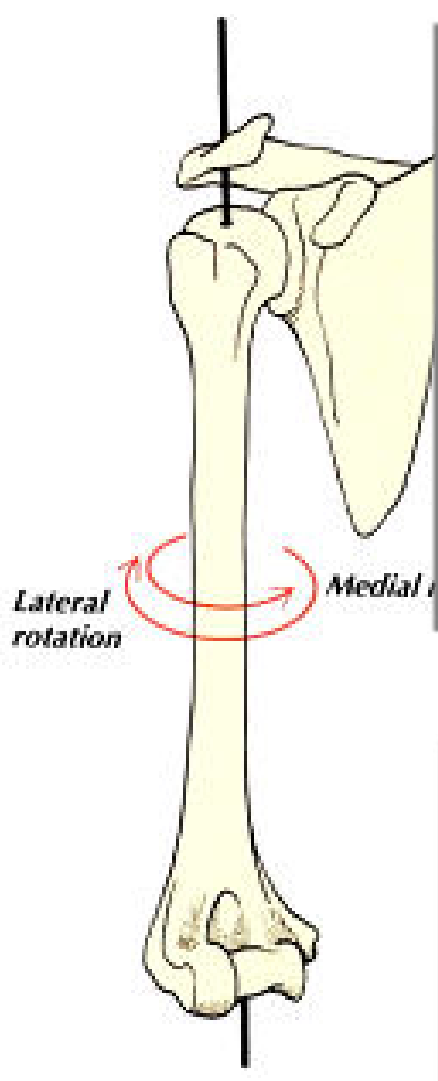


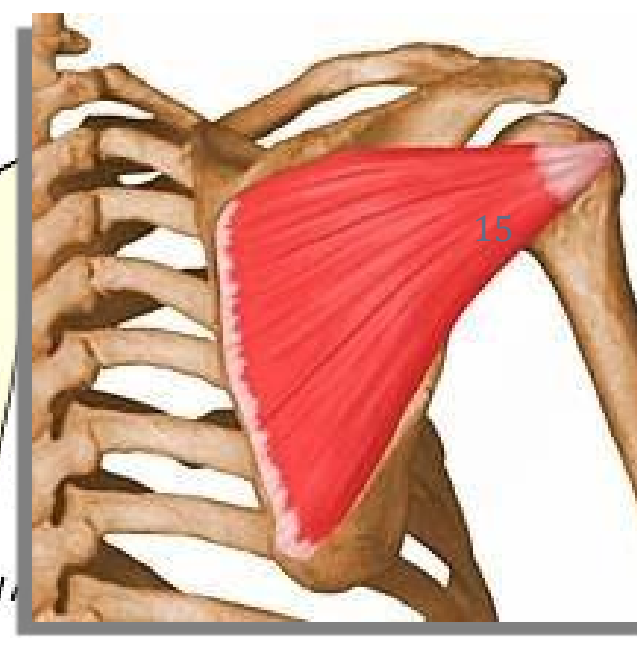


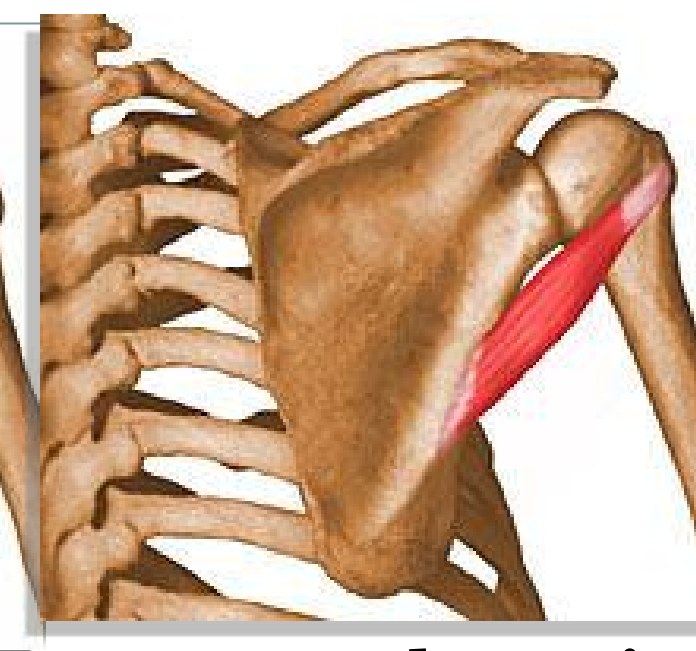


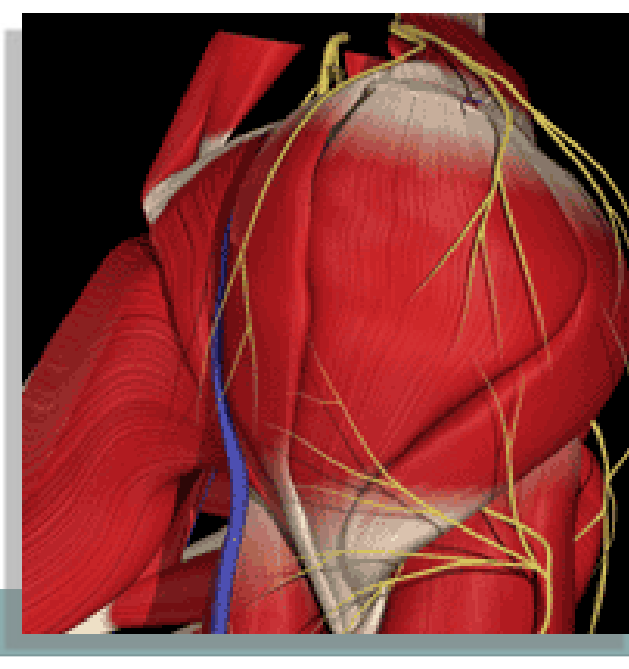
Adduction:

- Normally the upper limb can be swung 45° across the front of the chest.
- This is performed by:
  1. pectoralis major
  2. latissimus dorsi
  3. teres major
  4. teres minor



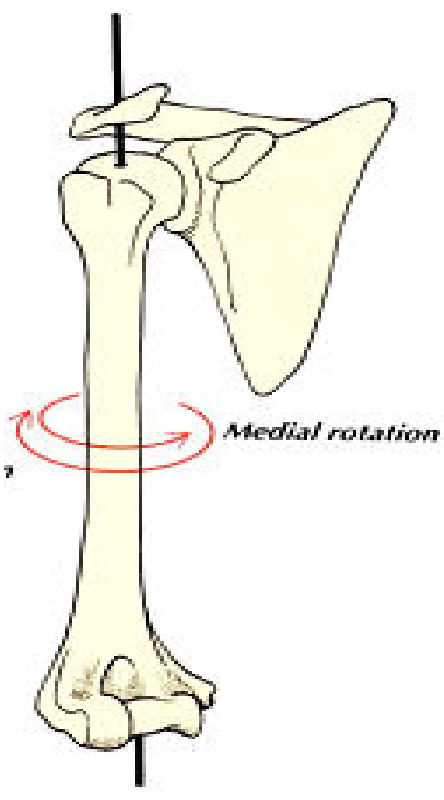


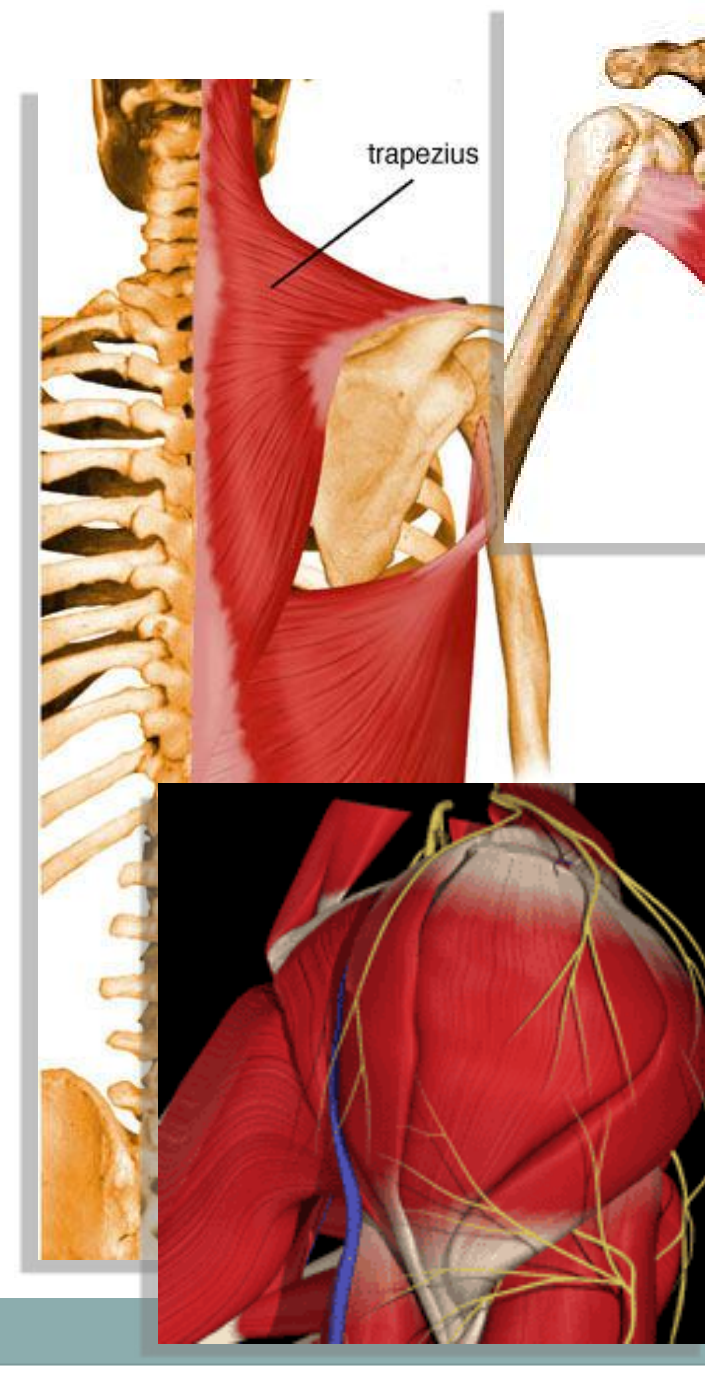


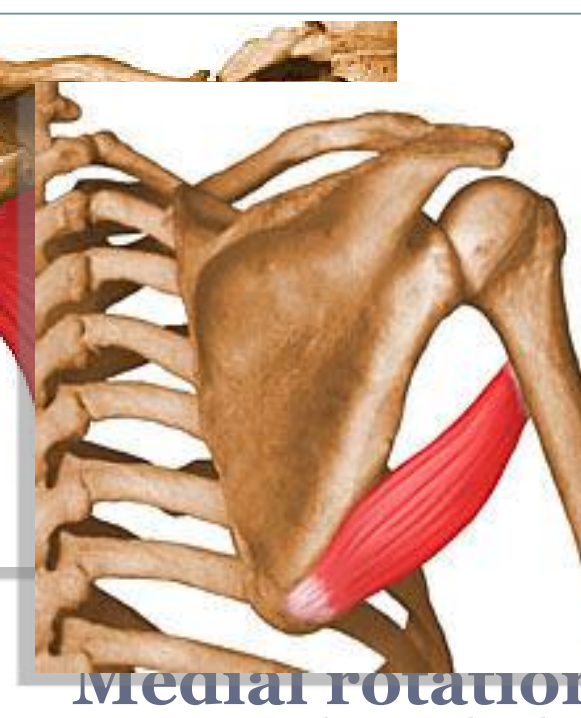


Lateral rotation:

- Normal lateral rotation is about 40 to 45°.
- This is performed by the:
  1. infraspinatus
  2. teres minor
  3. the ***posterior*** fibers of the deltoid muscle

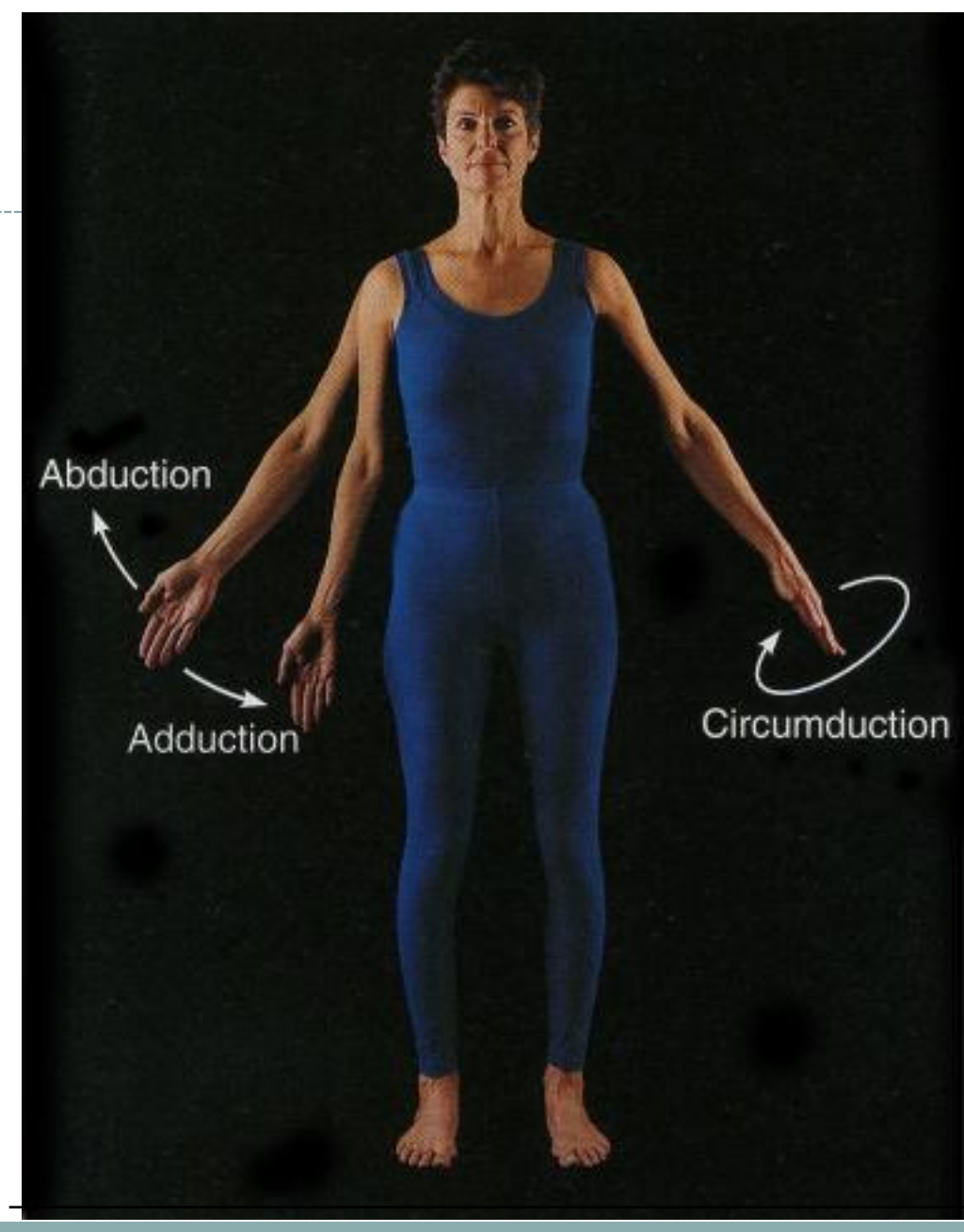






Medial rotation:

- Normal medial rotation is about 55°.
- This is performed by the:
  1. subscapularis
  2. latissimus dorsi
  3. teres major
  4. ***anterior*** fibers of the deltoid.



Circumduction:

This is a movement in which the distal end of the humerus moves in circular motion while the proximal end remains stable

- It is formed by flexion, abduction, extension and adduction. Successively

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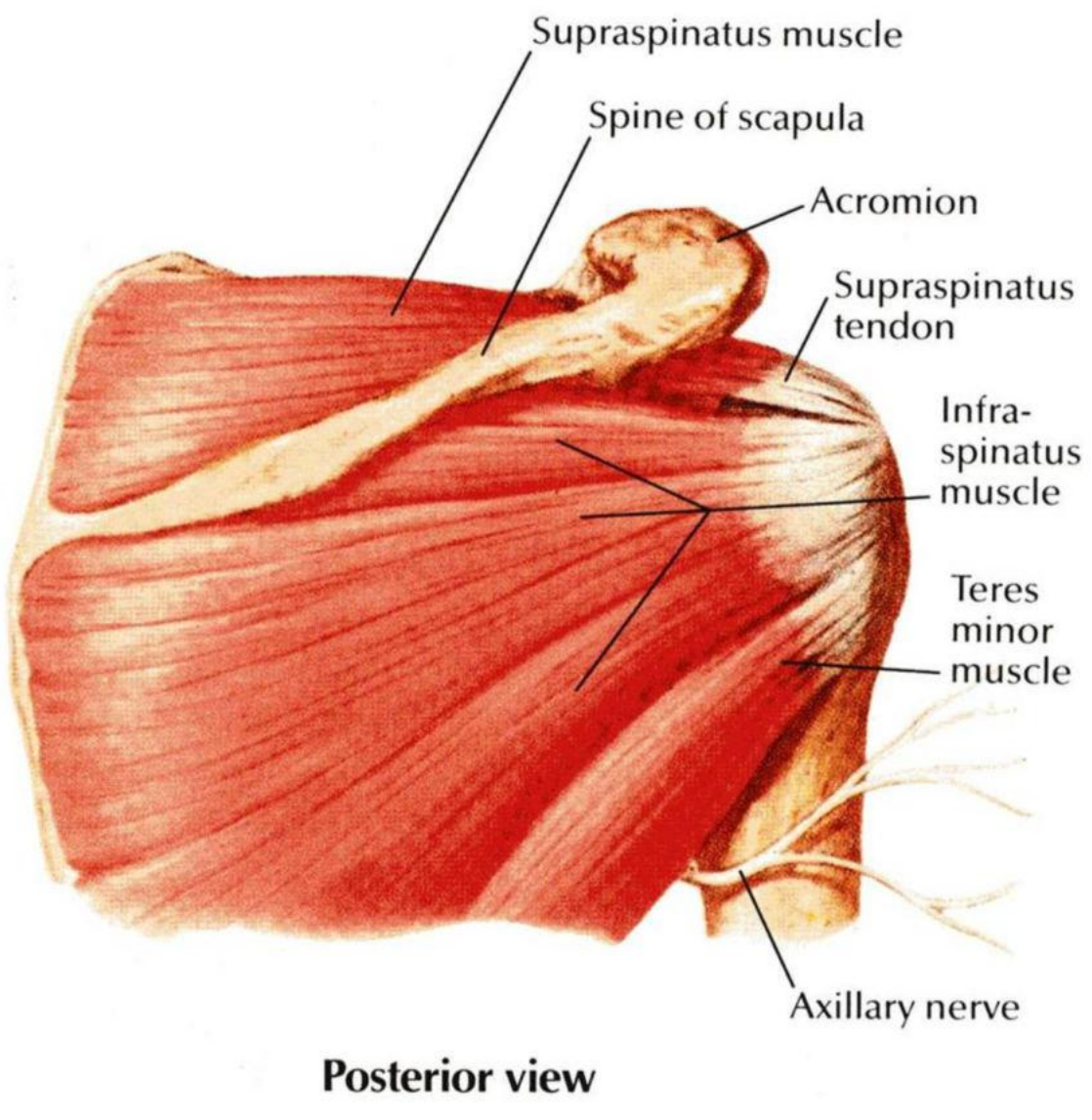
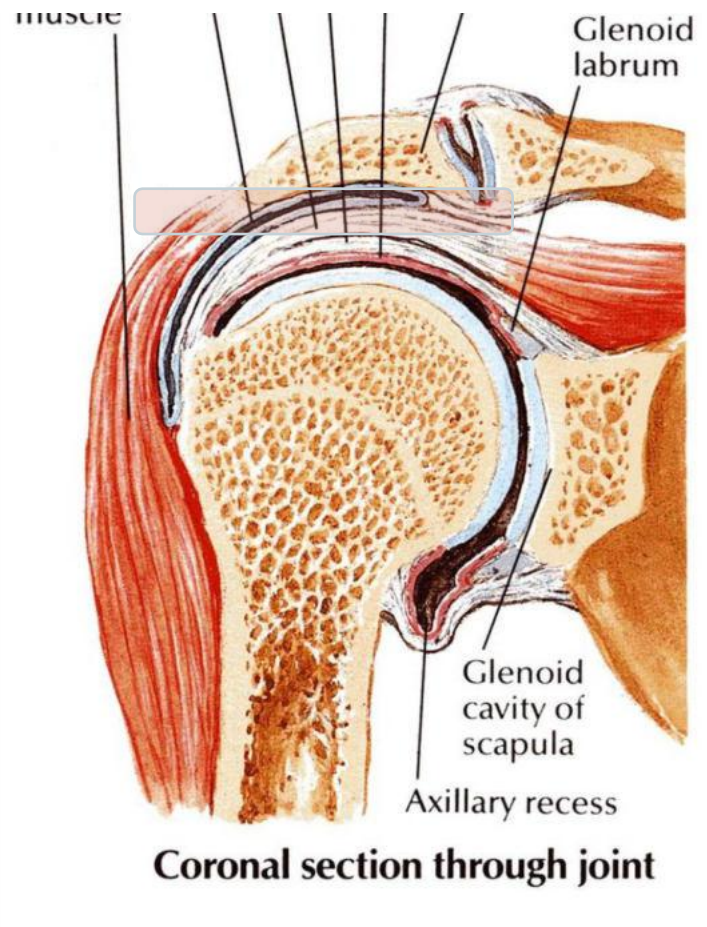


Posterior view

Posteriorly:

- Infraspinatus
- Teres minor muscles.

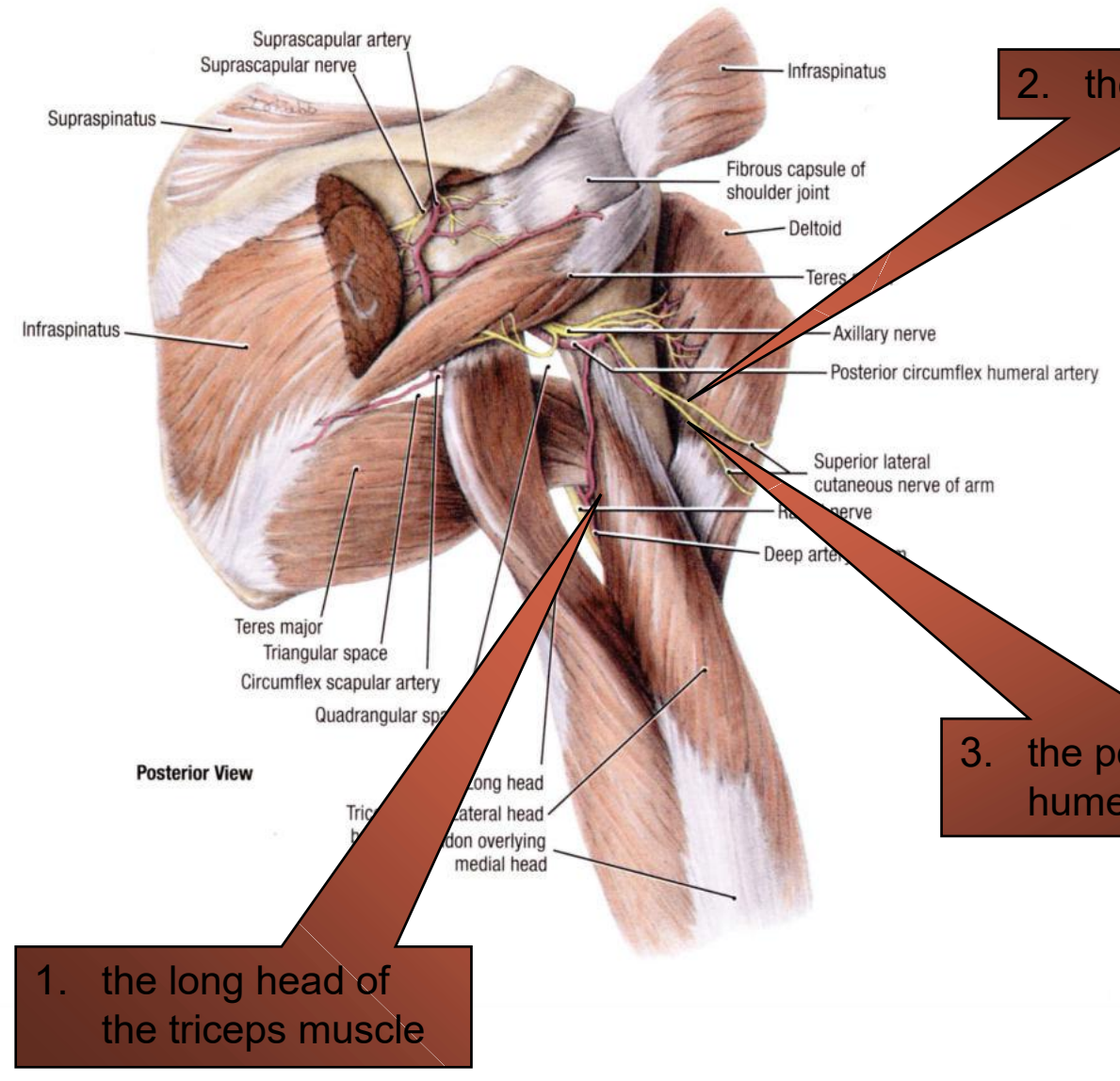


Coronal section through joint

transparent; superior aspect (60%).
Tendons marked with an asterisk (*) form the so-called rotator cuff (compare Fig. 302).

Superiorly:

1. Deltoid muscle
2. Coracoacromial ligament
3. Subacromial (subdeltoid) bursa
4. Supraspinatus muscle & tendon



2. the axillary nerve

3. the posterior circumflex humeral vessels

1. the long head of the triceps muscle

Inferiorly:

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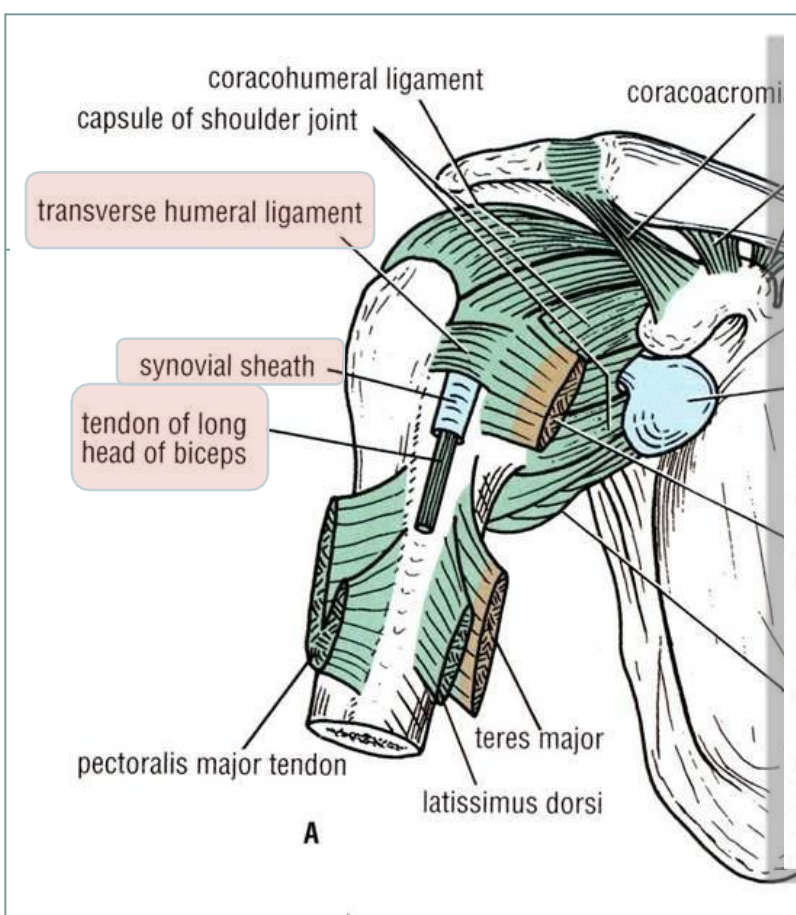
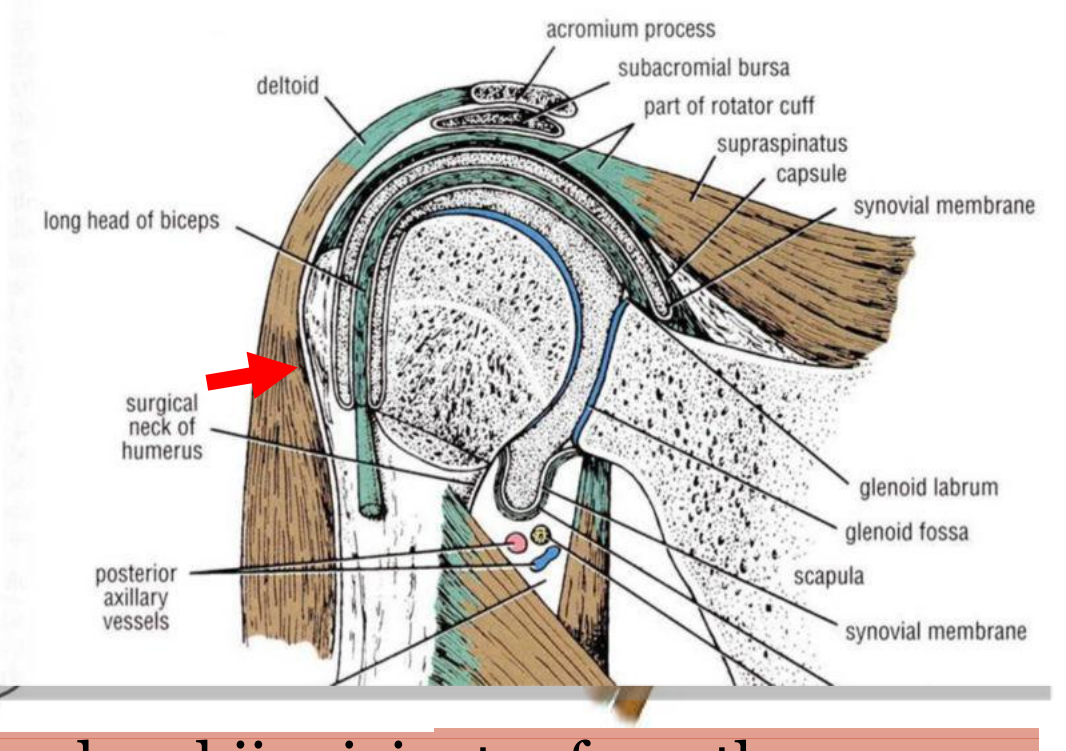
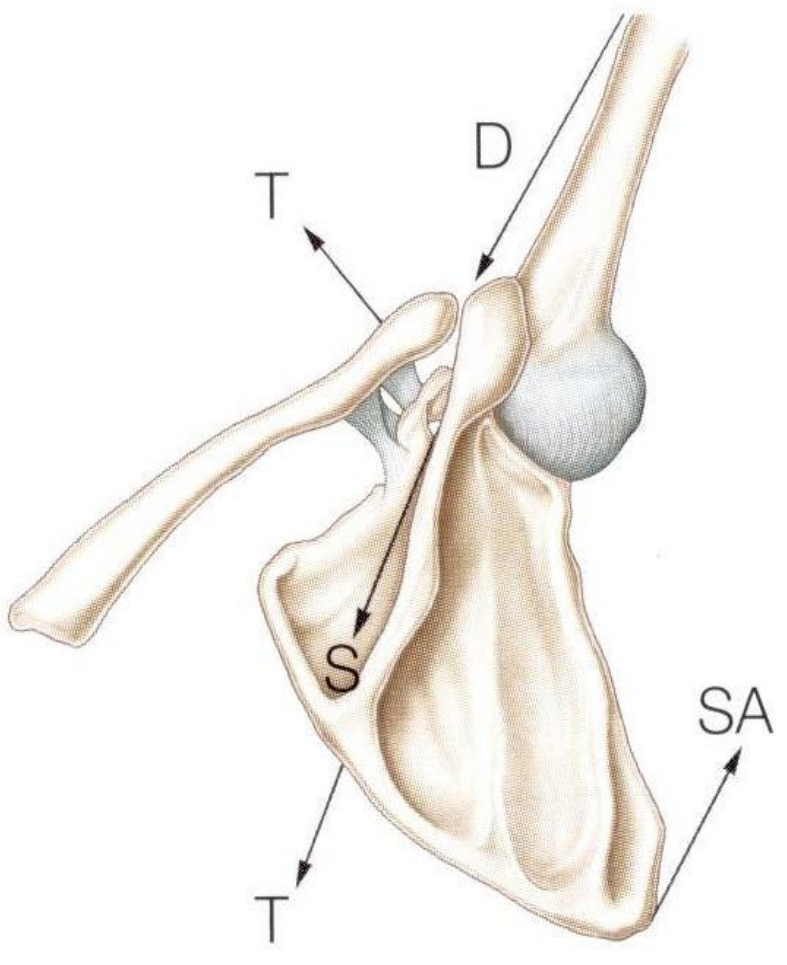




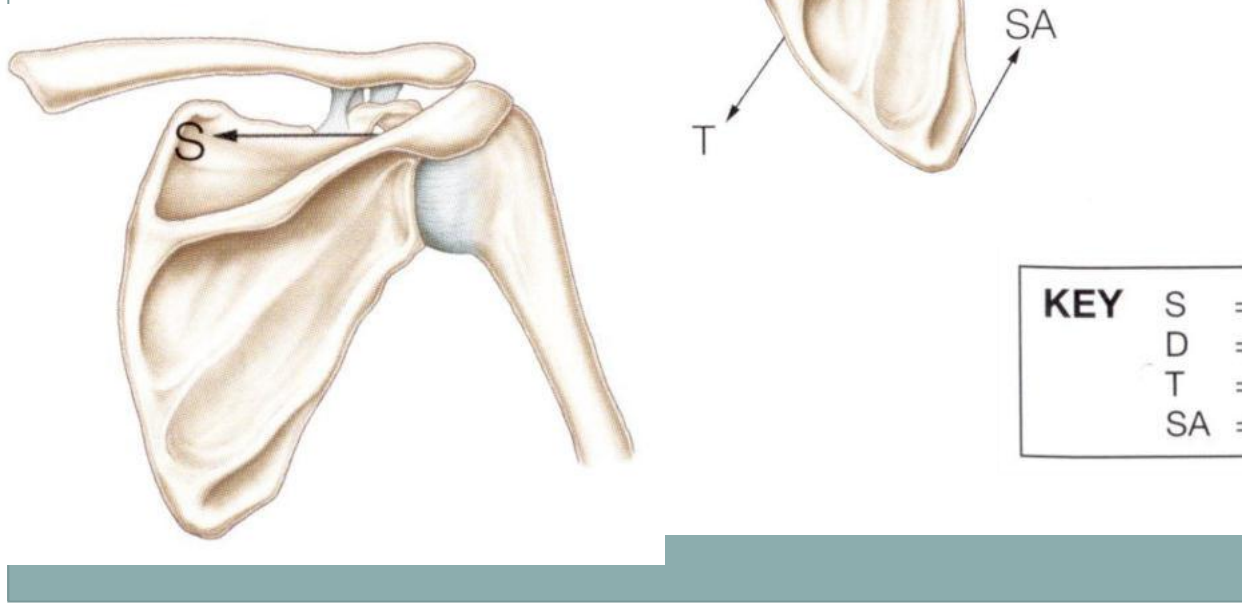
- The long head of the biceps brachii originates from the **supraglenoid tubercle** of the scapula,
- It is intracapsular but extrasynovial
- It's tendon passes through the shoulder joint and emerges ***beneath the transverse humeral ligament.***
- Inside the joint, the tendon is surrounded by a separate tubular sheath of the synovial capsule.



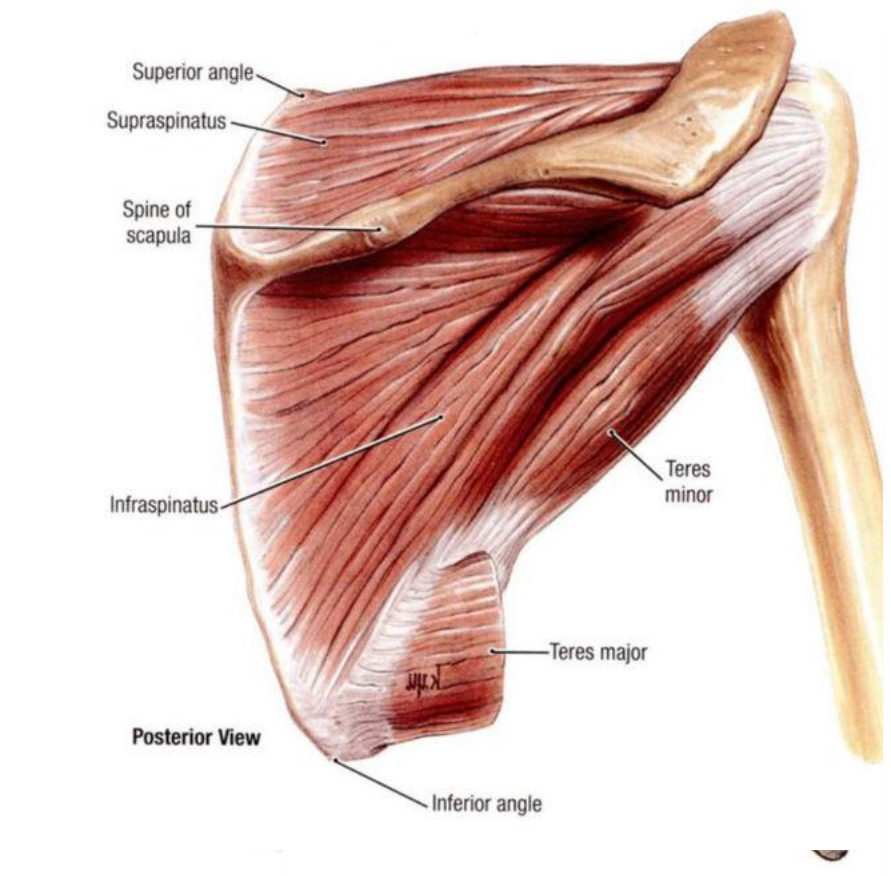
- Abduction involves rotation of the scapula as well as movement at the shoulder joint.
- For every 3° of abduction of the arm, a 2° abduction occurs in the shoulder joint and a 1° abduction occurs by rotation of the scapula.
- At about 120° of abduction of the arm, the greater tuberosity of the humerus impinges on lateral border of coraco-acromial arch.
- Further elevation of the arm above the head accomplished by rotating the scapula.

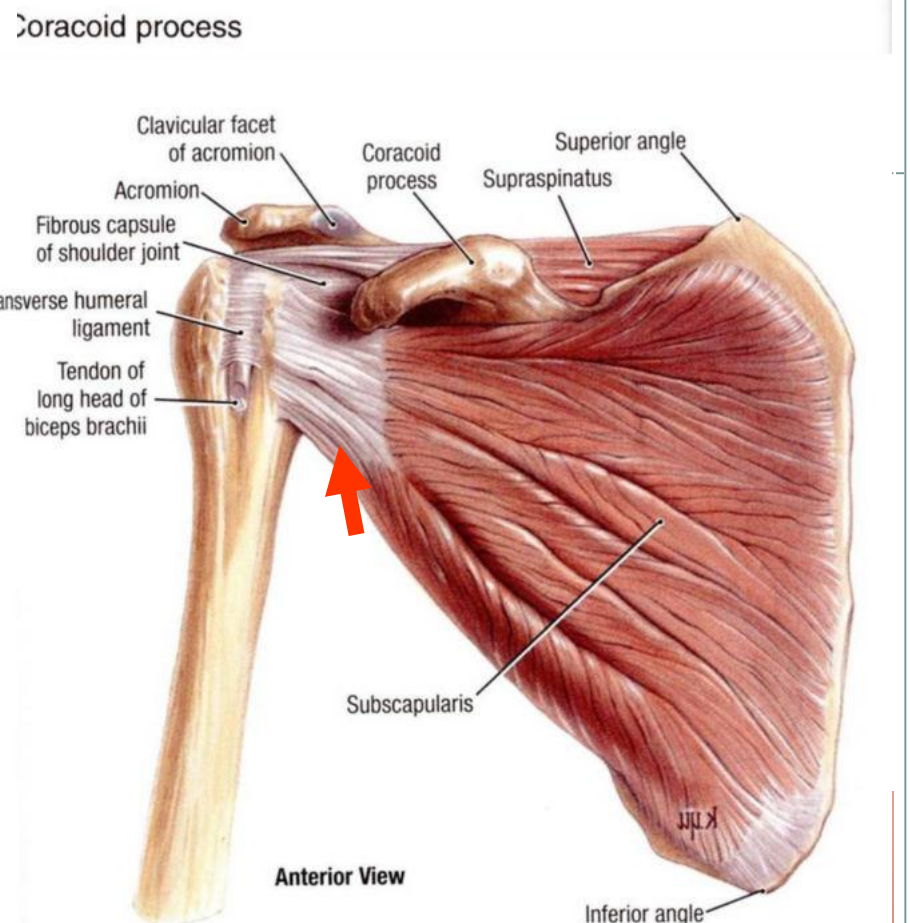
MUSCLES IN THE SCAPULAR-HUMERAL MECHANISM

24



KEY S = Supraspinatus
D = Deltoid
T = Trapezius
SA = Serratus anterior





- ***weak ligaments***

- Its strength almost entirely depends on the **tone** of the rotator cuff muscles.
- The tendons of these muscles are fused to the underlying capsule of the shoulder joint.
- ***The least supported part of the joint*** lies in the **inferior** location, where it is unprotected by muscles.

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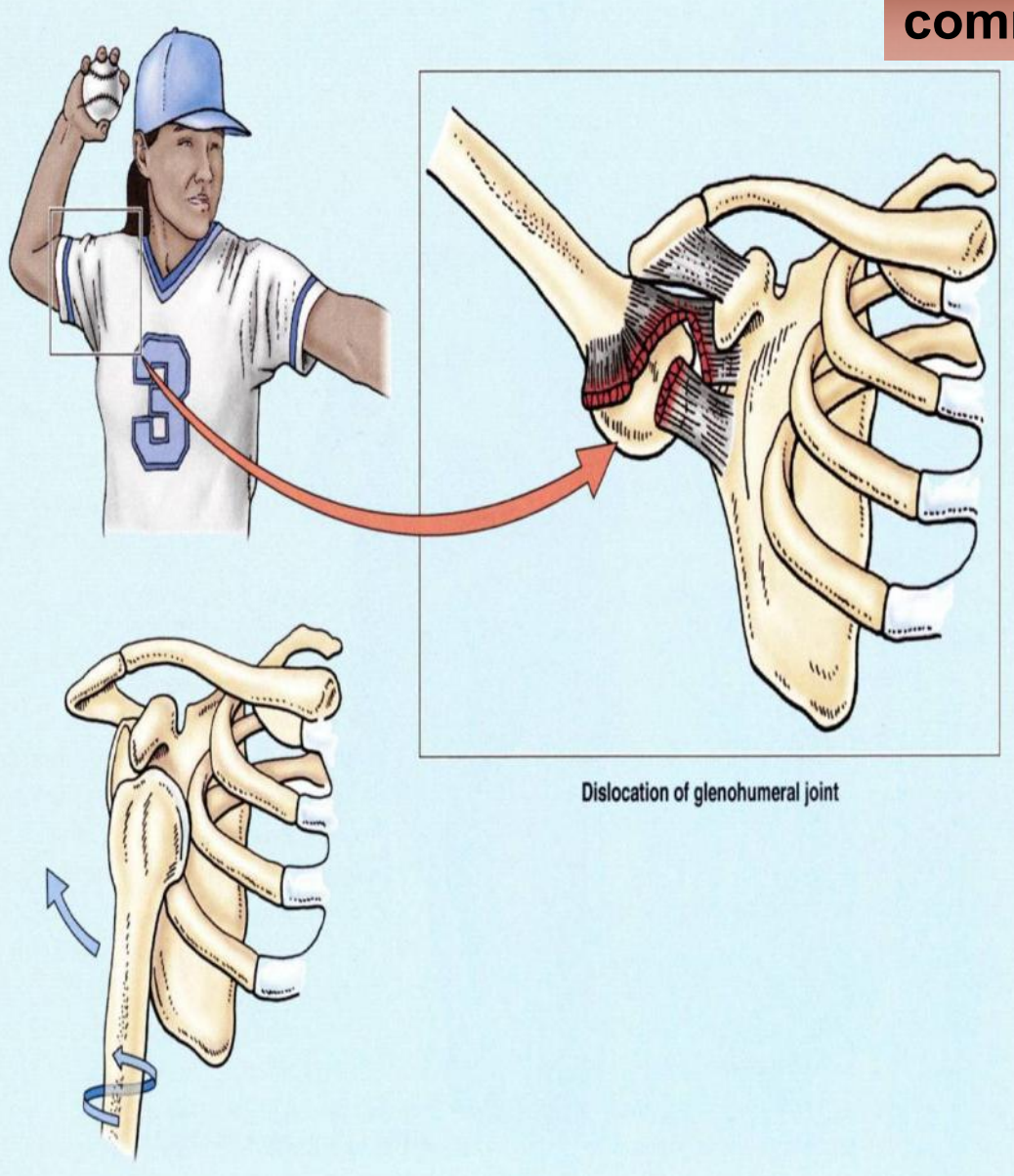
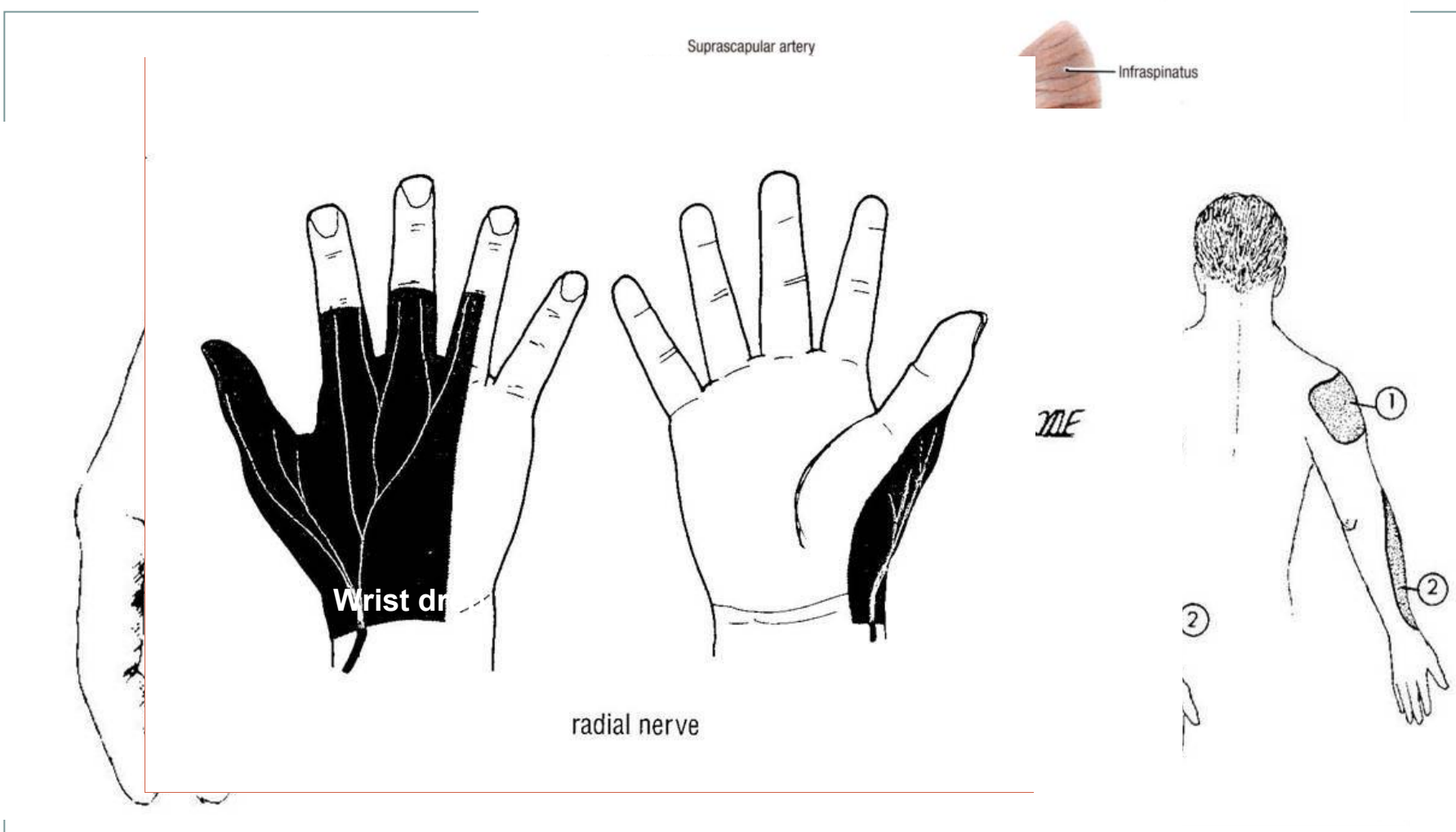
DISLOCATIONS OF THE SHOULDER JOINT

The shoulder joint is the most commonly dislocated large joint.

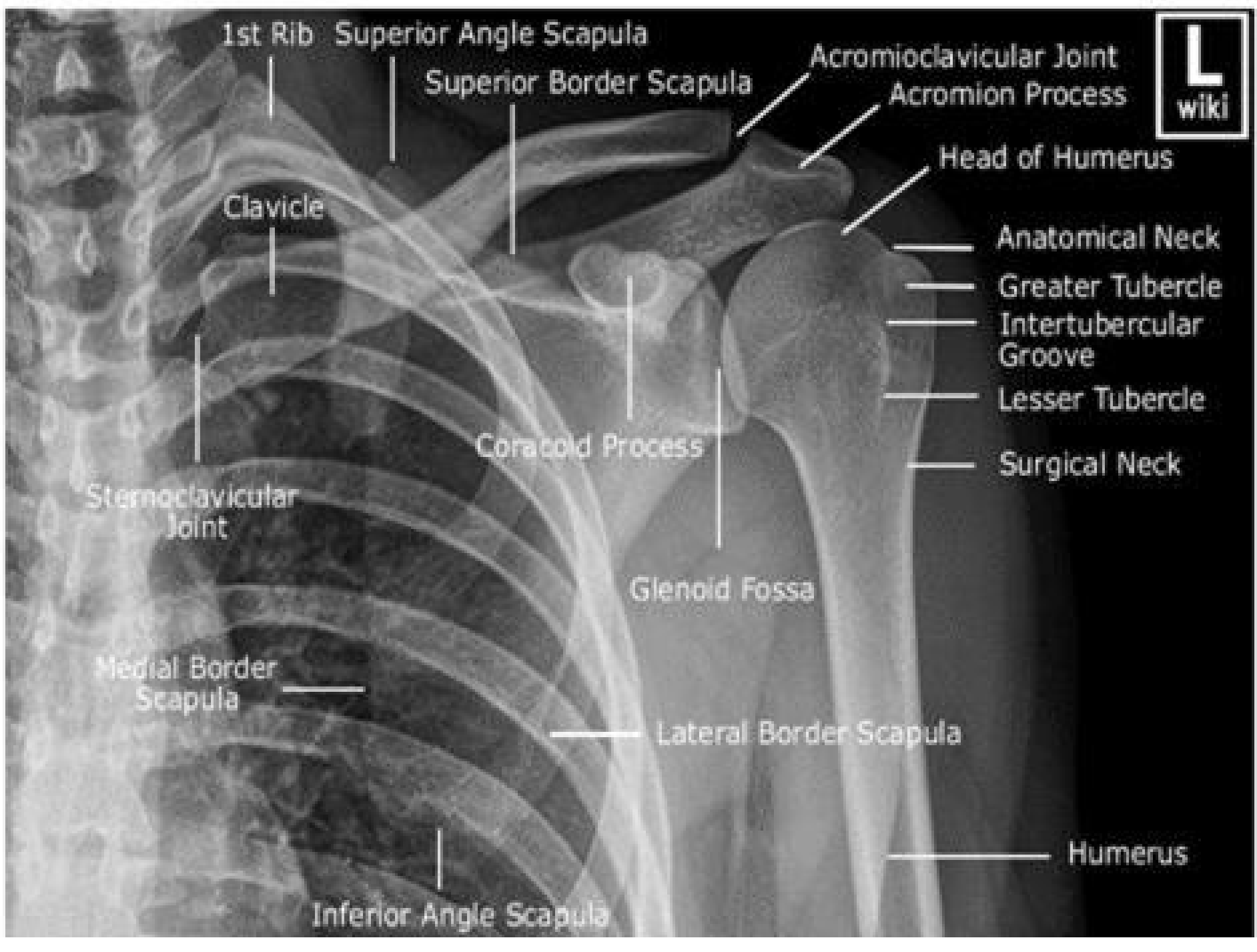


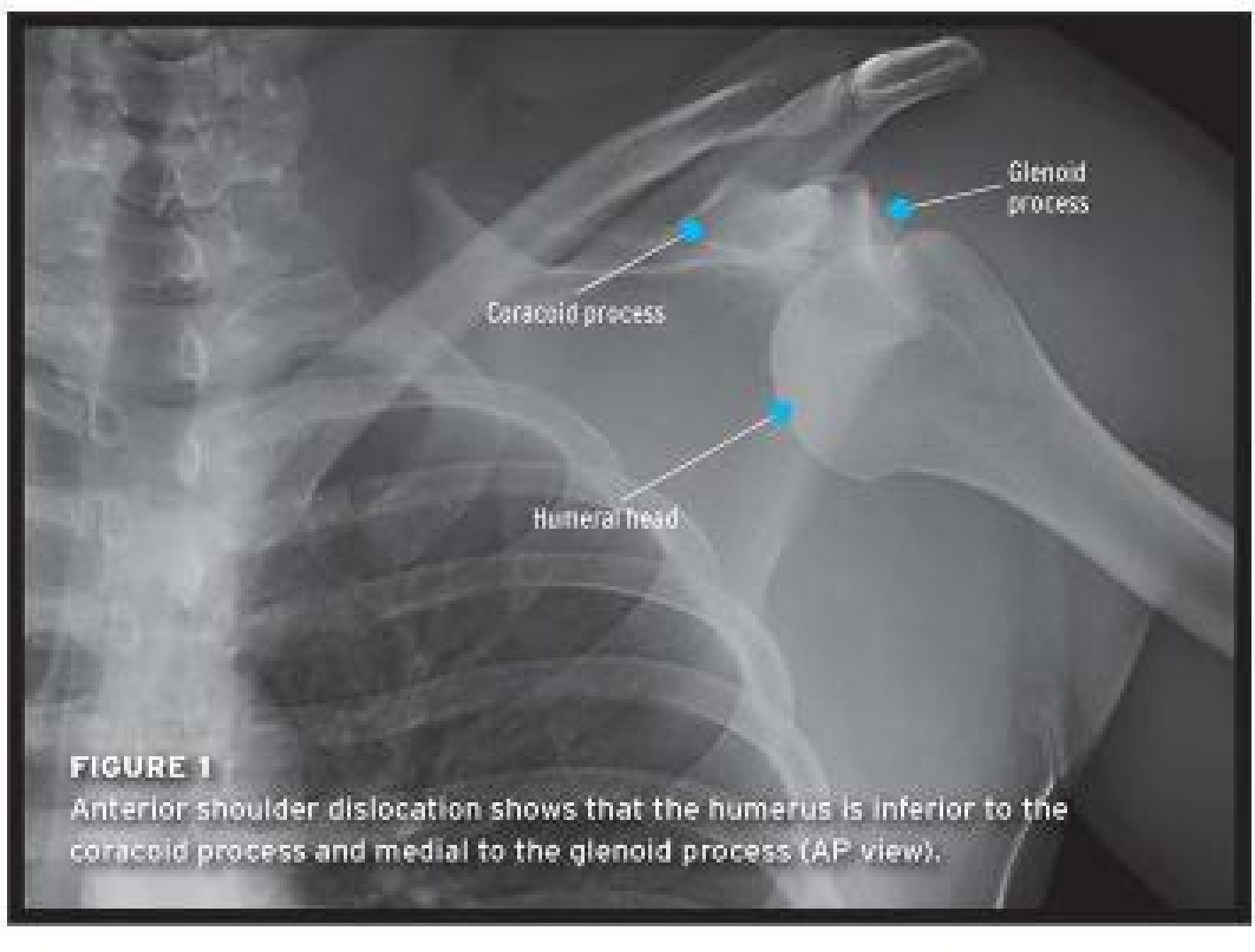
Anterior-Inferior Dislocation

- Sudden violence applied to the humerus with the joint fully abducted pushes the humeral head downward onto the inferior weak part of the capsule, which tears, and the humeral head comes to lie inferior to the glenoid fossa.



- A ***subglenoid*** displacement of the head of the humerus into the quadrangular space can cause **damage to the axillary nerve.**
- This is indicated by ***paralysis of the deltoid muscle*** and ***loss of skin sensation*** over the lower half of the deltoid.
- Downward displacement of the humerus can also **stretch and damage the radial nerve**.





Anterior shoulder dislocation shows that the humerus is inferior to the coracoid process and medial to the glenoid process (AP view).

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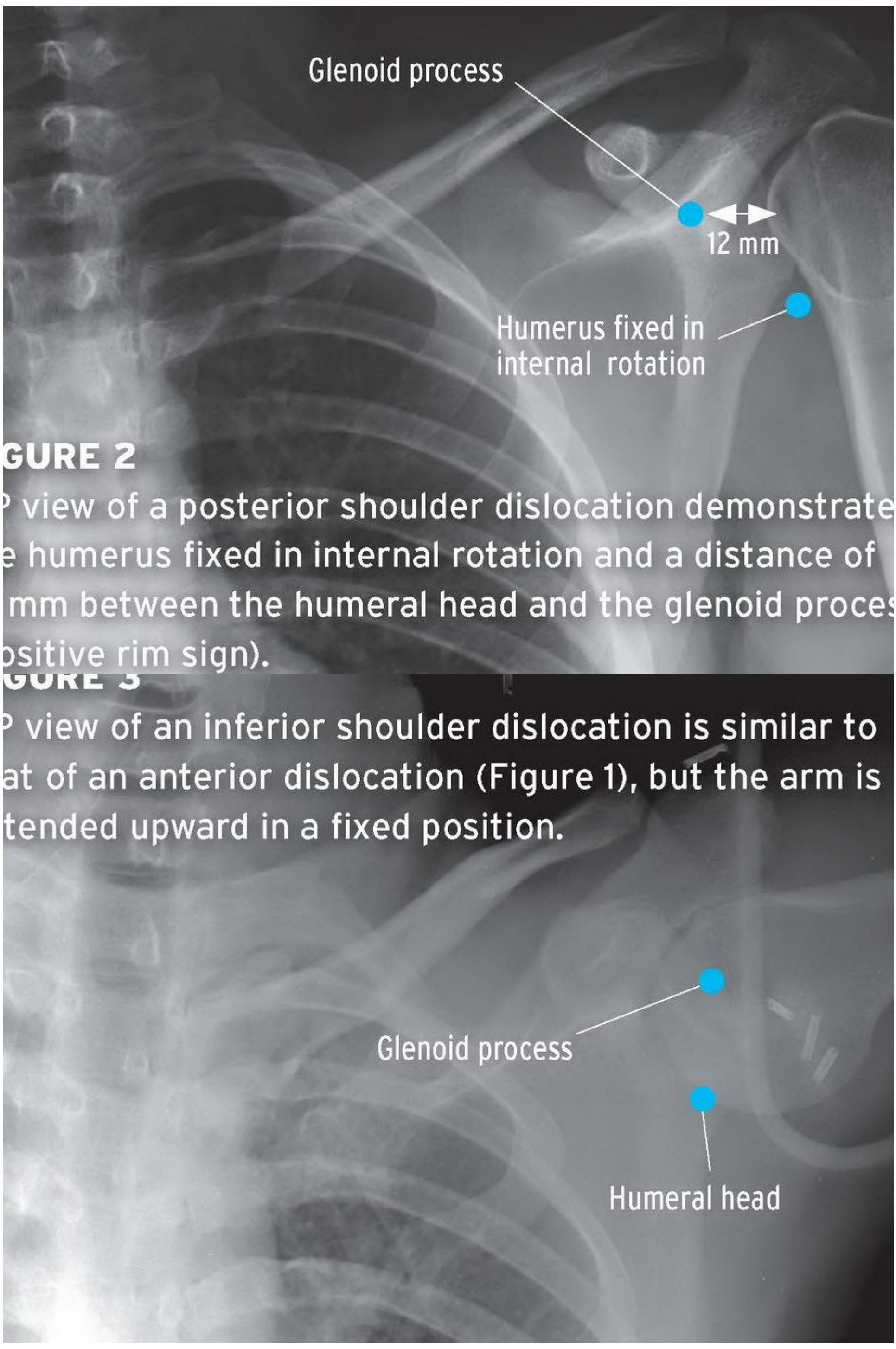


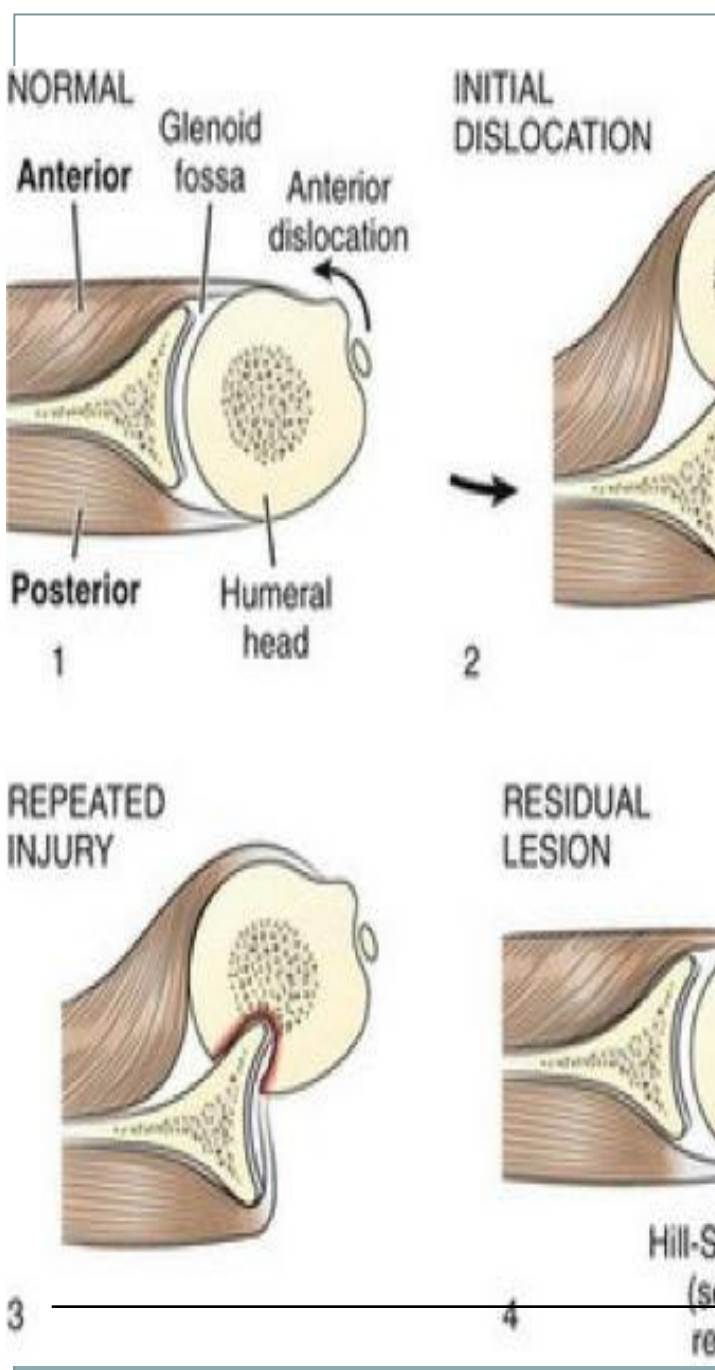
GURE 2
P view of a posterior shoulder dislocation demonstrate
e humerus fixed in internal rotation and a distance of
mm between the humeral head and the glenoid proces
ositive rim sign).

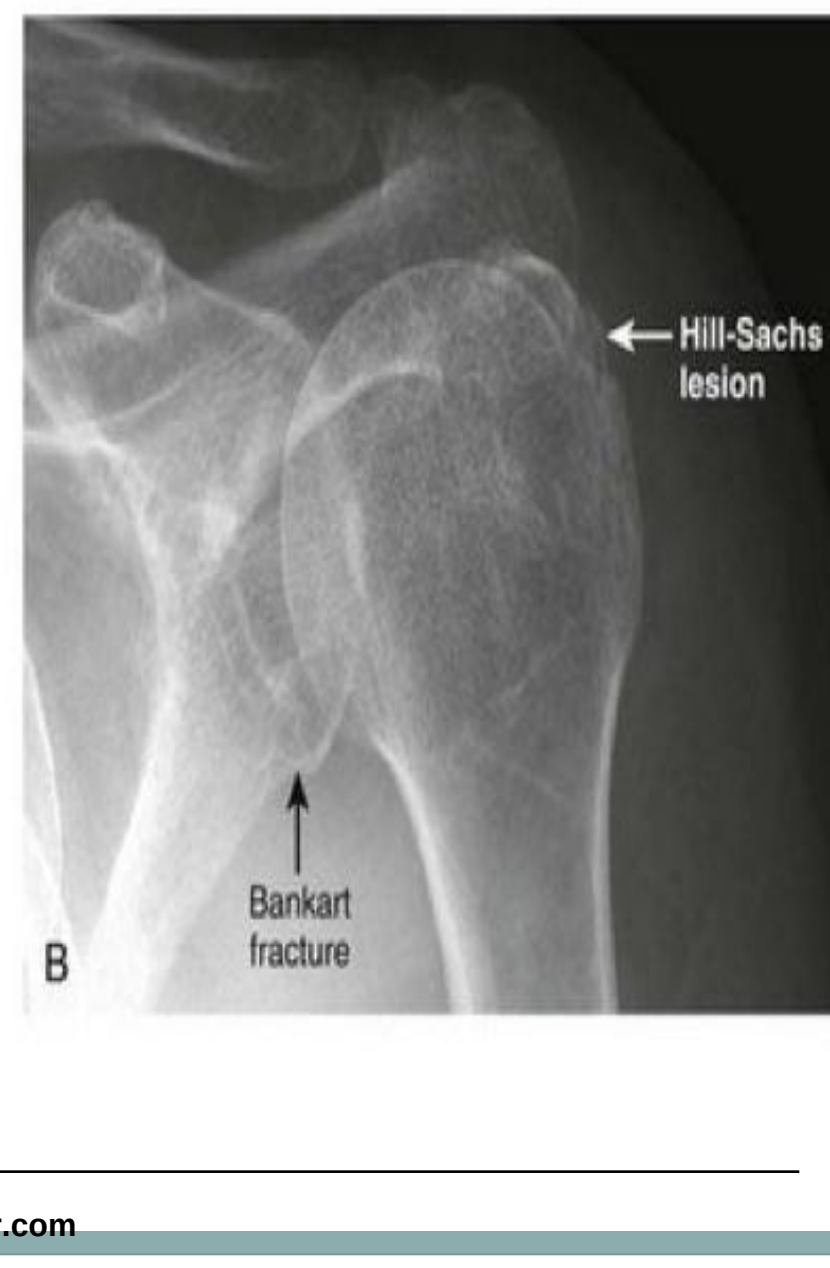
GURE 3
P view of an inferior shoulder dislocation is similar to
at of an anterior dislocation (Figure 1), but the arm is
tended upward in a fixed position.

Lesions that are commonly seen with an anterior dislocation include the **Hill-Sachs fracture and the Bankart fracture**.

A **Hill-Sachs fracture** is a fracture of the humeral head. It occurs along the posterior and superior aspect and is caused by the impaction of the humeral head on the inferior aspect of the glenoid process.

A **Bankart fracture** is caused by the same mechanism, but it is a fracture of the inferior aspect of the glenoid process.





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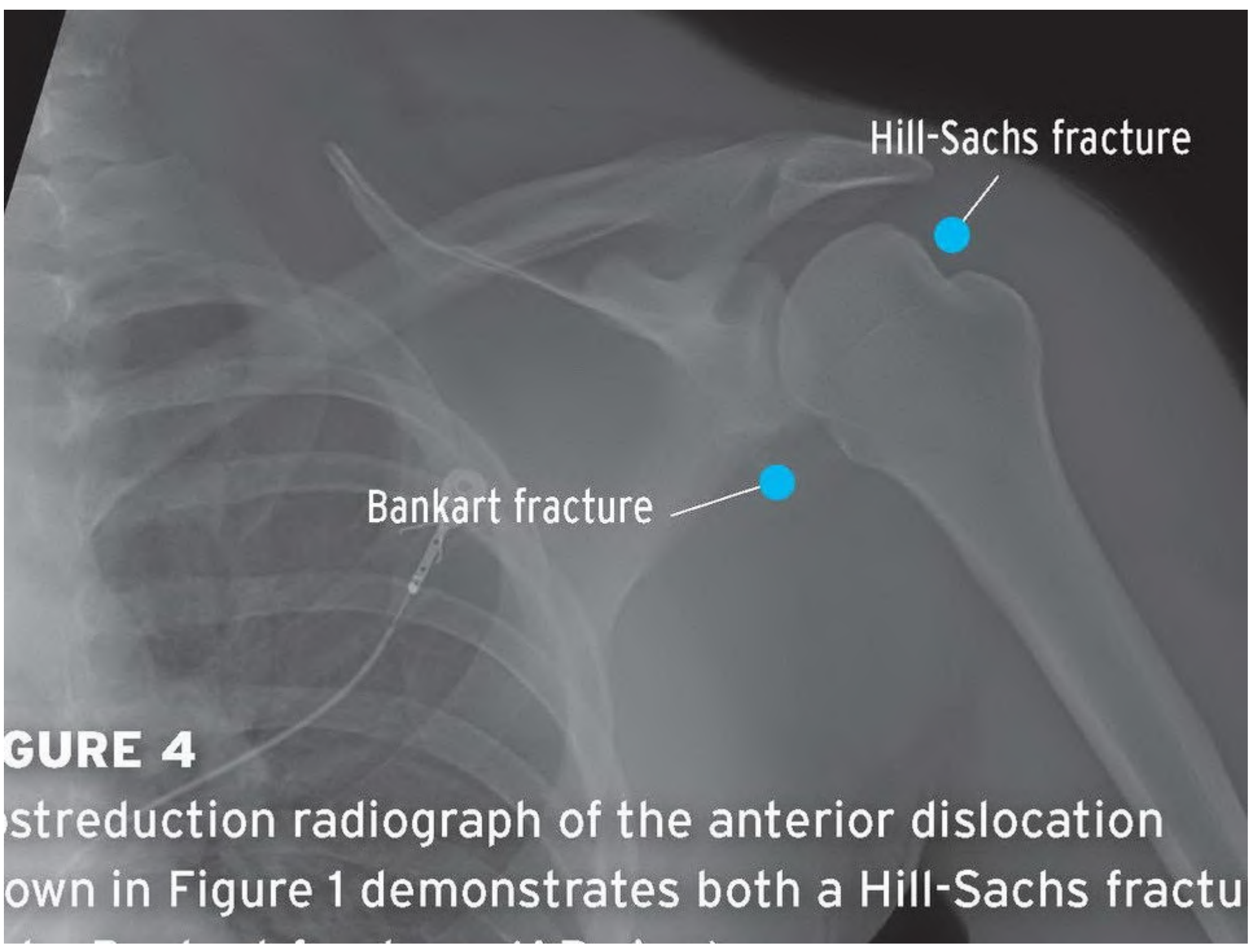
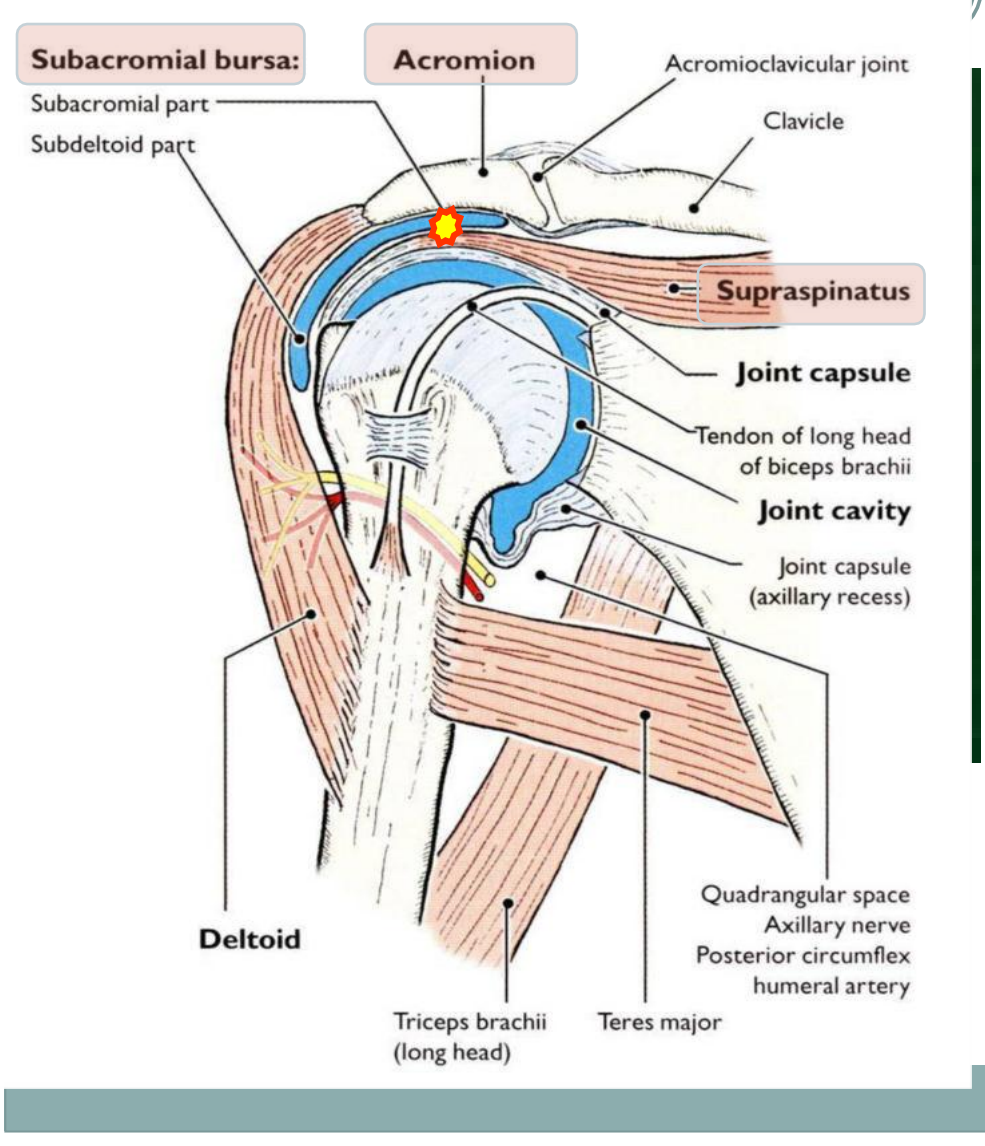
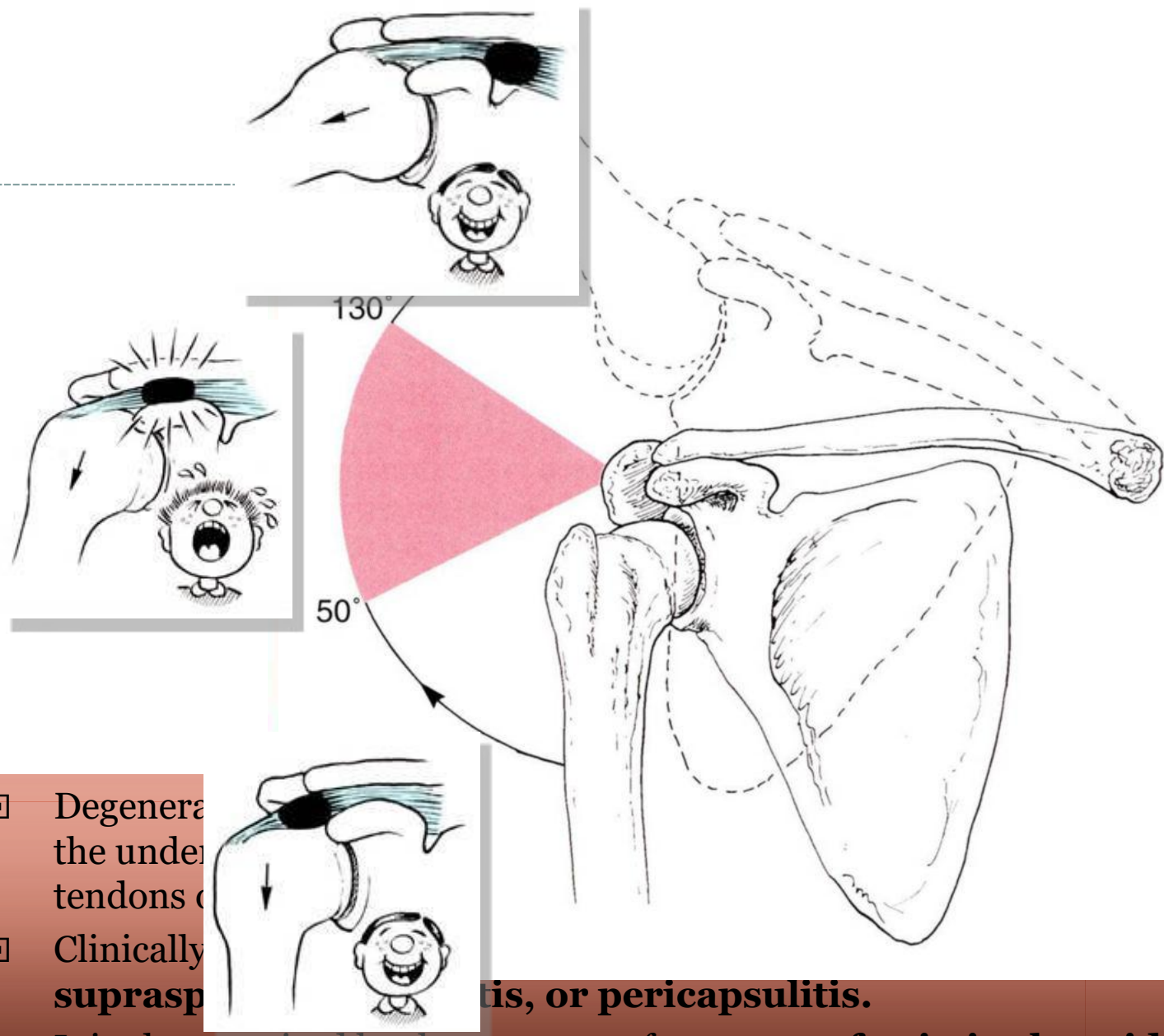


ROTATOR CUFF TENDINITIS



- Lesions of the rotator cuff are a common **cause of pain** in the shoulder region.
- **Excessive overhead activity** of the upper limb may be the cause of tendinitis, although many cases appear spontaneously.
- During abduction of the shoulder joint, the supraspinatus tendon is exposed to **friction against the acromion.**
- Under normal conditions the amount of friction is reduced to a minimum by the large **subacromial bursa,** which extends laterally beneath the deltoid.



- Degenera… …ges in the under… …other tendons …
- Clinically … **supraspi… …is, or pericapsulitis.**
- It is characterized by the presence of a **spasm of pain in the middle range of abduction** when the diseased area impinges on the acromion.

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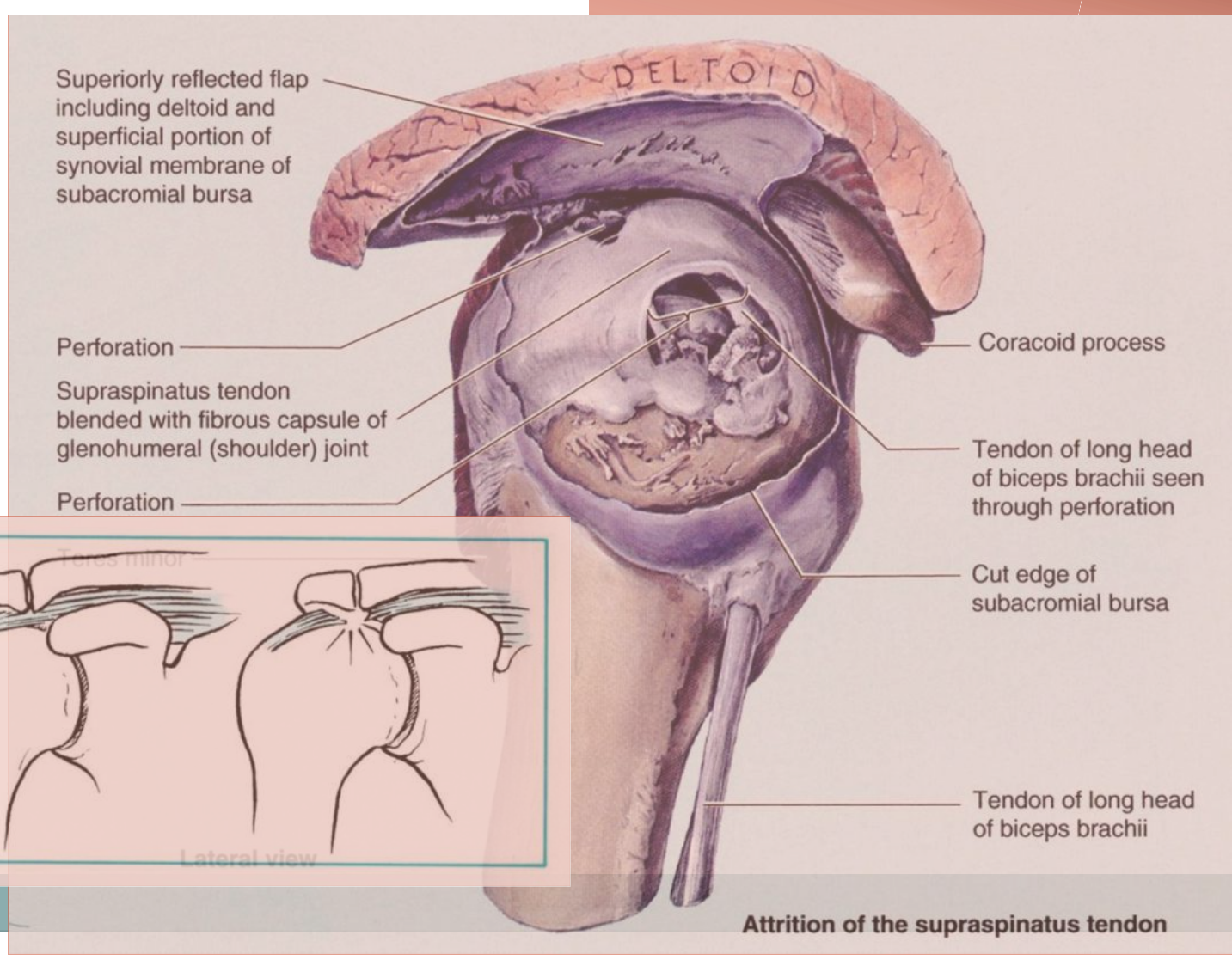
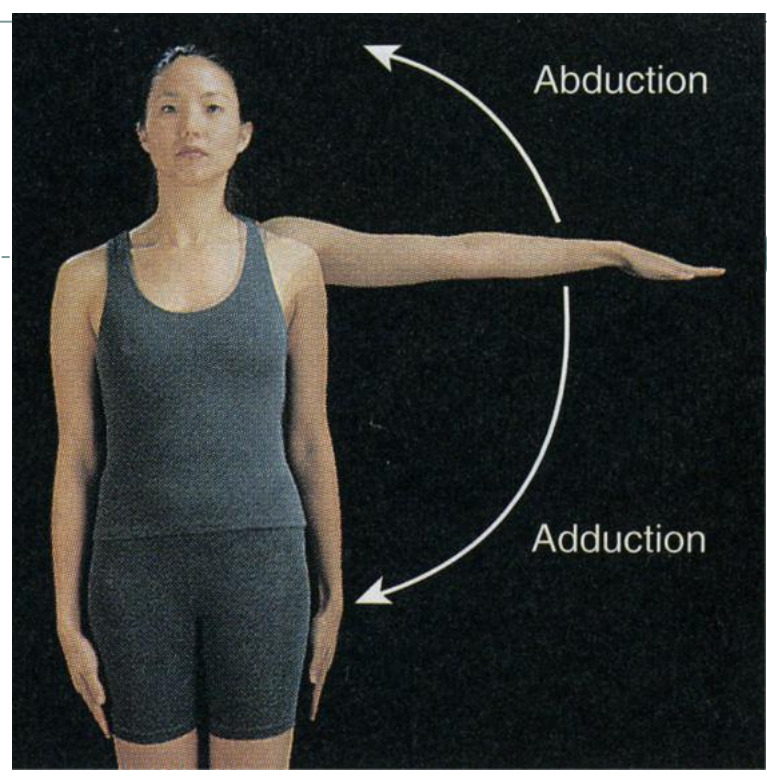
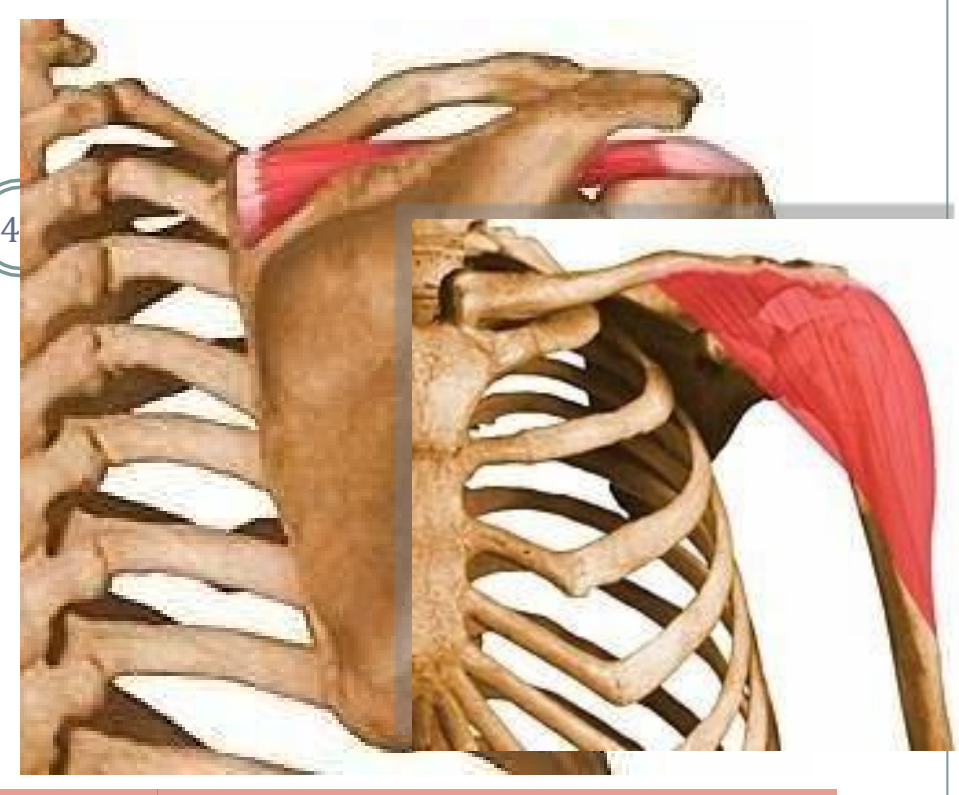
Painful Arc Syndrome

RUPTURE OF THE SUPRASPINATUS TENDON

In advanced cases of rotator cuff tendinitis, the necrotic supraspinatus tendon can become calcified or **rupture**.

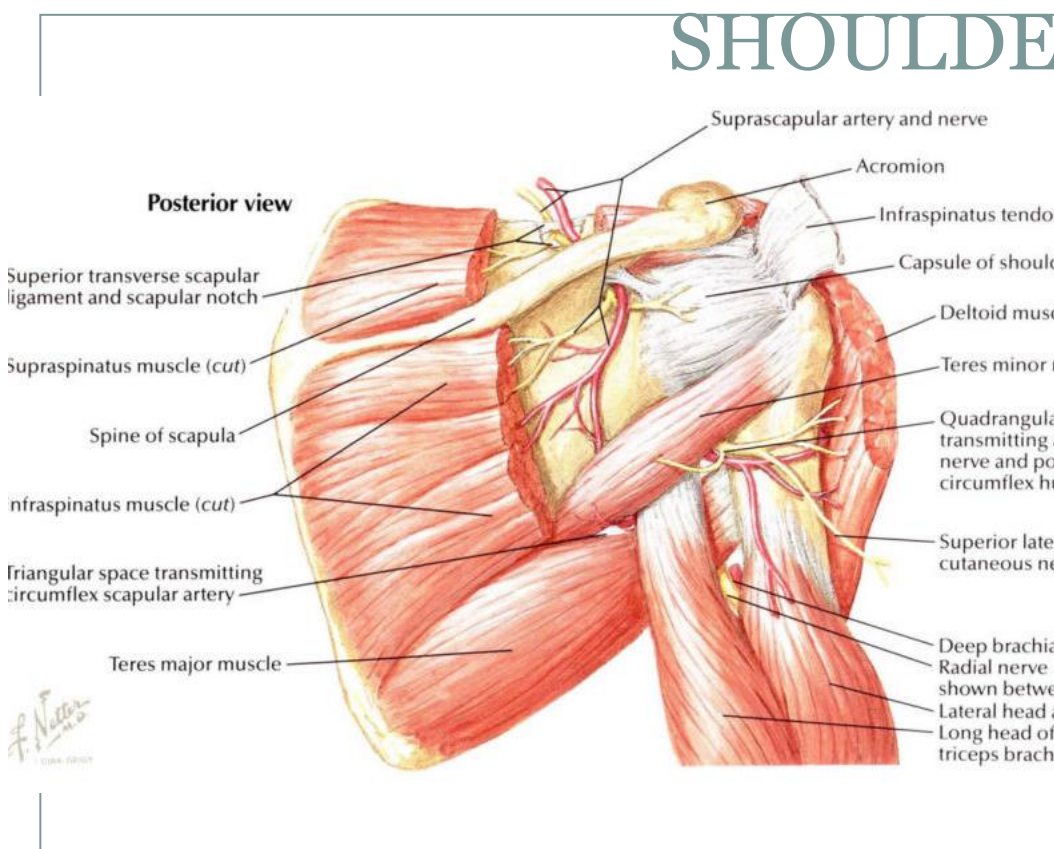






- Rupture of the tendon seriously ***interferes with the normal abduction movement*** of the shoulder joint.
- The main function of the supraspinatus muscle is to hold the head of the humerus in the glenoid fossa at the commencement of abduction.
- The patient with a ruptured supraspinatus tendon **is unable to initiate abduction of the arm.**
- ***However, if the arm is passively assisted for the first 15° of abduction, the deltoid can then take over and complete the movement to a right angle.***

SHOULDE



- The synovial membrane, capsule, and ligaments of the shoulder joint are innervated by the **axillary nerve** and the **suprascapular nerve**.
- The joint is sensitive to pain, pressure, excessive traction, and distension.
- The muscles surrounding the joint undergo **reflex spasm** in response to pain originating in the joint, which in turn serves to ***immobilize the joint*** and thus reduce the pain.
- Injury to the shoulder joint is followed by pain, limitation of movement, and muscle atrophy owing to disuse.

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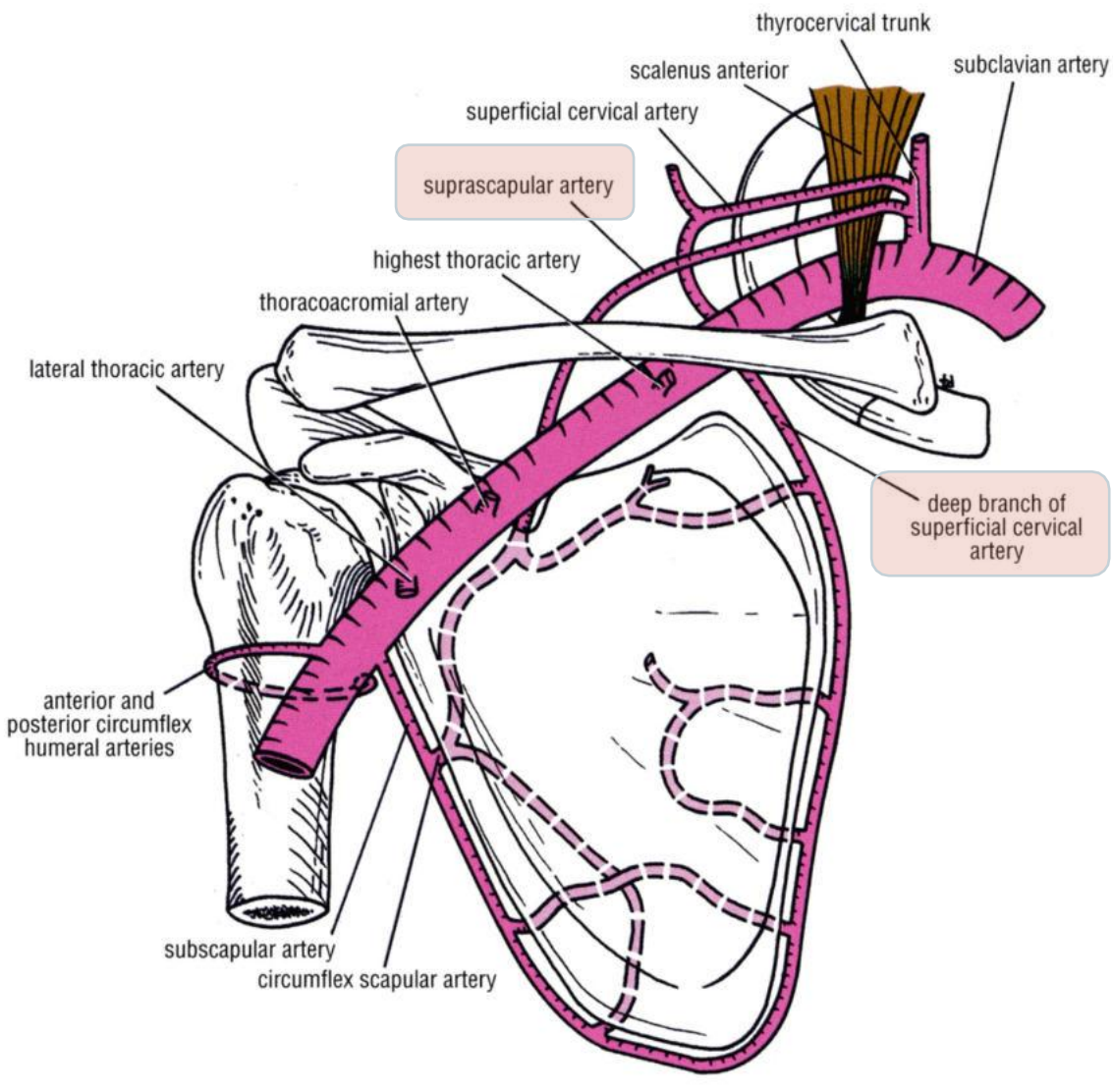
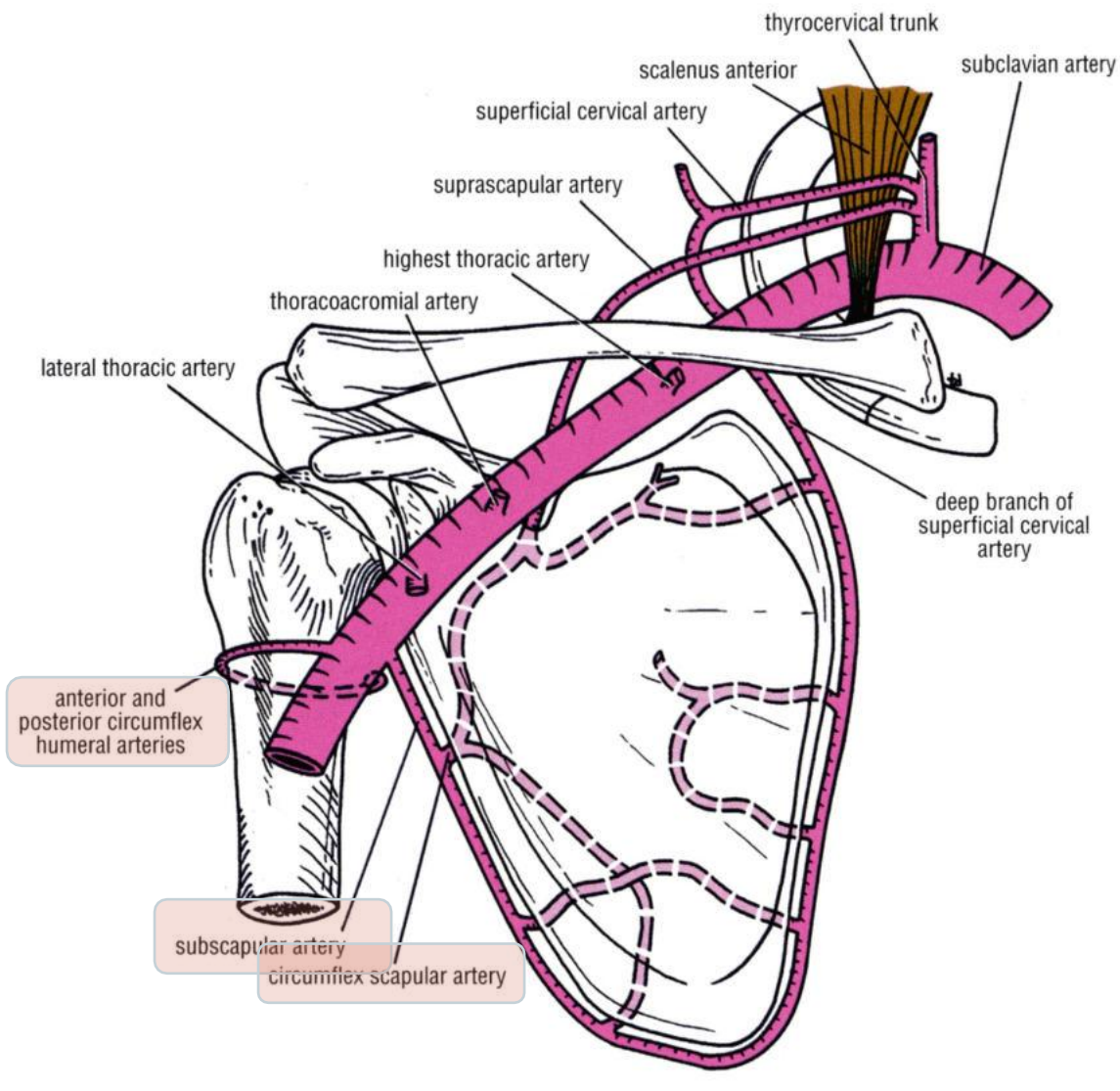
ANASTOMOSES AROUND THE SCAPULAR REGIONS

BRANCHES FROM THE SUBCLAVIAN ARTERY

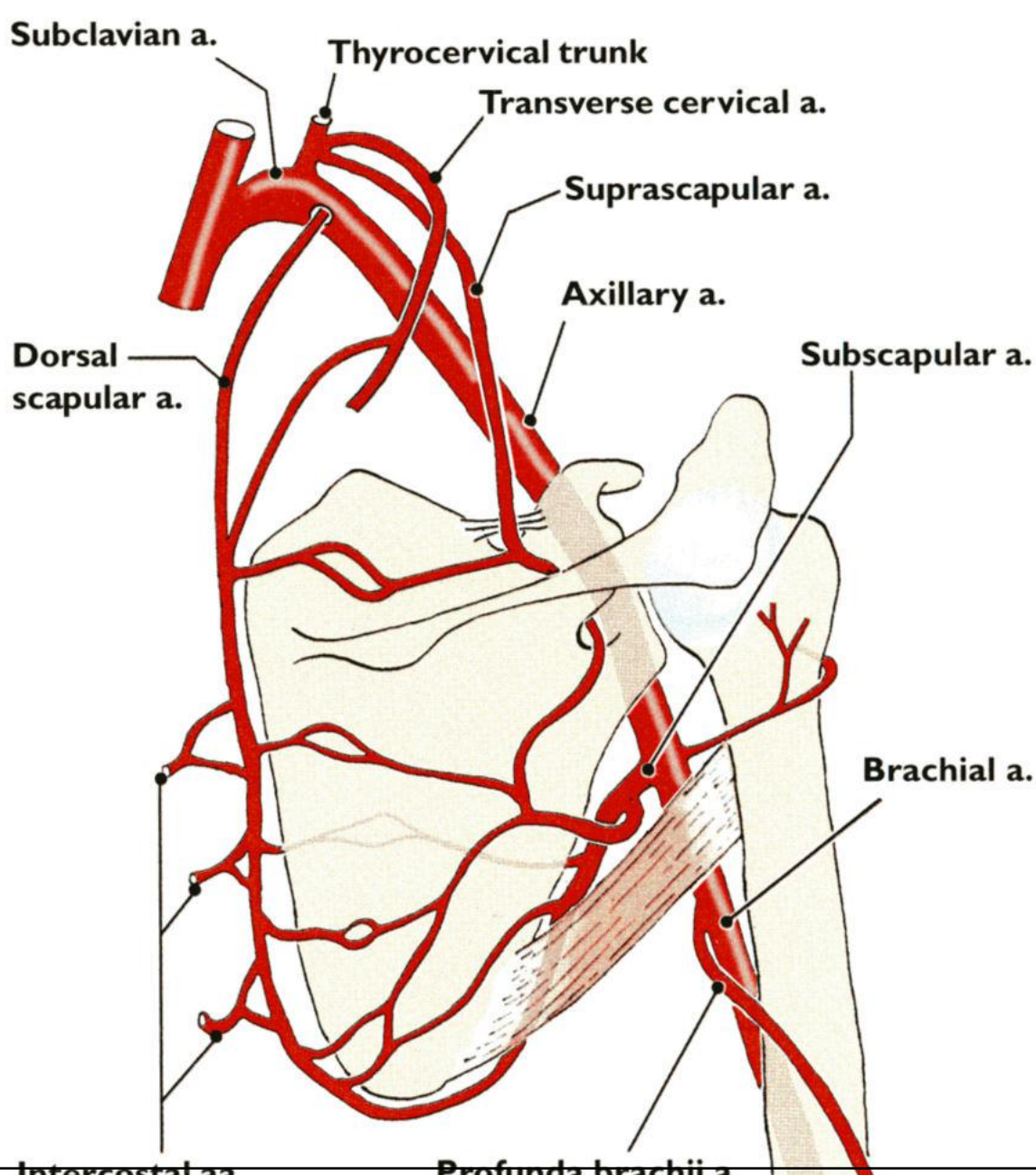


- **The suprascapular artery, (**branch from 1st part of subclavian artery) distributed to the supraspinous and infraspinous fossae of the scapula.
- **The superficial cervical artery,** which gives off a ***deep branch*** that runs down the medial border of the scapula.

BRANCHES FROM THE AXILLARY ARTERY



- **The subscapular artery** and its ***circumflex scapular branch*** supply the subscapular and infraspinous fossae of the scapula.
- **The anterior & posterior circumflex humeral artery.**
- Both the circumflex arteries form an ***anastomosing circle*** around the surgical neck of the humerus.



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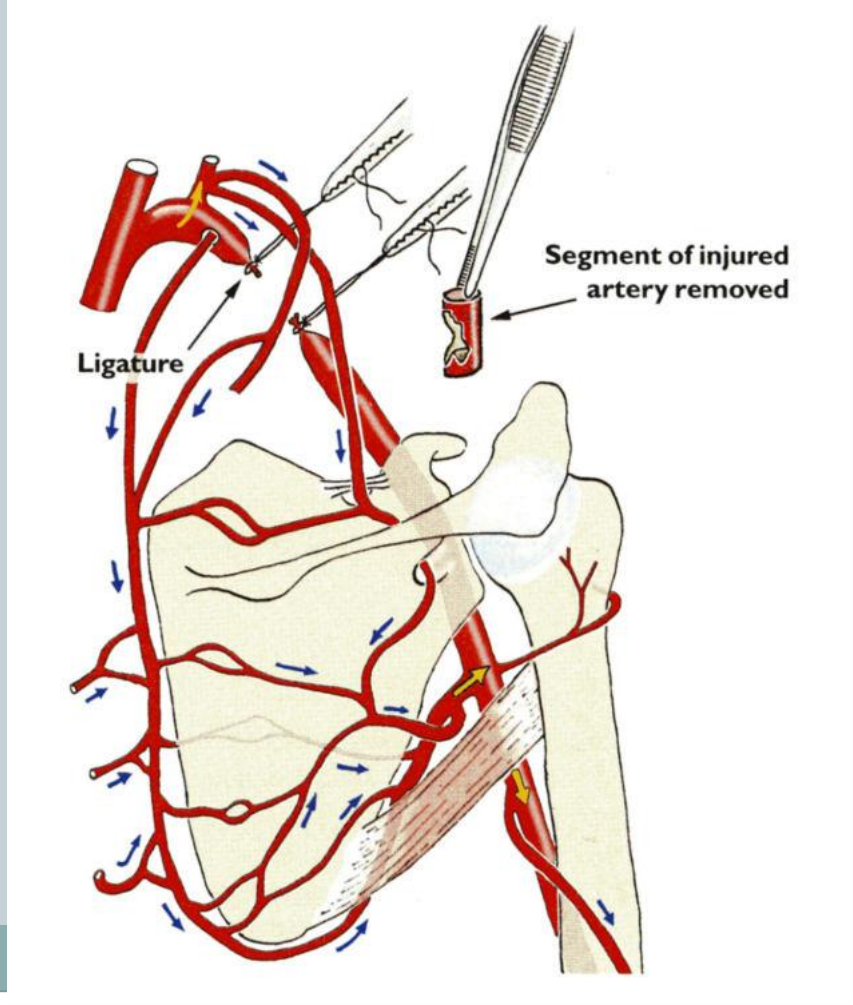
LIGATION OF THE AXILLARY ARTERY



The existence of the anastomosis around the shoulder joint is vital to preserving the upper limb if it should it be necessary to ligate the axillary artery.

MCQ

- Which of the following is NOT a rotator cuff muscle
- A. Supraspinatus
- B. Infraspinatus
- C. Teres major
- D. Subscapularis

MCQ

- Abduction of shoulder joint is initiated by :
- A. supraspinatus
- B. infraspinatus
- C. trapezius
- D. subscapularis

MCQ

- Which part of deltoid muscle is involved only in shoulder joint abduction ?
- Anterior fibres
- Posterior fibres
- Middle fibres
- All fibres

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MCQ

- Which two rotator cuff muscles laterally rotate the arm at the shoulder?
- A.Infraspinatus and subscapularis
- B.Supraspinatus and infraspinatus
- C.Teres Minor and Infraspinatus
- D.Teres minor and Subscapularis

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