

# Anatomy of the Shoulder Girdle

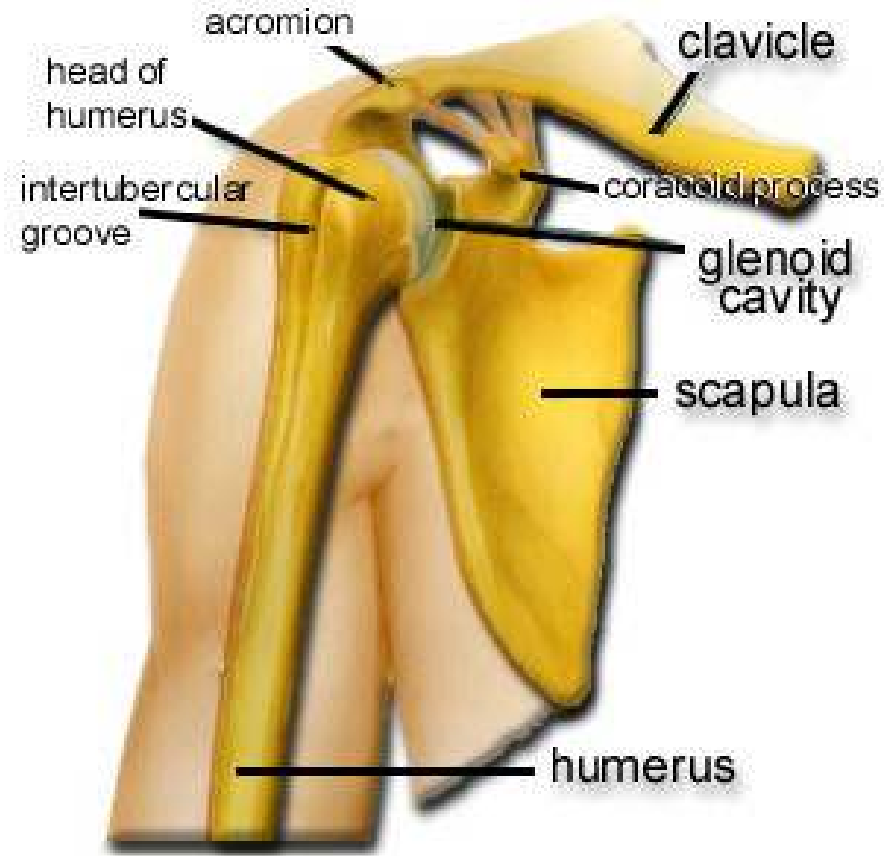
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# Bony Anatomy

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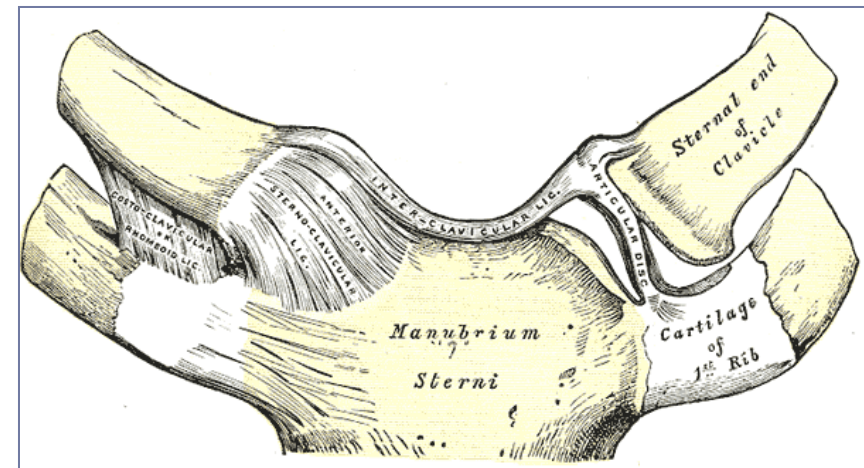
- ▶ **Shoulder Complex:**
  - ▶ Sternum(manubrium)
  - ▶ Clavicle
  - ▶ Scapula
  - ▶ Proximal humerus



# Manubrium Sterni

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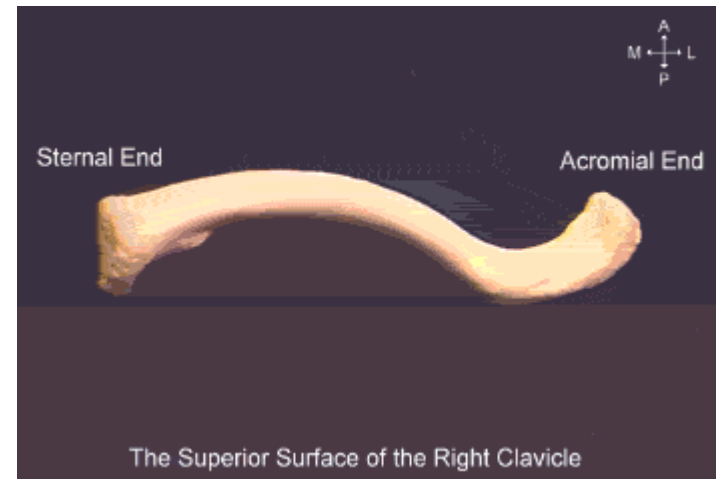
- ▶ Upper part of the sternum
- ▶ Attachment site of the clavicle to the manubrium is at the clavicular notch



# Clavicle

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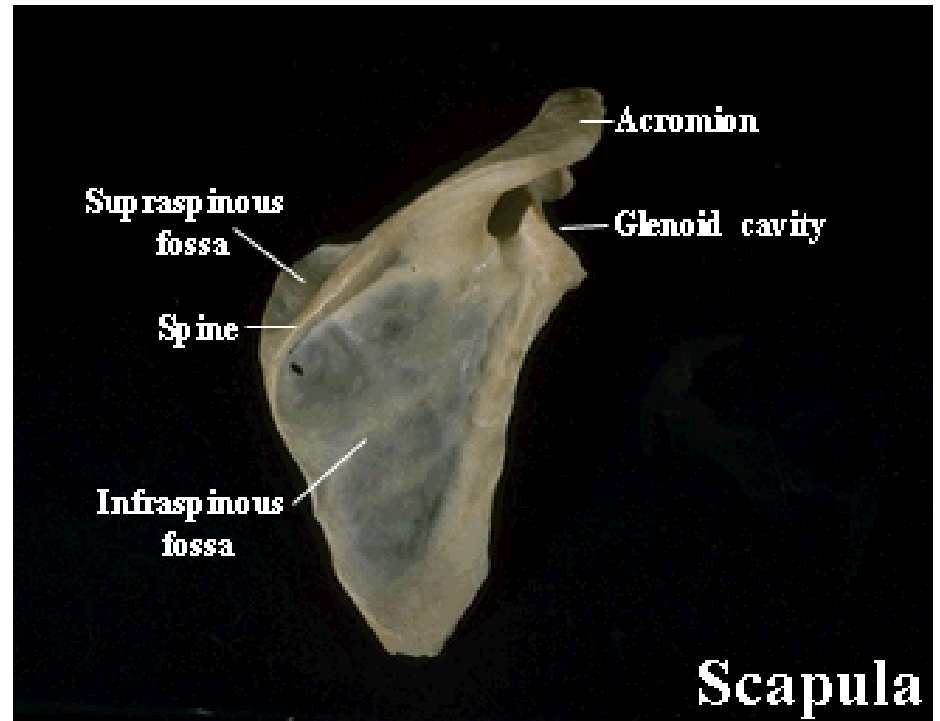
- ▶ Convex proximal (lateral) 2/3
- ▶ Concave distal (medial) 1/3 to meet scapula
- ▶ Superior surface not protected by muscle mass
- ▶ Elevates and rotates to maintain alignment of scapula



# Scapula

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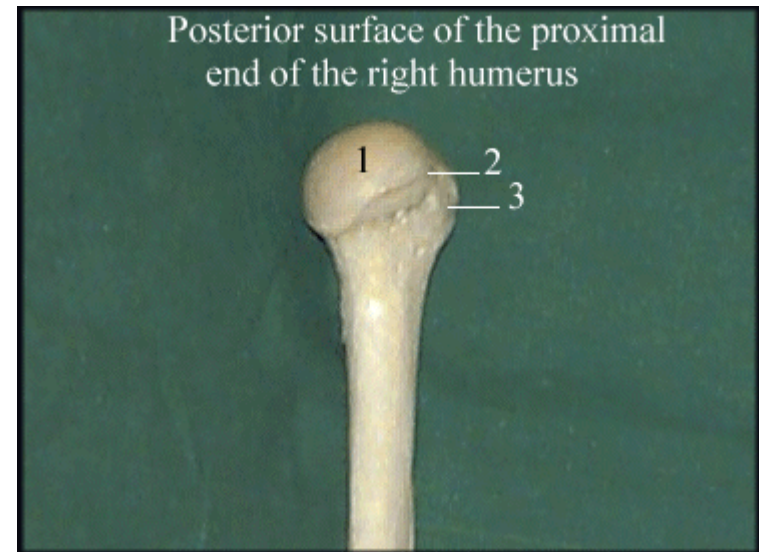
- ▶ Subscapular fossa
- ▶ Vertebral borders
- ▶ Spine of scapula
- ▶ Coracoid process
- ▶ Glenoid fossa



# Proximal Humerus

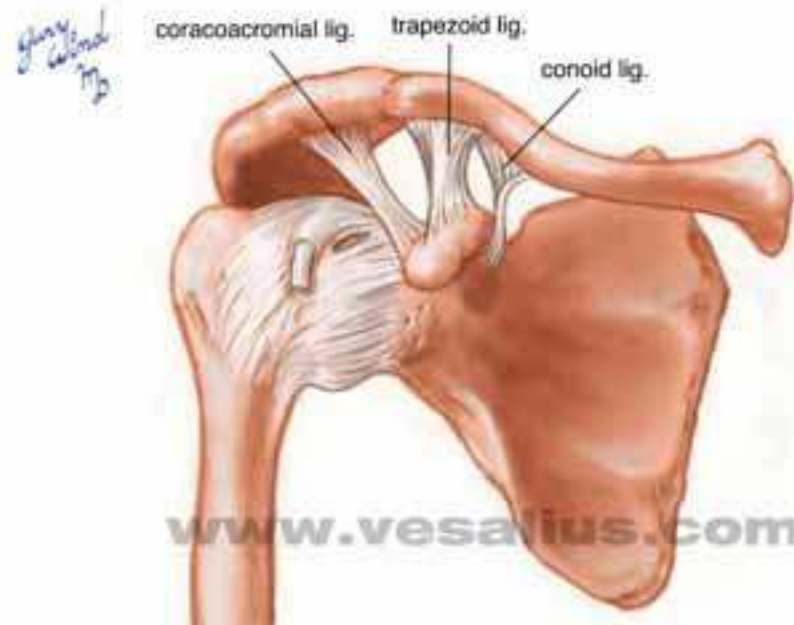
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- ▶ **Humeral head**
  - ▶ projects medially off the anatomical neck
- ▶ **Bicipital groove**
  - ▶ Lodges the long head of the biceps brachii
- ▶ **Greater tuberosity**
- ▶ **Lesser tuberosity**
- ▶ **Surgical neck**



# Acromioclavicular Joint (AC)

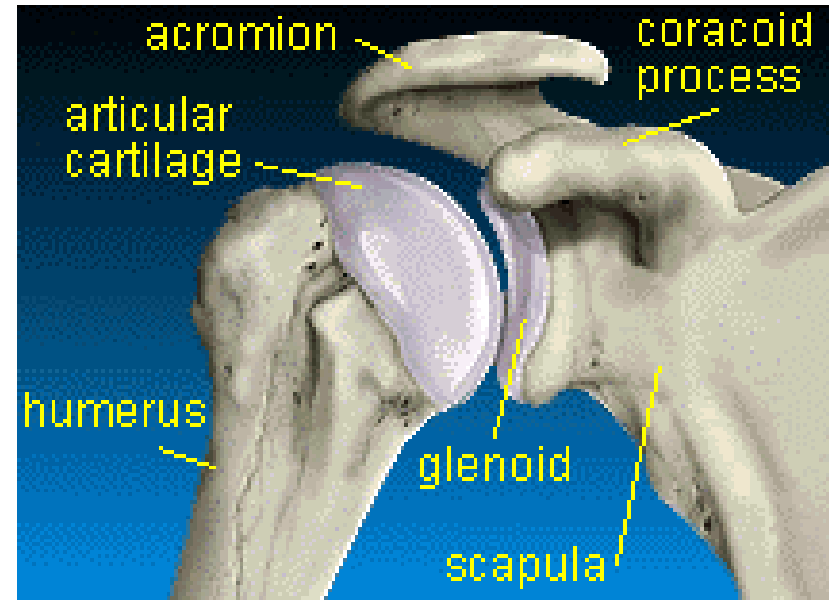
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# Glenohumeral Joint (Shoulder)

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- ▶ Bony components:
  - Head of the humerus
  - Glenoid cavity of the scapula
    - The glenoid cavity is widened and deepened slightly by a lip of fibrocartilage, the glenoid labrum

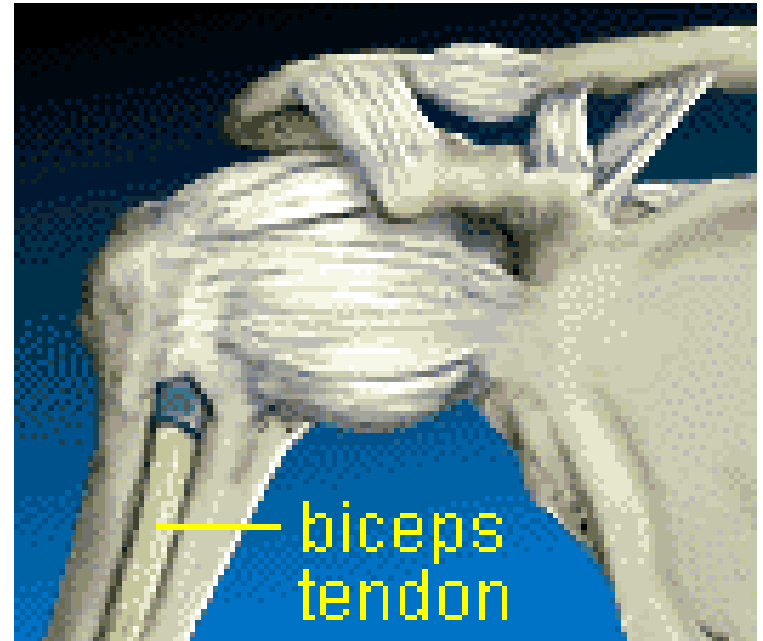




# Shoulder (anterior)

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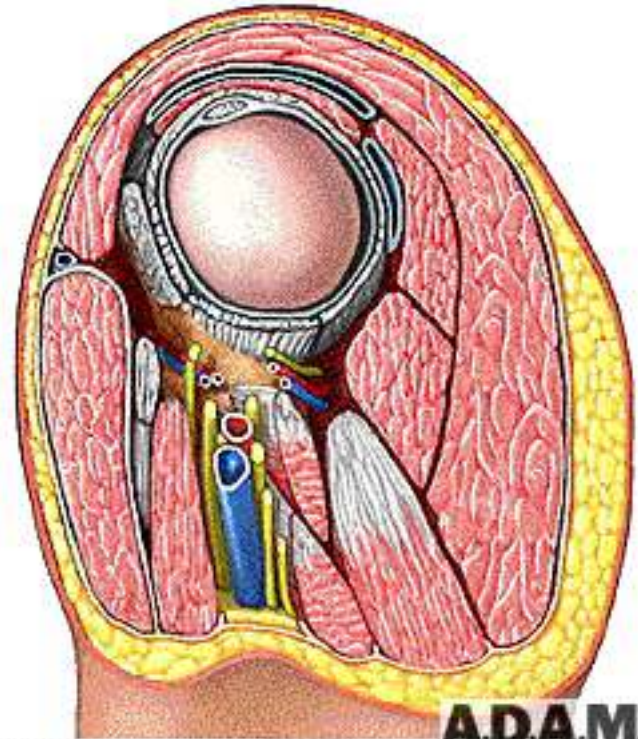
- ▶ Fibrous capsule
  - This attaches to the bony framework
  - Proximally to the circumference of the glenoid cavity
  - Distally to the anatomical neck of the humerus, except medially, where the attachment descends for a short distance on the shaft of the humerus



# Shoulder

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- ▶ The shoulder capsule is so thin and lax that it is not strong enough by itself to keep the head of the humerus in the glenoid cavity; this function is subserved by the rotator cuff muscles



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# Shoulder Girdle X-Ray appearance

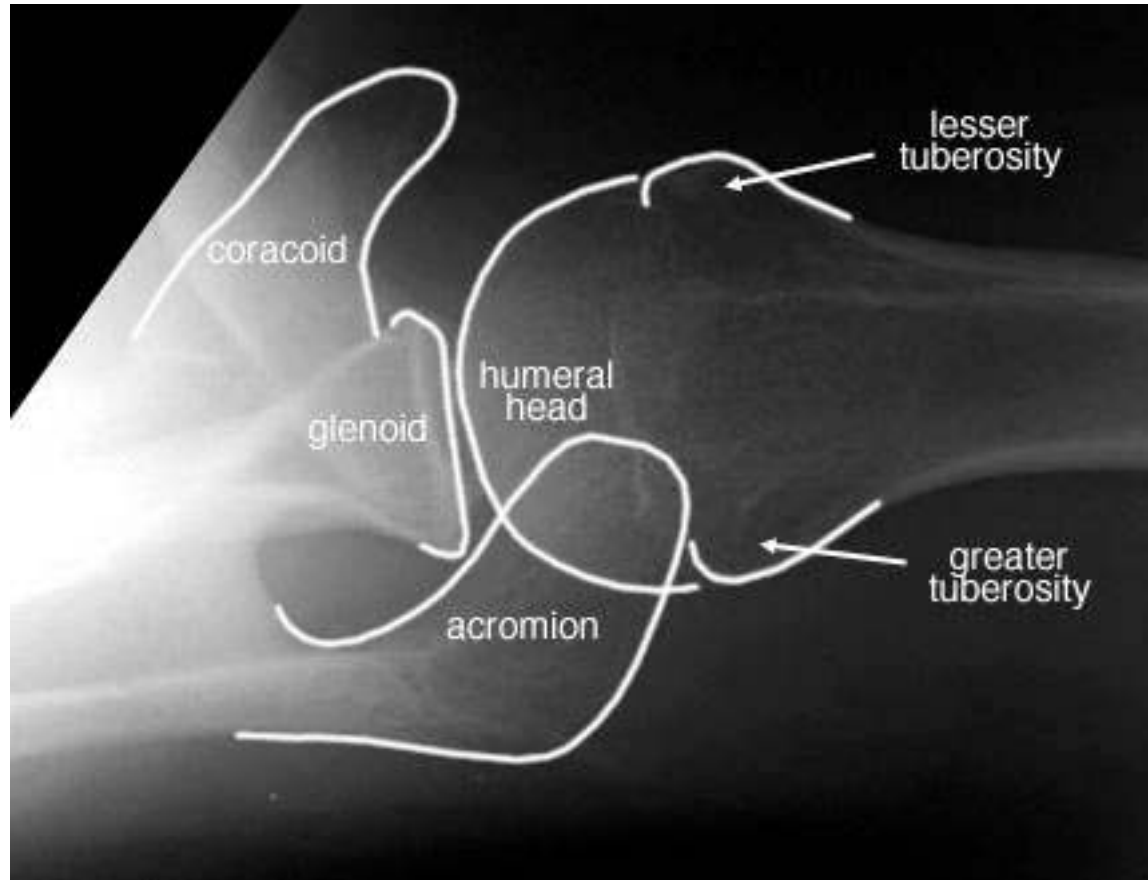
## Anterior Posterior view

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# Shoulder Girdle X-Ray appearance (Axillary view)

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# Movements at the shoulder joint

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- ▶ A ventral movement of the arm in a sagittal plane is flexion of the shoulder; the opposite movement is extension of the shoulder
- ▶ Movement of the arm away from the midline in a coronal plane is abduction of the shoulder; the opposite movement is adduction of the shoulder
- ▶ Rotation of the humerus around its longitudinal axis such that the anterior surface of the humerus turns medially is medial rotation of the shoulder; the opposite movement is lateral rotation of the shoulder



# Muscles of the shoulder girdle

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- ▶ **Two groups of muscles:**
  - ▶ Muscles acting on the scapula
  - ▶ Muscles acting on the humerus



# Muscles acting on the scapula

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## Actions

- ▶ Move the scapula to allow increased range of motion of the shoulder joint
- ▶ Fixate scapula to thorax
- ▶ Muscles include:
  - ▶ Rhomboid major and minor
  - ▶ Levator scapulae
  - ▶ Serratus Anterior
  - ▶ Pectoralis Major and Minor
  - ▶ Trapezius
  - ▶ Latissimus Dorsi



# Rhomboid major and minor

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**O:** **Rhomboid Minor** - Nuchal ligament and spinous processes C7 - T1

**Rhomboid Major** - Spinous processes T2 - T5

**I:** Medial border of scapula from level of the spine to inferior angle

**A:** Retracts the scapula, moving it towards the spine; and rotates it so that the glenoid tilts downward

**N:** Dorsal Scapular Nerve





# Levator scapulae

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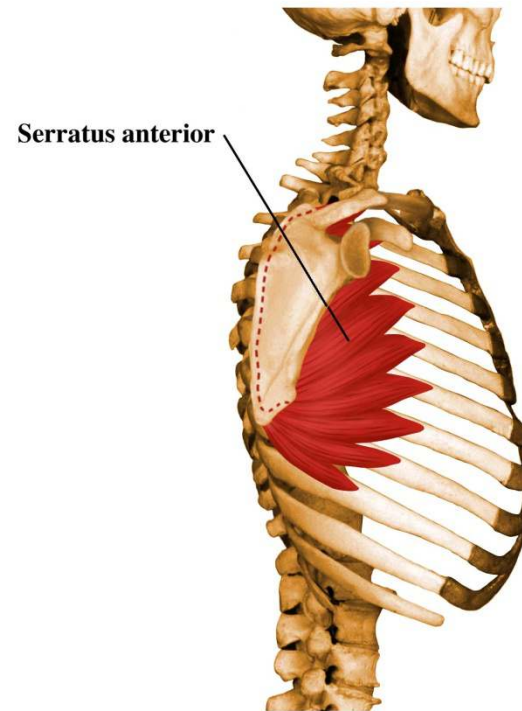
- O**: Posterior tubercles of transverse processes of C1 - C4 vertebrae
- I**: Superior part of medial border of scapula
- A**: Elevates scapula and tilts its glenoid cavity inferiorly by rotating scapula
- N**: Dorsal Scapular Nerve



# Serratus anterior

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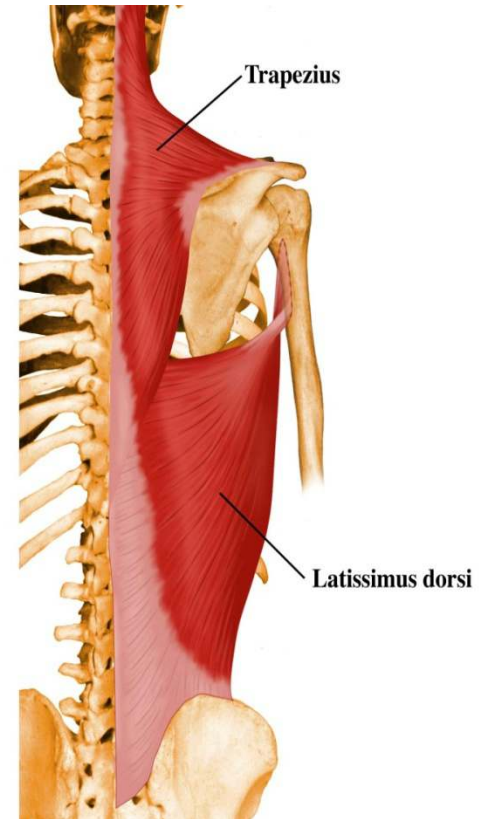
- O**: External surfaces of lateral parts of ribs 1 - 8
- I**: Anterior surfaces of medial border of the scapula
- A**: Protracts scapula and rotates it
- N**: Long Thoracic Nerve



# Trapezius

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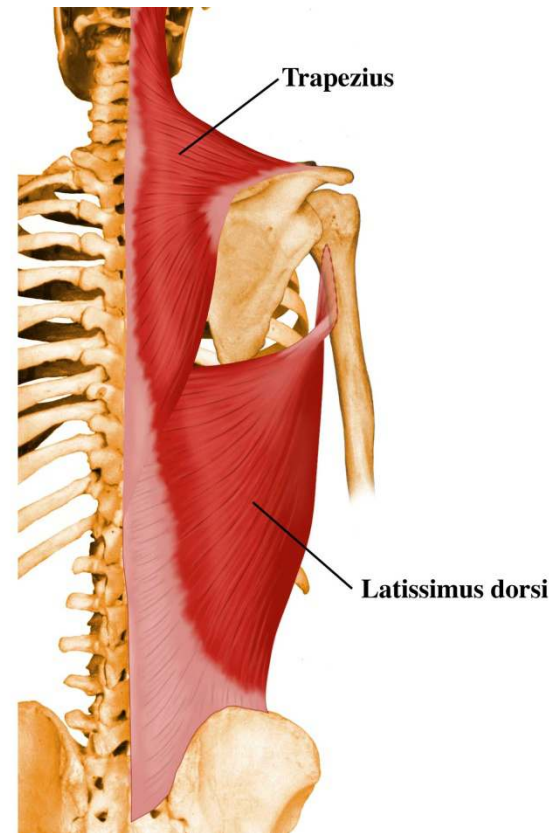
- O**: Medial 1/3 of superior nuchal line; external occipital protuberance; nuchal ligament; spinous processes of C7 - T12 vertebrae
- I**: Lateral third of clavicle; acromion and spine of scapula
- A**: Upperpart: Elevation, Lower Part: retraction and depression
- N**: Spinal root of Accessory Nerve



# Latissimus Dorsi

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- ▶ **O**: lumbar spine/iliac crest
- ▶ **I**: Intertubercular groove
- ▶ **A**:Adduction
  - Internal rotation
  - Extension
  - Upper fibers assist in retraction and downward rotation of scapula
- **N**:Thoracodorsal Nerve



# Pectoralis Major

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Has two heads

**O:** **Clavicular head:** anterior surface of medial half of clavicle

**Sternocostal head:** anterior surface of sternum, superior six costal cartilages, and aponeurosis of external oblique muscle

**I:** Lateral lip of intertubercular groove of humerus

**A:** Adducts and medially rotates humerus;  
Acting alone: clavicular head flexes humerus and sternocostal head extends it

**N:** Lateral and Medial Pectoral Nerves



# Pectoralis Minor

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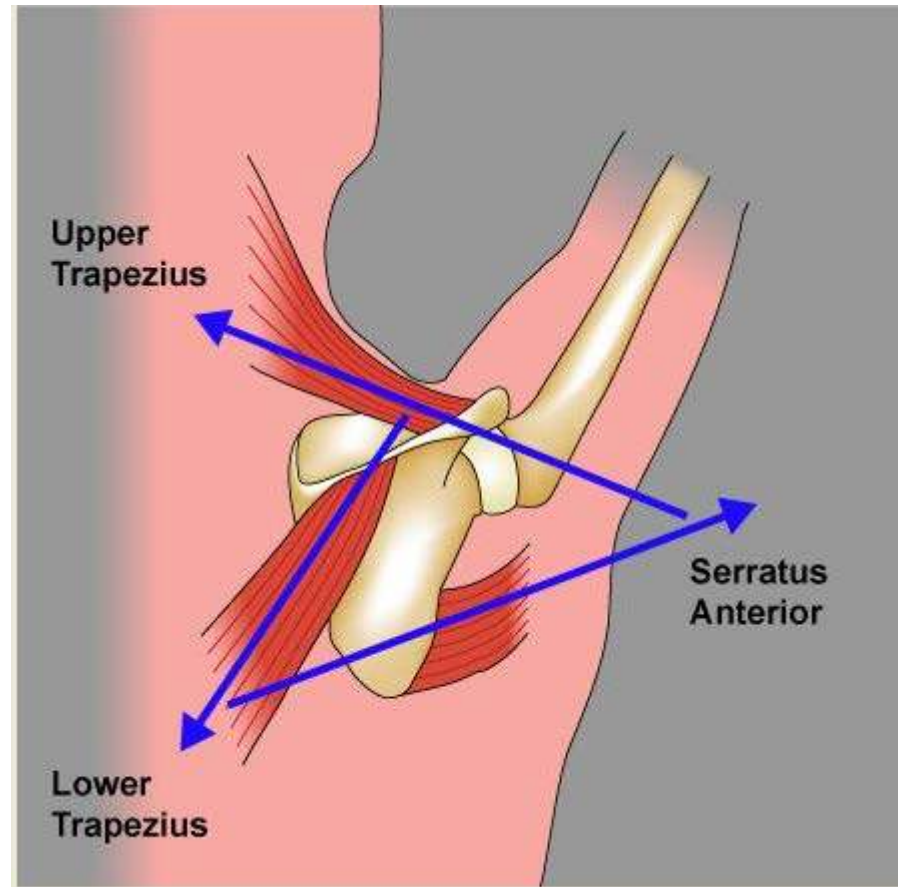
- O:** 3rd to 5th ribs near their costal cartilages
- I:** Medial border and superior surface of coracoid process of scapula
- A:** Stabilizes scapula by drawing it inferiorly and anteriorly against thoracic wall
- N:** Medial Pectoral Nerves



# Rotation of the scapular

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Combined effects  
of many muscles



# Muscles acting on the humerus

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- ▶ Rotator Cuff
- ▶ Teres Major
- ▶ Deltoid
- ▶ Pectoralis Major
- ▶ Latissimus Dorsi
- ▶ Long Head of triceps
- ▶ Coracobrachialis
- ▶ Biceps





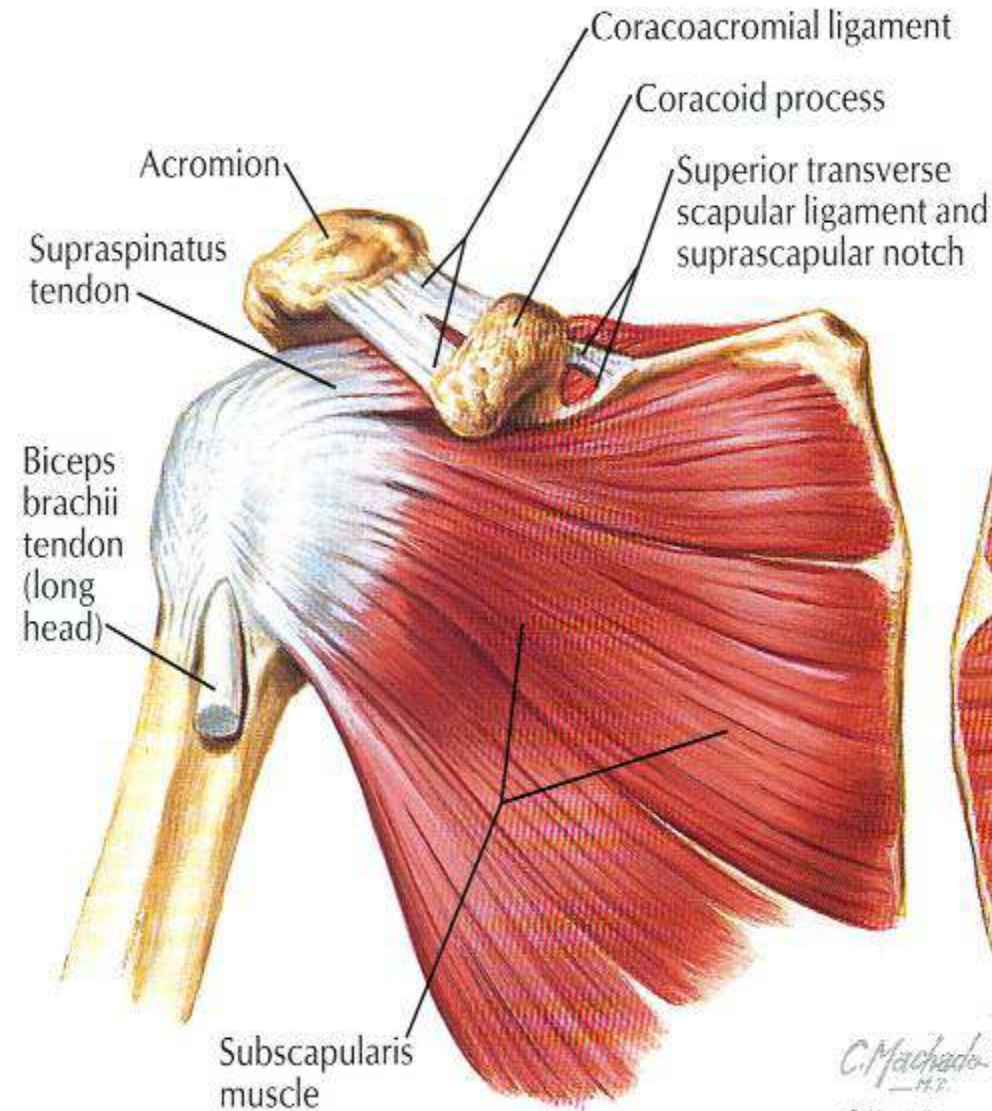
# Rotator Cuff Muscles

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- ▶ **S**upraspinatus
  - ▶ abduction/external rotation
- ▶ **I**nfraspinatus
  - ▶ external rotation/horizontal abduction
- ▶ **T**eres Minor
  - ▶ external rotation/horizontal abduction
- ▶ **S**ubscapularis
  - ▶ internal rotation

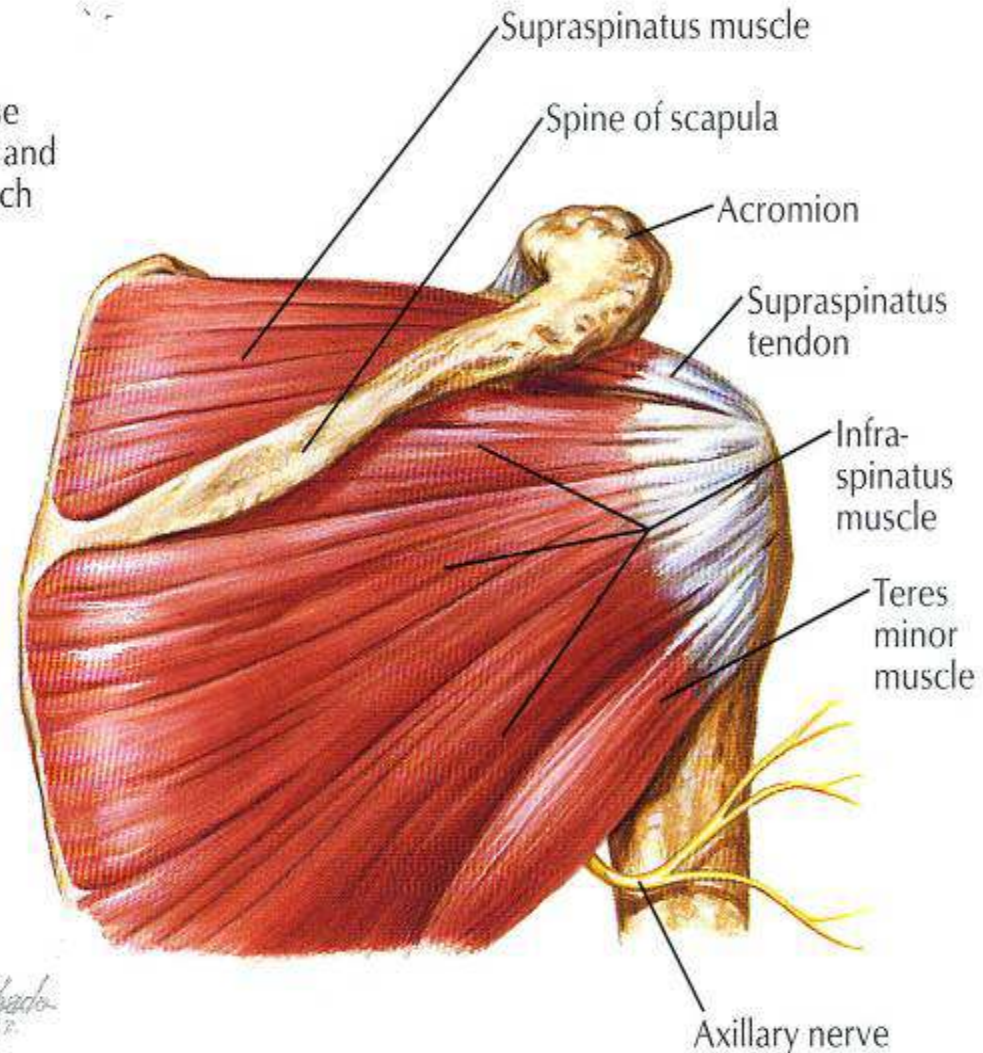


# rotator cuff musculature



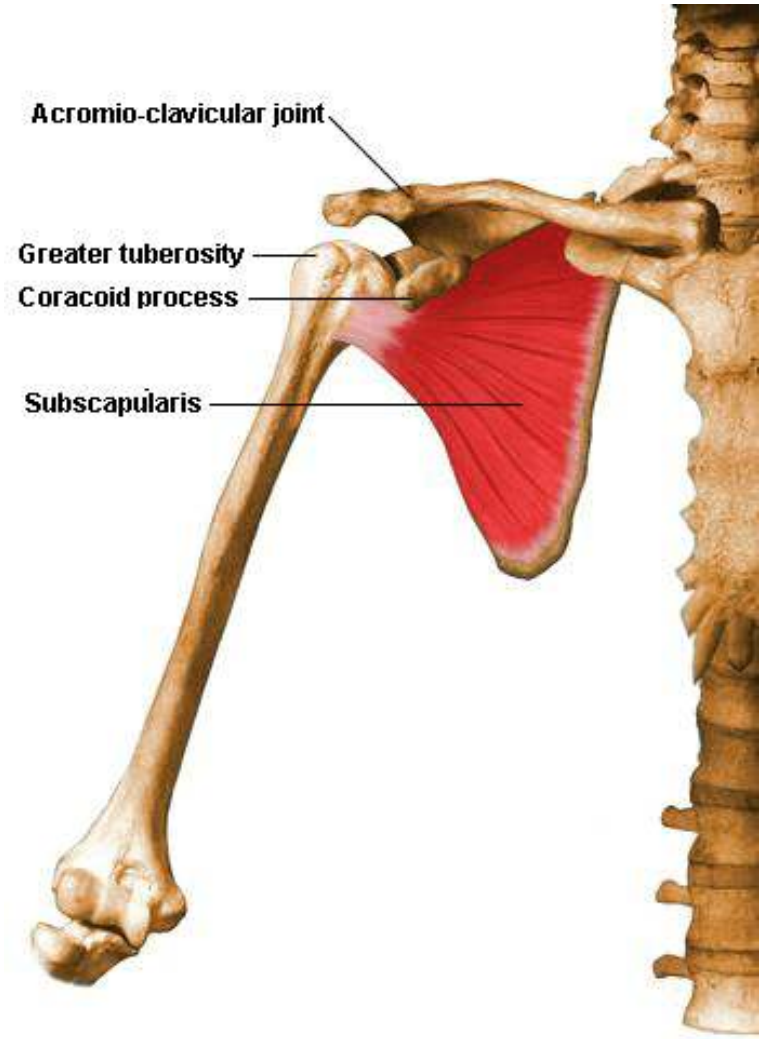
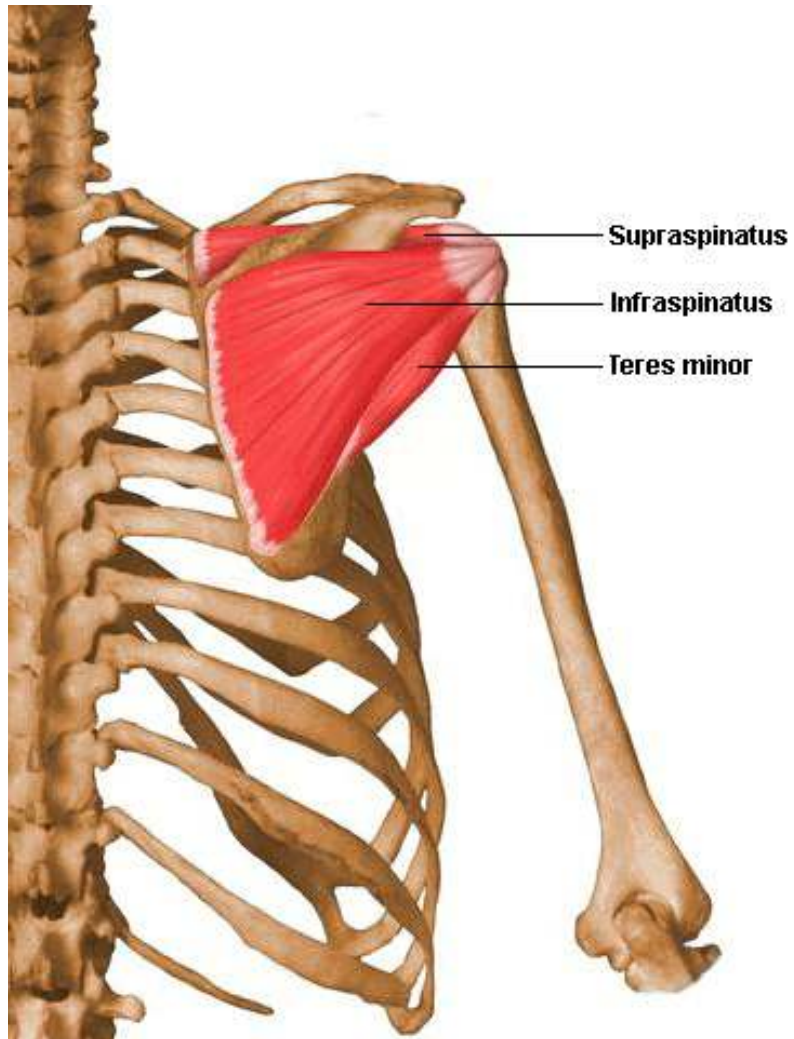
Anterior view

C. Machado  
— 1977 —  
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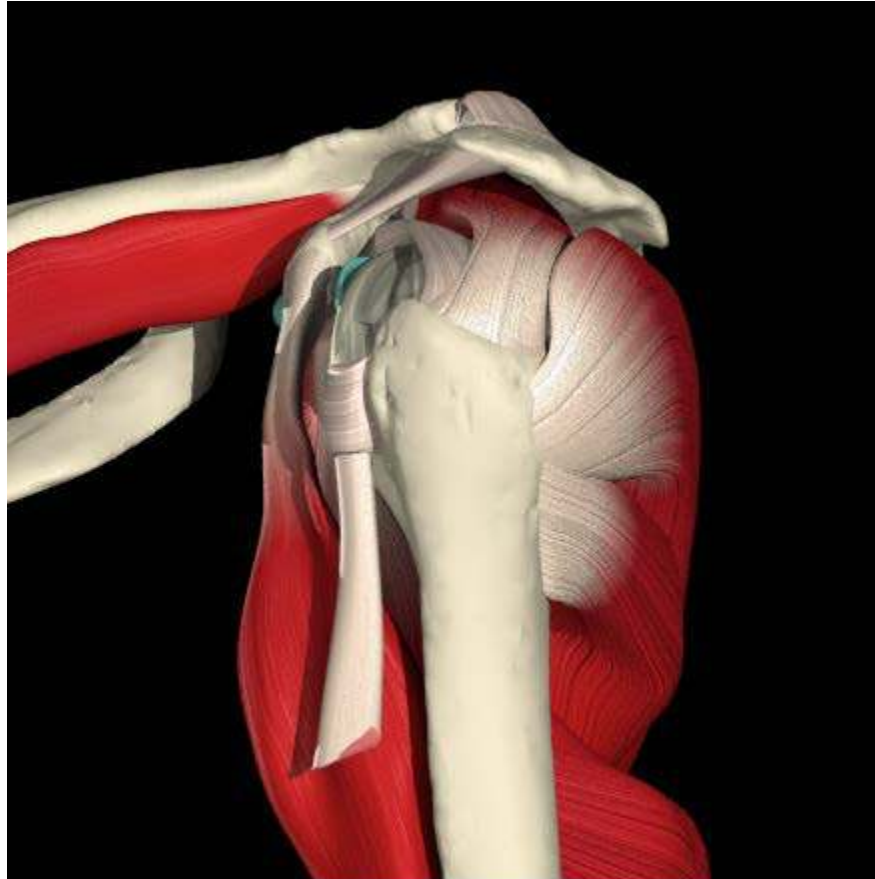
Posterior view

# Rotator Cuff



# Rotator cuff

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Interactive Shoulder © 2000 Primal Pictures Ltd.

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# Supraspinatus

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- O:** Supraspinous fossa
- I:** Superior facet on greater tubercle of humerus
- A:** Initiates and assists Deltoid in abduction; acts with other rotator cuff muscles
- N:** Suprascapular Nerve



# Infraspinatus

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- O:** Infraspinous fossa
- I:** Middle facet on greater tubercle of humerus
- A:** Laterally rotates the arm
- N:** Suprascapular Nerve



# Subscapularis

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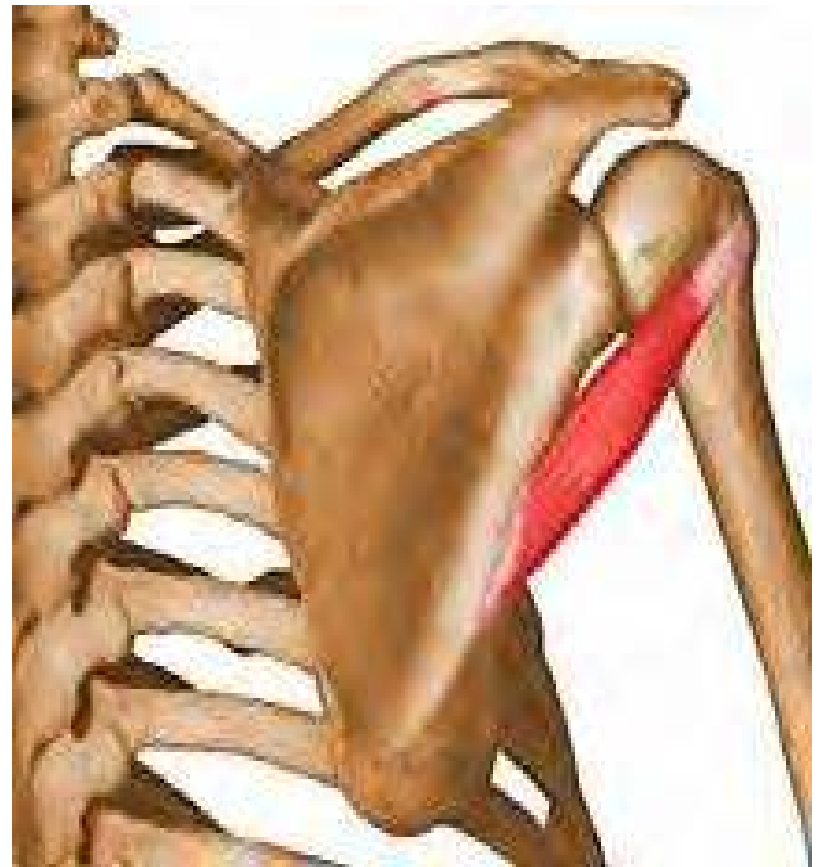
- O:** Subscapular fossa
- I:** Lesser tubercle of humerus
- A:** Medial rotation of arm and adduction
- N:** Upper and Lower Subscapular



# Teres minor

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- O**: Superior part of the lateral border of the scapula
- I**: Inferior facet on greater tubercle of humerus
- A**: Laterally rotates the arm
- N**: Axillary Nerve

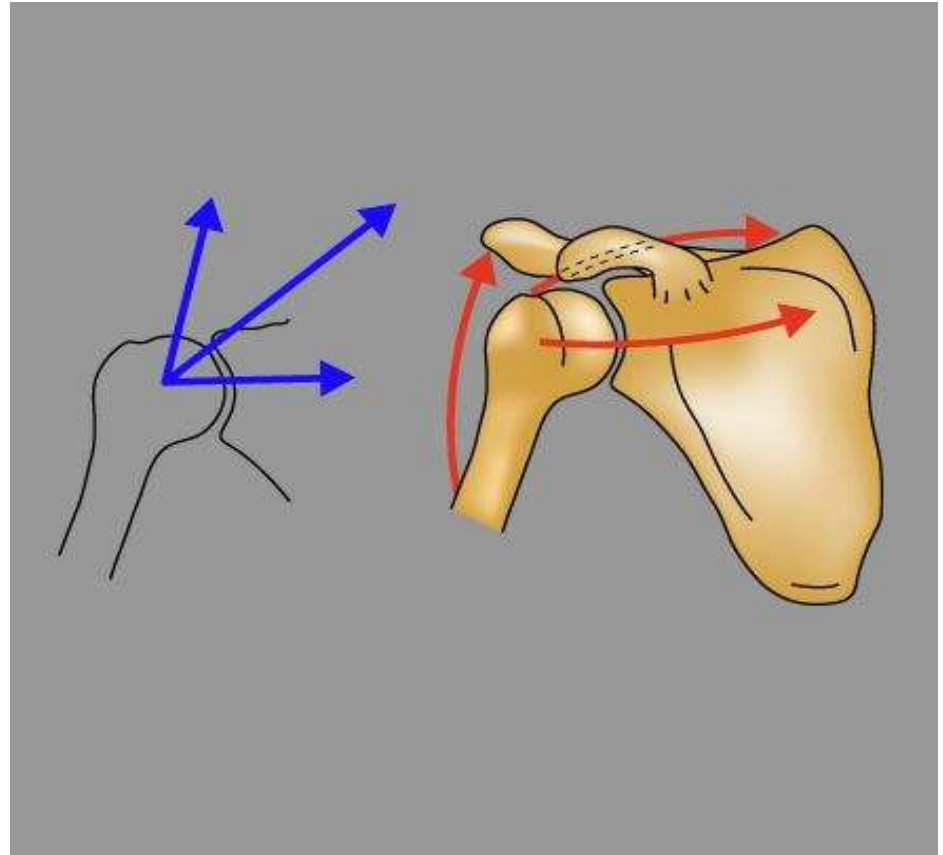




# Action of Rotator cuff

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The Rotator cuff stabilizes the head of the humerus on the glenoid to allow the deltoid abduct the arm



Interactive Shoulder © 2000 Primal Pictures Ltd.

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# Teres Major

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- O**: Dorsal surface of inferior angle of scapula
- I**: Medial lip of intertubercular groove of humerus
- A**: Adducts and medially rotates arm
- N**: Lower subscapular nerve



# Deltoid

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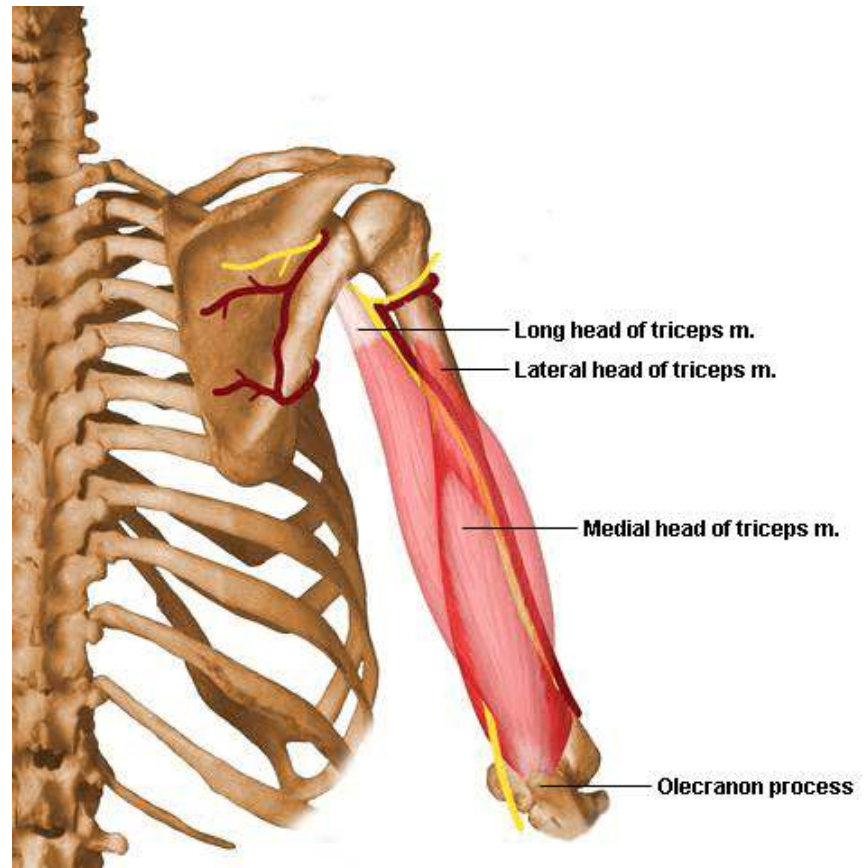
- O**: Lateral third of clavicle, acromion, and spine of scapula
- I**: Deltoid tuberosity
- A**: Anterior part: Flexes and Medially rotates arm, Middle Part: Abduction, Posterior part: Extends and laterally rotates arm
- N**: Axillary Nerve



# Triceps

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- O:** **Long head:** infraglenoid tubercle of scapula
- Lateral head:** posterior surface of humerus, superior to radial groove
- Medial head:** posterior surface of humerus, inferior to radial groove
- I:** Proximal end of olecranon process of ulna and fascia of forearm
- A:** Chief extensor of forearm; long head steadies head of abducted humerus
- N:** Radial Nerve



# Coracobrachialis

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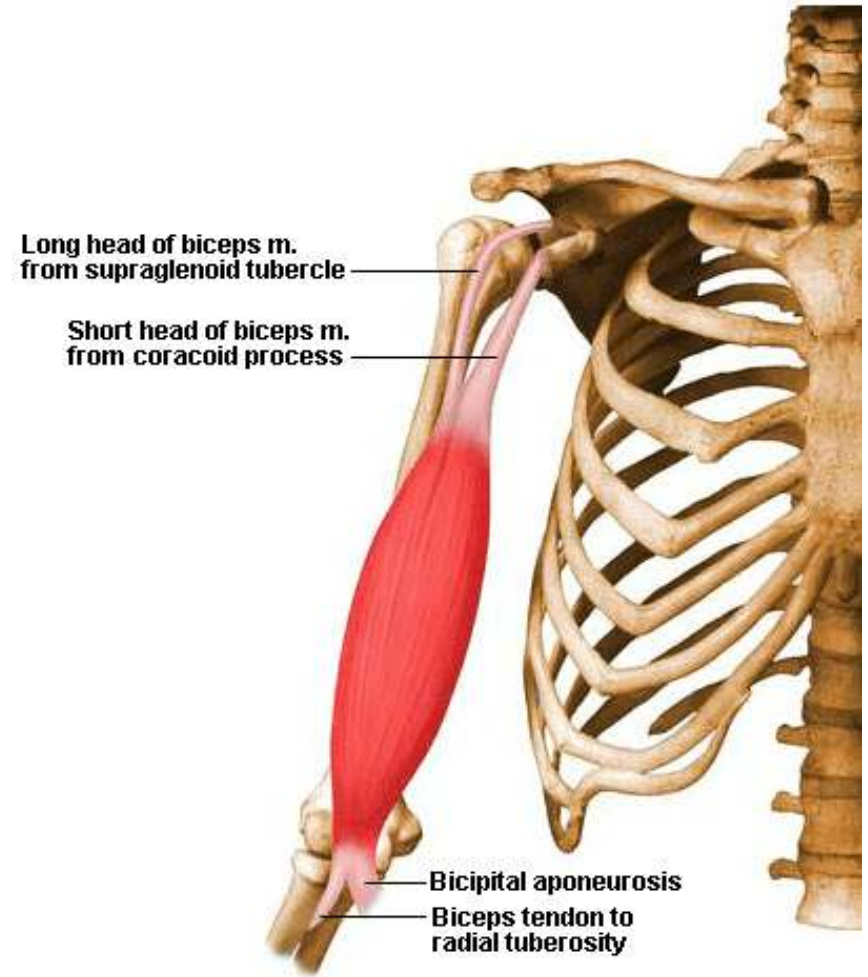
- O:** Tip of coracoid process of scapula
- I:** Middle third of medial surface of humerus
- A:** Helps to flex and adduct arm
- N:** Musculocutaneous nerve



# Biceps Brachii

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- O:** **Short head:** tip of coracoid process of scapula  
**Long head:** supraglenoid tubercle of scapula
- I:** Tuberosity of radius and fascia of forearm via bicipital aponeurosis
- A:** Supinates forearm and, when it is supine, flexes forearm
- N:** Musculocutaneous nerve



# Thank you for your attention

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