

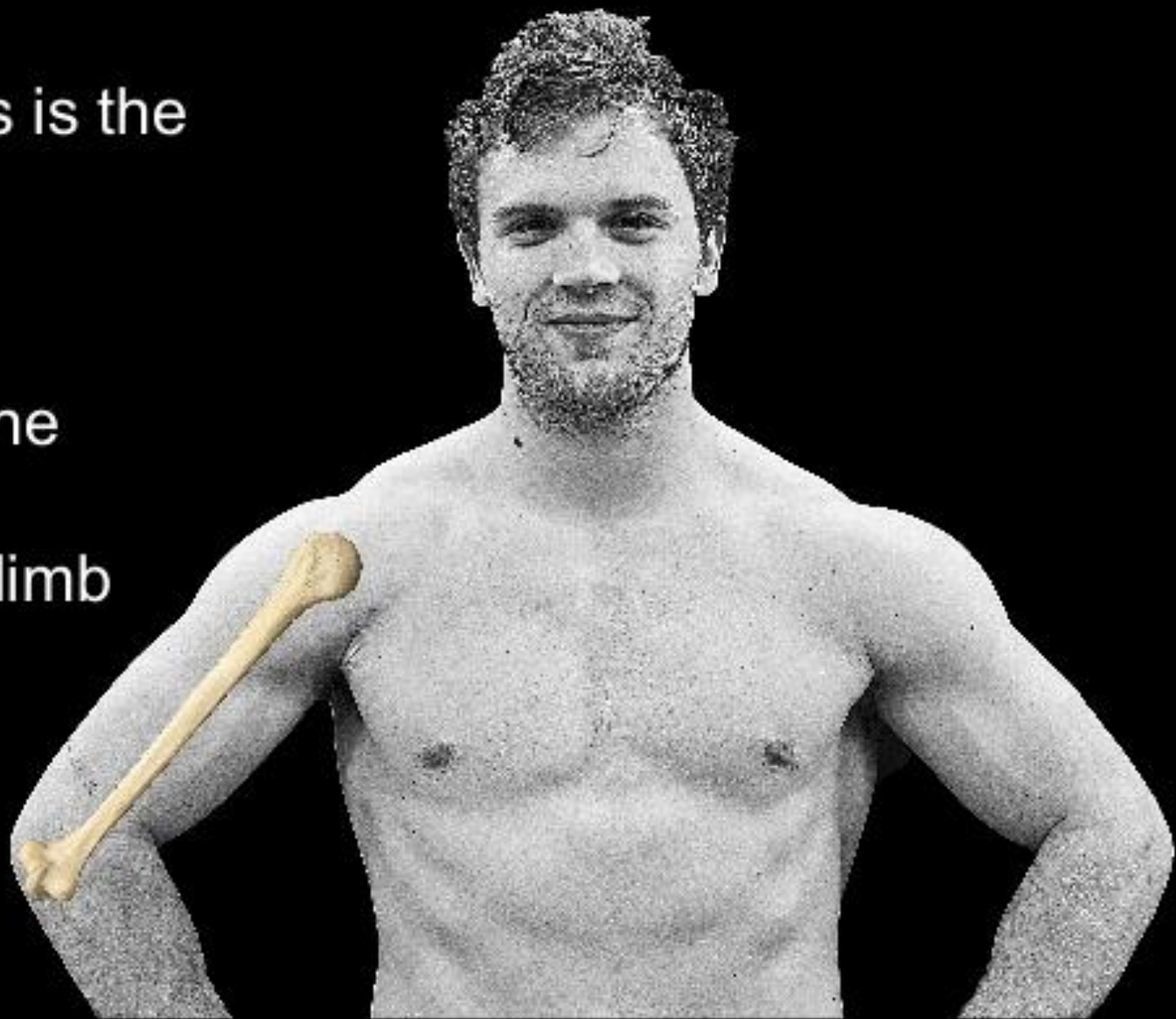
# OSTEOLOGY OF HUMERUS

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LECTURER KGMC

# The Humerus

The humerus is the  
longest and  
strongest bone  
in the upper limb



# SIDE DETERMINATION

- **Upper end: Rounded.**
- **Lower end: Expanded from side to side & flattened from before backwards.**
- **Head: Directed posterior & medially upwards.**
- **Lesser Tubercle: Projects from the front of the upper end & is limited laterally by the intertubercular sulcus.**

# The Humerus

## The Humerus

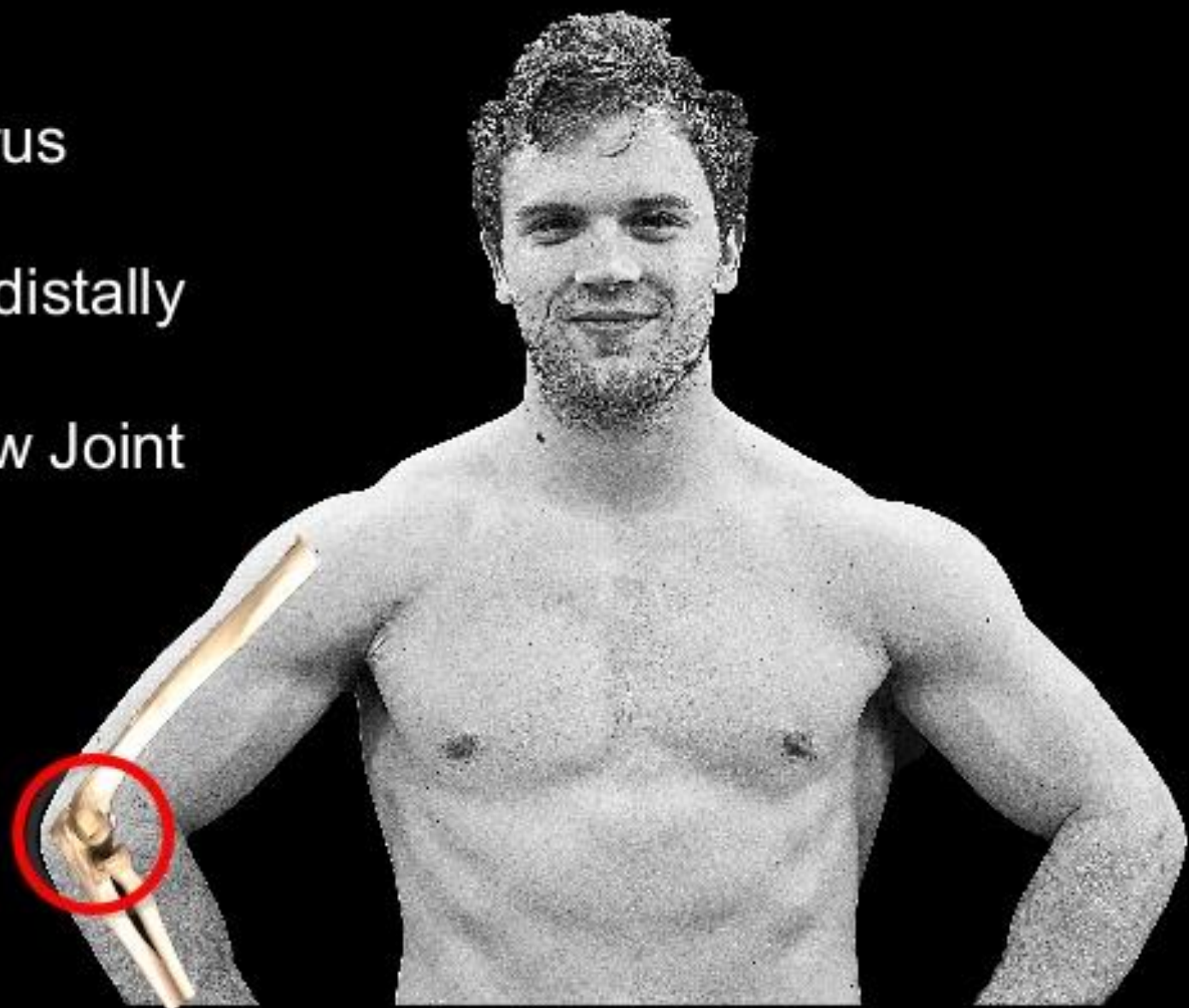
articulates proximally

at the Shoulder joint



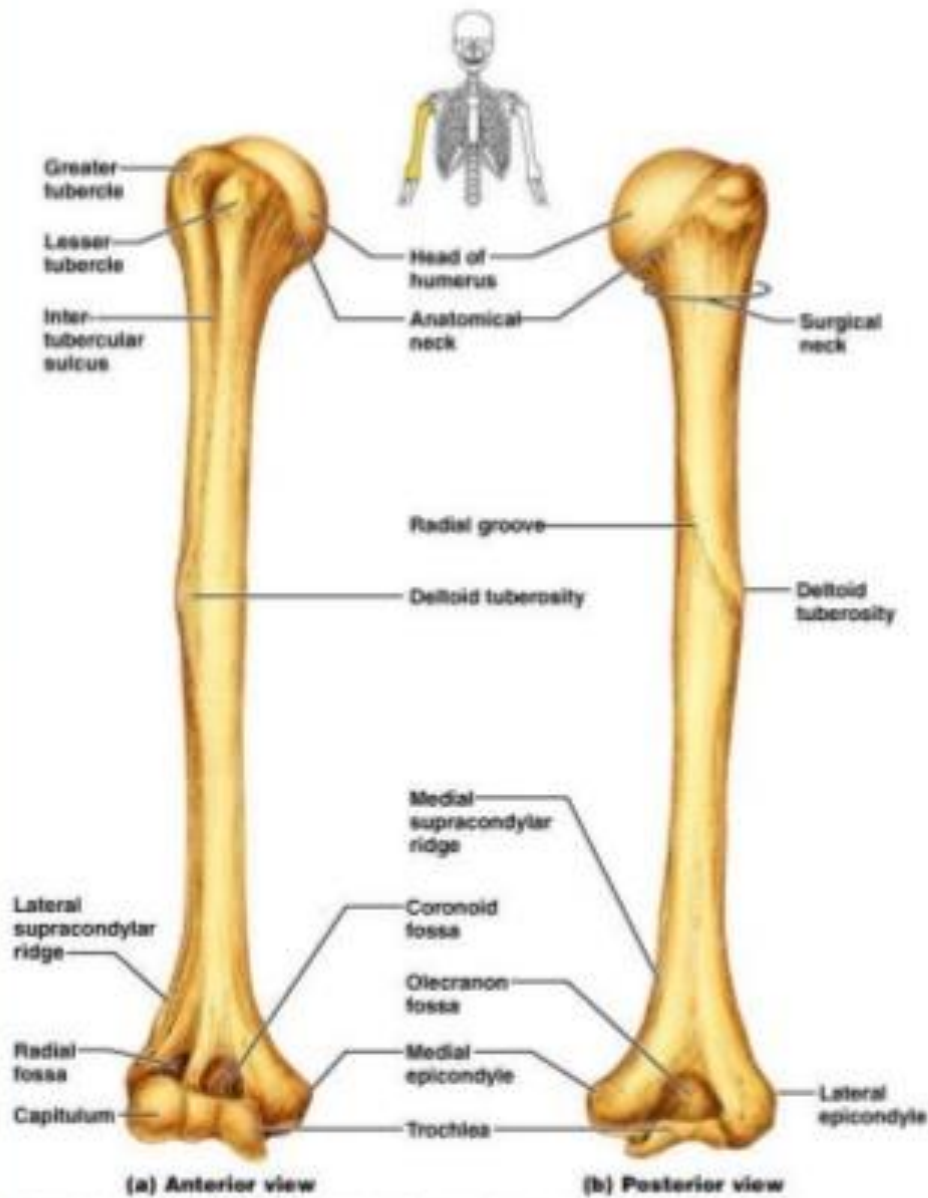
# The Humerus

The Humerus  
articulates distally  
at the Elbow Joint

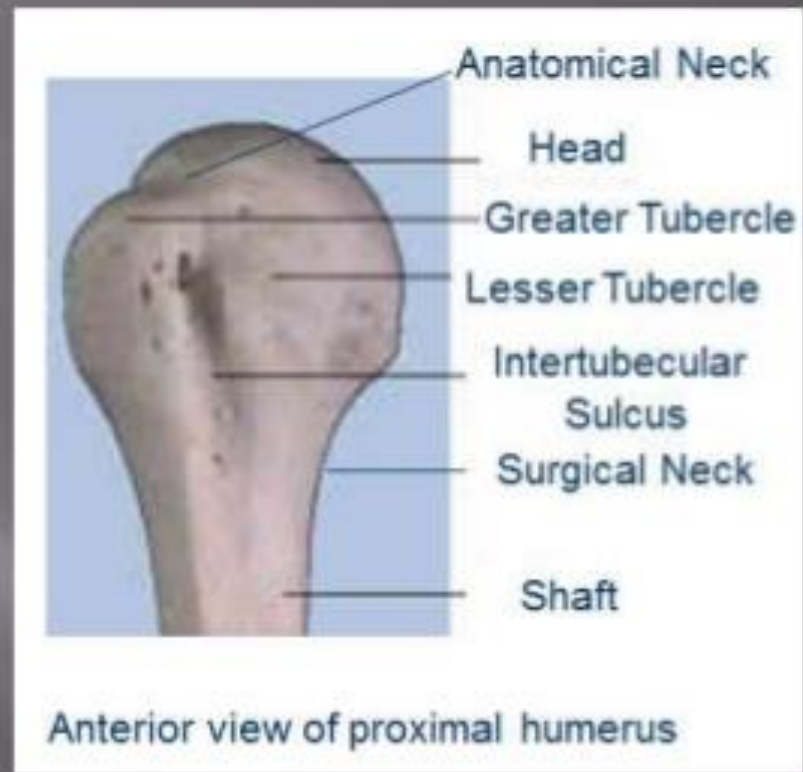


# Upper end

- I. It has HEAD which is medially backwards and upwards and articulates with glenoid cavity of scapula to form shoulder joint.
- II. The line separating the head from rest of upper end is called ANATOMICAL NECK.
- III. The LESSER TUBERCLE is an elevation on the anterior aspect of upper end.
- IV. The GREATER TUBERCLE is an elevation which form the lateral part of upper end.
- V. There is INTERTUBERCLE SULCUS (groove like structure) which separates lesser tubercle from greater tubercle.
- VI. The narrow line separating the upper end of humerus from shaft is called SURGICAL NECK.



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# Lower End

## Bony Features

### Articular Part:

- **Capitulum:** A rounded projection which articulates with the head of the radius.
- **Trochlea:** Pulley shaped surface. Articulates with the trochlear notch of ulna. Medial edge of projects 6mm downwards to form the carrying angle.





# NON ARTICULAR PARTS

- **Medial Epicondyle:** Prominent bony projection on the lower side medially. Subcutaneous & easily felt.
- **Lateral Epicondyle:** smaller than medial epicondyle & has a muscular impression.
- **Lateral Supracondylar ridge:** A small lateral margin just above the lower end.
- **Medial Supracondylar ridge:** Small medial ridge on the medial side.
- **Coronoid Fossa:** Depression just above the anterior aspect of trochlea. Accommodates with the coronoid process of ulna when Elbow is Flexed.
- **Radial Fossa:** Depression just above the anterior aspect of Capitulum. Accommodates with the head of radius when elbow in Flexed.
- **Olecranon Fossa:** Depression just above the posterior aspect of Trochlea. Accommodates with olecranon process of ulna when elbow is Extended.



Coronoid Fossa  
Radial Fossa  
Capitulum

Trochlear



Medial Epicondyle Lateral Epicondyle



Olecranon Fossa

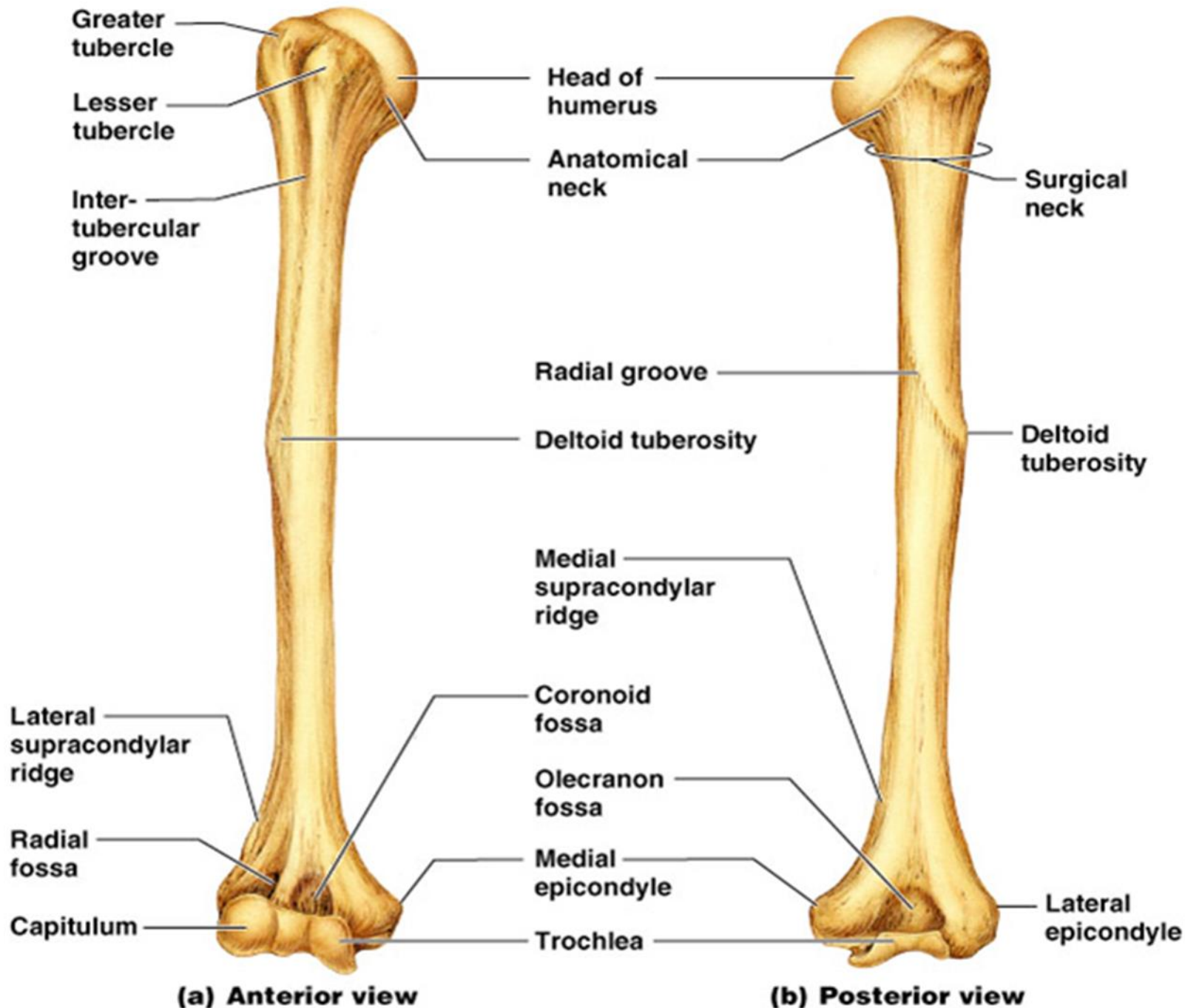
Posterior View

# SHAFT

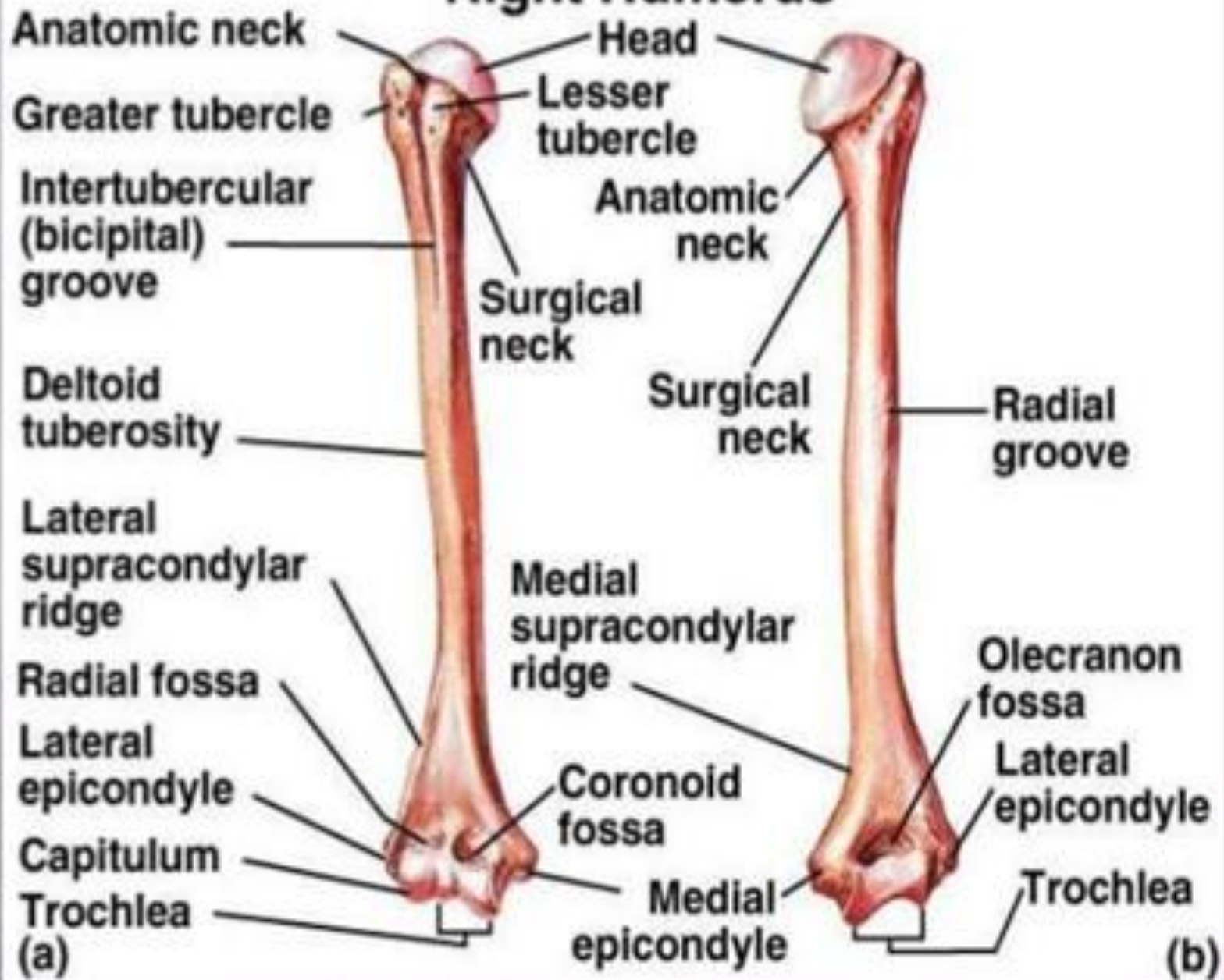
•**Rounded** in the upper half & **triangular** in the lower half. Contains **three borders** & **three surfaces**.

## Borders:

- **Anterior Border:** Upper one third forms the Lateral lip of the intertubercular sulcus. Middle part forms the anterior region of Deltoid tuberosity. Lower half is smooth & rounded.
- **Lateral Border:** Prominent only in the lower region where it forms lateral supracondylar ridge. In the middle it is interrupted by Radial groove.
- **Medial Border:** Forms the medial lip of the intertubercular sulcus. Rough through its middle & continuous below with the medial supracondylar ridge.

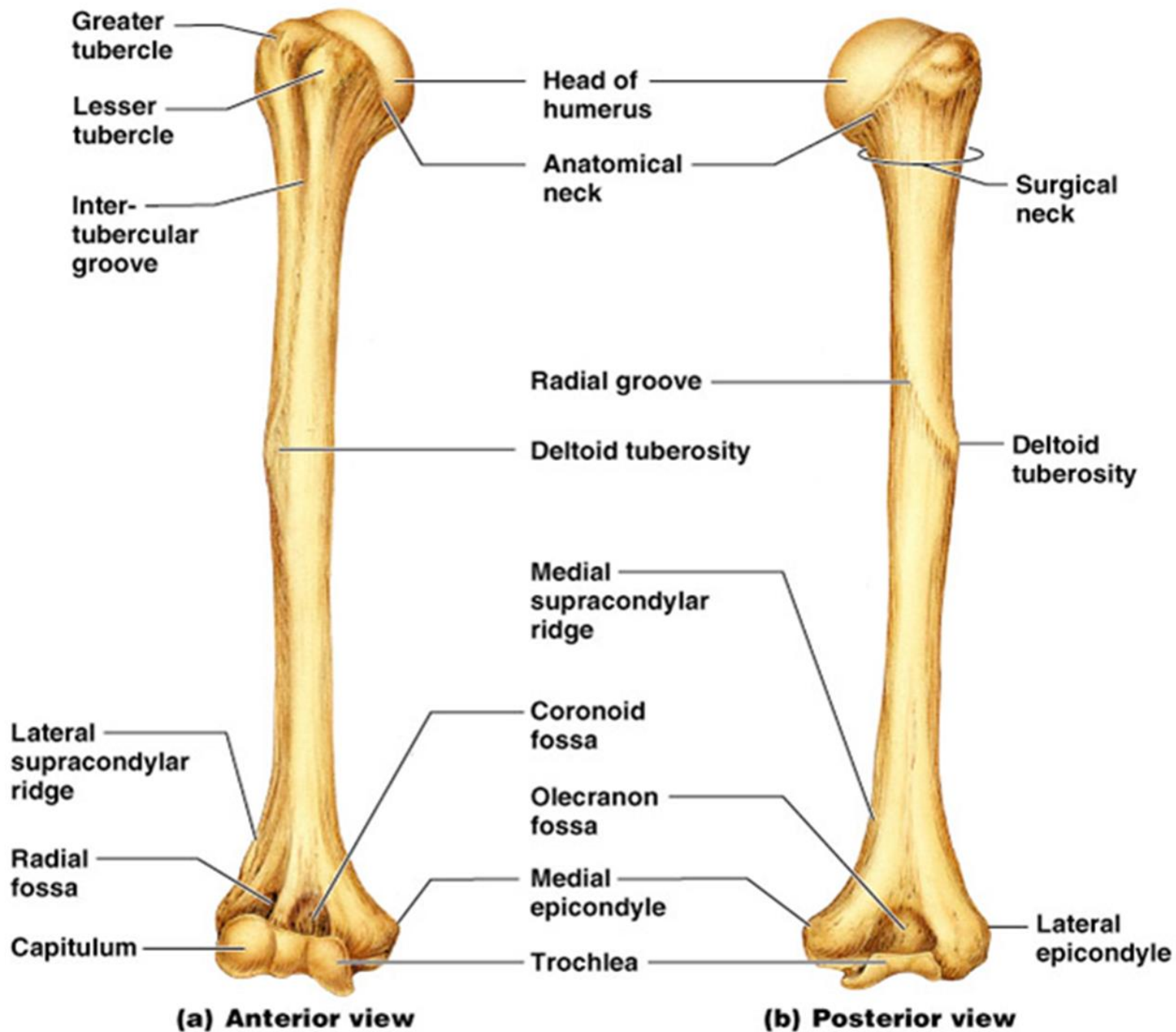


# Right Humerus



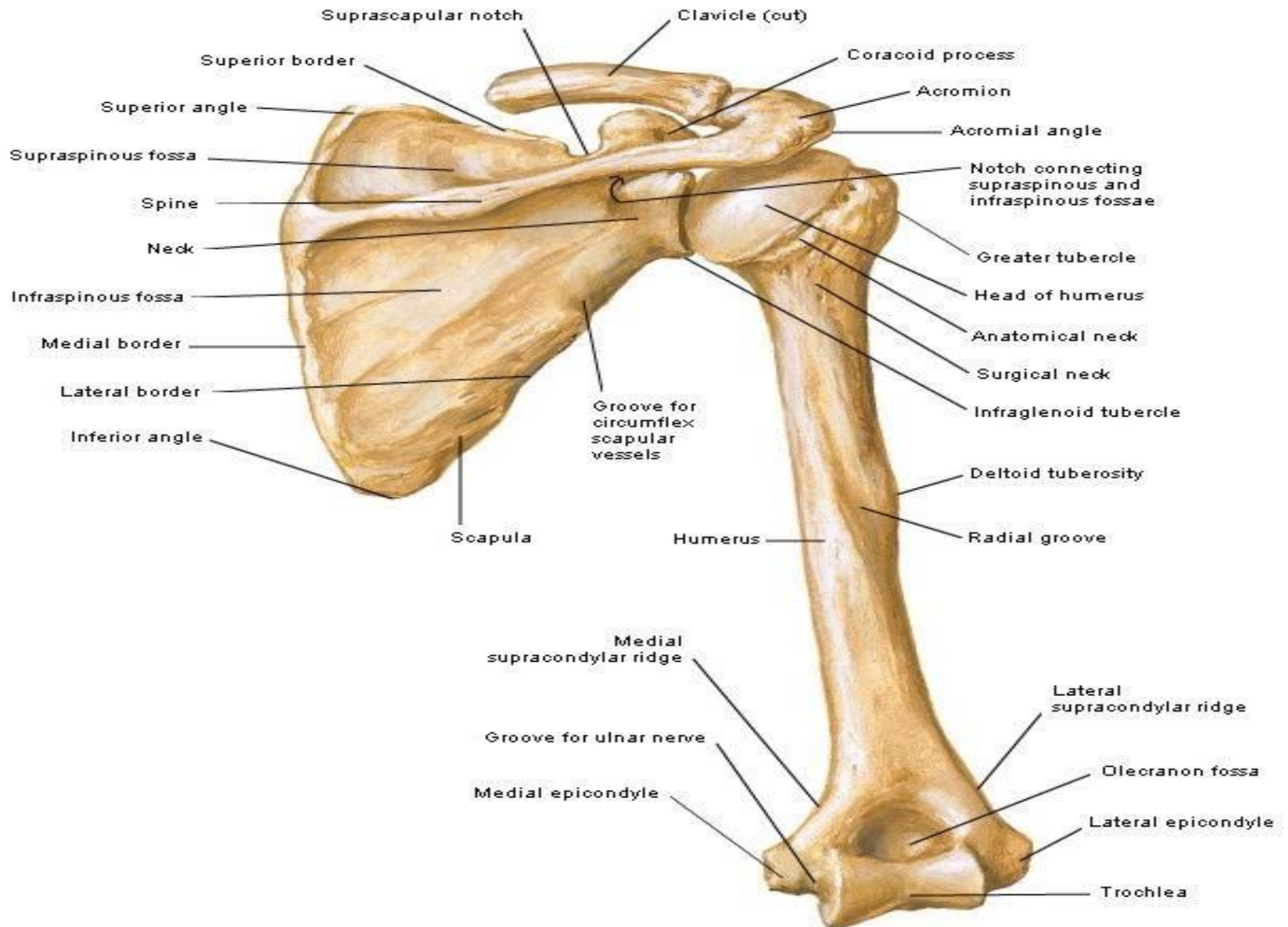
# Surfaces:

- Anterolateral Surface(b/w anterior & lateral borders): Upper half is covered by the deltoid. A little above it is marked by a V shaped deltoid tuberosity. Radial groove runs downwards & forwards across the surface.
- Anteromedial Surface(b/w anterior & medial border): Upper end is narrow & forms floor of the intertubercular sulcus. Nutrient foramen is seen near the medial border.
- Posterior Surface(b/w medial & lateral borders): Upper part is marked by an oblique ridge & lower end is crossed by a radial groove.



# Humerus and Scapula

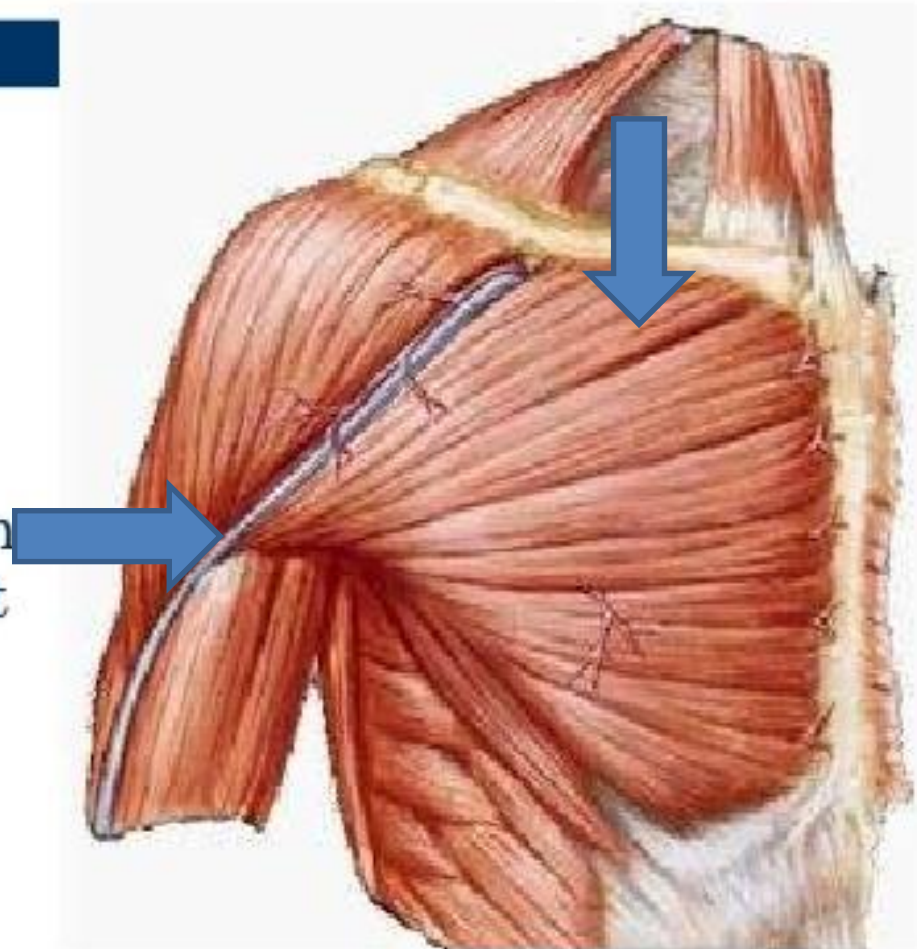
## Posterior View: Features





# Clavicle origin of Pectoralis Major

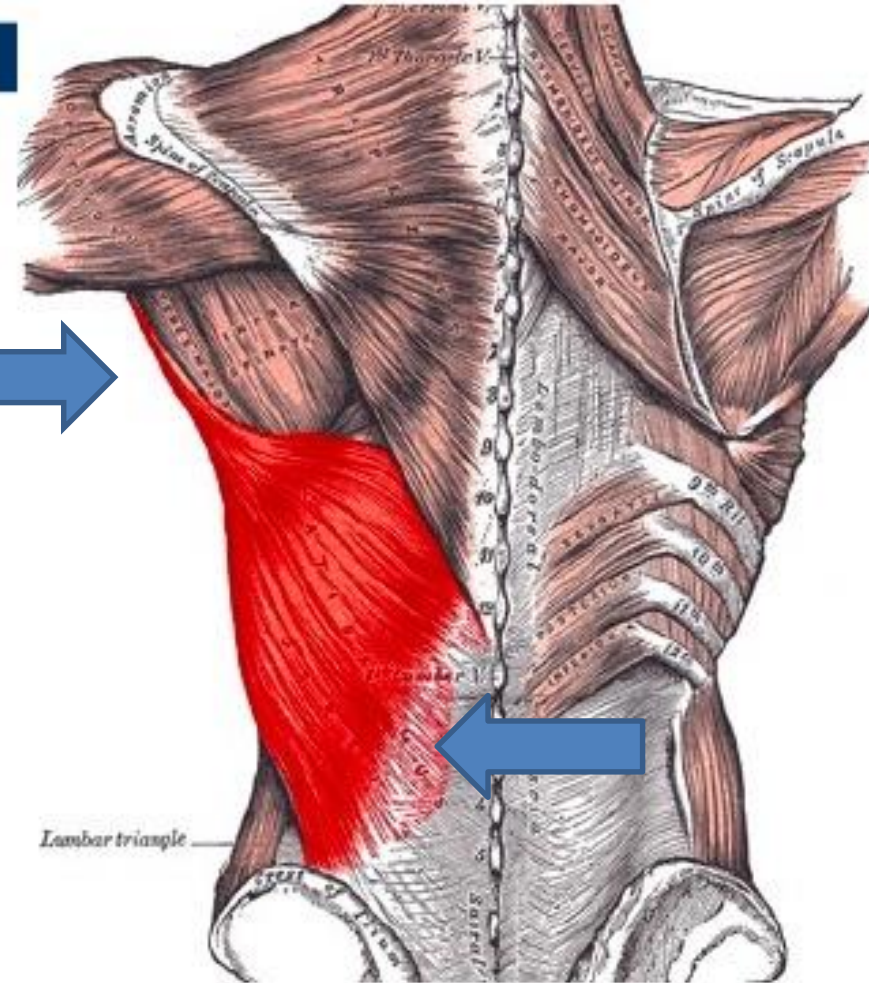
- Origin – medial half of anterior clavicle
- Insertion – lateral lip of intertubercular sulcus of humerus
- Action – Flexion, adduction and medial rotation arm at shoulder joint.
- Nerve supply
  - Medial and lateral pectoral nerve



# Latissimus Dorsi

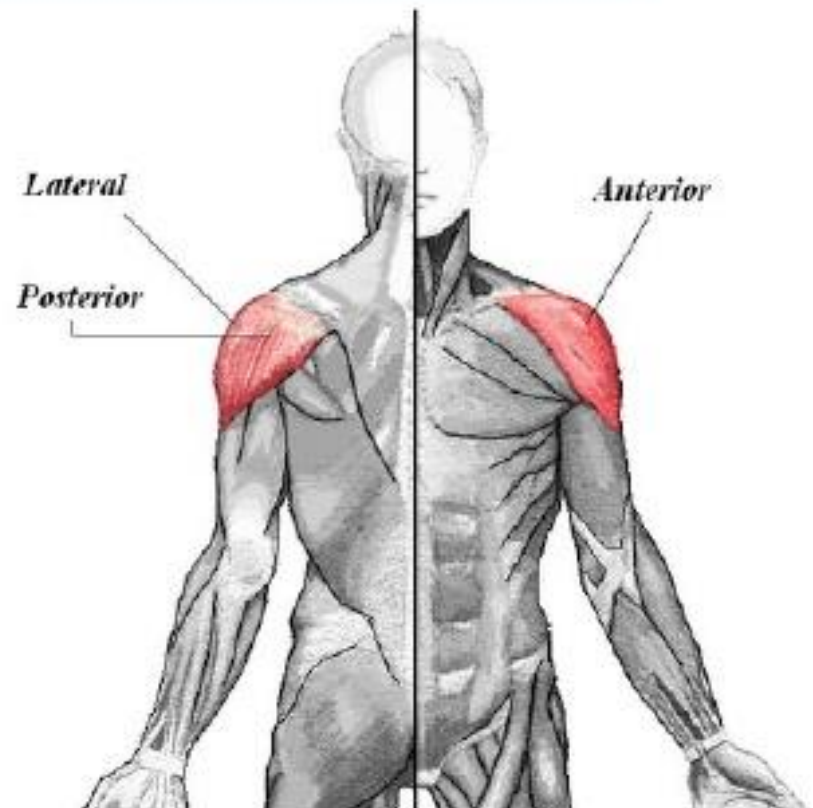
- Origin – Spines of inferior 6 thoracic vertebrae (T6-T12), lumbar vertebrae (L1-L5), crest of sacrum and iliac crest of hip bone and inferior four ribs.
- Insertion – Intertubercular sulcus of humerus
- Action
  - Extends, adduction and medial rotation arm at shoulder joint.
- Nerve supply - Thoracodorsal nerve

# Latissimus Dorsi



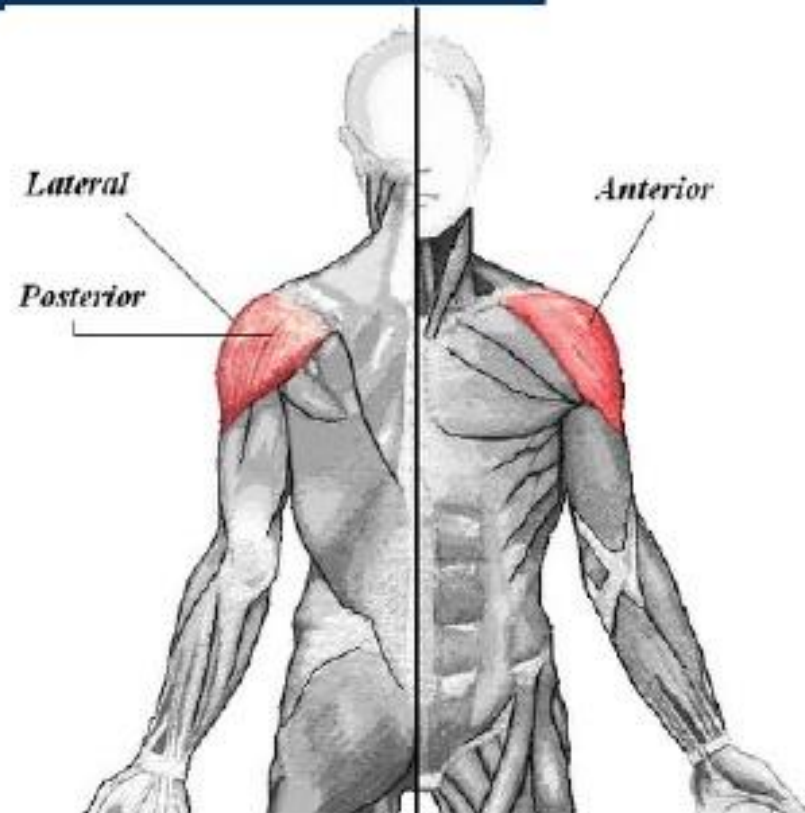
# Anterior Fiber of Deltoid

- Origin – anterior border of the lateral one third of the clavicle
- Insertion – deltoid tuberosity
- Action – flexion and middle rotation arm at GH joint.



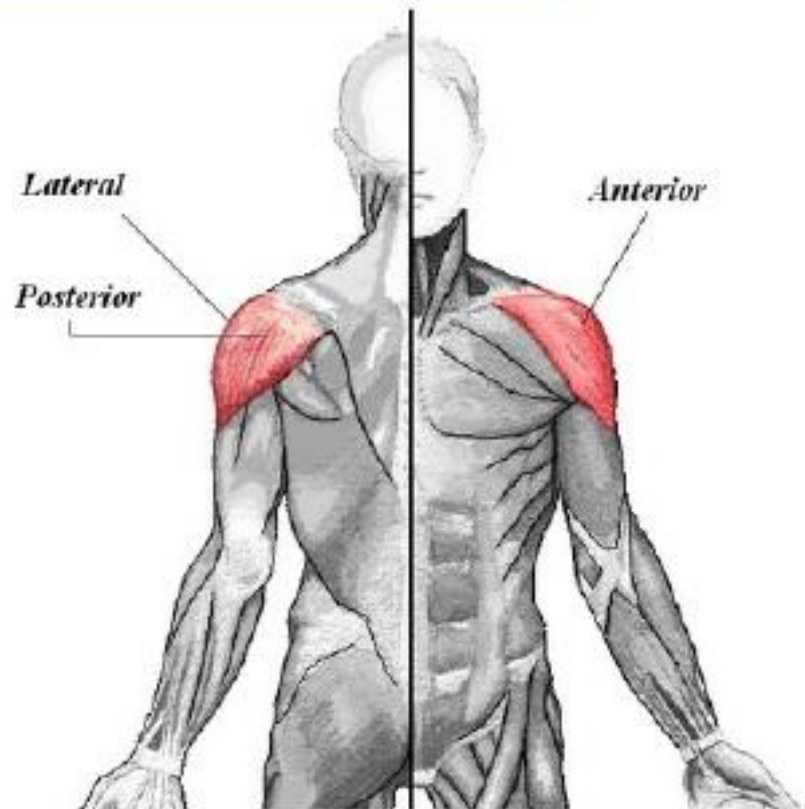
# Middle fiber of Deltoid

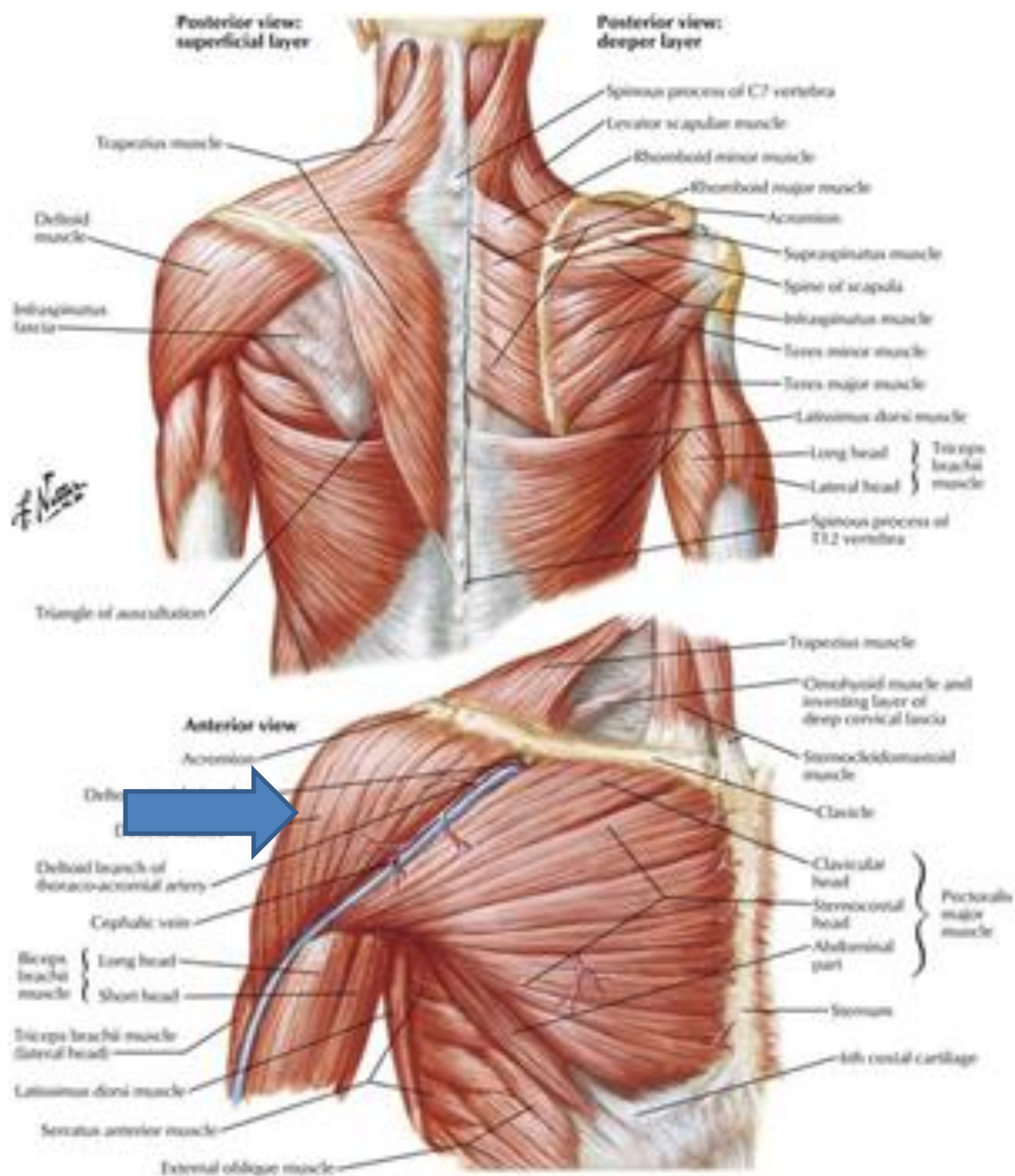
- Origin – lateral border and superior surface of the acromion process of the scapula
- Insertion – deltoid tuberosity
- Action – abduction arm at GH joint



# Posterior Fiber of Deltoid

- Origin – inferior lip of the crest of the spine of the scapula]
- Insertion – deltoid tuberosity
- Action – extension and lateral rotation arm at GH joint.





# Rotator Cuff Muscles

- Consists 4 muscles
- S – Supraspinatus
- I – Infraspinatus
- T – teres minor
- S – Subscapularis
- Group of muscles that stabilize GH joint.



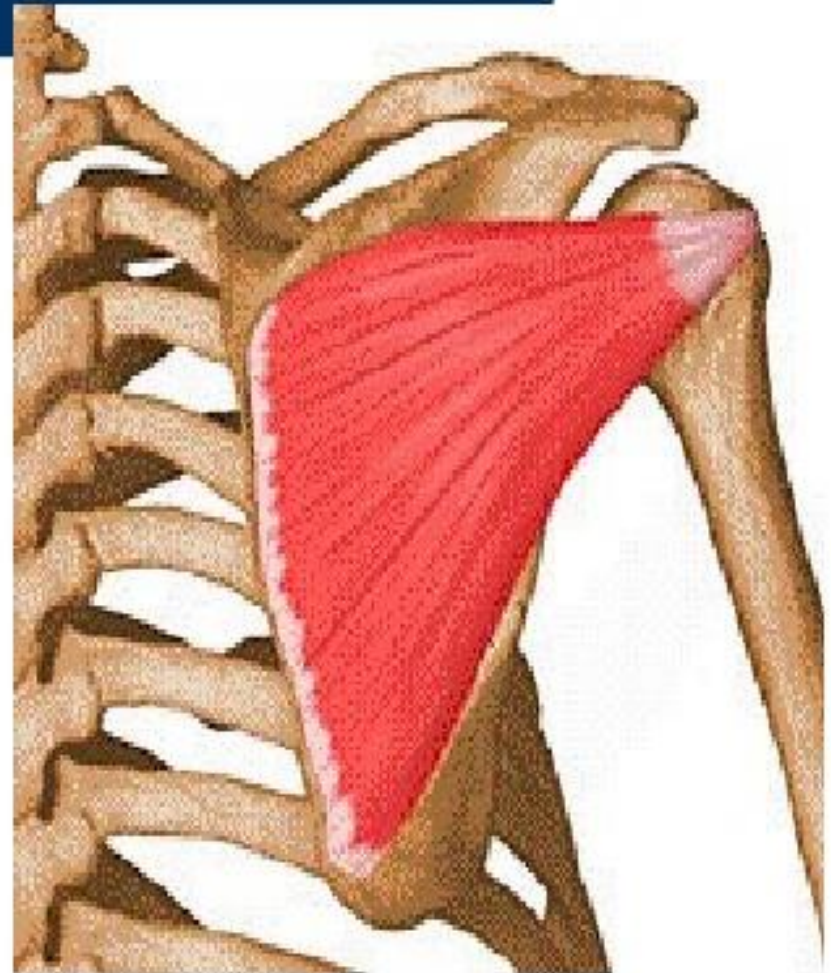
# Supraspinatus Muscle

- Origin – supraspinous fossa of scapula
- Insertion – Greater tubercle of humerus (superior aspect)
- Action – initially abduction (15 degrees) at shoulder joint, stabilizing shoulder joint
- Nerve supply -



# Infraspinatus Muscle

- Origin – Infraspinous fossa of scapula
- Insertion – Greater tubercle of humerus (middle aspect)
- Action – Laterally rotation and adduction arm at shoulder joint
- Nerve supply - Suprascapular nerve



# Teres Minor

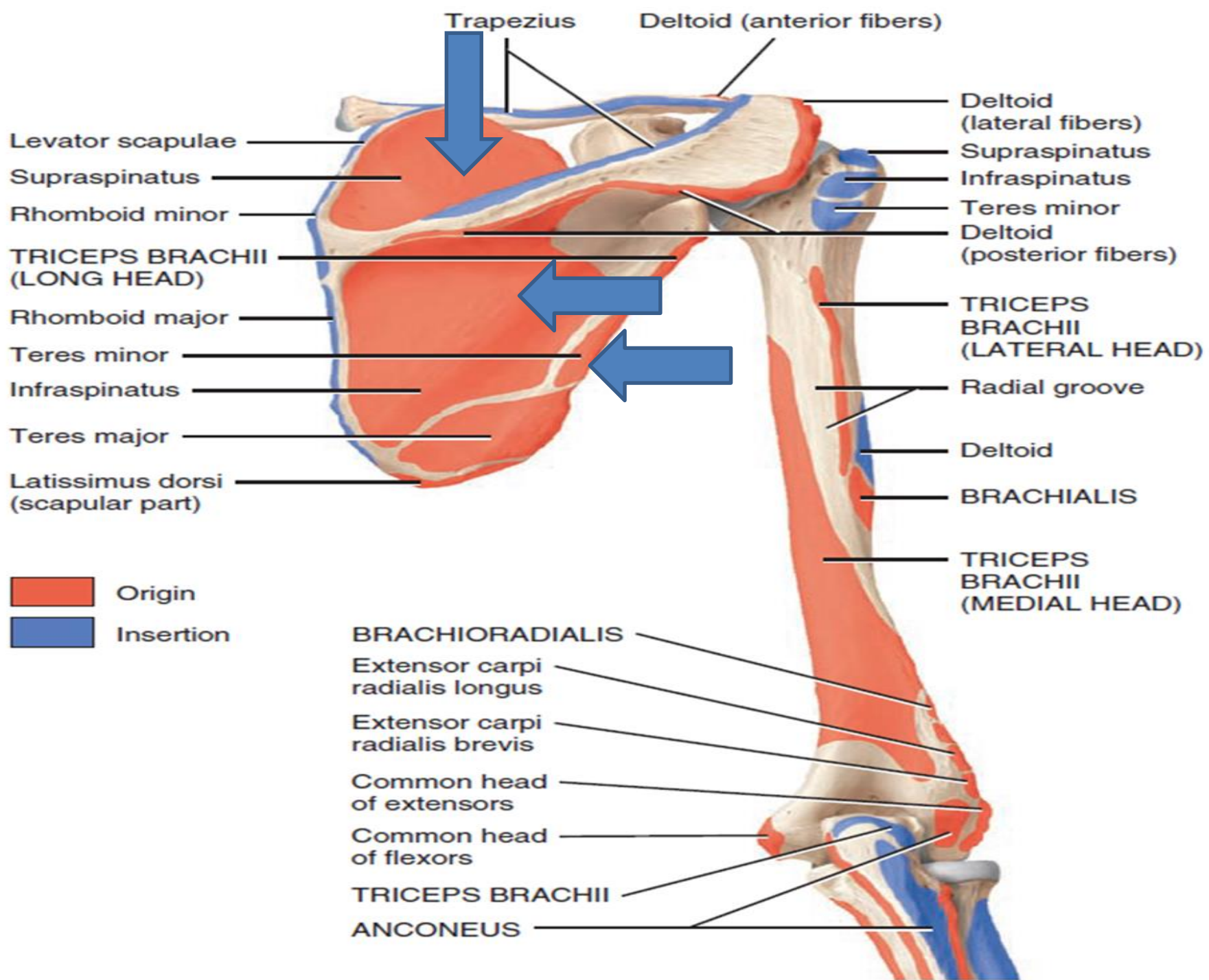
- Origin – Inferior lateral border of scapula
- Insertion – Greater tubercle of humerus (posterior inferior aspect)
- Action – Laterally rotation, extends and adduction arm at shoulder joint

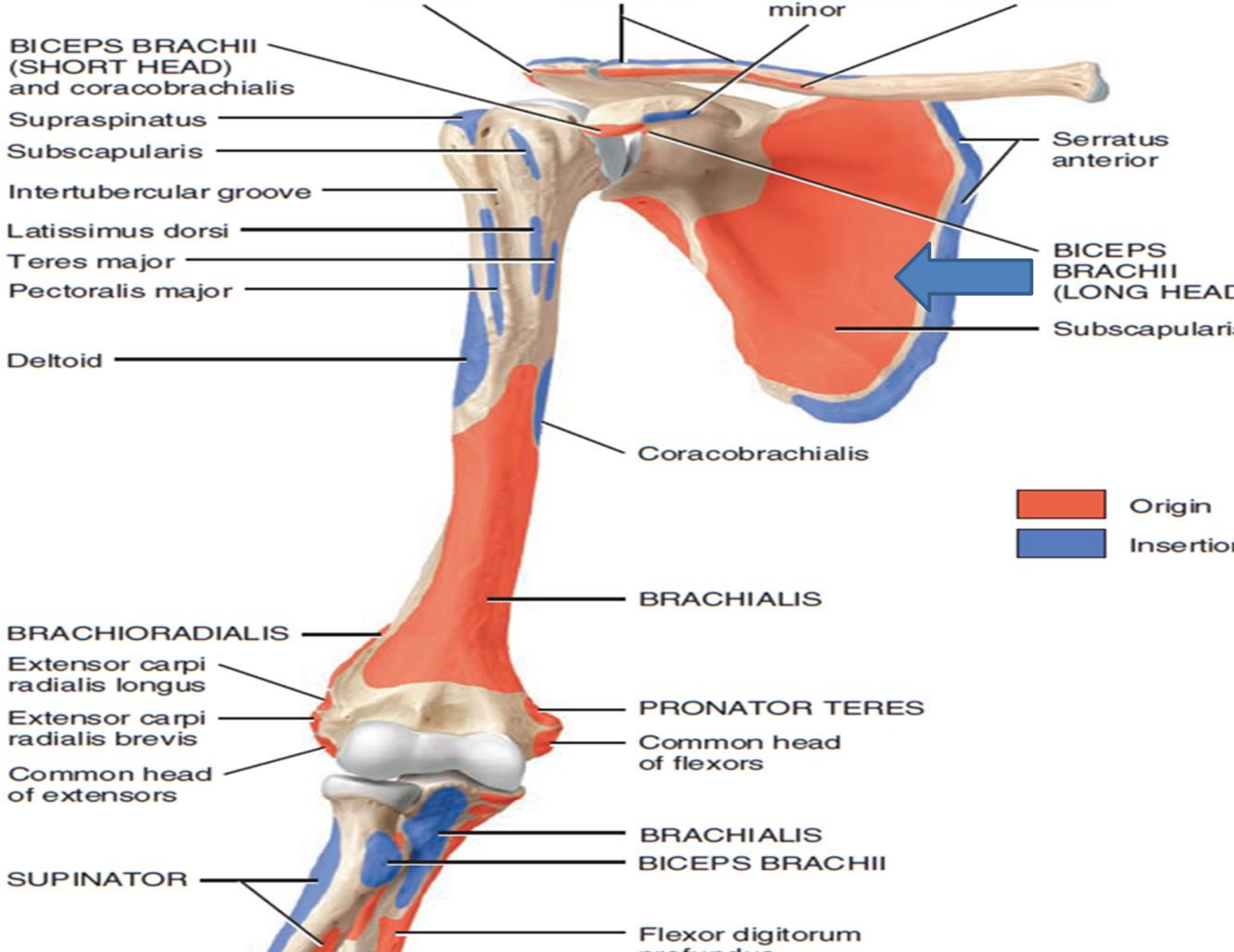


# Subscapularis Muscle

- Origin – subscapular fossa of scapula
- Insertion – lesser tubercle of humerus
- Action – Medial rotation arm at shoulder joint
- Nerve supply – upper and lower subscapular nerve

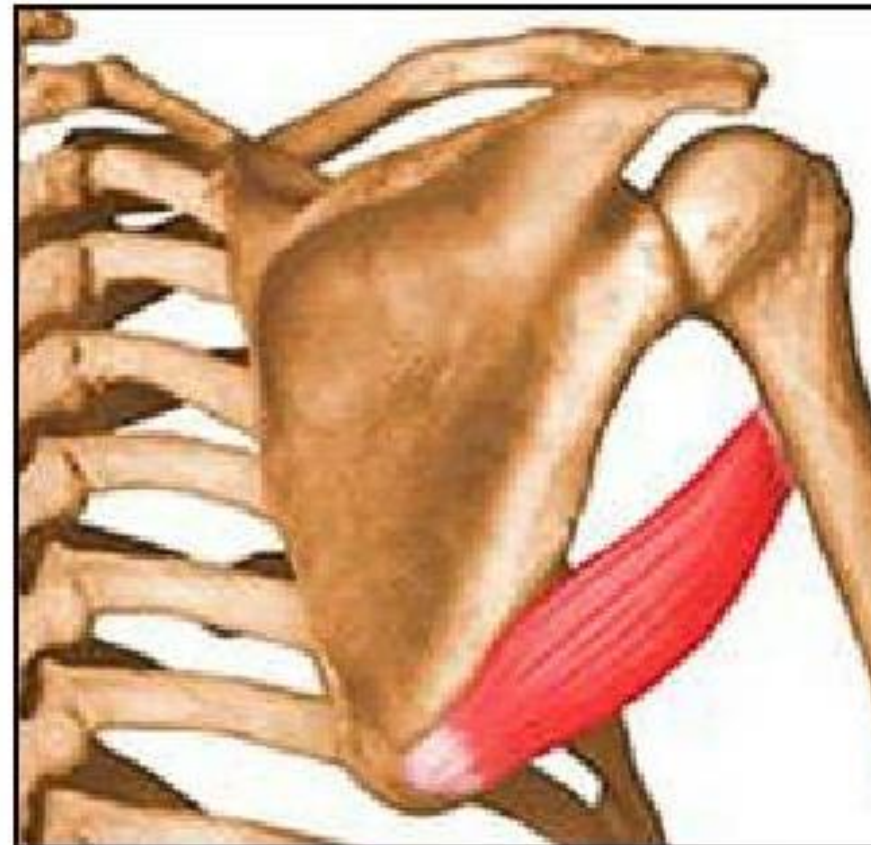




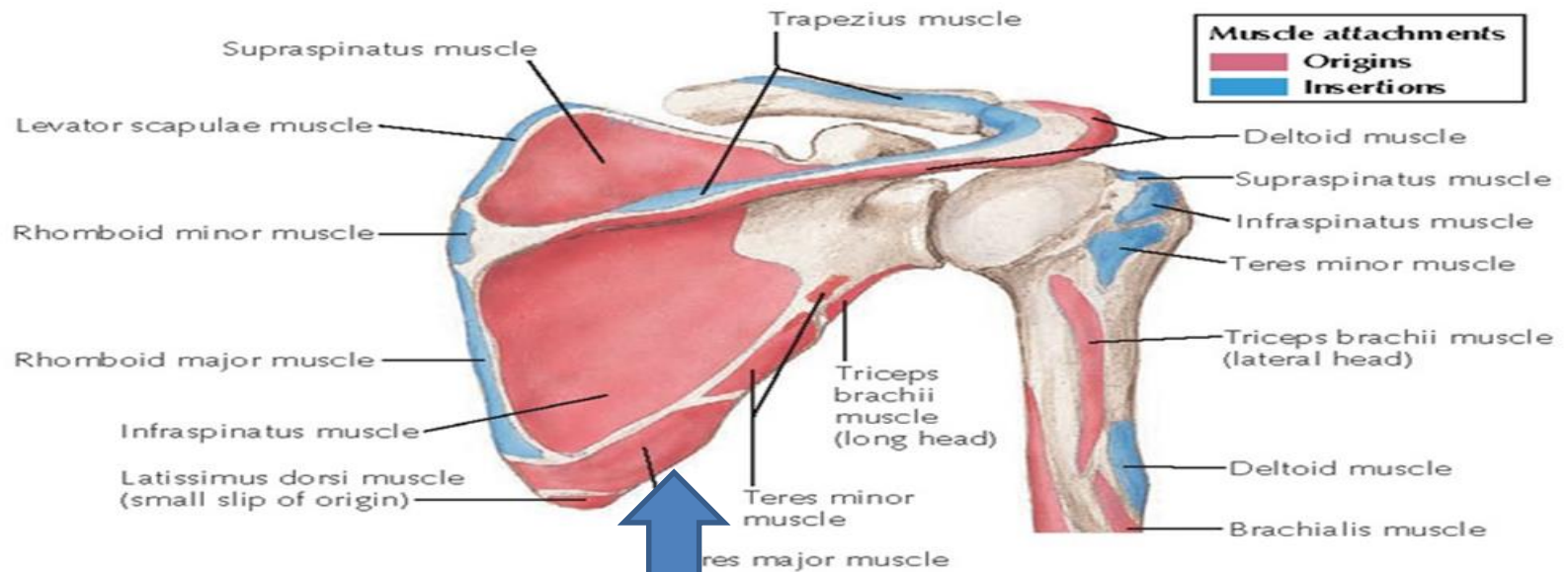
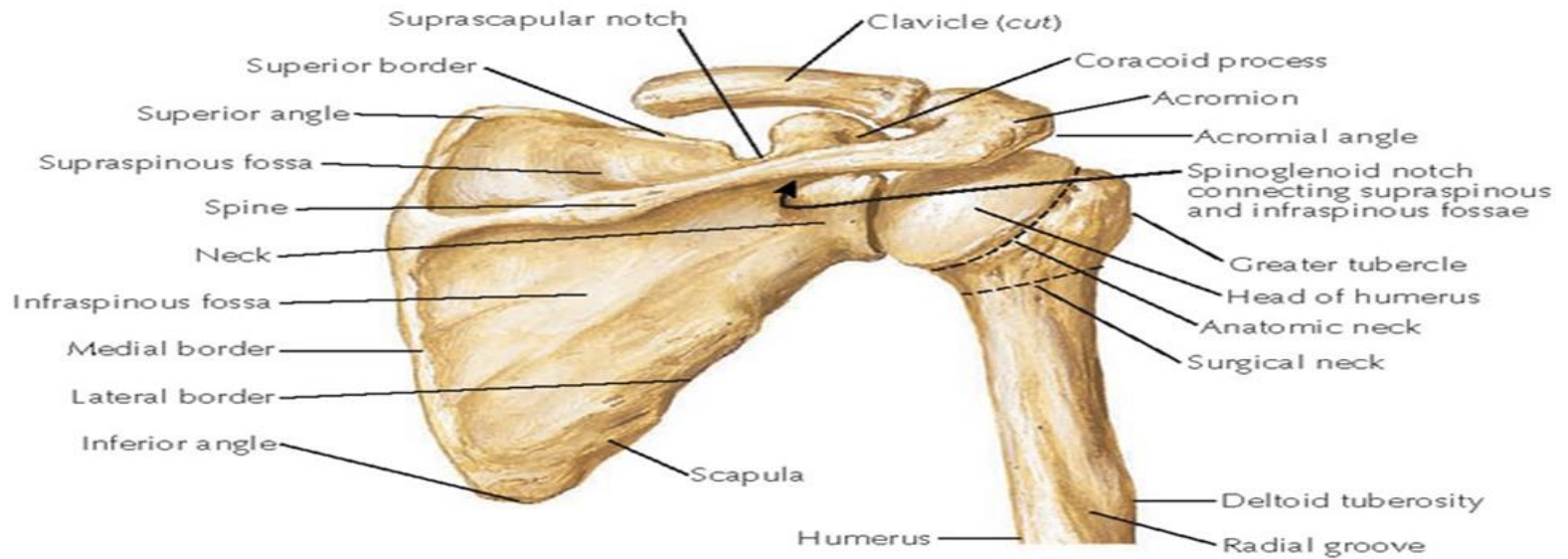


# Teres Major

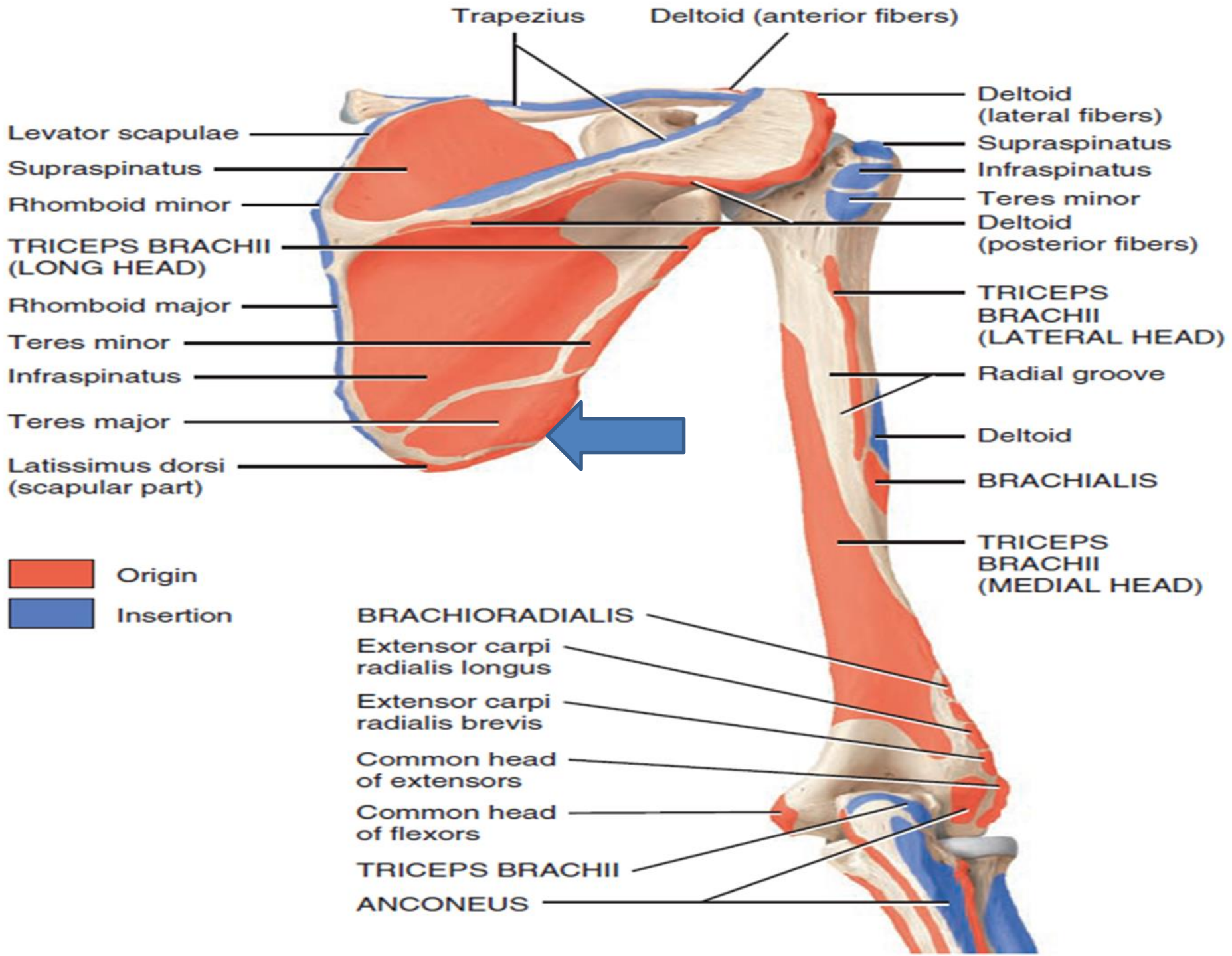
- Origin – Inferior angle of scapula
- Insertion – medial lip of Intertubercular sulcus of humerus
- Action
  - Extends arm at shoulder joint
  - Assist in adduction and medial rotation of arm at shoulder joint.



SCAPULA AND HUMERUS: POSTERIOR VIEW



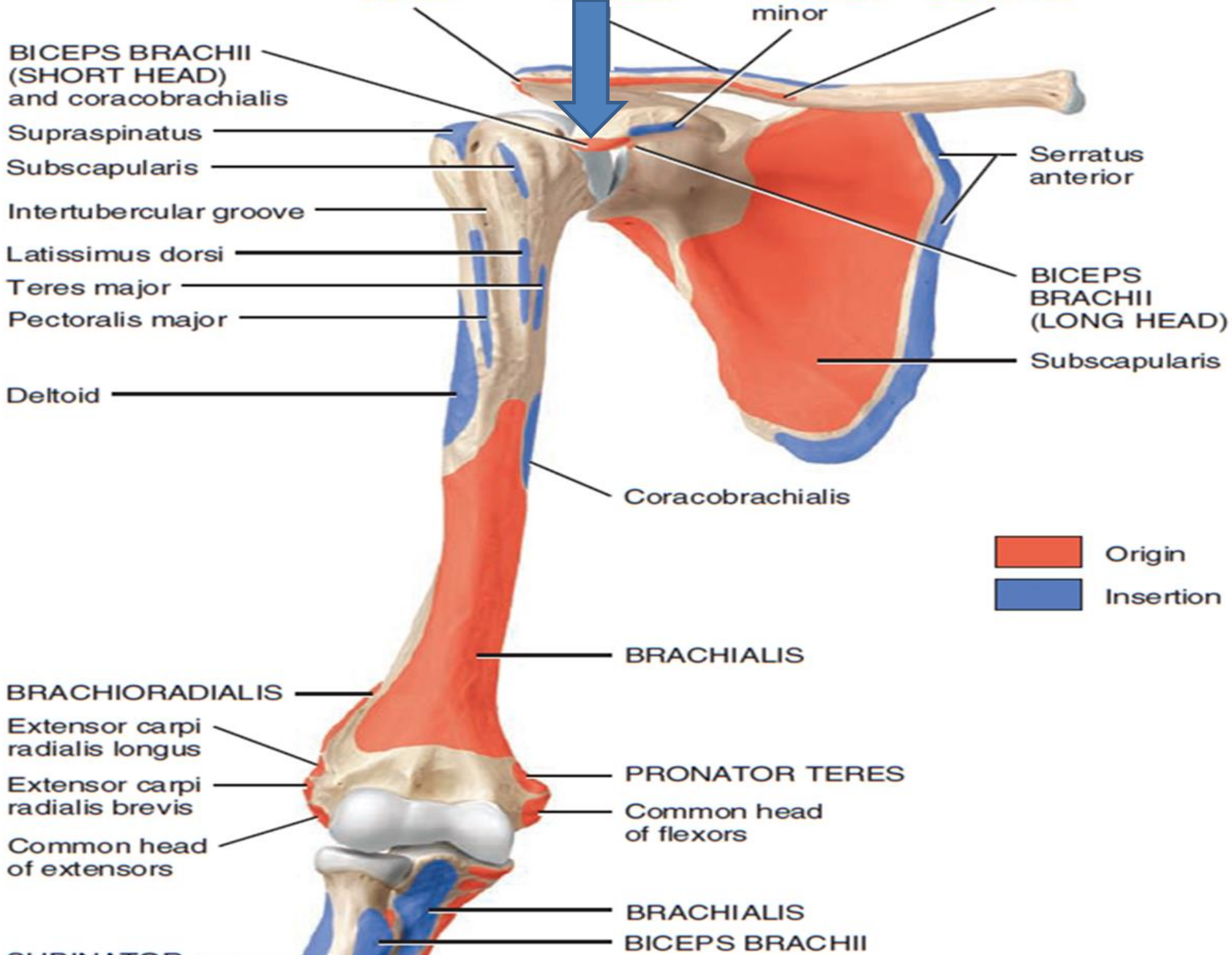




# Coracobrachialis

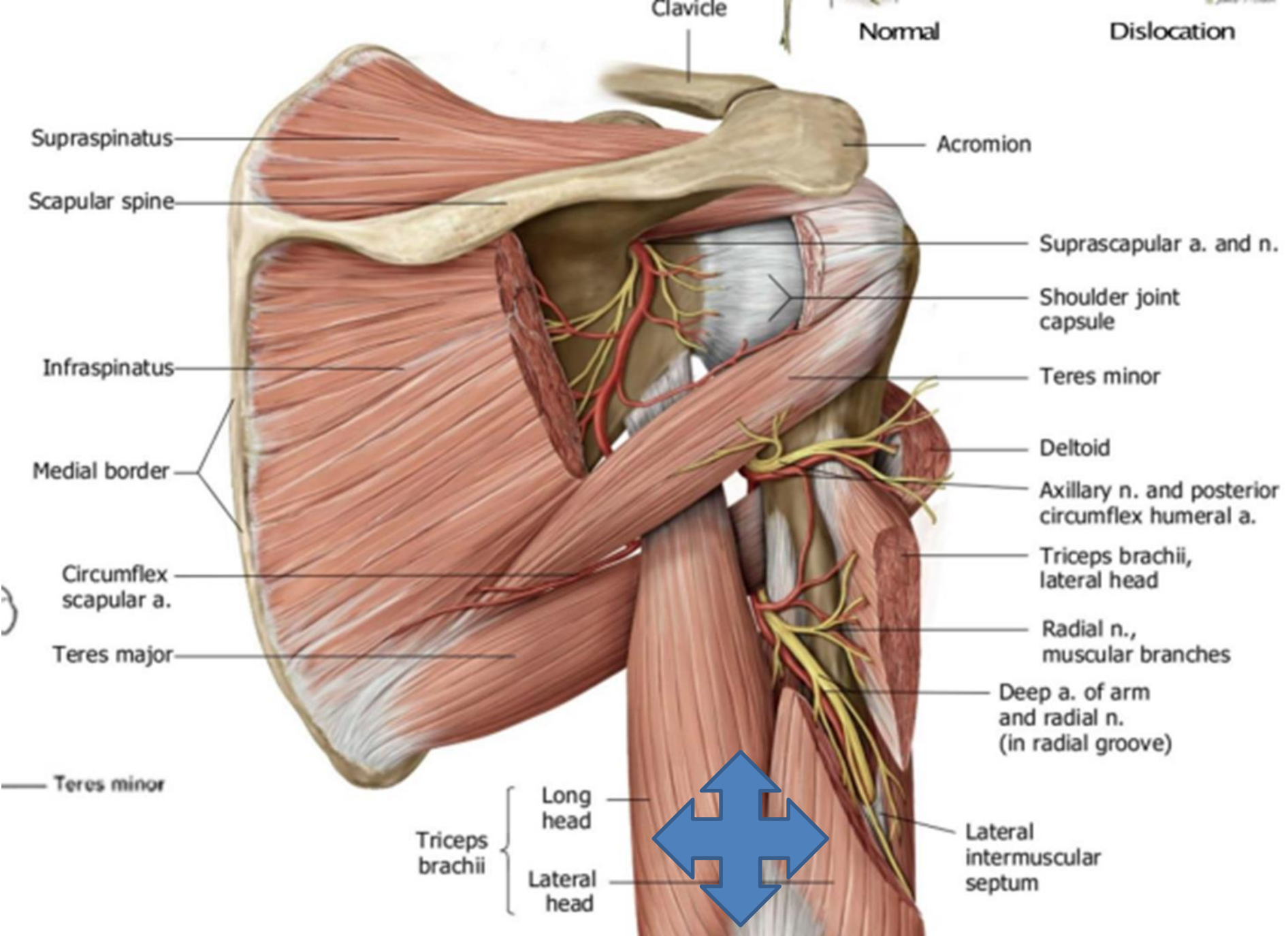
- Origin - Coracoid process of scapula
- Insertion - Middle of medial surface of shaft of humerus.
- Action - Flexion and adduction arm at shoulder joint.
- Nerve supply -  
Musculospiral nerve





# TRICEPS BRACHII

- Triceps brachii is a three-headed (tri - three, cep - head) muscle of the arm. It represents the only constituent of the posterior muscle group of the arm, spanning almost the entire length of the humerus.
- The triceps brachii muscle consists of a long, medial and lateral head, that originate from their respective attachments on the humerus and scapula, and insert via a common tendon on the ulna.

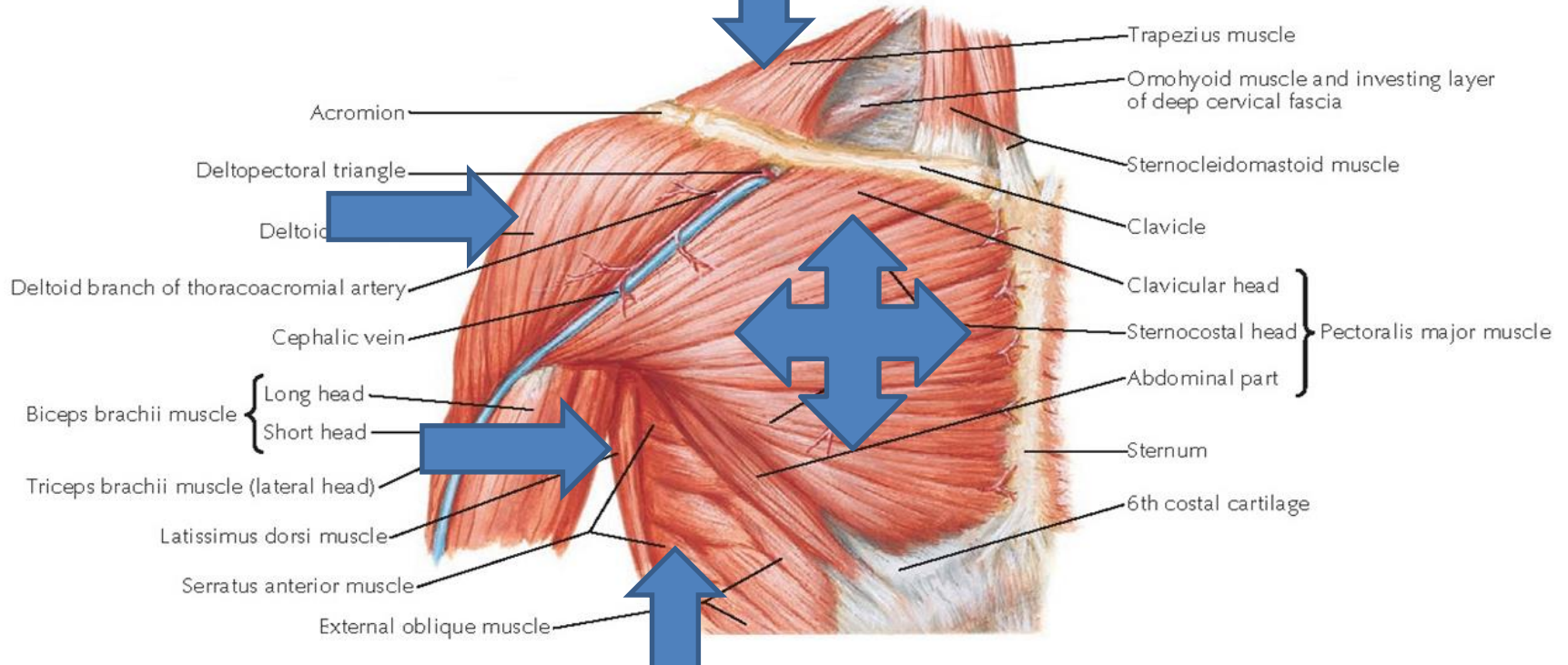
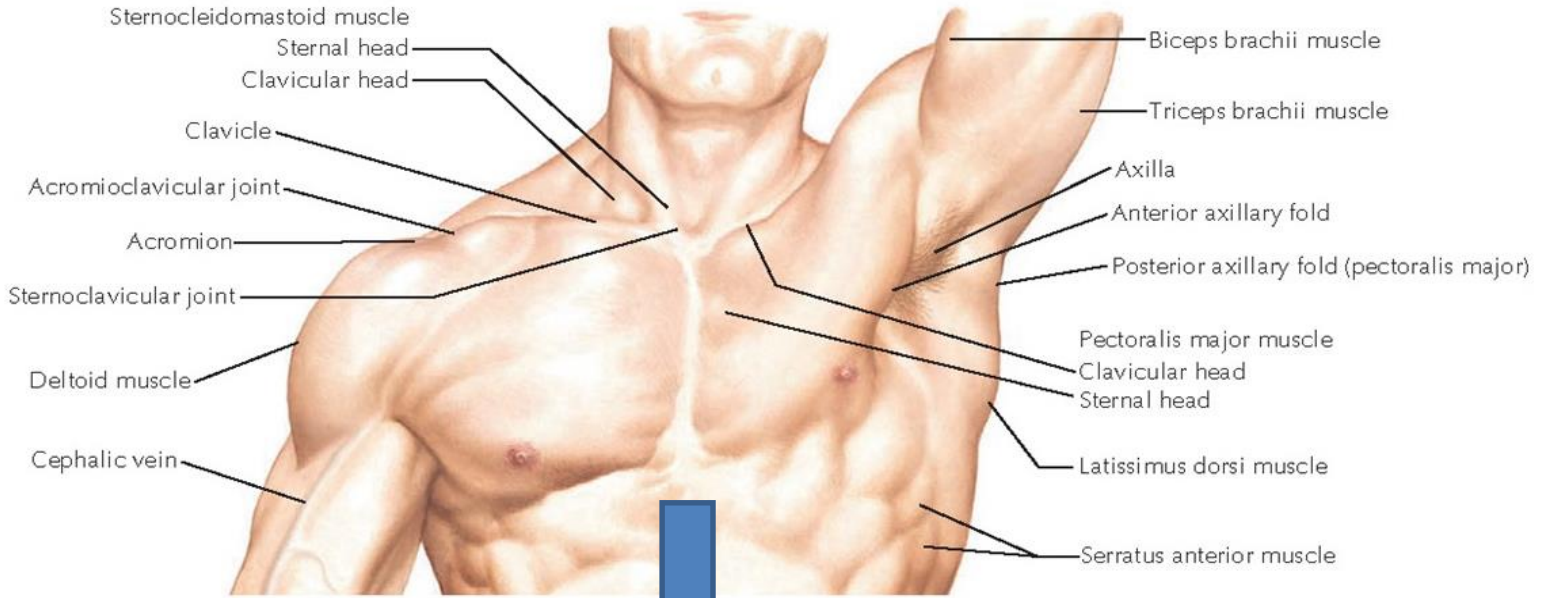


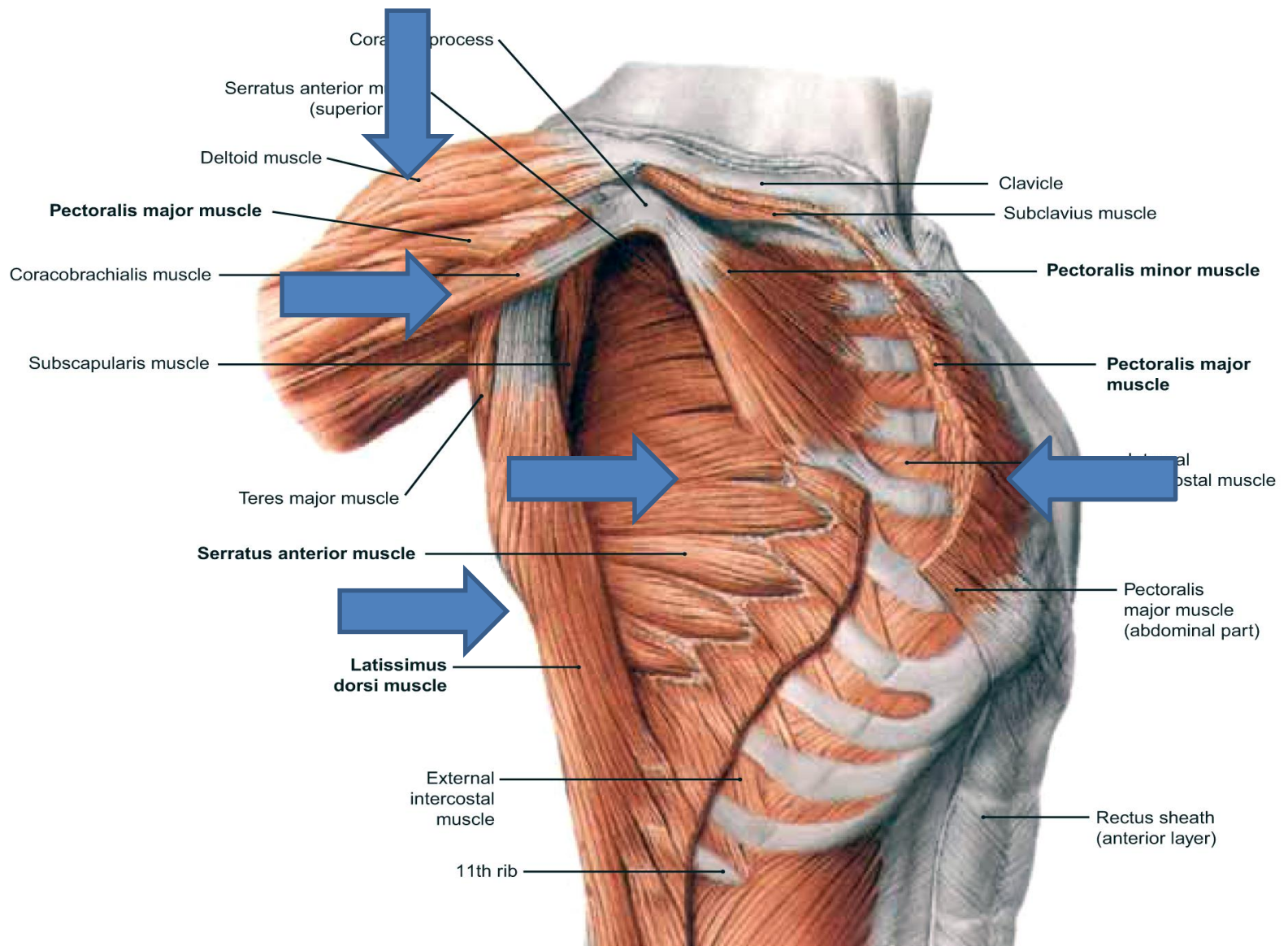
# MUSCLE ATTACHMENTS OF UPPER END

## MUSCLE ATTACHMENTS

- Lesser Tubercle: Insertion of The Multipennate SUBSCAPULARIS.
- Greater Tubercle(uppermost impression): Insertion of the SUPRASPINATUS.
- Greater Tubercle(middle impression): Insertion of the INFRASPINATUS.
- Greater Tubercle(lower impression): Insertion of TERES MINOR.
- Intertubercular Sulcus(lateral lip): Insertion of PECTORALIS MAJOR.
- Intertubercular Sulcus(floor): Insertion of LATISSMUS DORSI.
- Intertubercular Sulcus(medial lip): Insertion of TERES MAJOR.
- **Deltoid Tuberosity:** Insertion of DELTOID.
- **Medial Border(rough area):** Insertion of CHORACOBRACHIALLIS.
- **Shaft:** BRACHIALIS arises from the lower halves of the anteromedial & anterolateral surfaces of the shaft.

# ANTERIOR MUSCLES OF SHOULDER





**PECTORALIS MINOR, SERRATUS ANTERIOR, AND LATISSIMUS DORSI MUSCLES, LATERAL VIEW (RIGHT)**



# □ Nerves

- *Three Nerves* are directly related to the Humerus.
- *AXILLARY Nerve* at the Surgical neck.
- *RADIAL Nerve* at the Radial groove.
- *ULNAR Nerve* behind the medial epicondyle.

# APPLIED ANATOMY

- Fractures
- Fractures of the the proximal humerus can be caused by a direct blow to the area from a fall, collision, or motor vehicle accident.
- Because the scapula is protected by the chest and surrounding muscles, it is not easily fractured.

# FRACTURES

- Symptoms of fractures about the shoulder are related to the specific type of fracture.
- General Findings
- Pain
- Swelling and bruising
- Inability to move the shoulder
- A grinding sensation when the shoulder is moved
- Deformity -- "It does not look right"

- Specific Findings: Proximal Humerus Fracture
- A severely swollen shoulder
- Very limited movement of the shoulder
- Severe pain

# TREATMENT OF FRACTURE

- Most fractures of the proximal humerus can be treated without surgery if the bone fragments are not shifted out of position (displaced). If the fragments are shifted out of position, surgery is usually required. Surgery usually involves fixation of the fracture fragments with plates, screws, or pins or it involves shoulder replacement.

# DISLOCATION

- Anterior dislocations of the shoulder are caused by the arm being forcefully twisted outward (external rotation) when the arm is above the level of the shoulder. These injuries can occur from many different causes, including a fall or a direct blow to the shoulder.
- Posterior dislocations of the shoulder are much less common than anterior dislocations of the shoulder. Posterior dislocations often occur from seizures or electric shocks when the muscles of the front of the shoulder contract and forcefully tighten.

# TREATMENT

- The initial treatment of a shoulder dislocation involves reducing the dislocation ("putting it back in the socket"). This usually involves treatment in the emergency room.
- The patient is given some mild sedation and pain medicine, usually through an intravenous line. Often, the physician will pull on the shoulder until the joint is realigned. Reduction is confirmed on an X-ray and the shoulder is then placed in a sling or special brace.
- Additional treatment at a later date is based on the patient's age, evidence of persistent problems with the shoulder going out of place, and the underlying associated soft-tissue injury (either to the rotator cuff or the capsulolabral complex).