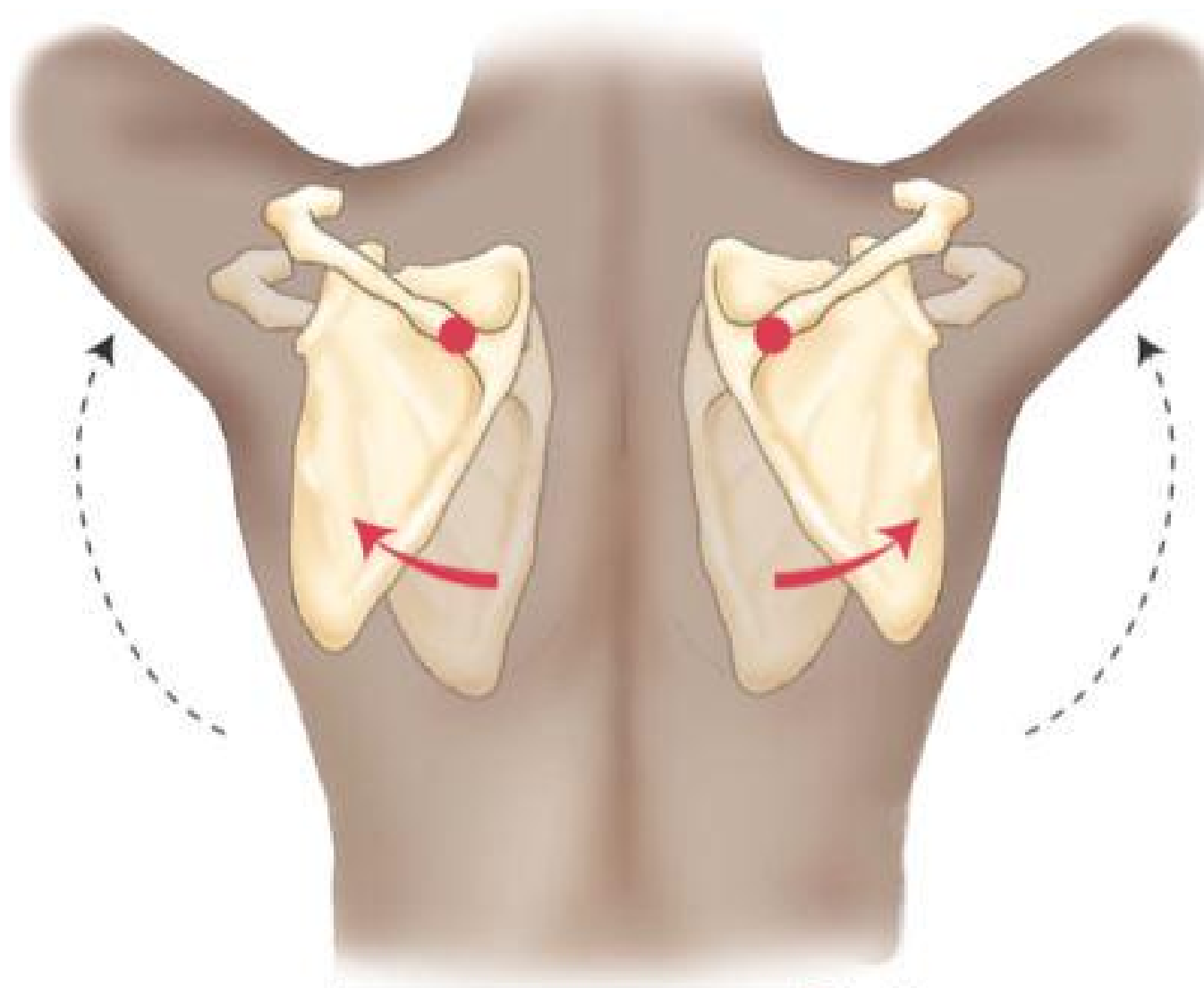


## Objectives

- Know the landmarks of the bony structures of the shoulder/axillary regions
- Know the rotator cuff muscles, external rotators, internal rotators
- Be familiar with principal muscles of the scapular , scapulo-humeral region
- Scapular rotation in relation with shoulder movements

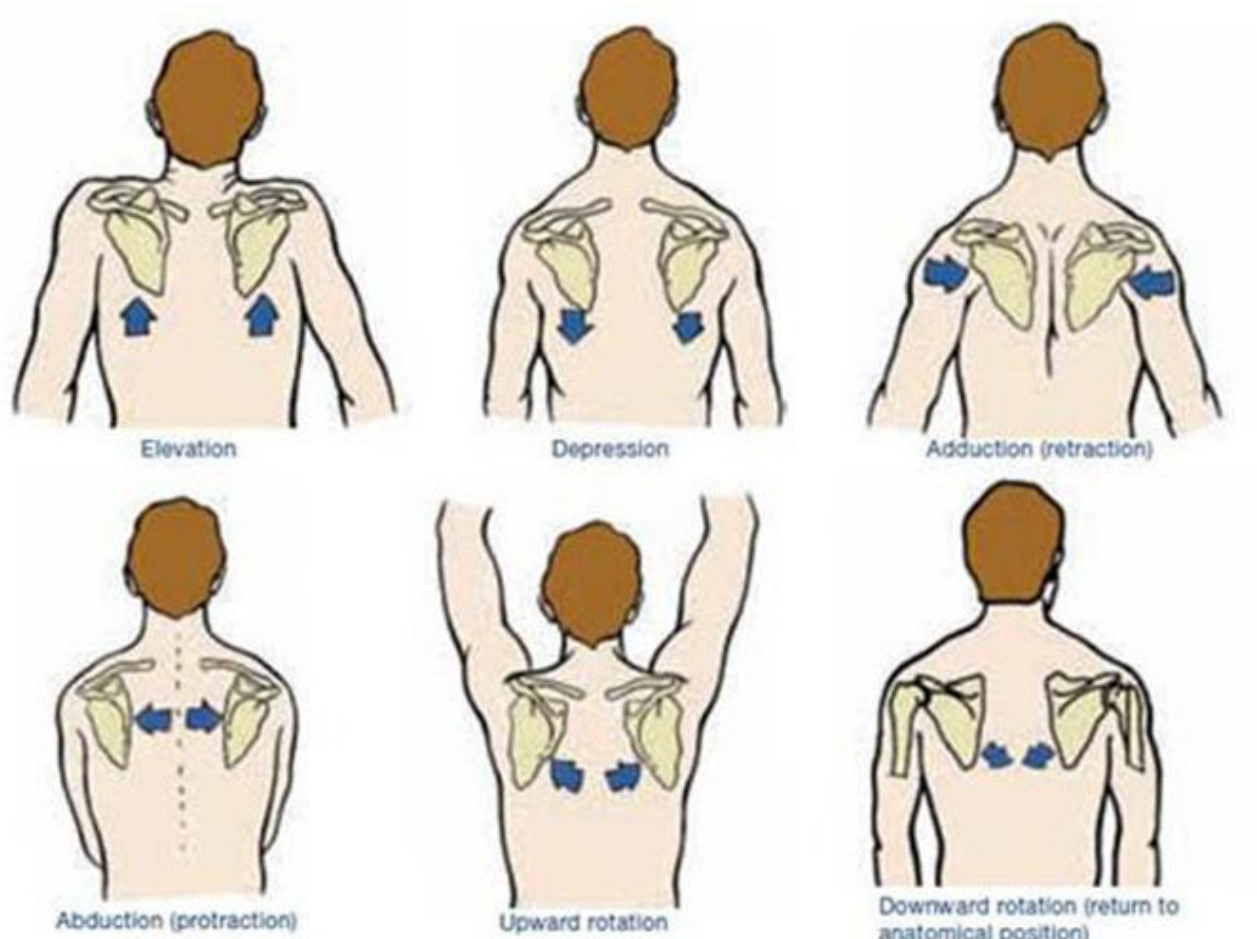
## Muscles Connecting the Upper Limb to the Vertebral Column

### Movements of Scapula



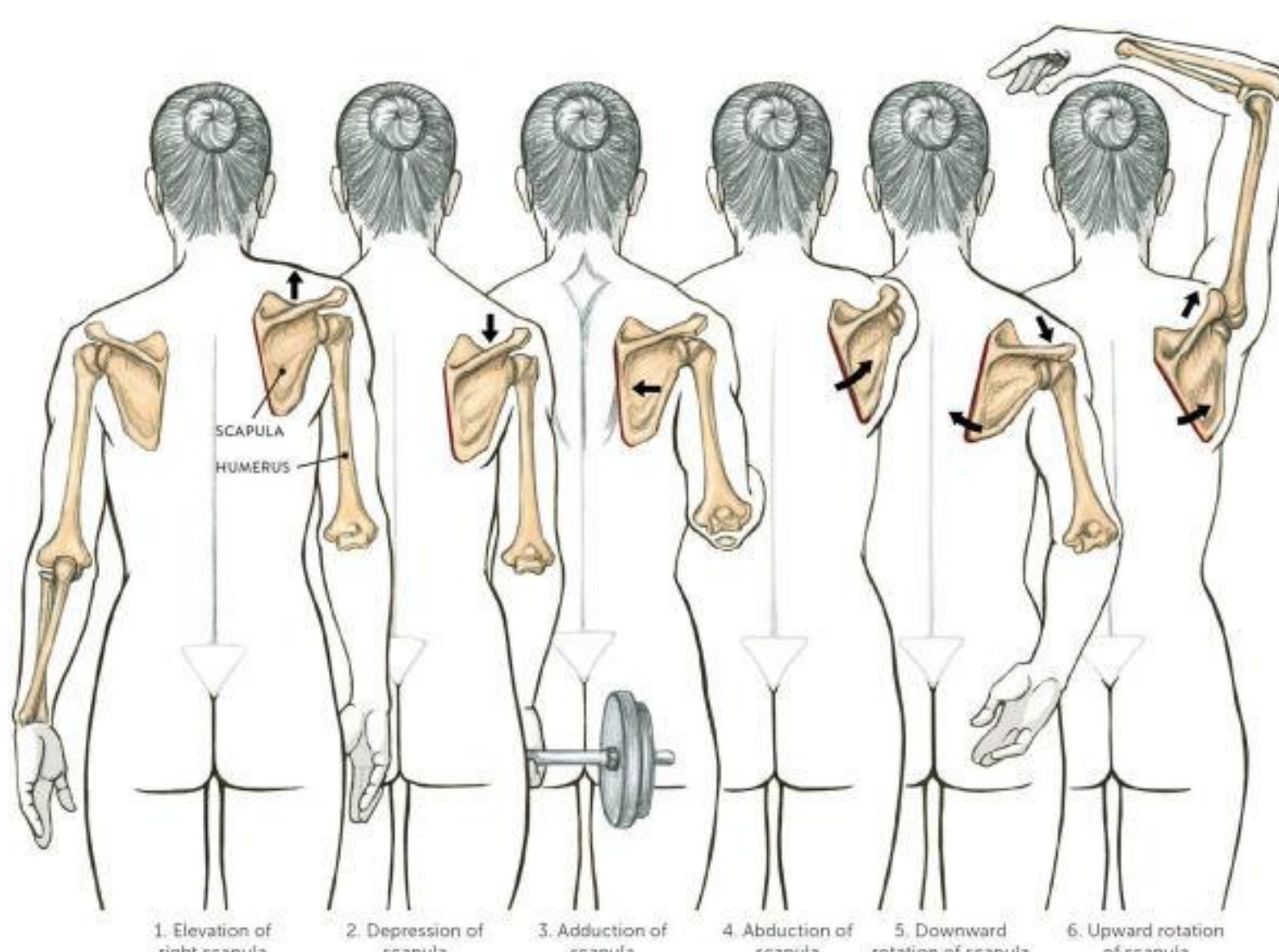
### Movements of Scapula

Figure 3-34  
Scapular  
movements

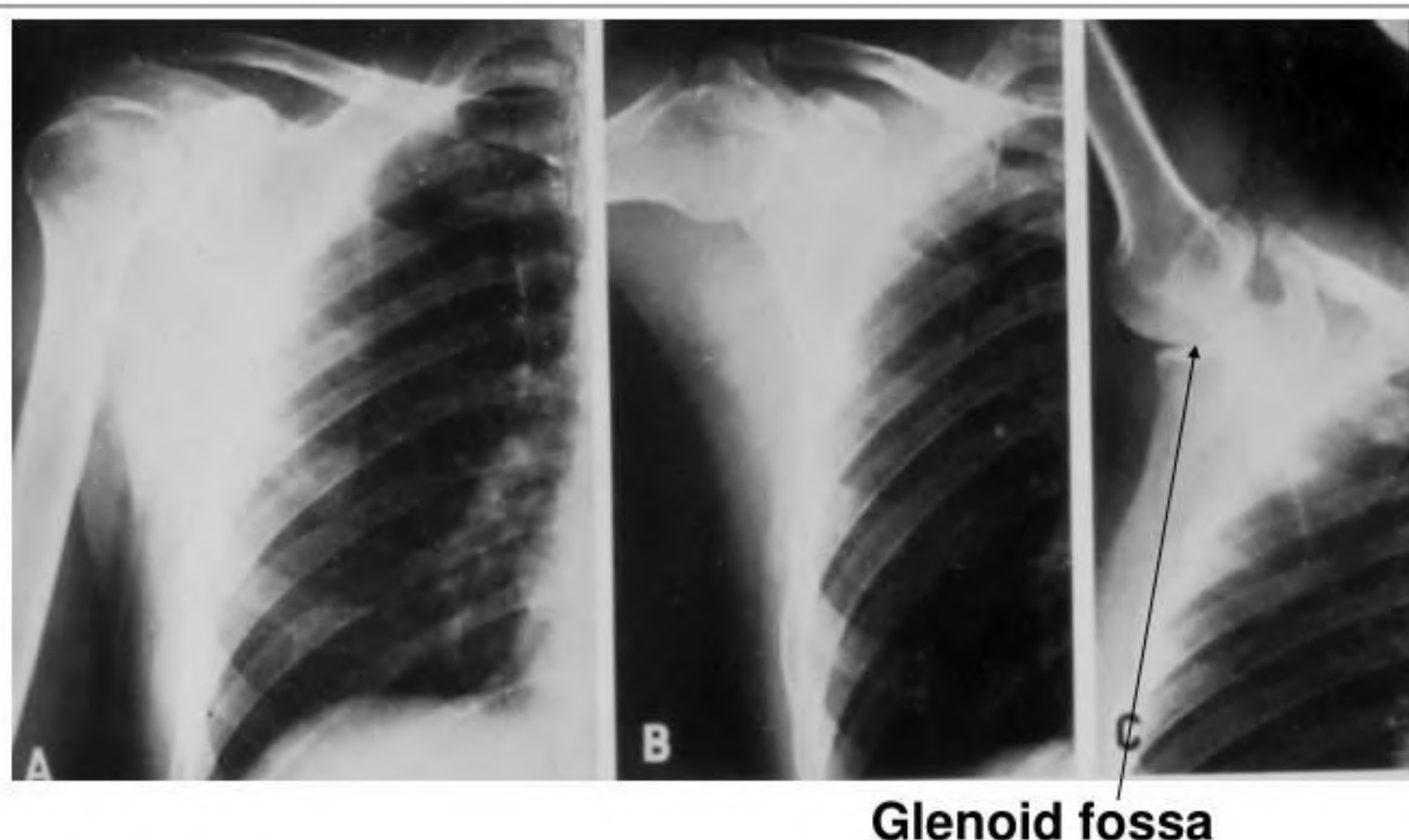




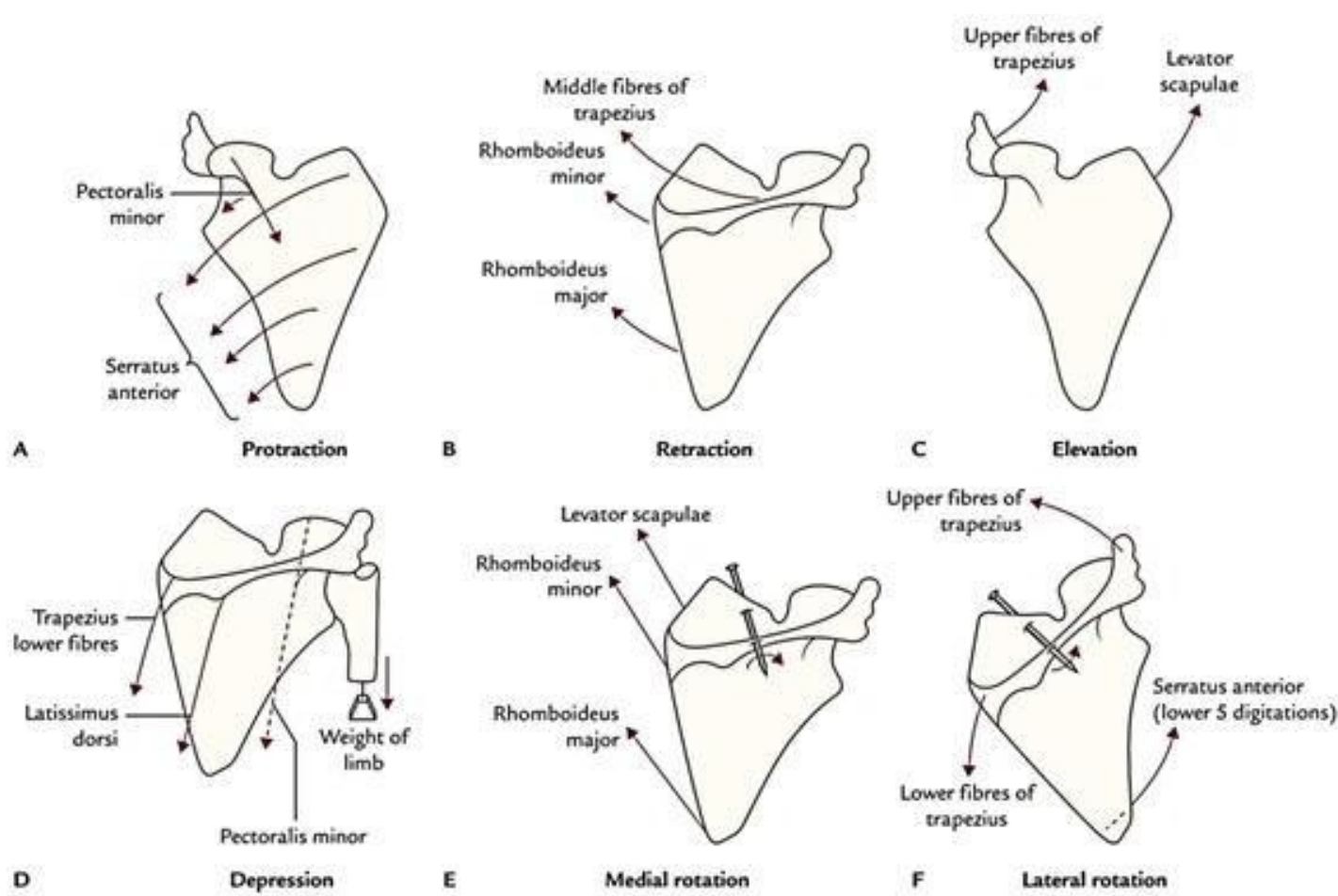
## Movements of Scapula



**Complete abduction at the shoulder joint requires superior rotation of the scapula so that the glenoid fossa faces superiorly.**



## Movements of Scapula



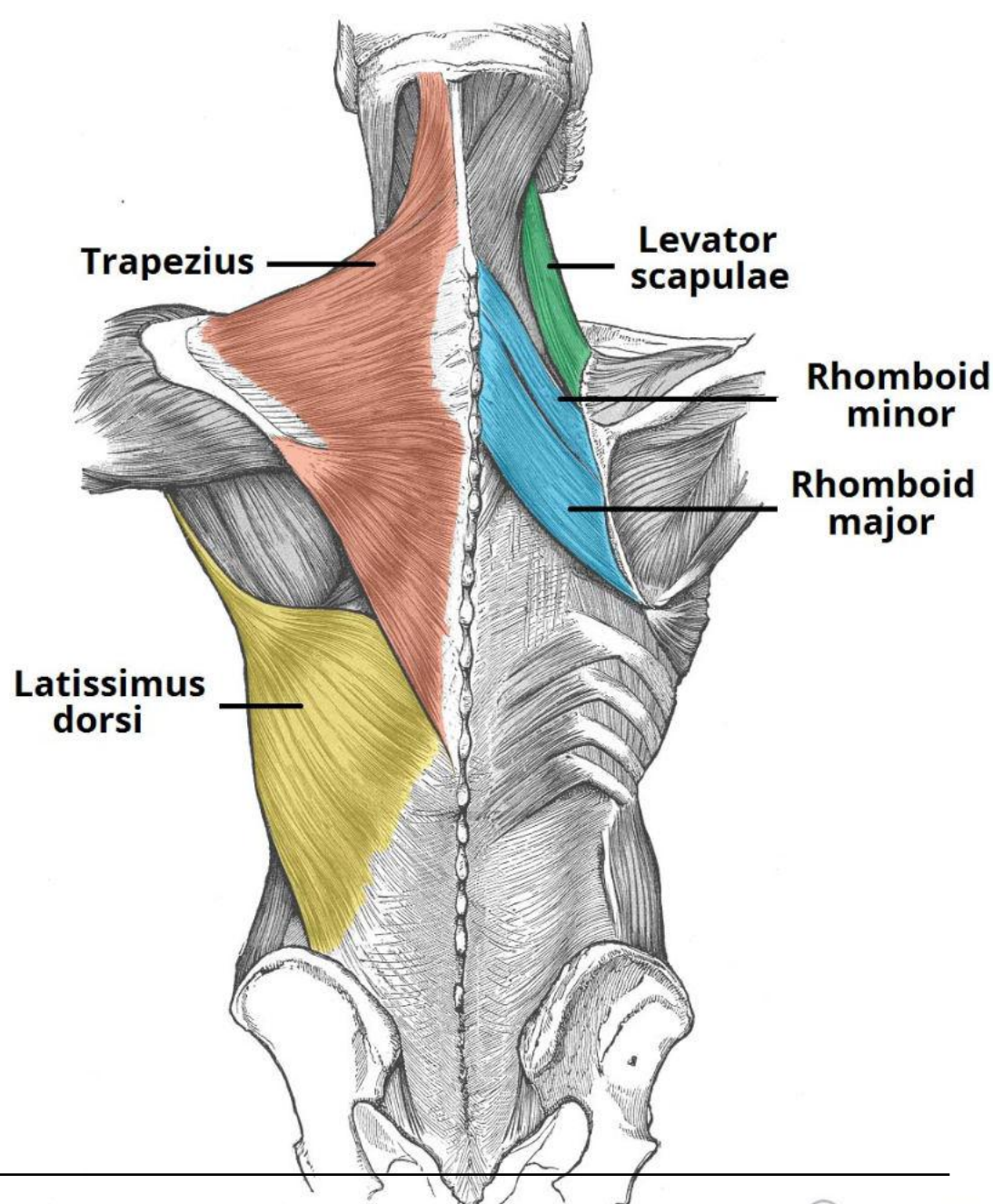
Arranged in two layers

Layer 1<sup>st</sup>

- Trapezius
- Latissimus dorsi

Layer 2<sup>nd</sup>

- Levator scapulae
- Rhomboideus major and minor





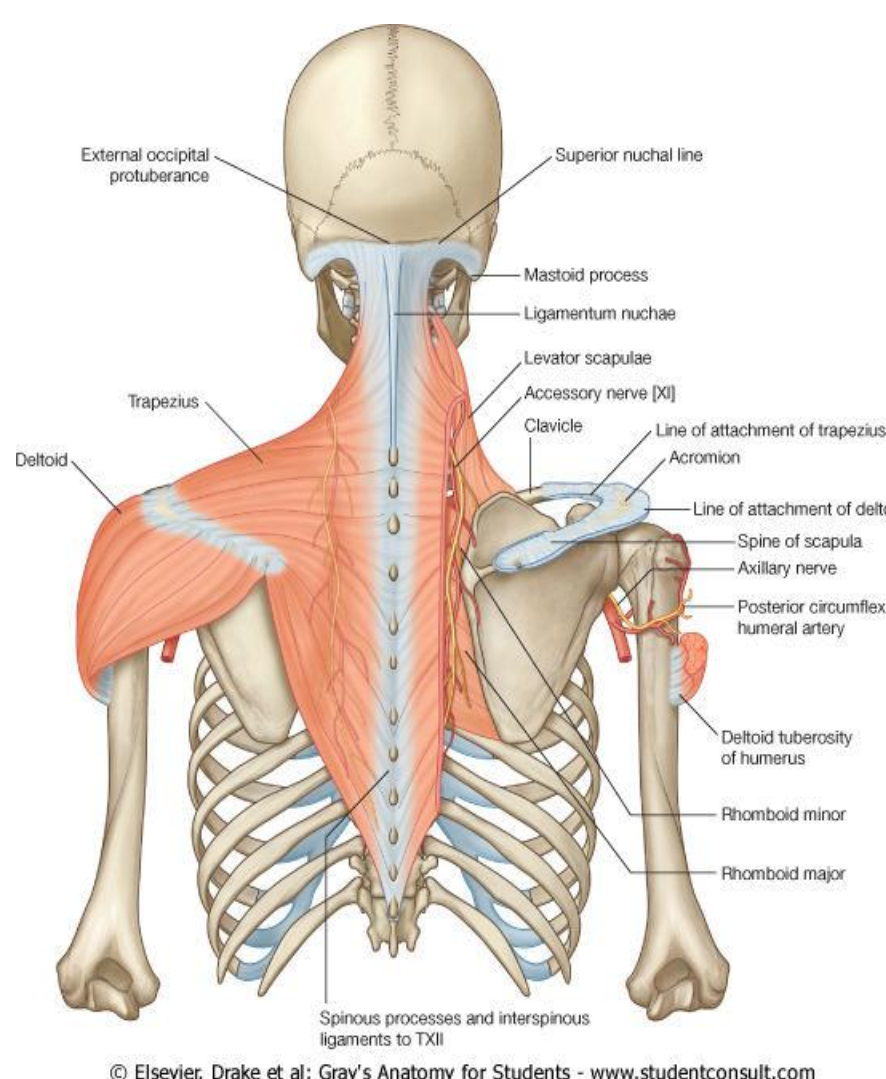
# Trapezius

## Origin

- Occipital bone(external occipital protuberance), superior nuchal line, ligamentum nuchae, spine of seventh cervical vertebra, spines of all thoracic vertebrae and their supraspinous ligament

## Insertion

- Upper fibers into posterior border of lateral third of clavicle
- middle fibres- medial border of acromion and upper lip of crest of spine
- lower fibers pass upward and laterally and insert on medial end of spine of scapula



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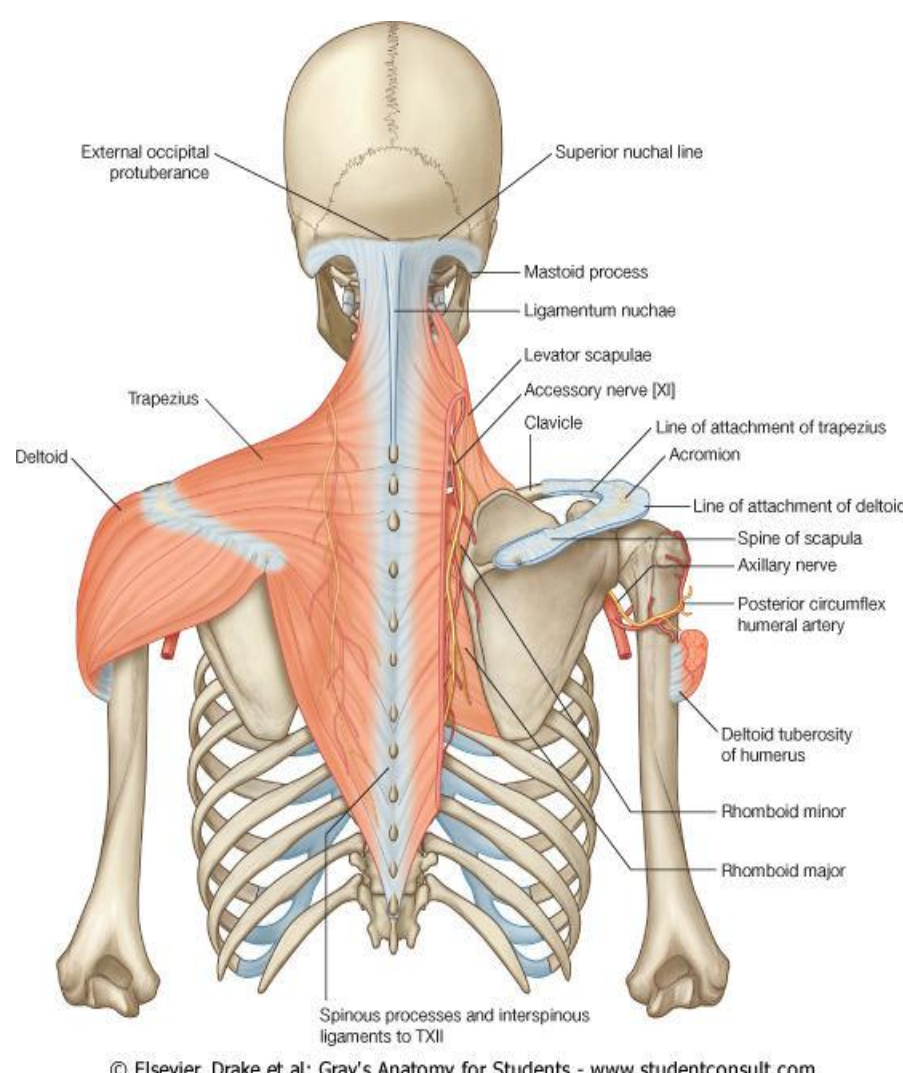
# Trapezius

## Nerve Supply

- Spinal part of accessory nerve (motor) and ventral rami of C3 and 4 (sensory- proprioceptive)

## Action

- Upper fibers along with levator scapulae elevate the scapula;
- middle fibers with rhomboids pull scapula medially (retracts);
- lower fibers pull medial border of scapula downward , so upper and lower fibres acting together rotate scapula-glenoid cavity face upward assisted by lower 5 digitations of serratus anterior



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# Latissimus dorsi

## Origin

- Iliac crest, lumbar fascia, spines of lower six thoracic vertebrae(T7-T12), lower three or four ribs, and inferior angle of scapula (5)

## Insertion

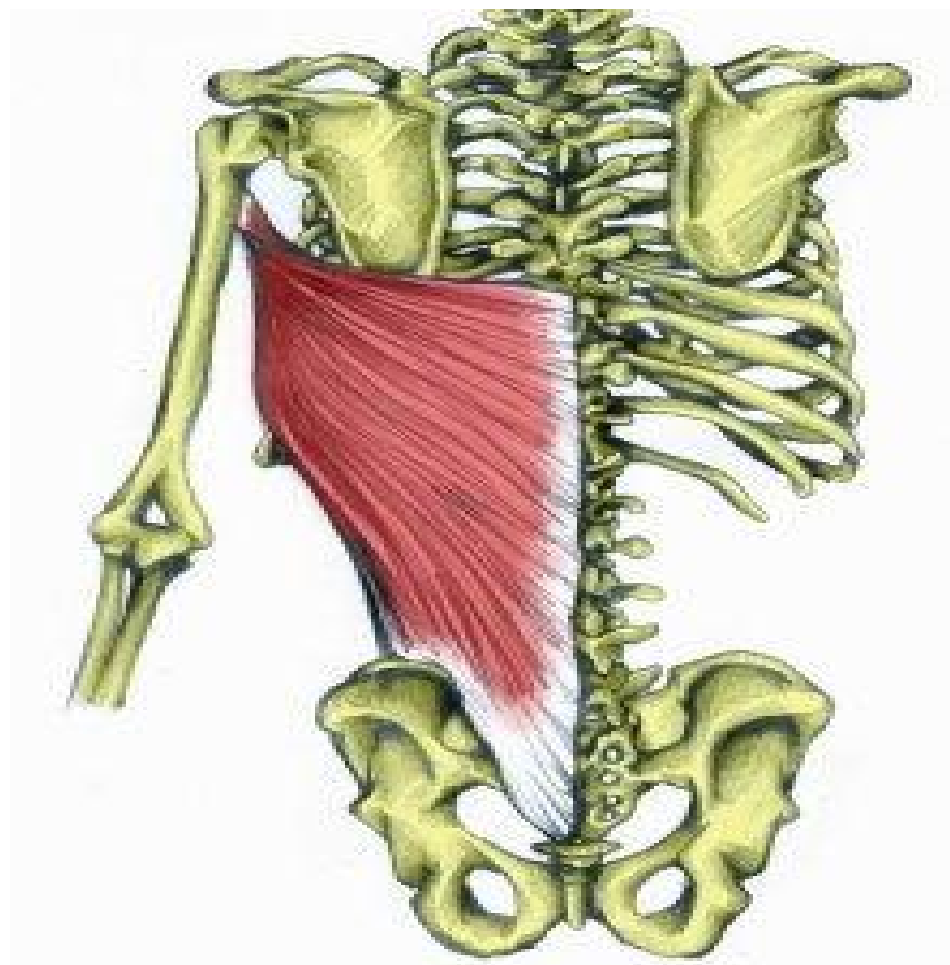
- Floor of bicipital groove of humerus (1)

## Nerve Supply

- Thoracodorsal nerve
- C6, 7, 8,

## Action

- Extends, adducts, and medially rotates the arm (3)
- Its called the climbing muscle
- Raising of the trunk above the arm



# Levator scapulae

## Origin

- Transverse processes of first fourth cervical vertebrae (1)

## Insertion

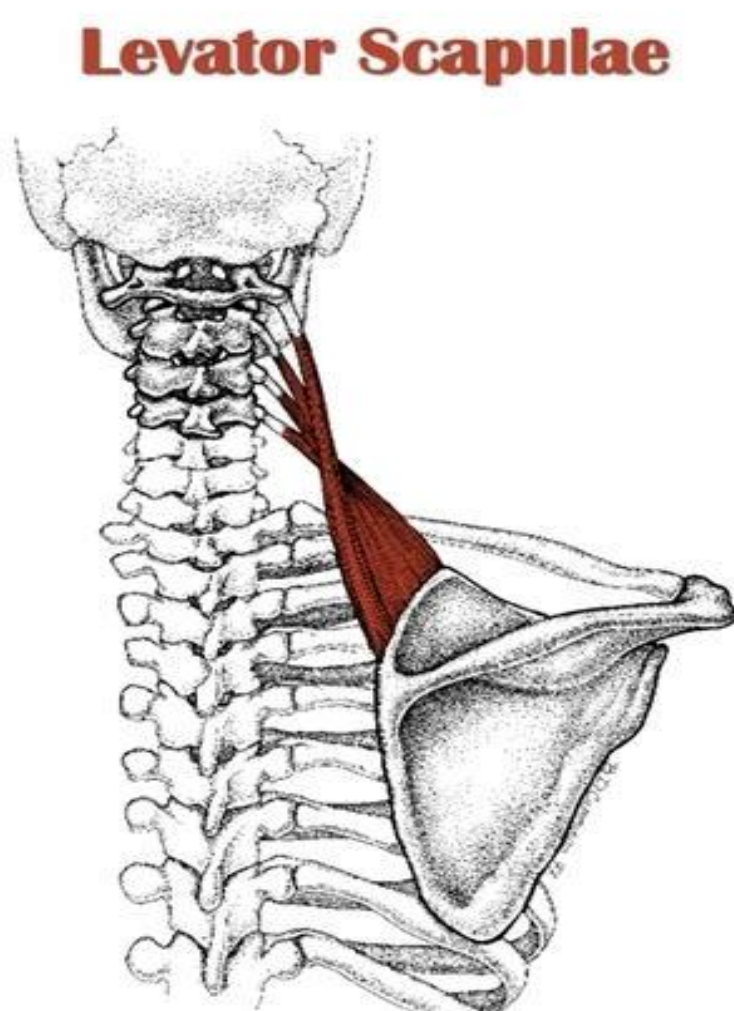
- Medial border of scapula (1)

## Nerve supply

- C3 and 4 and dorsal scapular nerve
- C3, 4, 5

## Action

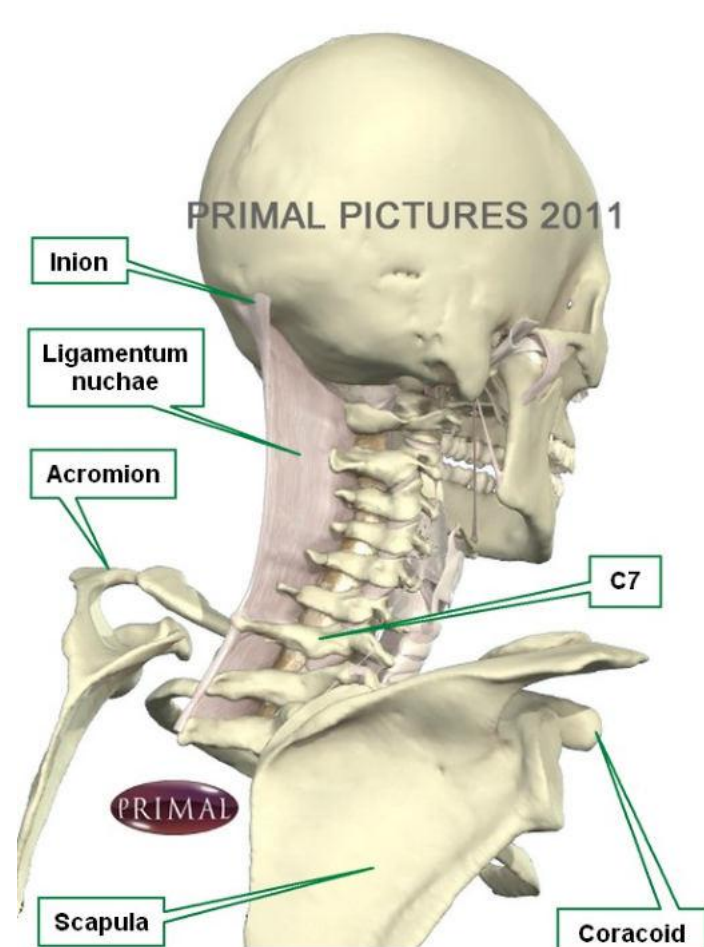
- Raises medial border of scapula





## ligamentum nuchae

The ligamentum nuchae is a large median ligament composed of tendons and fascia located between the posterior muscles of the neck. It covers the spines of C1 to C6 vertebrae. It is a superior and posterior extension of the supraspinous ligament.



## Rhomboid minor

### Origin

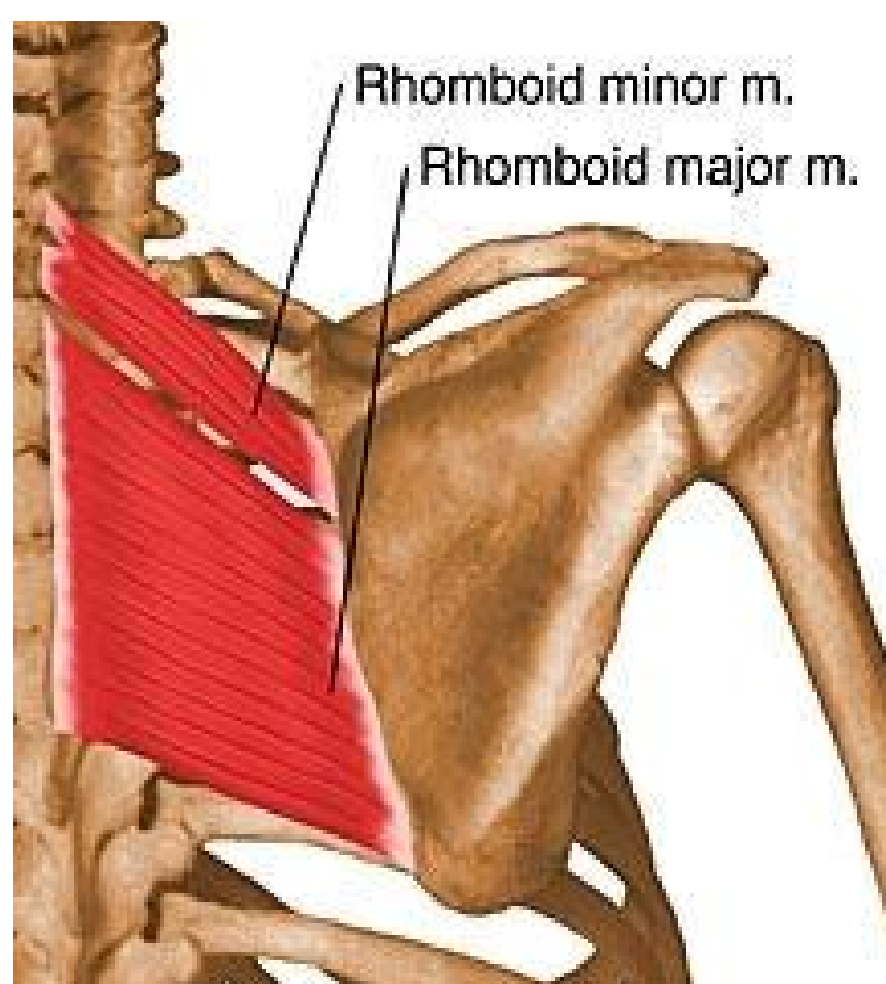
- Ligamentum nuchae and spines of seventh cervical and first thoracic vertebrae (3)

### Insertion

- Medial border of scapula (1)

### Nerve supply

- Dorsal scapular nerve **C4, 5**



## Rhomboid major

### Origin

- Second to fifth thoracic spines

### Insertion

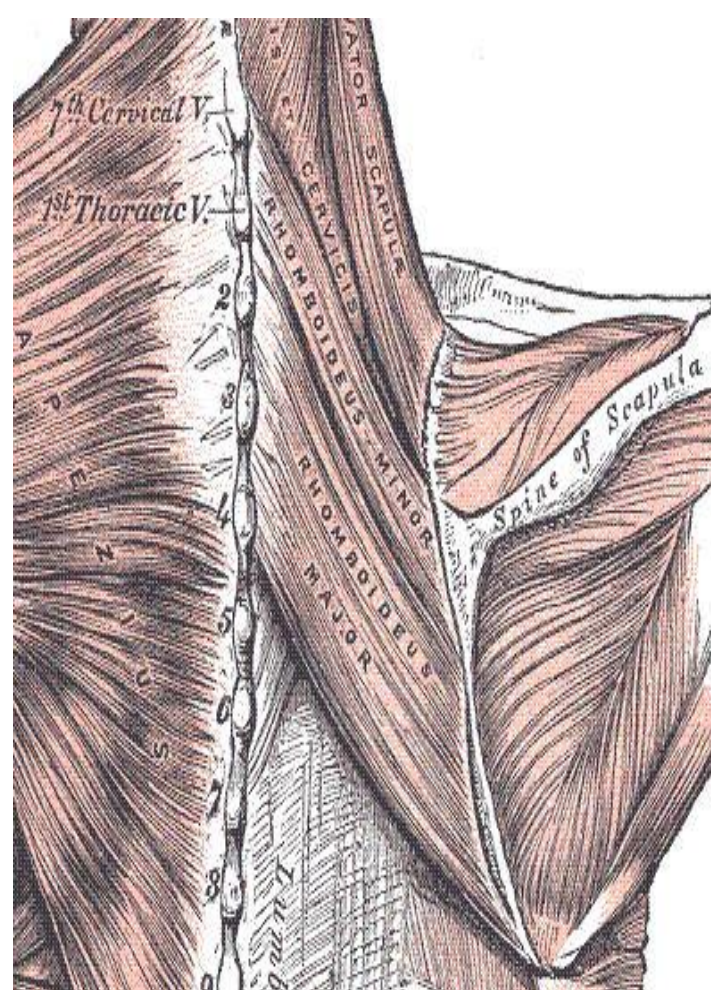
- Medial border of scapula (1)

### Nerve supply

- Dorsal scapular nerve **C4, 5**

### Action

- Retract scapula
- The **rhomboids** work collectively with the levator scapulae muscles to elevate the medial border of the scapula, downwardly rotating the scapula with respect to the glenohumeral joint.



## Muscles Connecting the Scapula to the Humerus



# MUSCLES OF THE SHOULDER GIRDLE

- Deltoid.
- Supraspinatus.
- Infraspinatus
- Teres Minor.
- Teres Major.
- Subscapularis.

## Deltoid

### Origin

- Lateral third of clavicle, acromion, spine of scapula

### Insertion

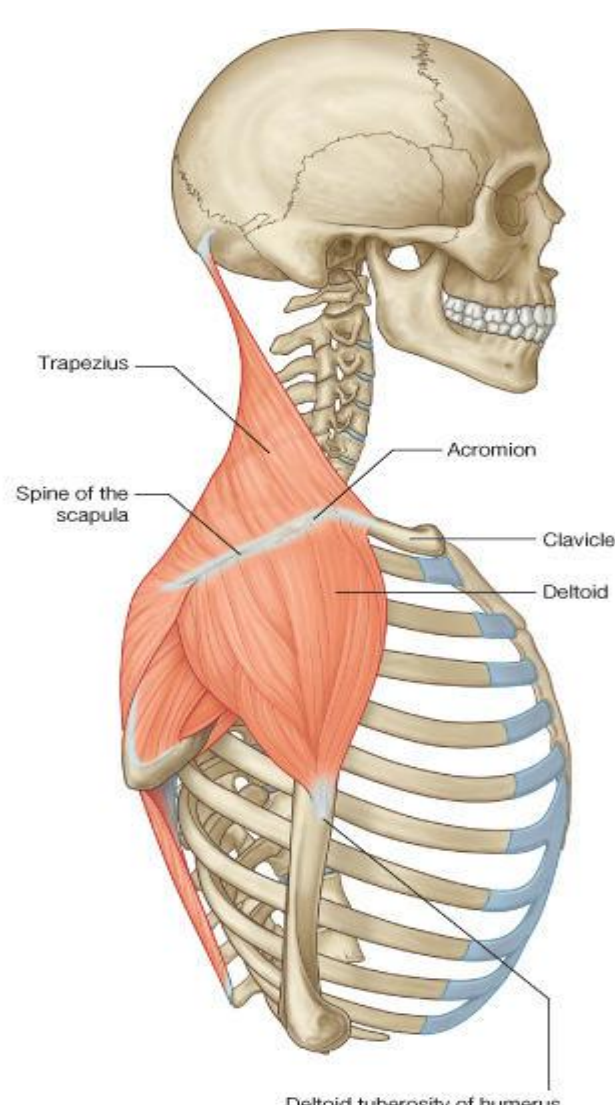
- Middle of lateral surface of shaft of humerus

### Nerve supply

- Axillary nerve C5, 6

### Action

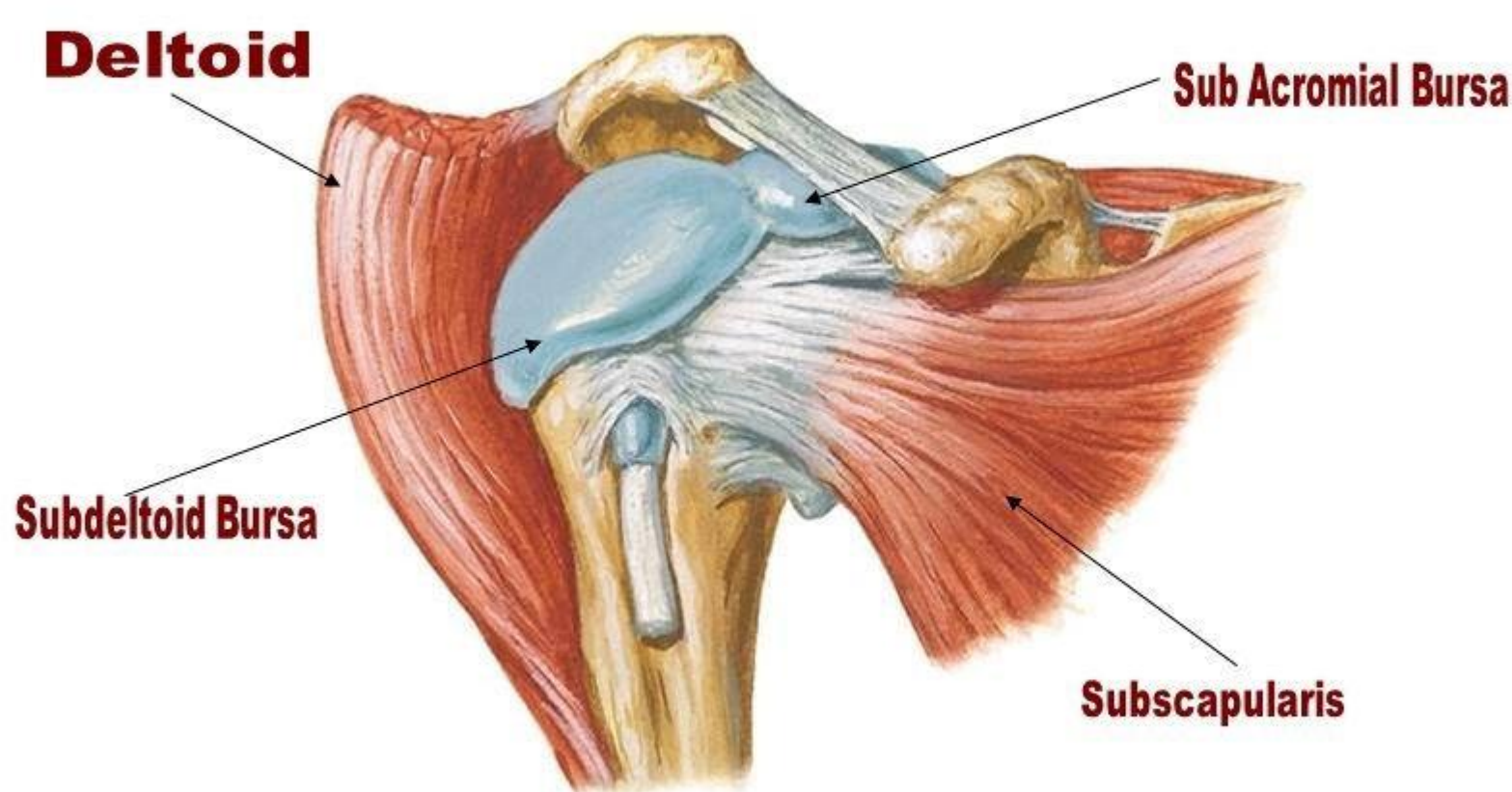
- Middle fibers Abducts arm; anterior fibers flex and medially rotate arm; posterior fibers extend and laterally rotate arm
- Abduction from 15-90 degrees



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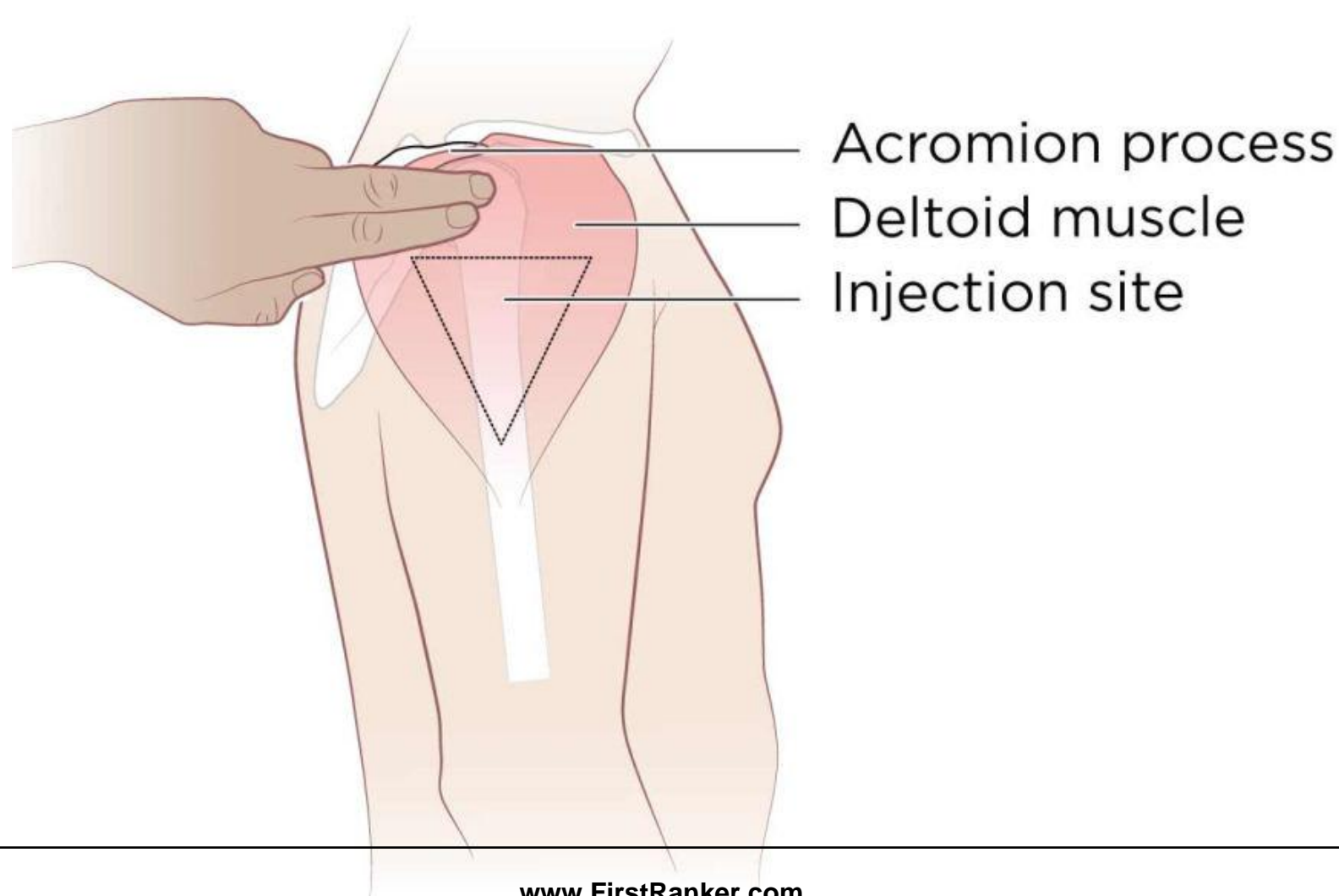
### Shoulder (Glenohumeral) Joint Anterior View: Supporting Muscles

#### Subdeltoid / Subacromial bursa.

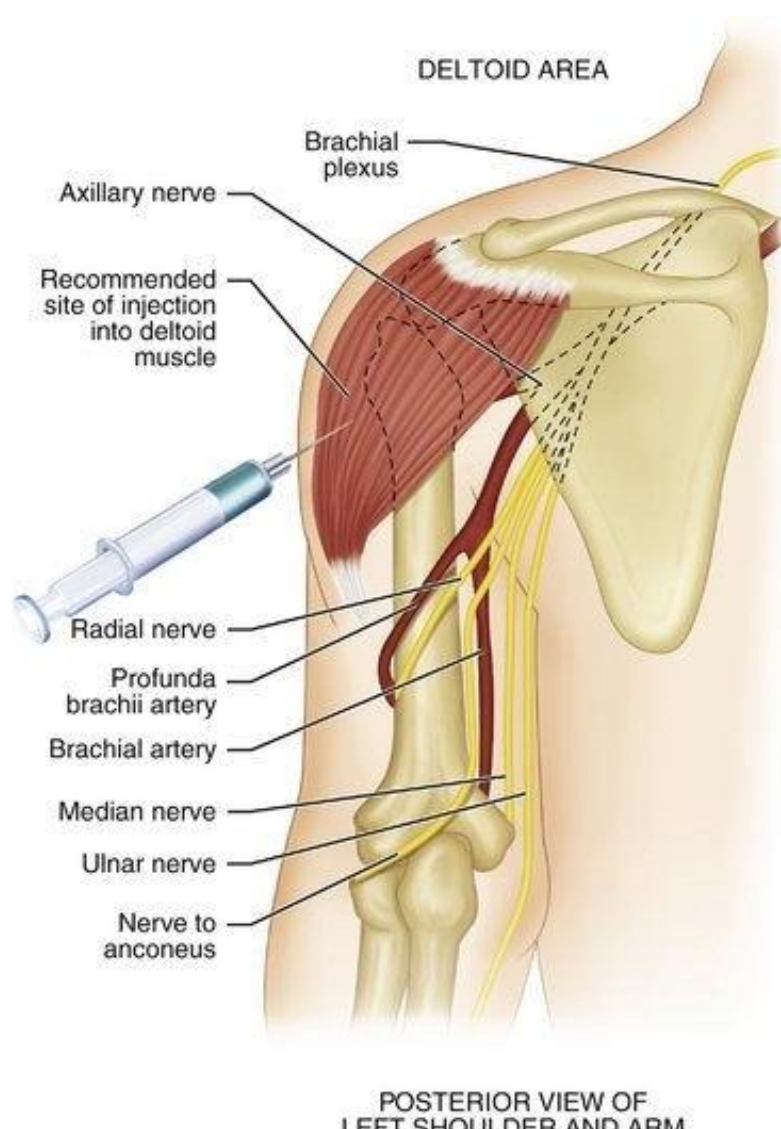


**Bursa:** a closed sac or envelope, lined with synovium and containing fluid, usually in areas subject to friction.

## Intramuscular Injection







POSTERIOR VIEW OF LEFT SHOULDER AND ARM

## Structures under cover of Deltoid

**BONE-** Upper part humerus, coracoid process, greater tubercle, lesser tubercle Intertuberculus sulcus

**Bursa-** Subdeltoid, subacromial bursa

**Muscles** – attached around shoulder joint

**Vessel-** Ant and Post circumflex humeral vessel

**Nerves-** Axillary

## Supraspinatus

### Origin

- Supraspinous fossa of scapula

### Insertion

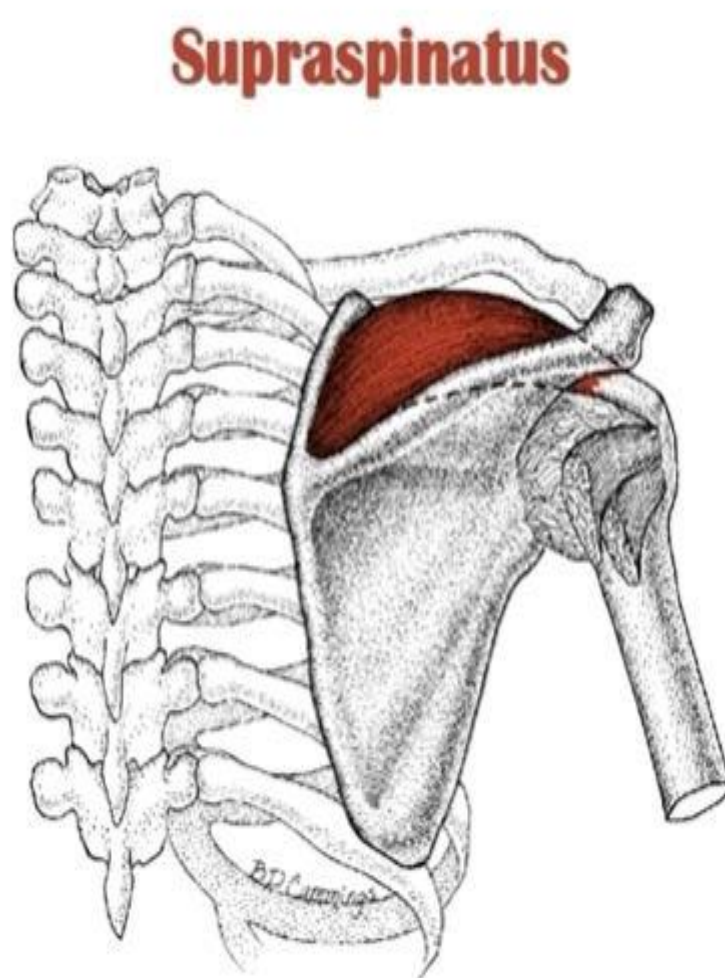
- Greater tuberosity of humerus; capsule of shoulder joint

### Nerve supply

- Suprascapular nerve 5, 6

### Action

- Abducts arm and stabilizes shoulder joint
- Initiation of abduction 0-15 degrees



## Infraspinatus

### Origin

- Infraspinous fossa of scapula

### Insertion

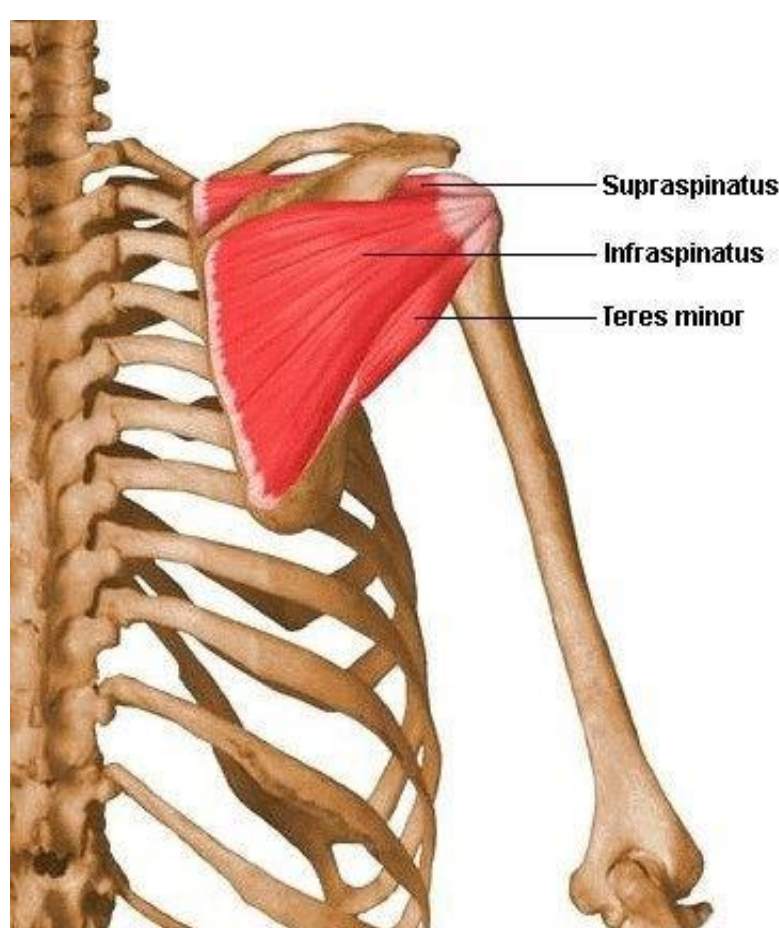
- Middle impression of greater tubercle of humerus; capsule of shoulder joint

### Nerve supply

- Suprascapular nerve after passing through spino-glenoid notch 5, 6

### Action

- Laterally rotates arm and stabilizes shoulder joint





## Teres major

### Origin

- Lower third of lateral border of scapula

### Insertion

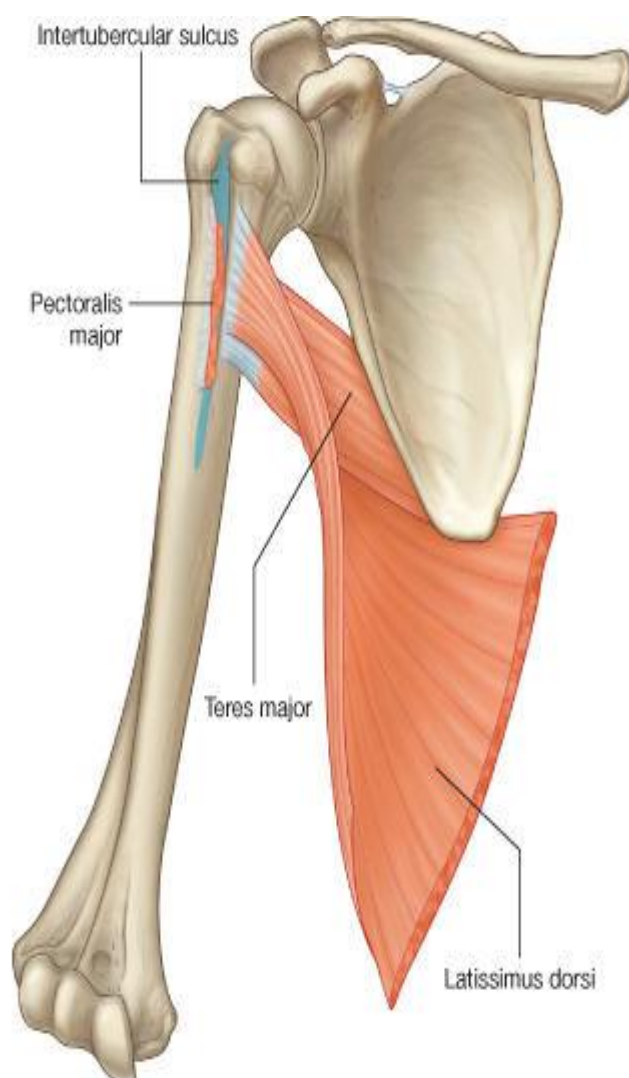
- Medial lip of bicipital groove of humerus

### Nerve supply

- Lower subscapular nerve **C6, 7**

### Action

- Medially rotates and adducts arm and stabilizes shoulder joint



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## Teres minor

### Origin

- Upper two thirds of lateral border of scapula

### Insertion

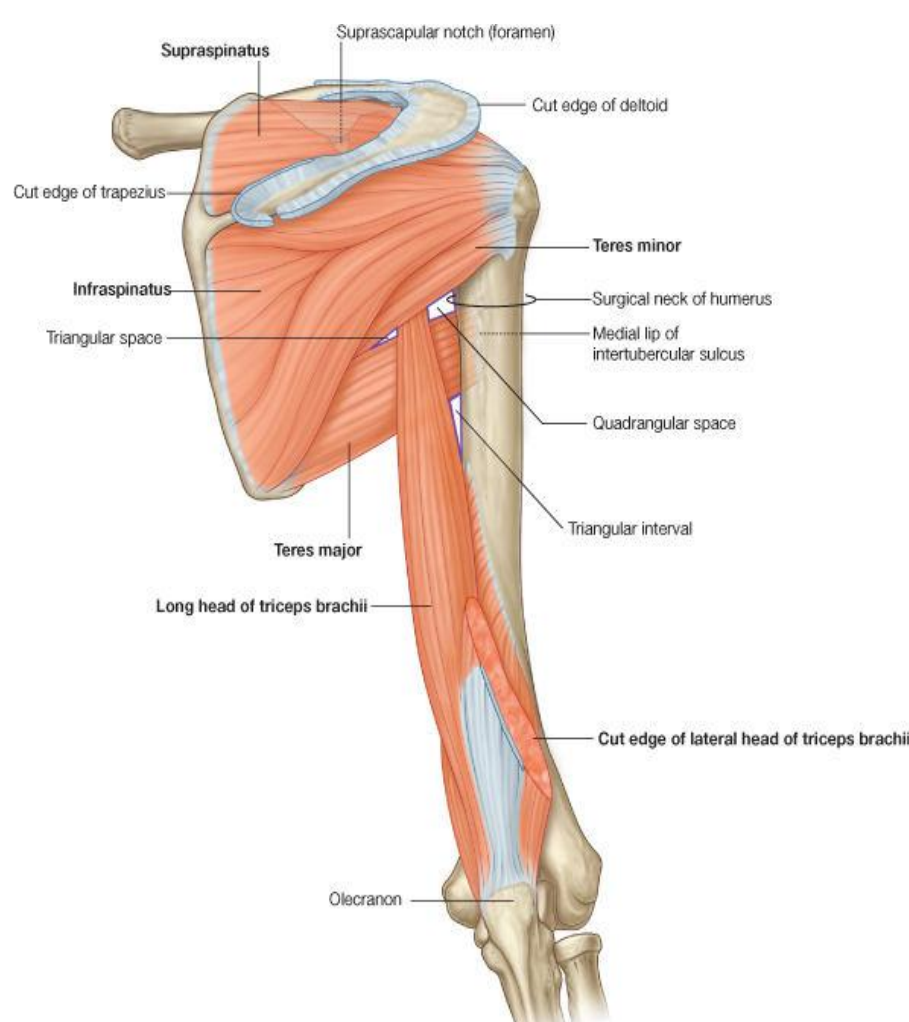
- Greater tuberosity of humerus; capsule of shoulder joint

### Nerve supply

- Axillary nerve (C4), **C5, 6**

### Action

- Laterally rotates arm and stabilizes shoulder joint



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## Subscapularis

### Origin

- Subscapular fossa

### Insertion

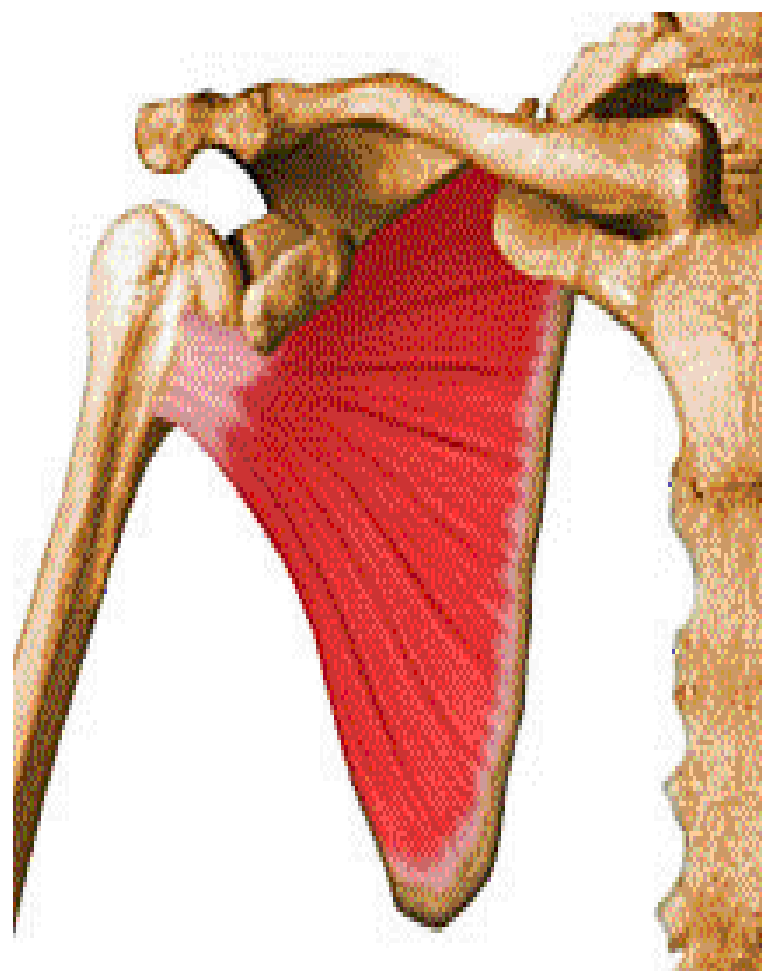
- Lesser tuberosity of humerus

### Nerve supply

- Upper and lower subscapular nerves **C5, 6, 7**

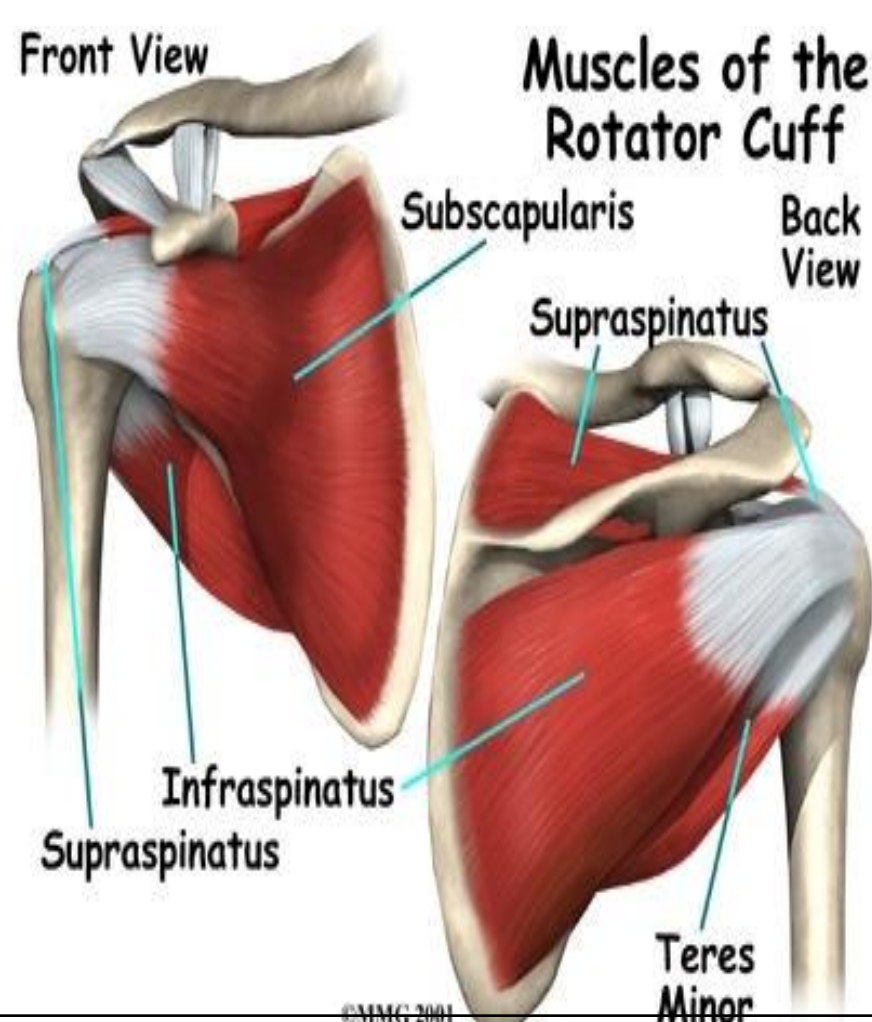
### Action

- Medially rotates arm and stabilizes shoulder joint



## Rotator Cuff

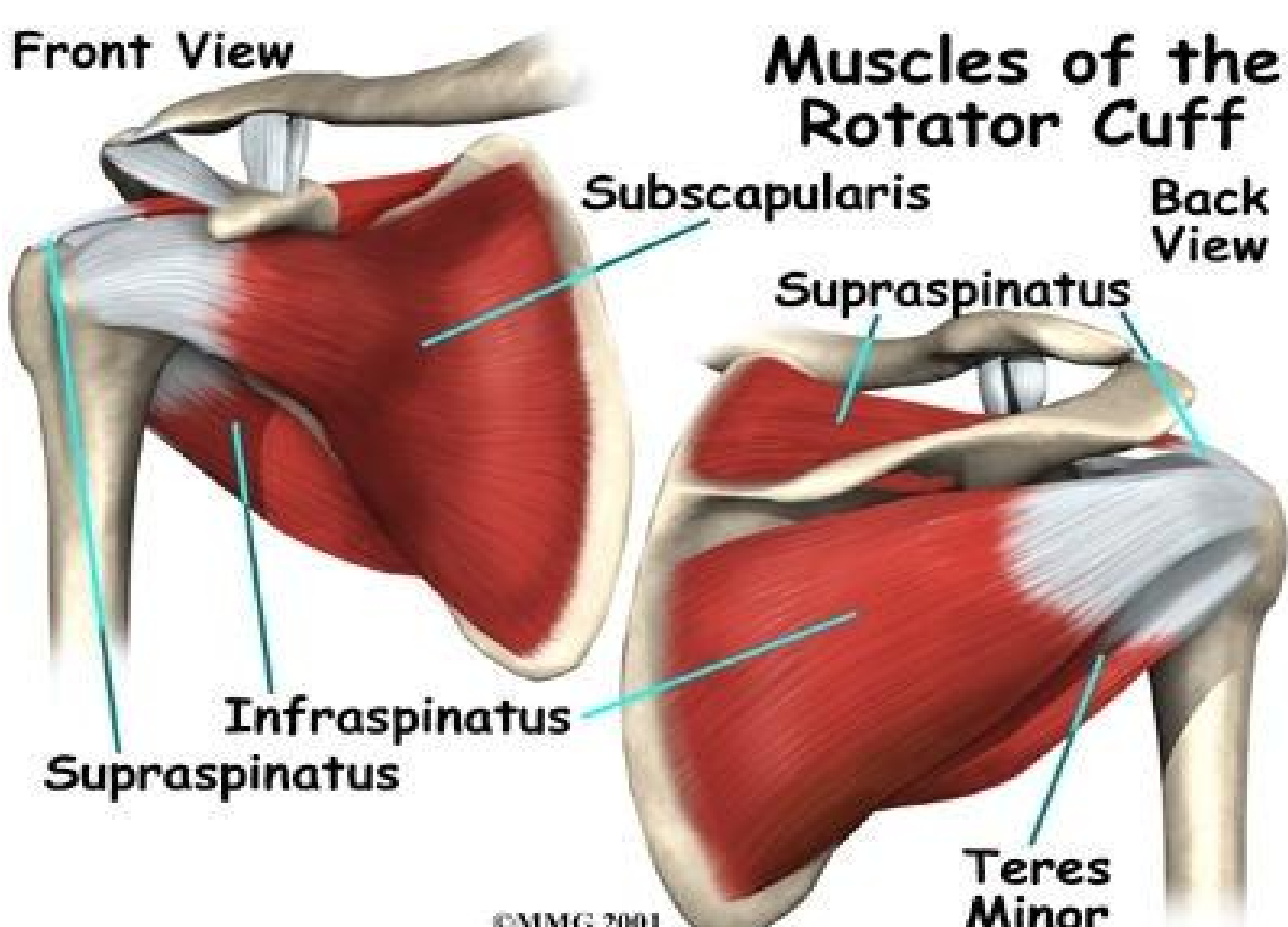
- The rotator cuff is the name given to the tendons of the subscapularis, supraspinatus, infraspinatus, and teres minor muscles
- are fused to the underlying capsule of the shoulder joint
- **stabilizing the shoulder joint**
- The cuff is deficient inferiorly, and this is a site of potential weakness.



©MMG 2001



## Rotator Cuff



**Rotator cuff** muscles stabilize the shoulder joint.  
**Supraspinatus, Infraspinatus, Subscapularis, Teres minor**

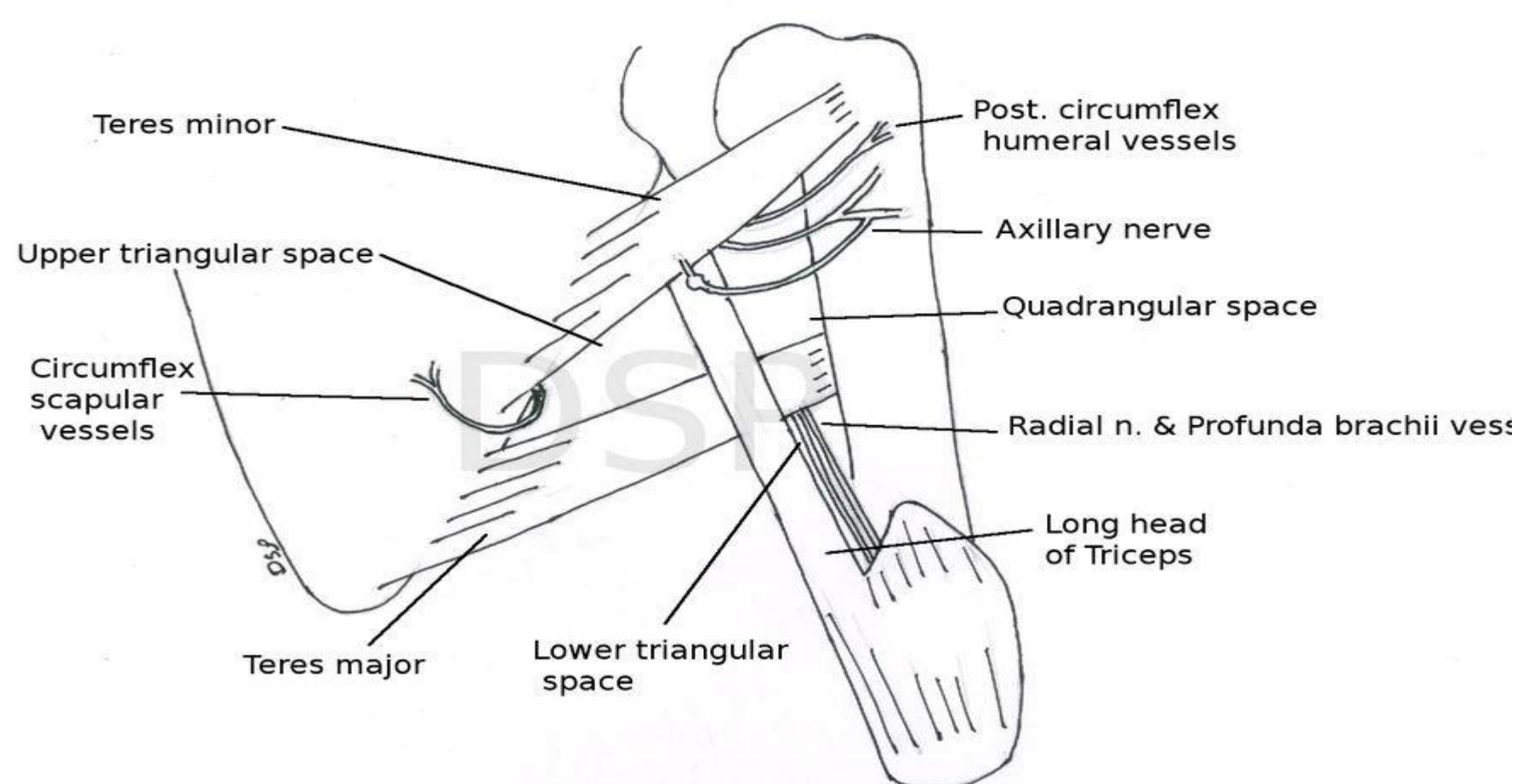
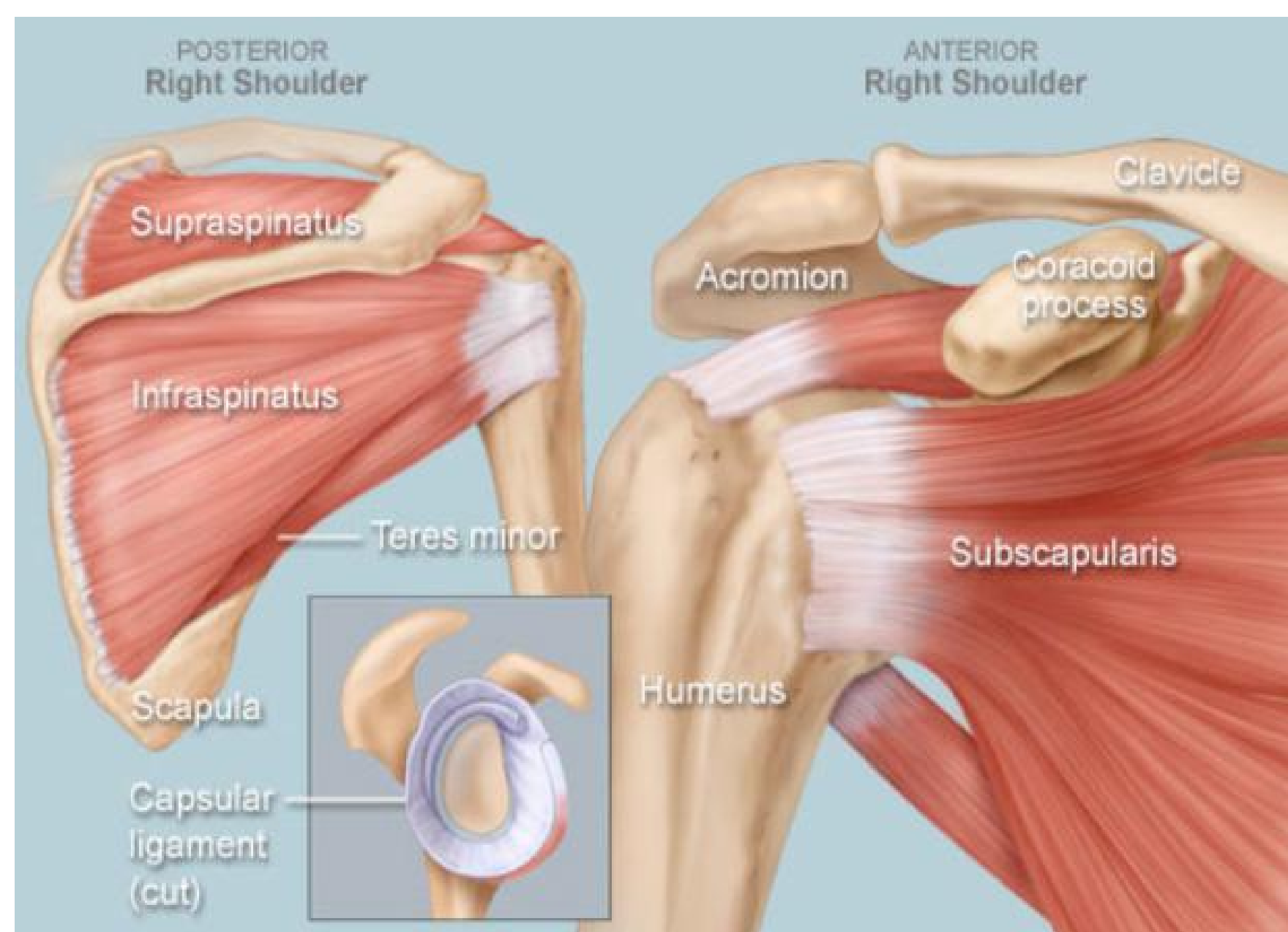
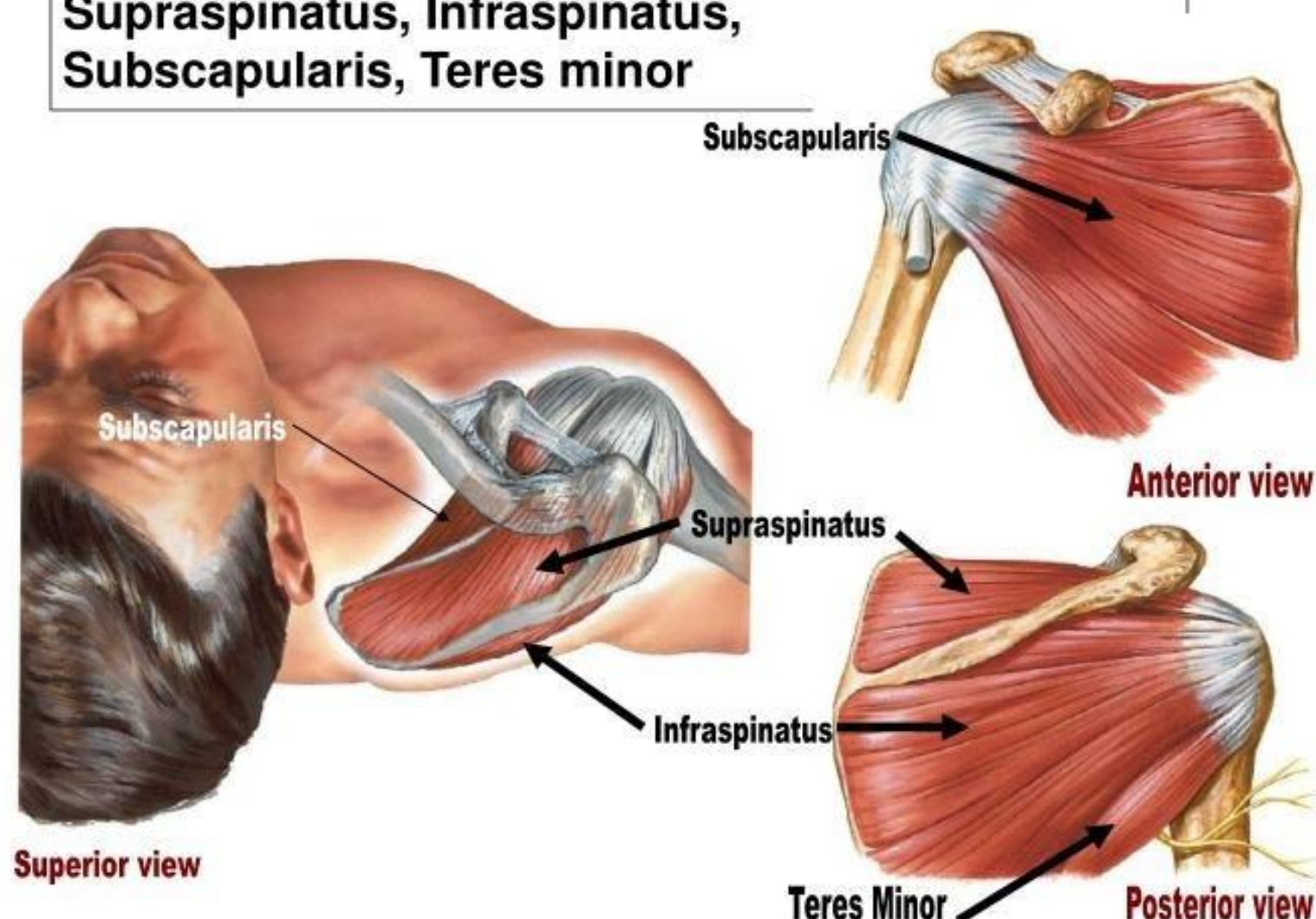


Fig. 5.4 Quadrangular & Triangular spaces



# INTERMUSCULAR SPACES

## 1- Quadrangular space:

### Boundaries

It is bounded by:

Superiorly: Teres minor.

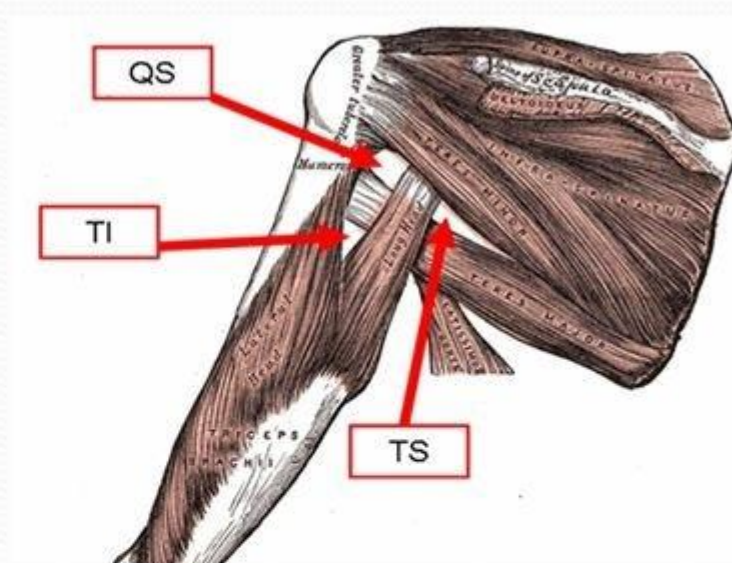
Inferiorly: Teres major.

Medially: the long head of the Triceps brachii.

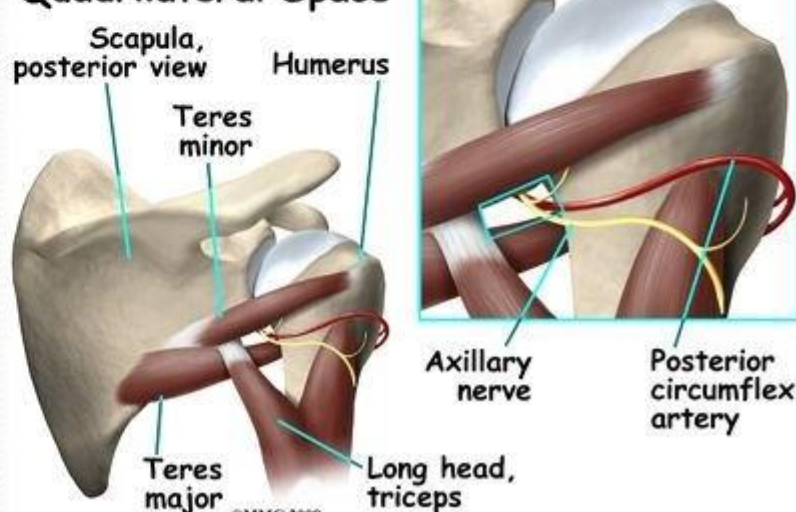
Laterally: the surgical neck of the humerus.

### Contents

It transmits the axillary nerve and posterior circumflex humeral artery.



### Quadrilateral Space



## 2-Medial triangular space

### Boundaries:

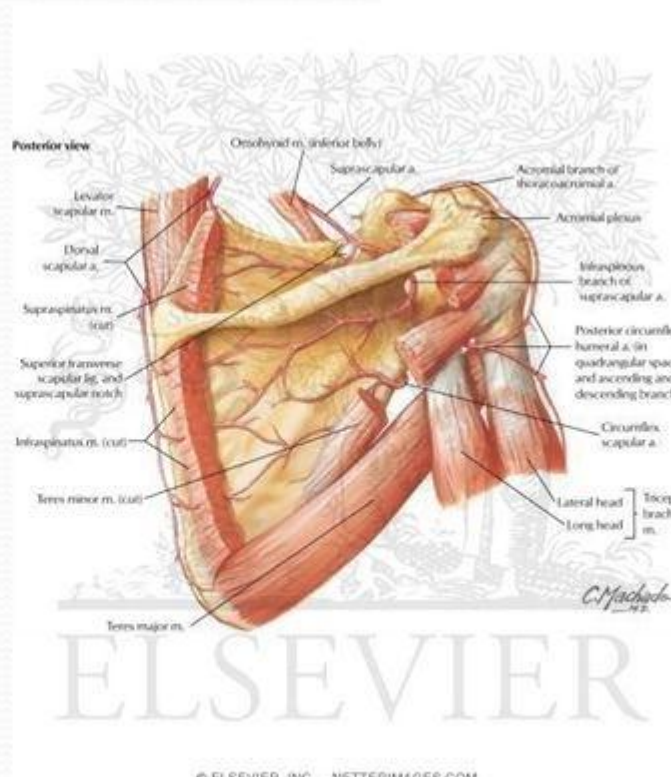
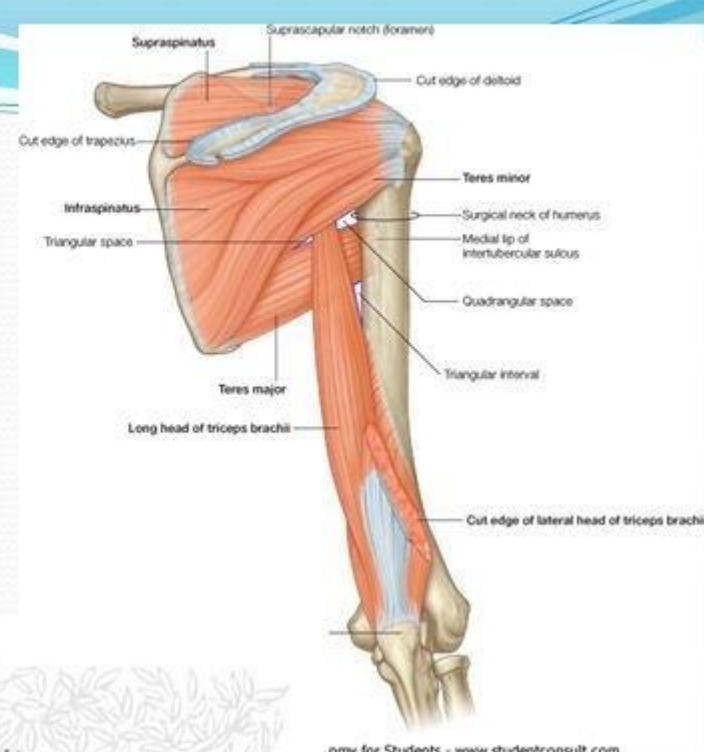
Teres minor superiorly.

Teres major inferiorly.

Long head of the Triceps laterally.

### Contents:

It contains the circumflex scapular vessels.



## 3- Lateral triangular space

### Boundaries:

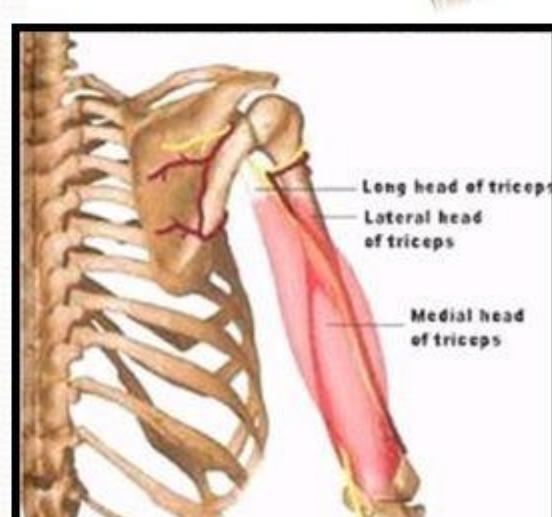
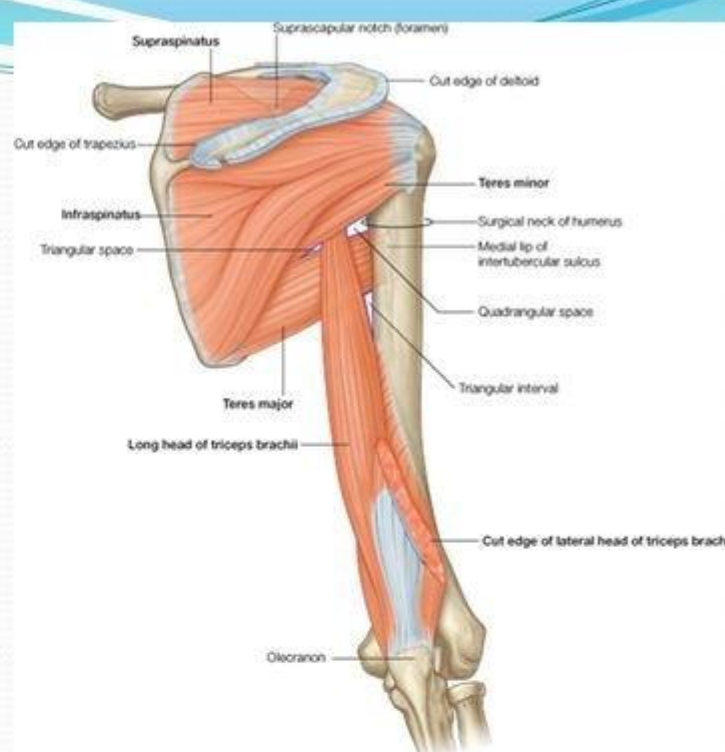
Teres major superiorly.

Long head of the Triceps medially.

Humerus laterally.

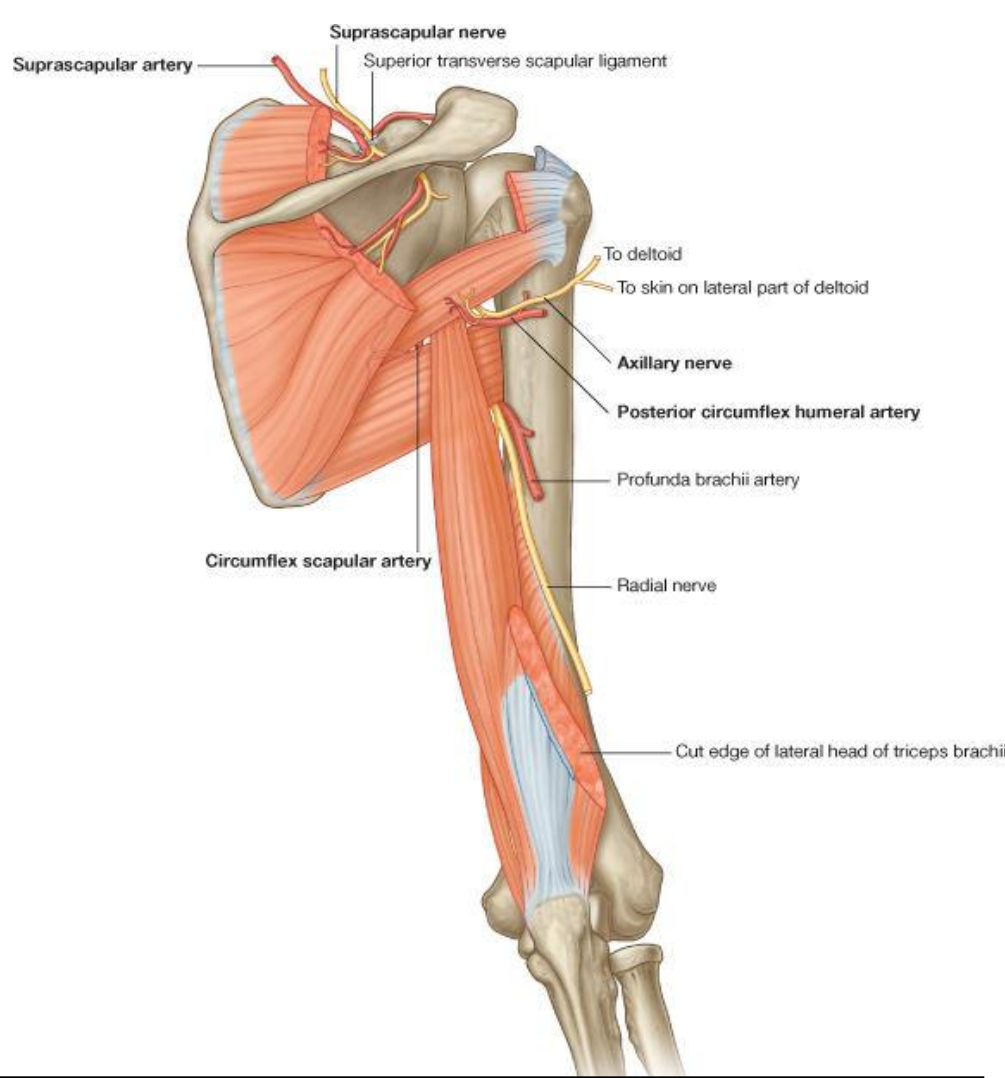
### Contents:

The radial nerve and profunda brachii artery.



## Axillary Nerve

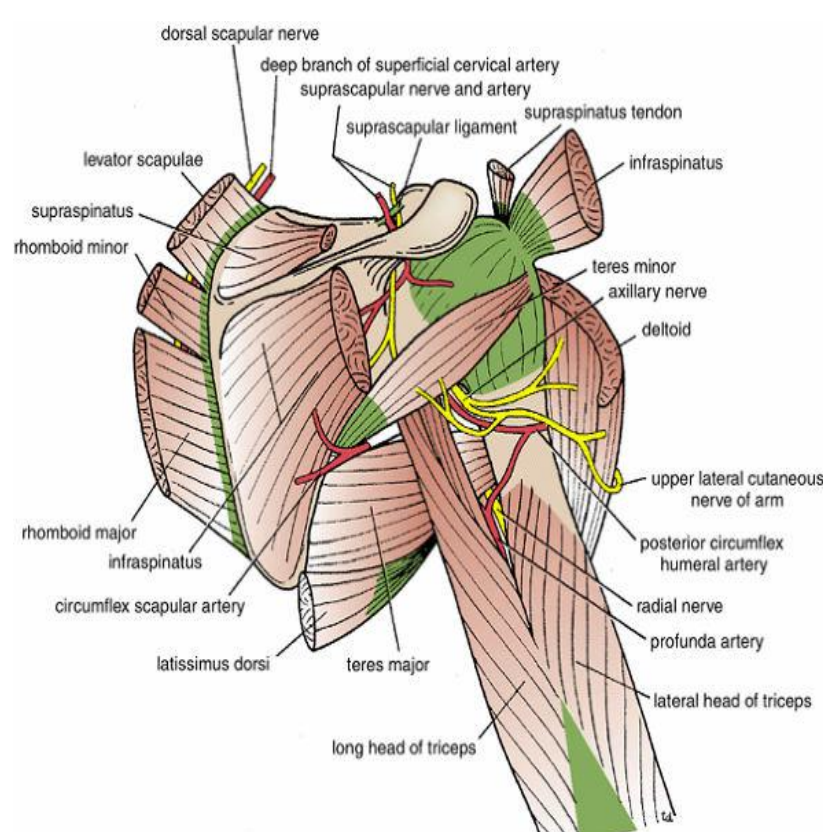
- The axillary nerve arises from the posterior cord of the brachial plexus (C5 and 6) in the axilla
- It passes backward and enters the quadrangular space with the posterior circumflex humeral artery
- As the nerve passes through the space, it comes into close relationship with the inferior aspect of the capsule of the shoulder joint and with the medial side of the surgical neck of the humerus
- It terminates by dividing into anterior and posterior branches





## Axillary Nerve

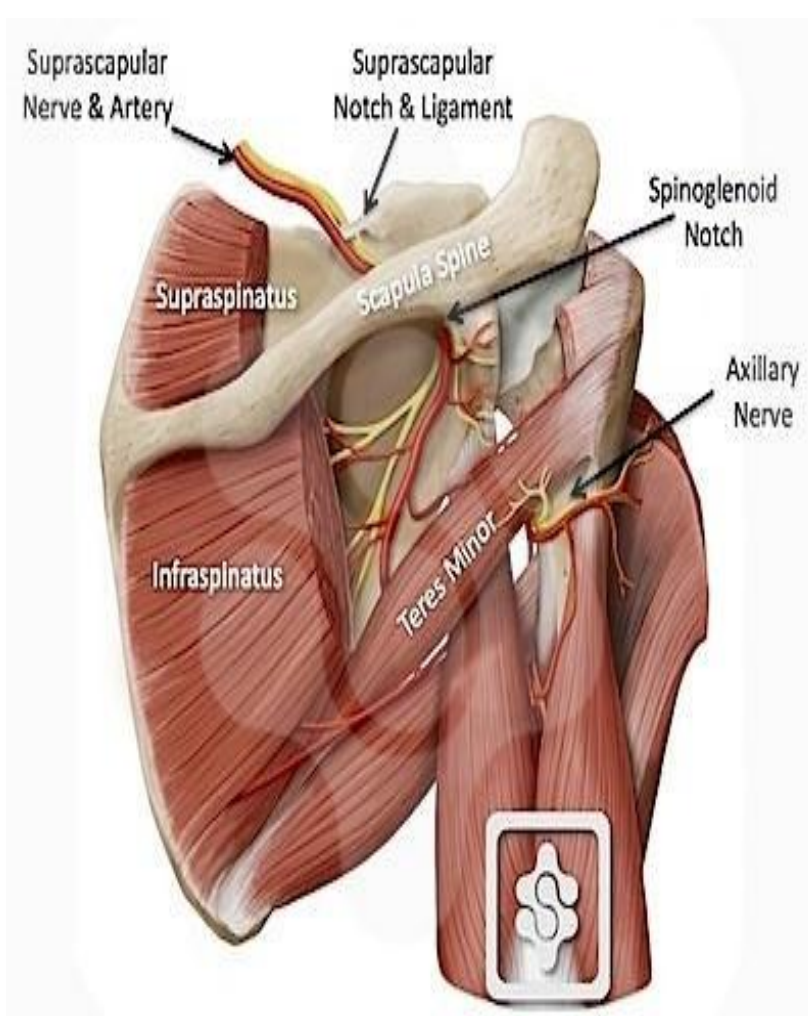
- branches:
- An articular branch to the shoulder joint
- An anterior terminal branch, which winds around the surgical neck of the humerus beneath the deltoid muscle; it supplies the deltoid and the skin that covers its lower part.



## Axillary Nerve

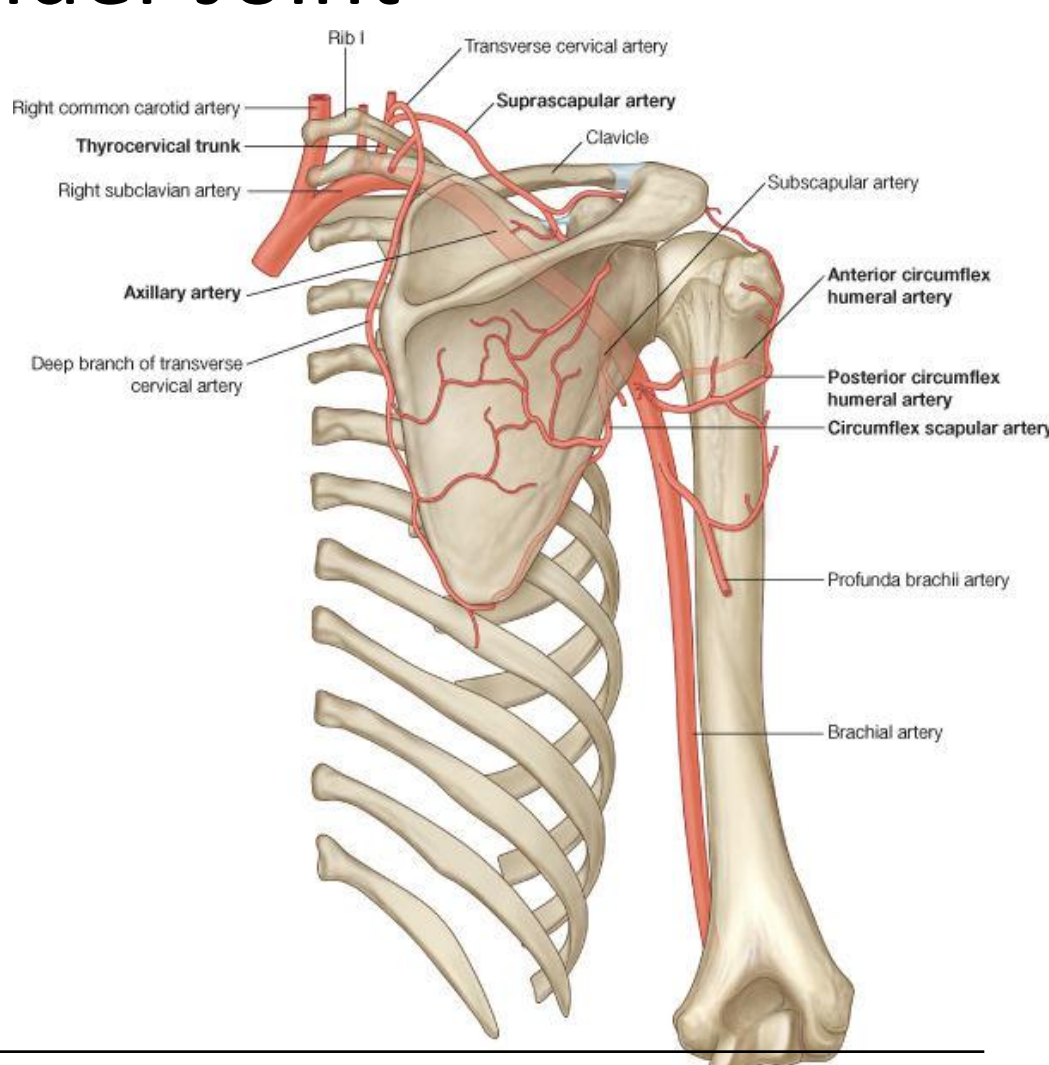
- A posterior terminal branch, which gives off a branch to the teres minor muscle and a few branches to the deltoid, then emerges from the posterior border of the deltoid as the upper lateral cutaneous nerve of the arm
- The axillary nerve can be injured in dislocations of the shoulder joint

## Suprascapular nerve



## Arterial Anastomosis Around the Shoulder Joint

- The extreme mobility of the shoulder joint may result in kinking of the axillary artery and a temporary occlusion of its lumen
- To compensate for this, an important arterial anastomosis exists between the branches of the subclavian artery and the axillary artery
- ensuring that an adequate blood flow takes place into the upper limb irrespective of the position of the arm





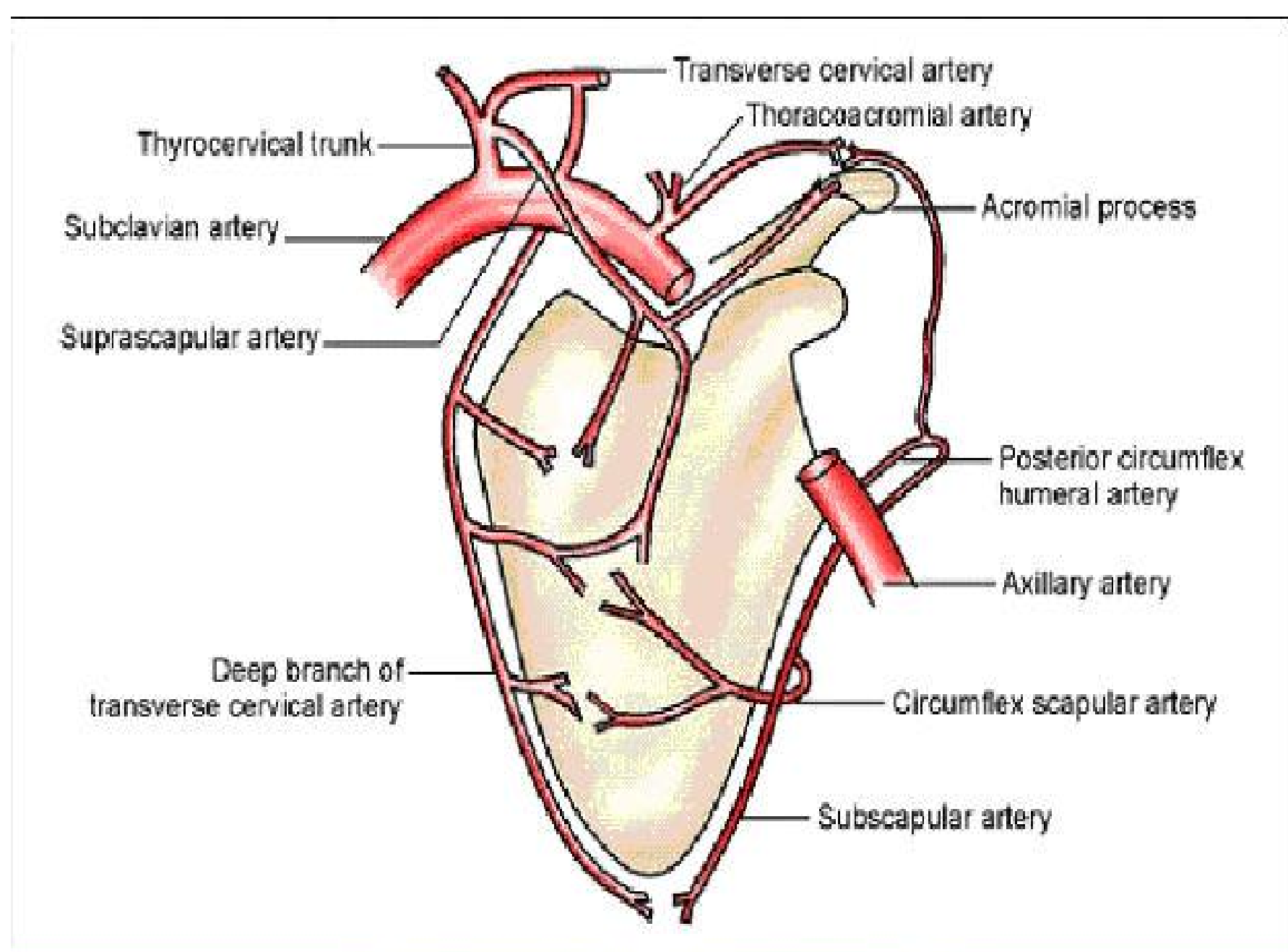
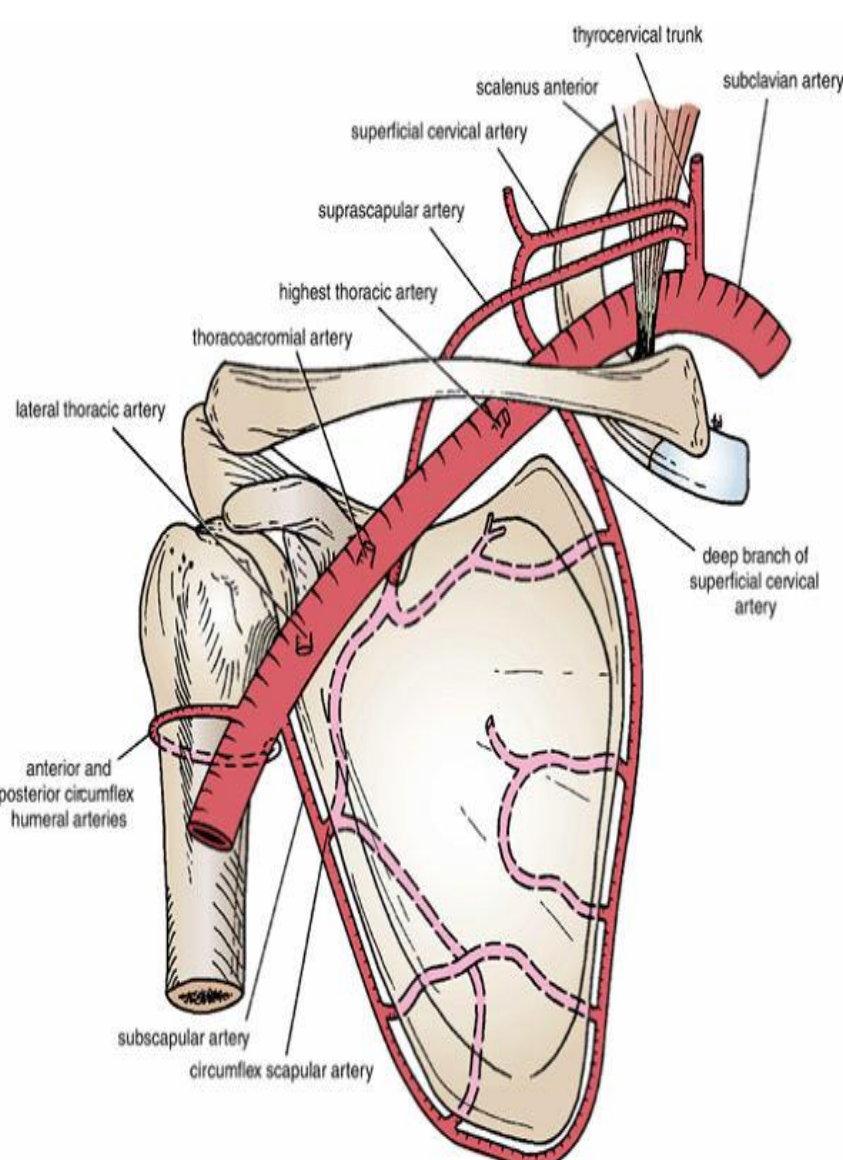
## Arterial Anastomosis Around the Shoulder Joint

### Branches from the Subclavian Artery

- The **suprascapular artery**, which is distributed to the supraspinous and infraspinous fossae of the scapula
- The **superficial or transverse 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, respectively.
- The anterior circumflex humeral artery
- The posterior circumflex humeral artery
- Both the circumflex arteries form an anastomosing circle around the surgical neck of the humerus



## Triangle Of Auscultation

### Boundaries-

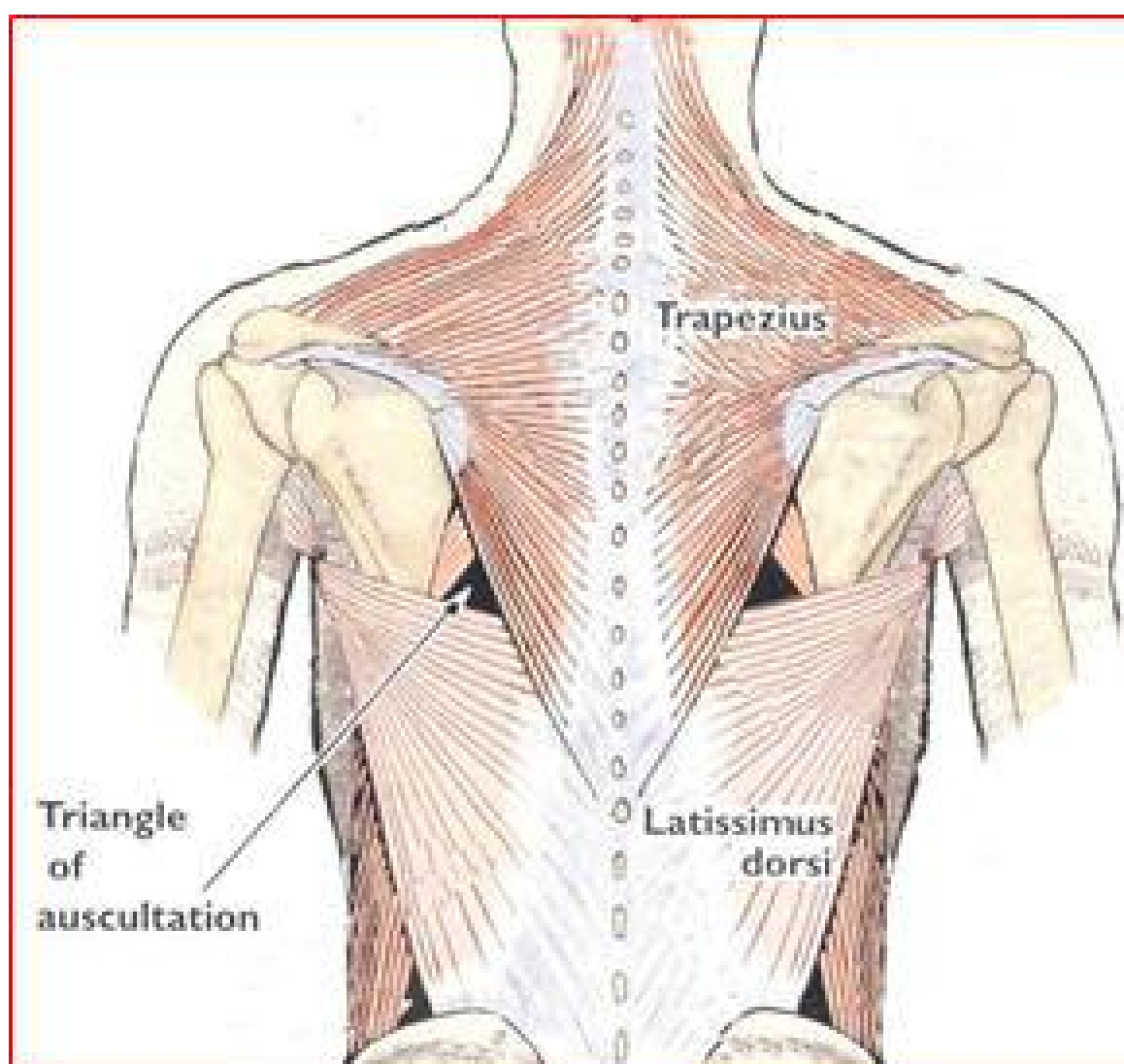
Below- Horizontal fibres of latissimus dorsi

Medially- lateral border of trapezius

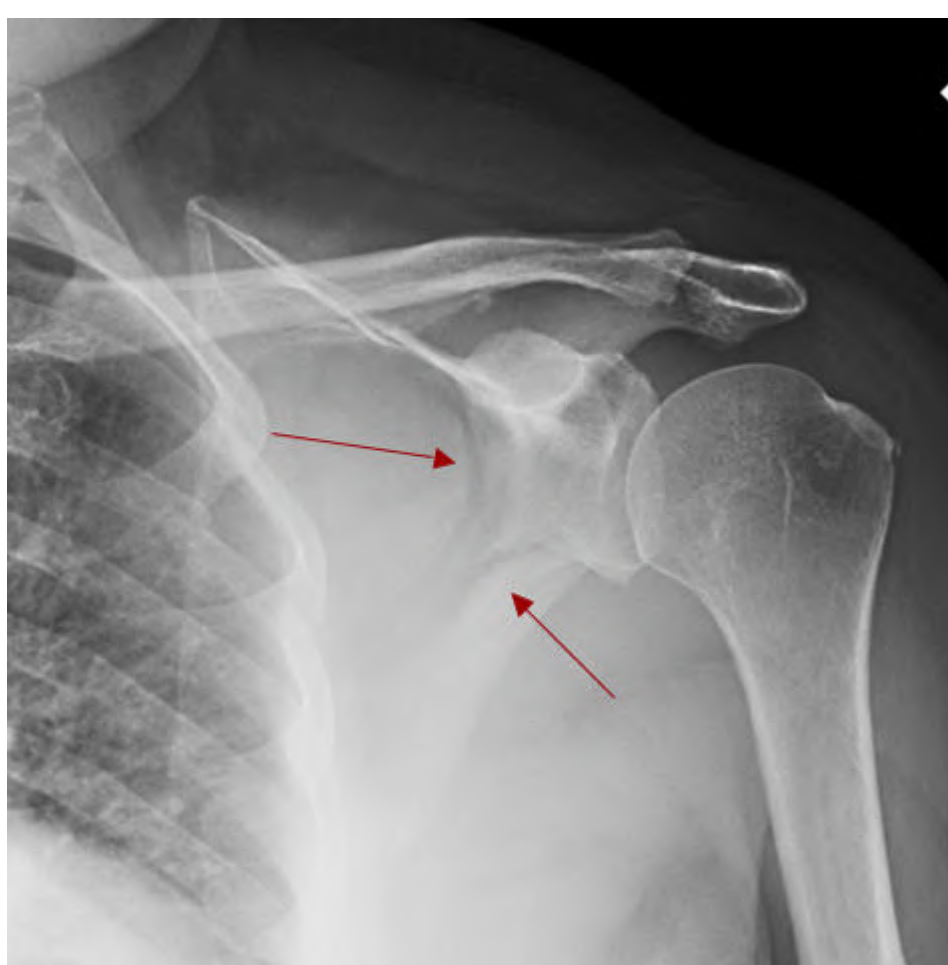
Laterally- vertebral border of scapula

Floor – 6<sup>th</sup> and 7<sup>th</sup> rib

Apex of lower lobe of both lungs lie beneath this triangle

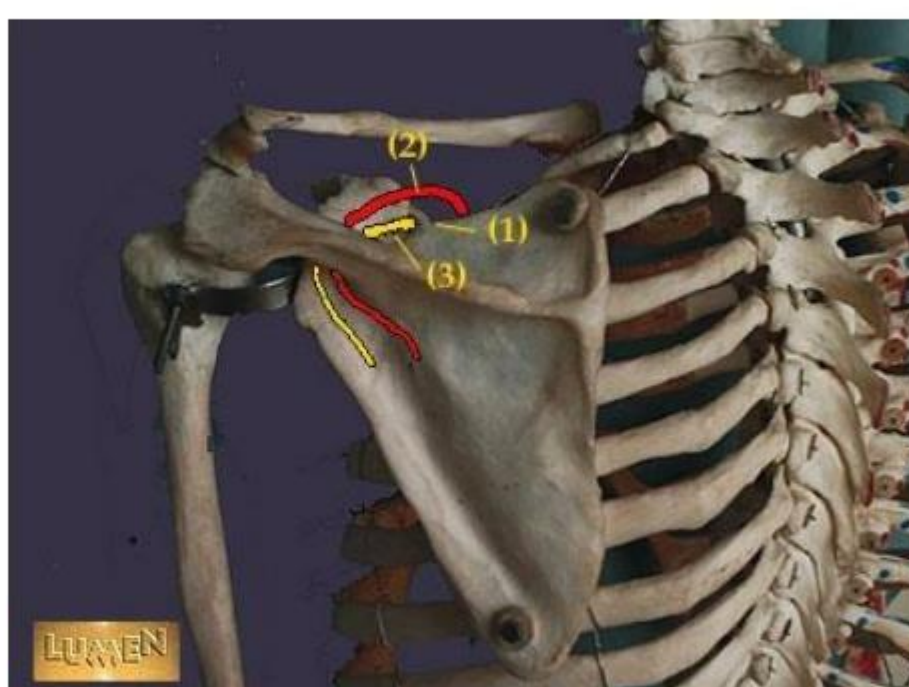


## Scapular Fracture



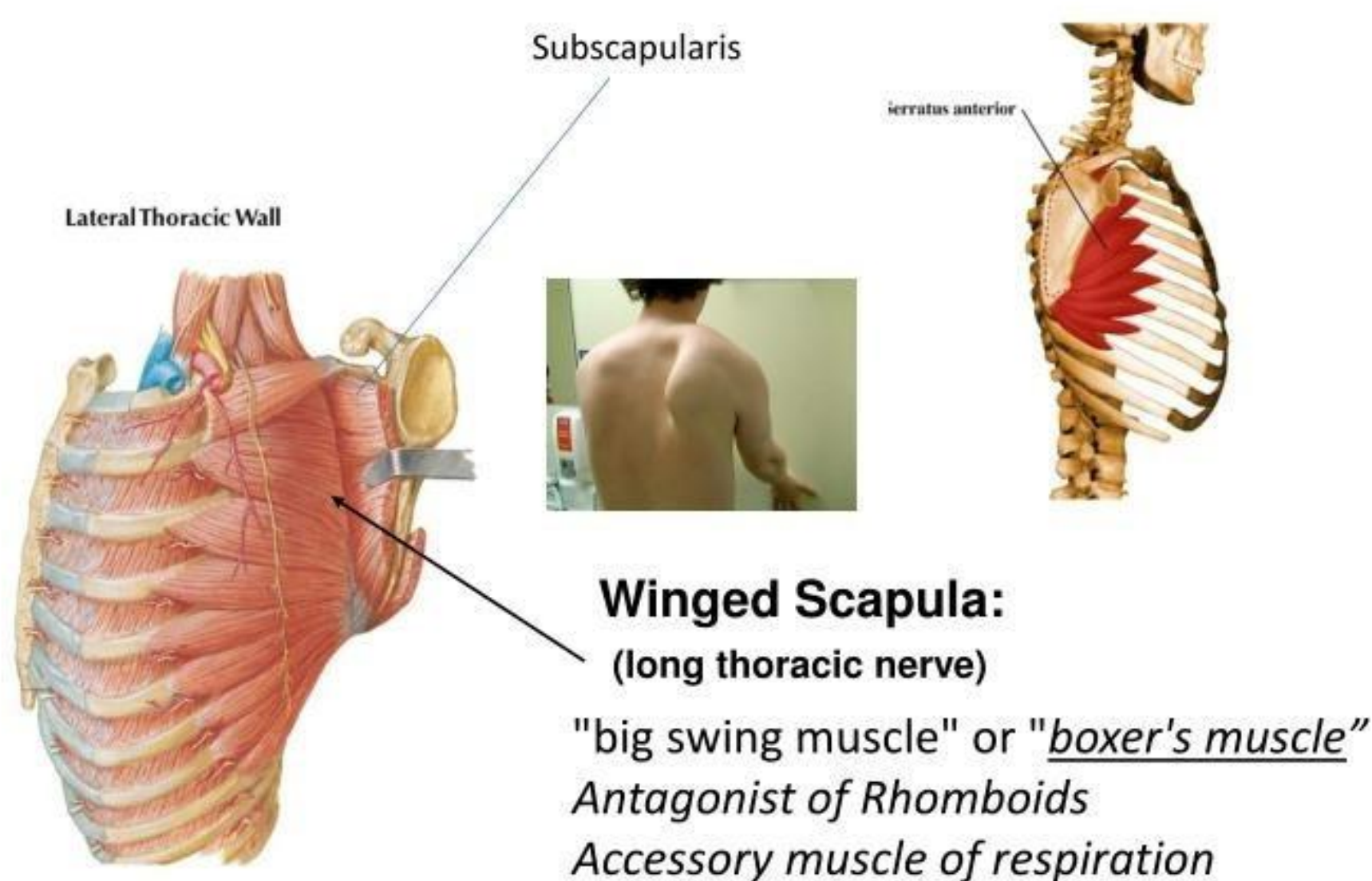


## Transverse scapular ligament



- Runs between Subscapular nerve (C5,6) and artery, which supply supra and infra spinatus ms
- Artery above, nerve below
- Army un over the bridge, navy sail under the bridge

## Serratus Anterior



## Is there any problem ?



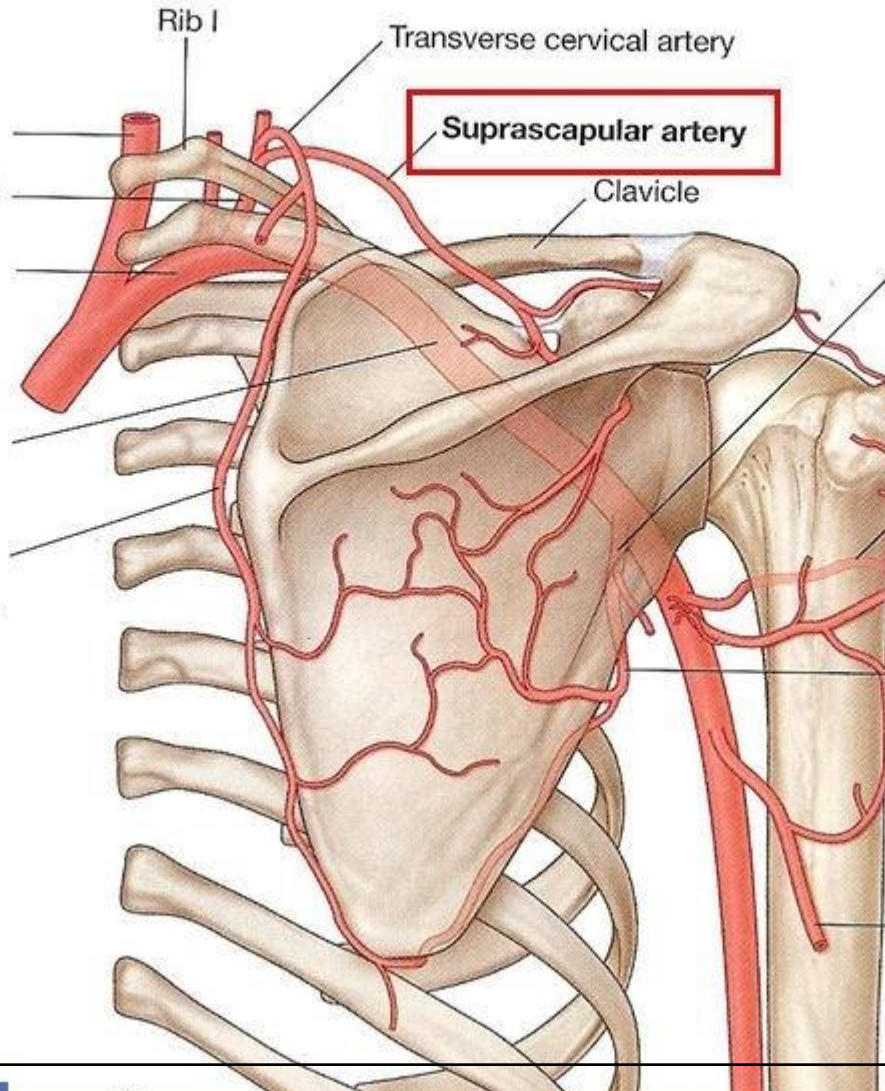
## Arterial anastomoses around the scapula

∴ Thoracoacromial artery  
- Cadavers are dead people

- 1. clavicular
- 2. acromial
- 3. deltoid
- 4. pectoral

thyrocervical trunk  
axillary a.  
deep branch of transverse cervical a.  
\*(dorsal scapular)

**Scapular loop:**  
Suprascapular  
Dorsal scapular  
Subscapular



**Humeral loop:**

anterior circumflex humeral  
posterior circumflex humeral  
profunda brachii



## MCQ

- Injury to which of the following nerve leads to winging of scapula
  - a) Long thoracic nerve
  - b) Thoracodorsal nerve
  - c) Suprascapular nerve
  - d) Dorsal scapular nerve

## MCQ

- Which of the following group of muscle acts as lateral rotator of shoulder joint
  - a) Teres minor and infraspinatus
  - b) Teres minor and teres major
  - c) Supraspinatus and infraspinatus
  - d) Serratus anterior and rhomboids

## MCQ

- Which of the following group of muscle acts as lateral rotator of shoulder joint
  - a) **Teres minor and infraspinatus**
  - b) Teres minor and teres major
  - c) Supraspinatus and infraspinatus
  - d) Serratus anterior and rhomboids