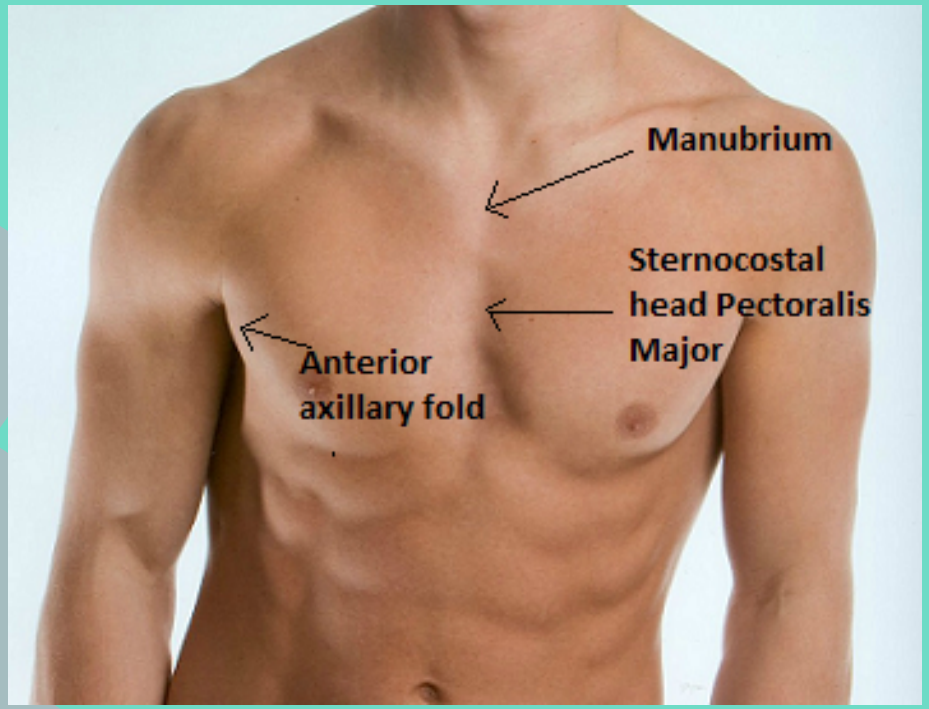
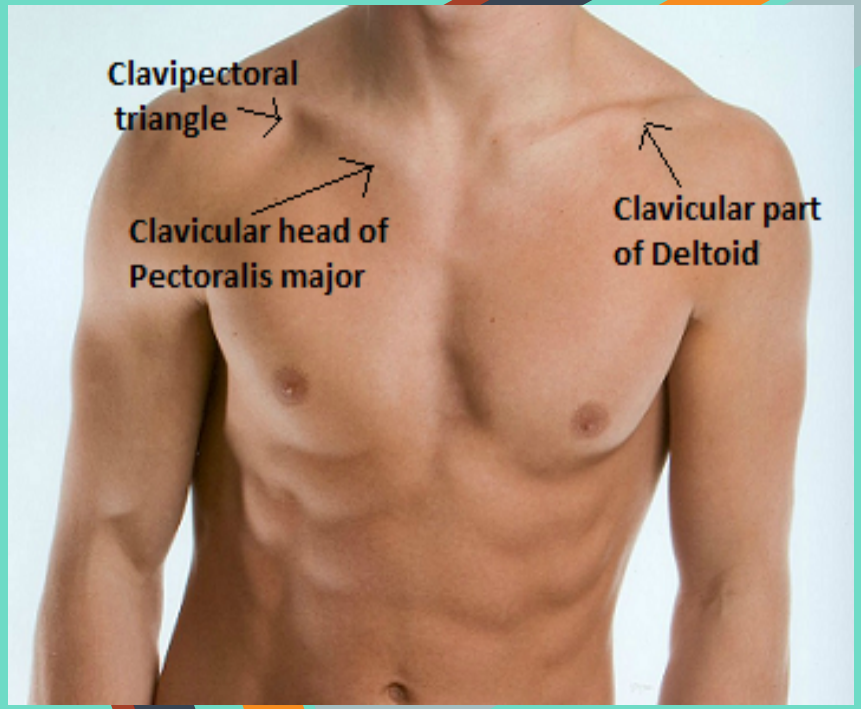
Glenohumeral

Laura Leonetti
Genna Moak
Taylor Hansen

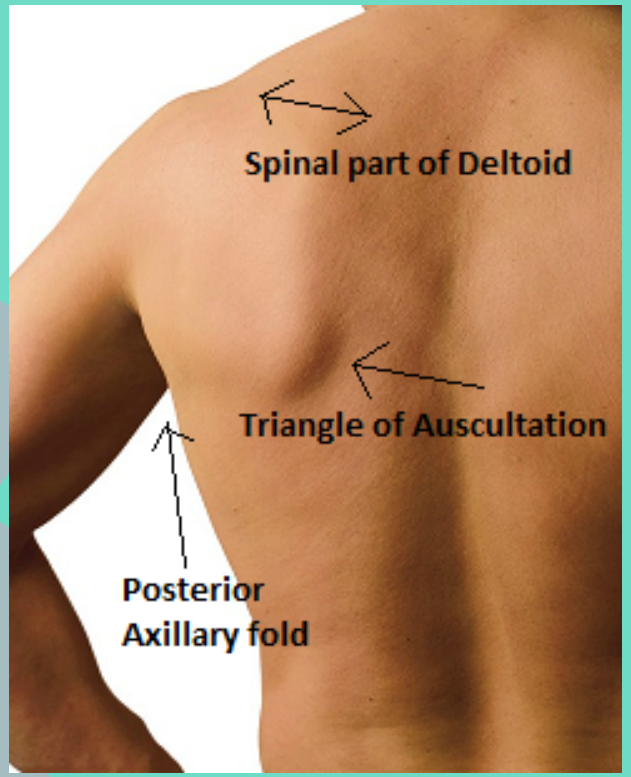
Surface anatomy

Anterior axillary fold	Clavicle
Clavicular head of Pectoralis major	Clavipectoral triangle
Acromial part of Deltoid	Manubrium
Posterior axillary fold	Sternocostal head Pectoralis Major
Ascending part of Trapezius	Middle part of Trapezius
Descending part of Trapezius	Clavicular part of Deltoid
Triangle of Auscultation	Spinal part of Deltoid

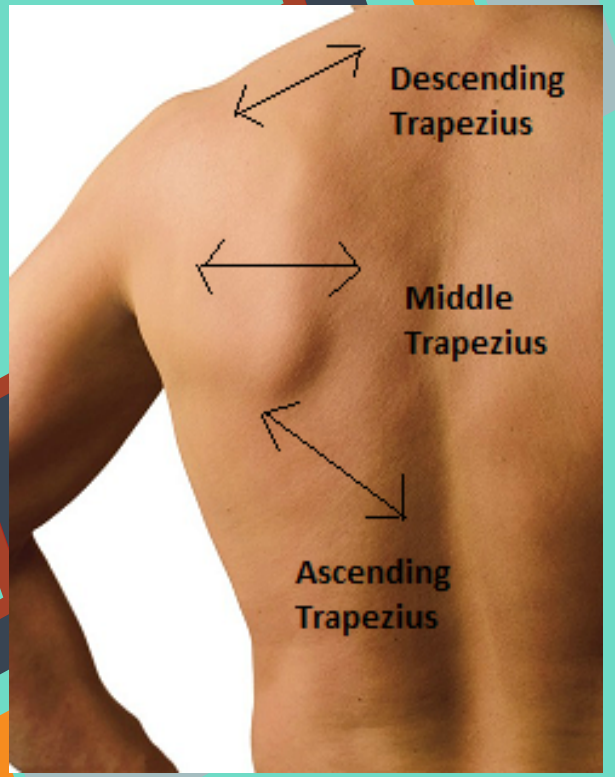

Manubrium
Sternocostal head Pectoralis Major
Anterior axillary fold


Clavipectoral triangle
Clavicular head of Pectoralis major
Clavicular part of Deltoid

Genna


Spinal part of Deltoid
Triangle of Auscultation
Posterior
Axillary fold


Acromial part of
Deltoid


Descending
Trapezius
Middle
Trapezius
Ascending
Trapezius

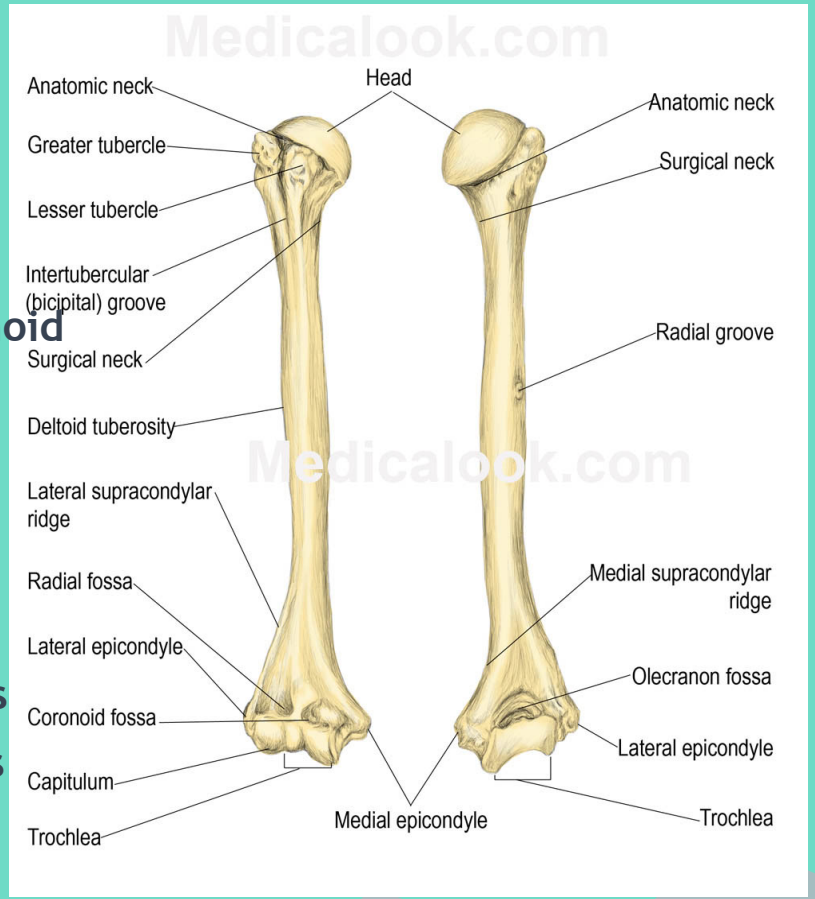
Humerus

Head

- ball and socket joint, articulates with glenoid cavity of scapula
- necks - surgical and anatomical

Tubercles

- lesser and greater
- prominences that serve as insertion points for supraspinatus, infraspinatus, and teres minor.



Genna

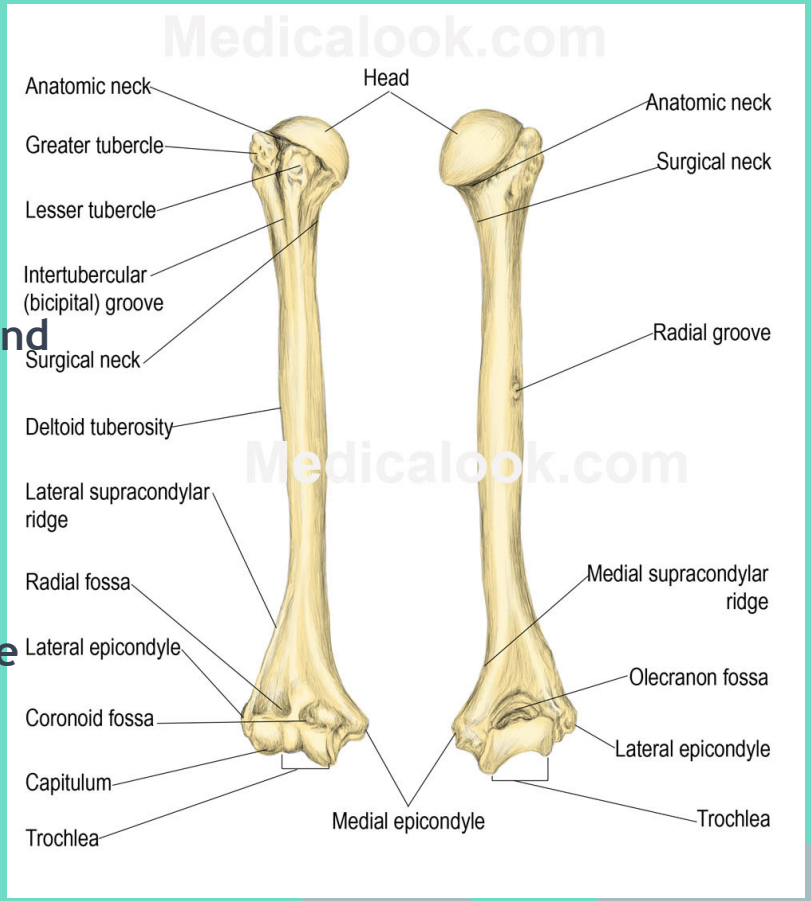
Humerus cont’d

Intertubercular sulcus

- or bicipital sulcus - runs between greater and and lesser tubercles.

Deltoid Tuberosity

- tuberosity on lateral side of humerus where the deltoid muscle inserts.



Genna

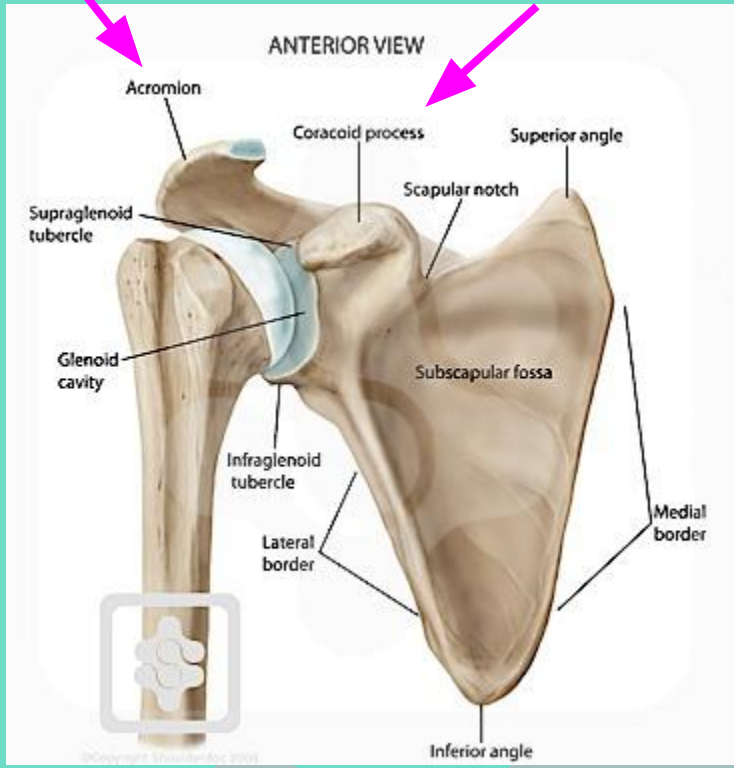
Bones of The Scapula

Acromion Process

- The **Acromion Process** originates posteriorly from the **Coracoid process** and extends superiorly. It is the sole attachment to the clavicle and the axial skeleton

Coracoid Process

- The **coracoid process** is a small hook-like structure on the lateral edge of the superior anterior portion of the scapula. With the acromion process it stabilizes the shoulder joint.



Taylor

Scapula Continued

Borders:

- Superior, vertebral (medial), Axillary (lateral)

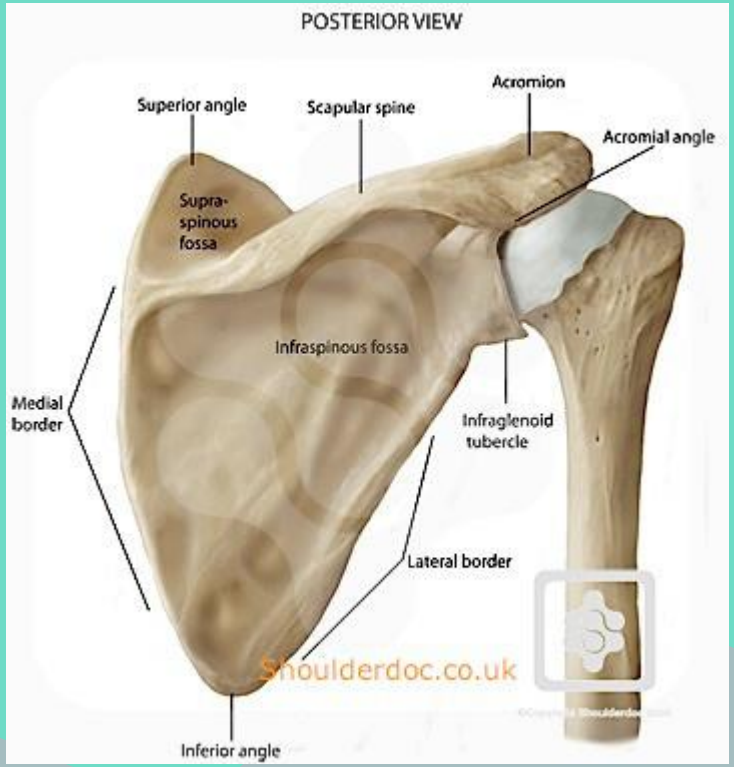
Angles:

- Superior, Inferior

Fossae:

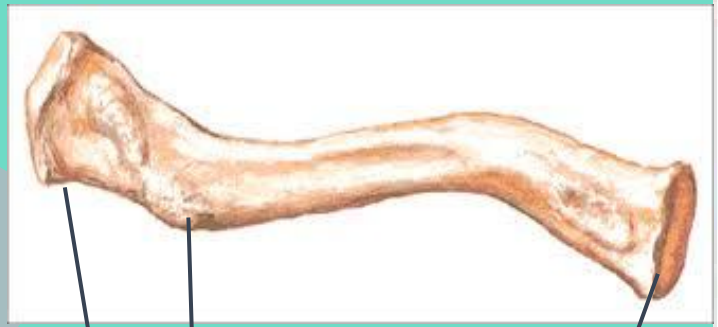
- Subscapularis, Supraspinous, Infraspinous

Spine of Scapula



Taylor

Clavicle



Conoid tubercle

Acromial end

Sternal end



Laura

Arteries!

Subclavian

Transverse Cervical Artery

Lateral Thoracic Artery

Deep Scapular Artery

Suprascapular Artery

Brachial Artery

Axillary

Dorsal Scapular Artery

Posterior Circumflex Artery

Circumflex Artery

Subscapular Artery



Taylor

Transverse Cervical Artery

Suprascapular Artery

Dorsal Scapular Artery

Posterior Circumflex Artery

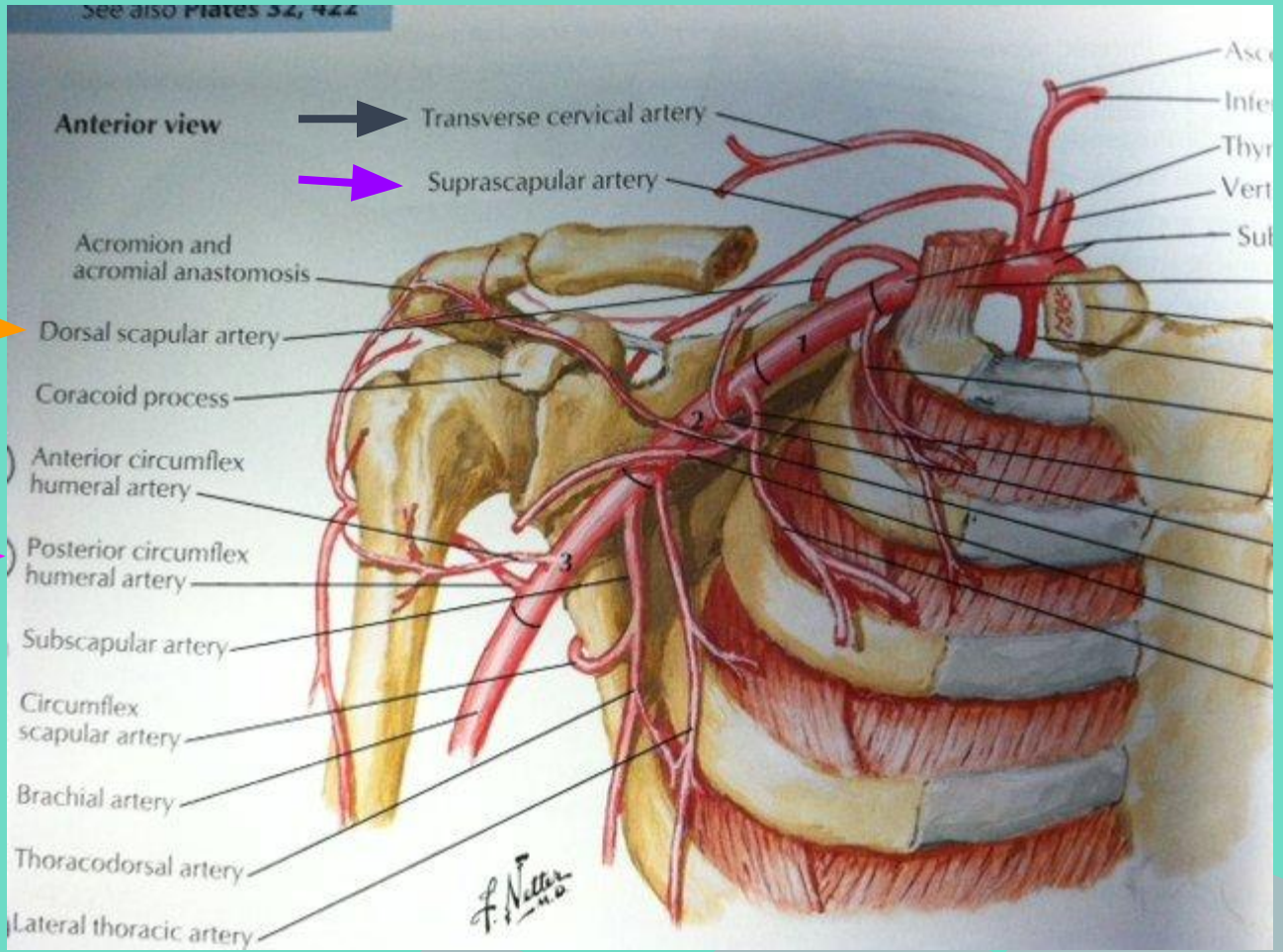
Subscapular Artery

Circumflex Scapular Artery

Brachial Artery

Lateral Thoracic Artery

***Find your arrow**

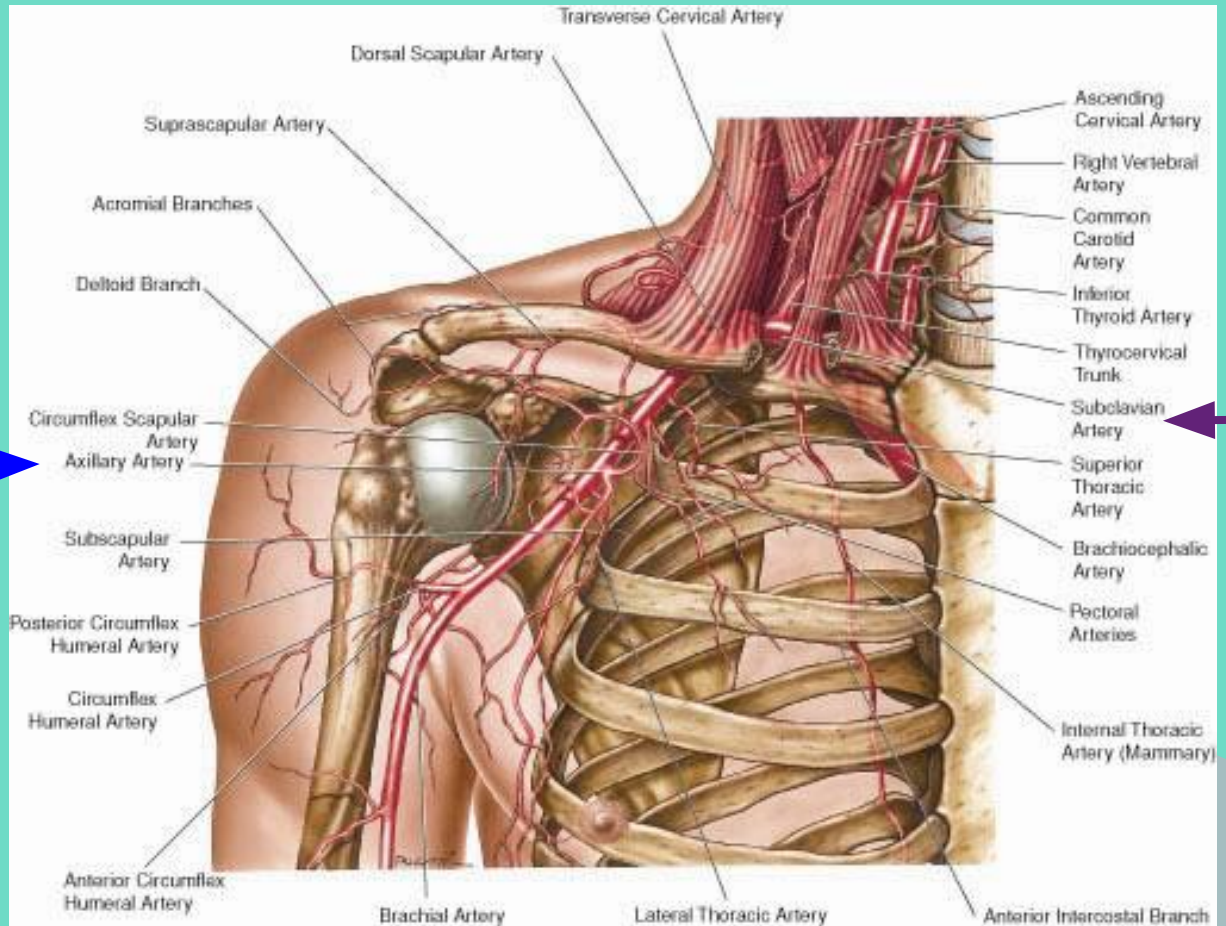


Taylor

Arteries

Subclavian

Axillary



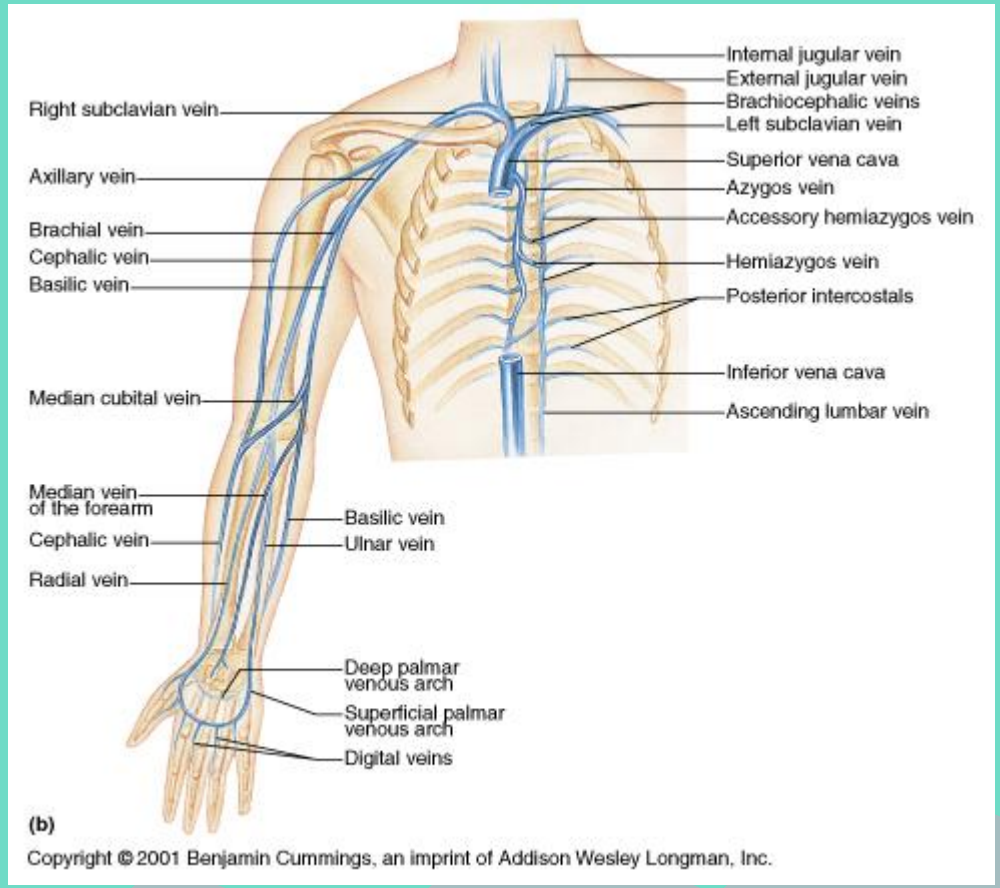
Taylor

Veins

Cephalic

Basilic

Axillary



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*Find your arrow

Taylor

What is a Ligament????

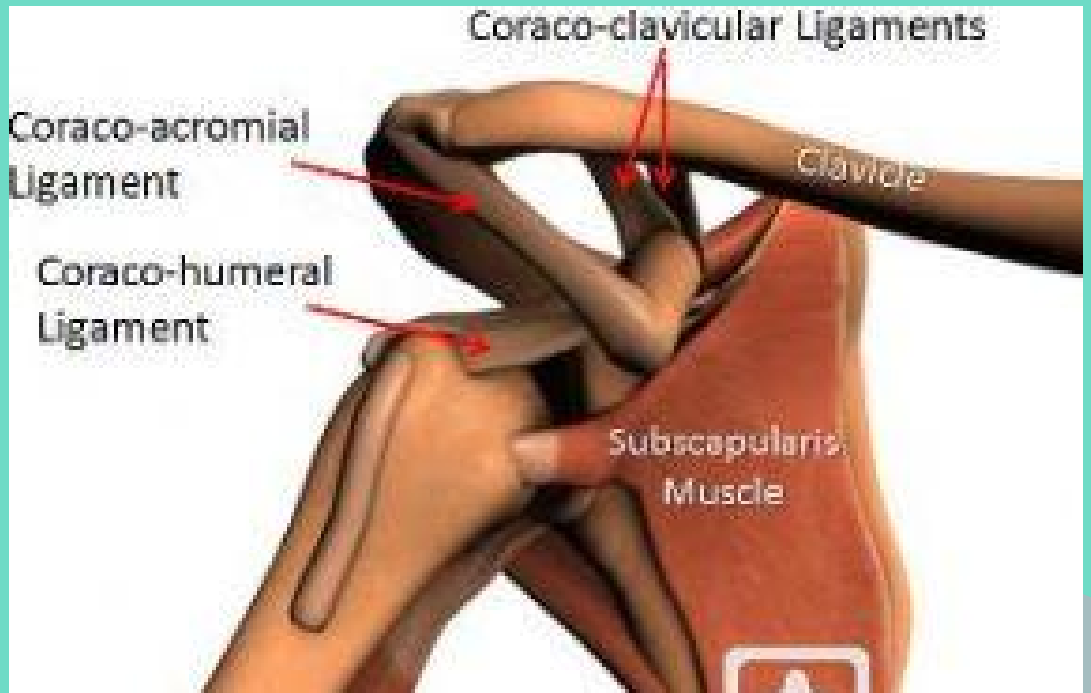
- a short band of tough, flexible, fibrous connective tissue that connects two bones or cartilages or holds together a joint.
- a membranous fold that supports an organ and keeps it in position.



Taylor

Coracohumeral Ligament

- Strong, flat band that crosses over the superior aspect of the fibrous capsule of the shoulder joint. It attaches to the lateral part of the base of the coracoid process and crosses the shoulder joint to attach to the anterior surface of the greater tubercle of the humerus.
- Function: Stabilizes the shoulder joint, limits downward displacement of the joint



Taylor

Glenohumeral Ligament

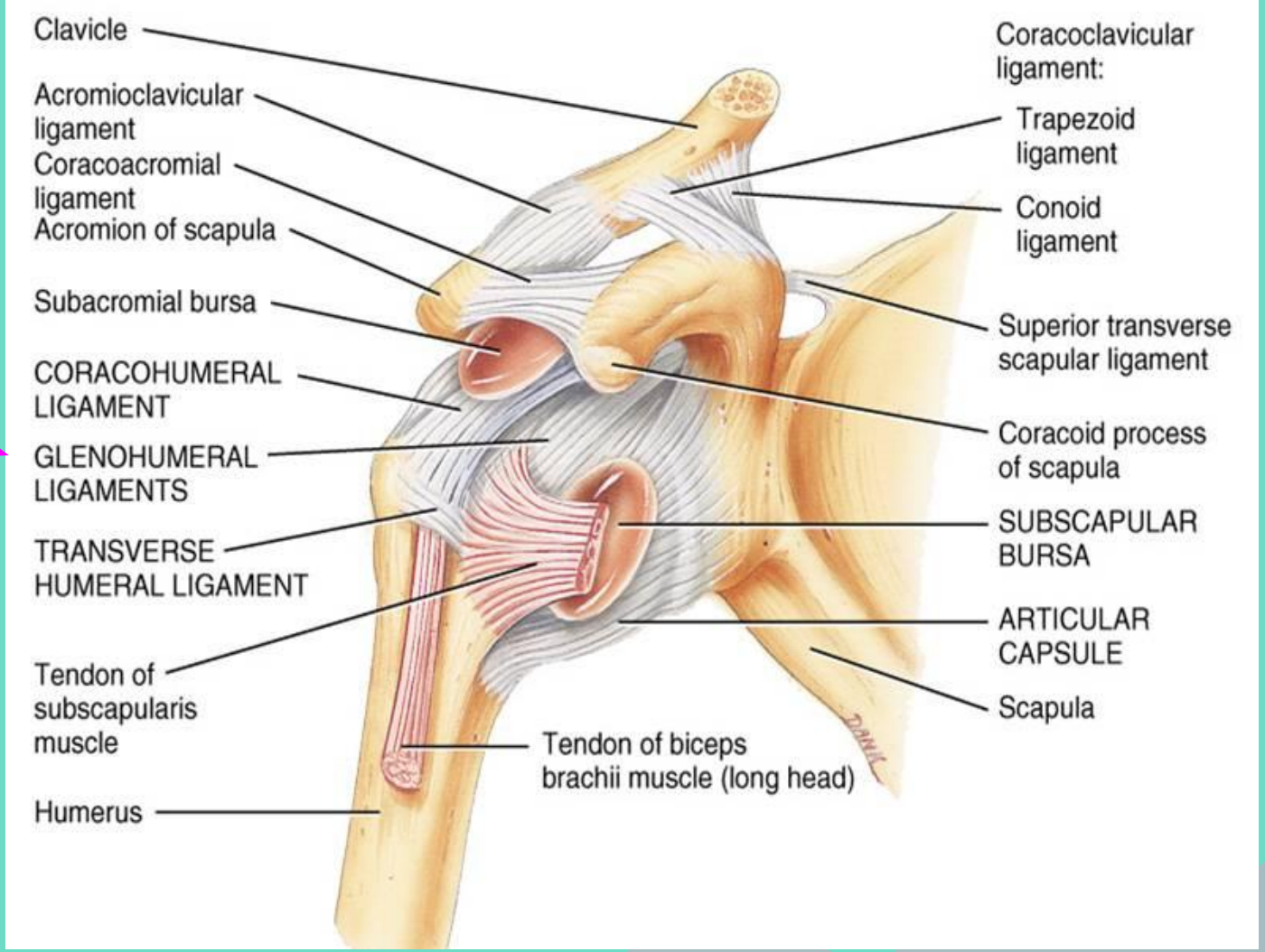
Ligament	Shoulder motions to pull the ligament taut	Humeral head motion to pull the ligament taut
Superior glenohumeral lig.	Full adduction	Inferior or anterior glide
Middle glenohumeral lig.	External rotation	Anterior glide
Inferior glenohumeral lig. Anterior band Posterior band	 Abduction and external rotation Abduction and internal rotation	Non specific

- Three ligaments on the anterior side of the glenohumeral joint. Found between the glenoid cavity of the scapula and the head of the humerus.

Function

Stabilizes the head of the humerus depending on arm position and degree of motion.

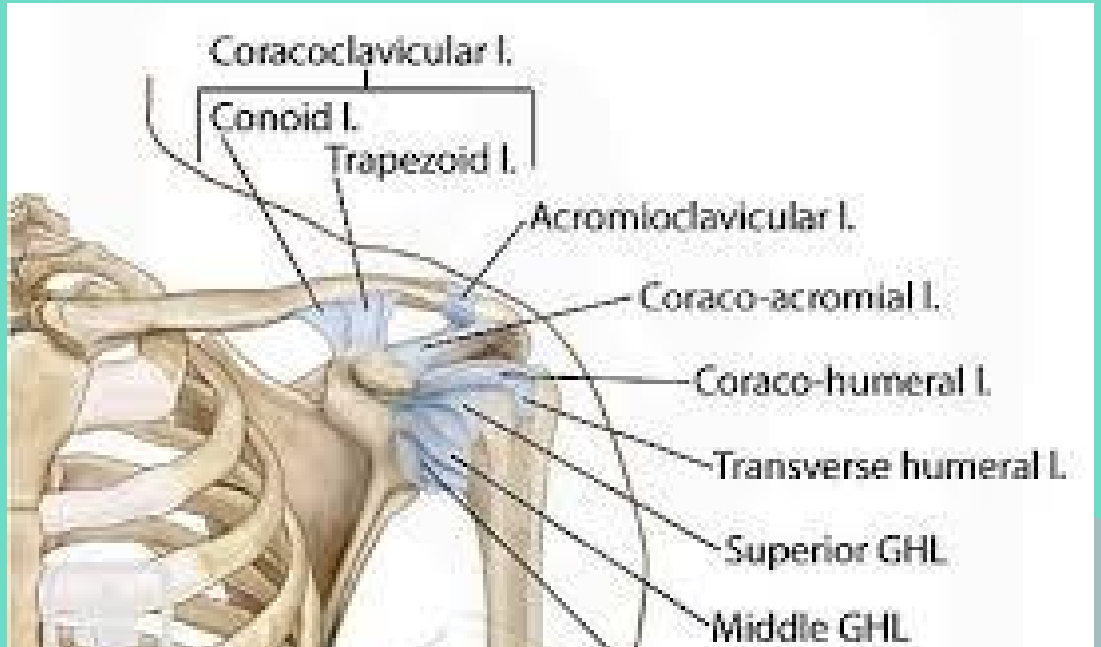
Taylor


Clavicle
Acromioclavicular ligament
Coracoacromial ligament
Acromion of scapula
Subacromial bursa
CORACOHUMERAL LIGAMENT
GLENOHUMERAL LIGAMENTS
TRANSVERSE HUMERAL LIGAMENT
Tendon of subscapularis muscle
Humerus
Coracoclavicular ligament:
Trapezoid ligament
Conoid ligament
Superior transverse scapular ligament
Coracoid process of scapula
SUBSCAPULAR BURSA
ARTICULAR CAPSULE
Scapula
Tendon of biceps brachii muscle (long head)

Taylor

Transverse Humeral Ligament

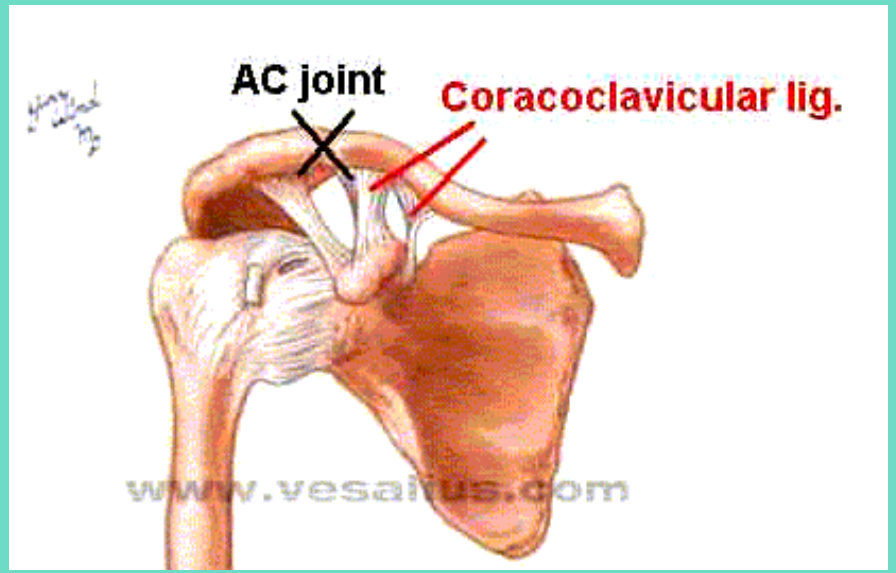
- Consists of a narrow sheet of connective tissue fibers that runs between the lesser and the greater tubercles of the humerus. Together with the intertubercular groove of the humerus, the ligament creates a canal through which the long head of the biceps brachii muscle passes.
- Function: Holds the long head of the biceps brachii in the intertubercular groove.



Taylor

Coracoclavicular Ligament

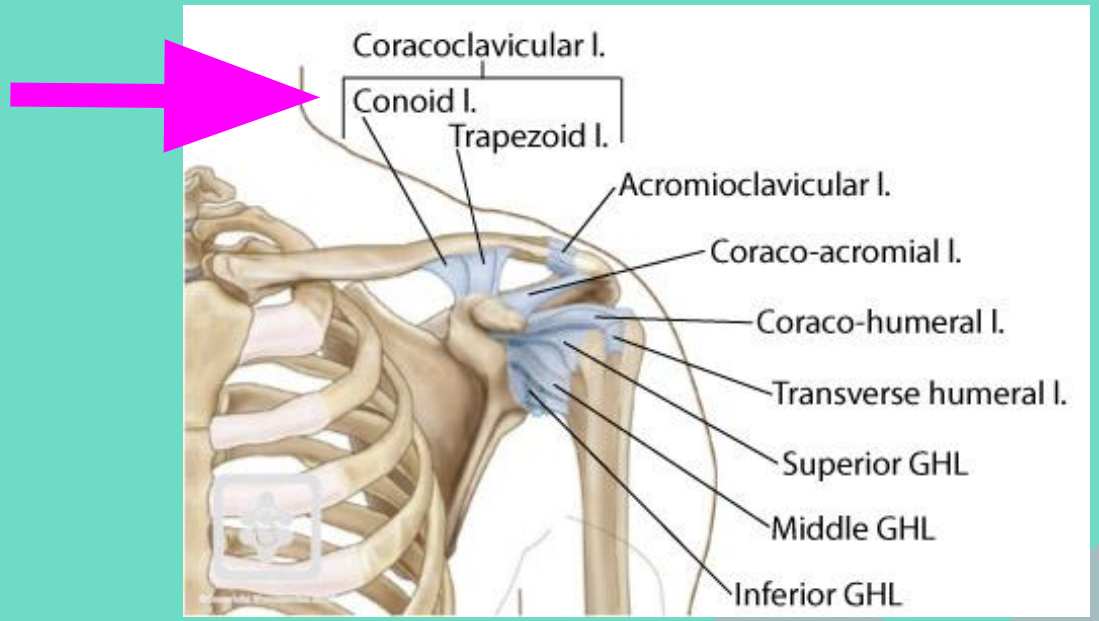
- The coracoclavicular ligament connects the coracoid process to the clavicle.



Taylor

Conoid Ligament

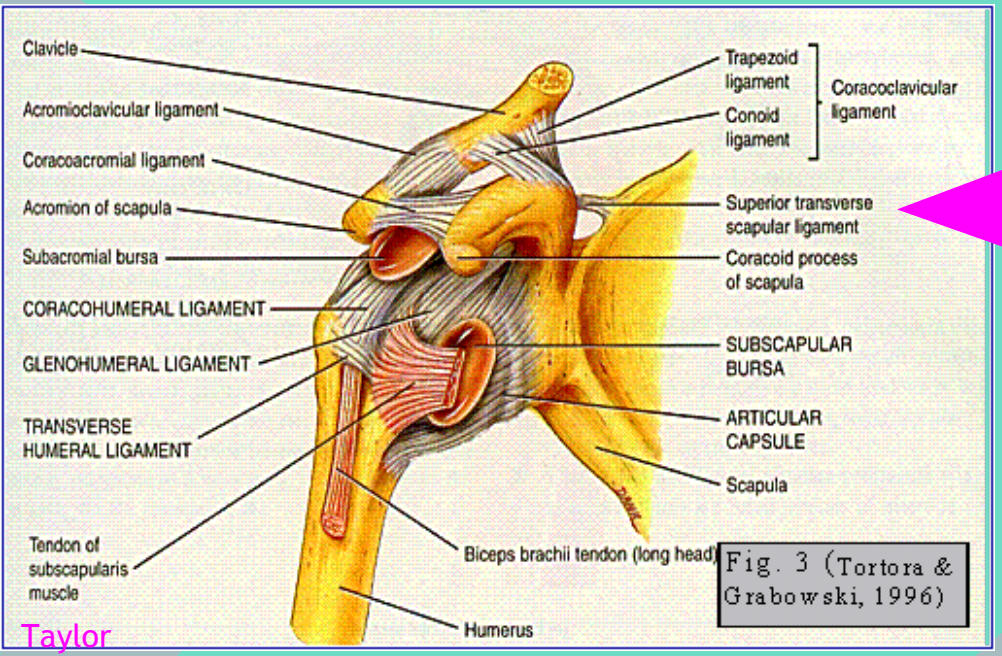
The conoid ligament, along with the trapezoid ligament, is part of the coracoclavicular ligament. Provides stabilization to the acromioclavicular joint. They are attached between the coracoid process of the scapula and the underside of the clavicle.



Taylor

Superior Transverse Scapular Ligament

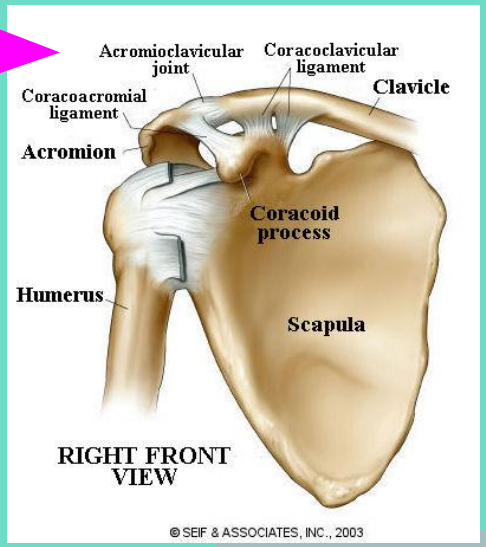
- A strong, flat, short ligamentous band that courses between the base of the coracoid process and the medial margin of the scapular notch. This ligament converts the scapular notch into a small foramen. Sometimes the ligament ossifies.



Taylor

Acromioclavicular Ligament

- Found at the top of the shoulder; it is part of the acromioclavicular joint, which lies between the part of the scapula and clavicle. The acromioclavicular ligament divided into two parts: the superior and the inferior.
- This ligament gives the acromioclavicular joint its horizontal stability.



Taylor

Ball & Socket Joint

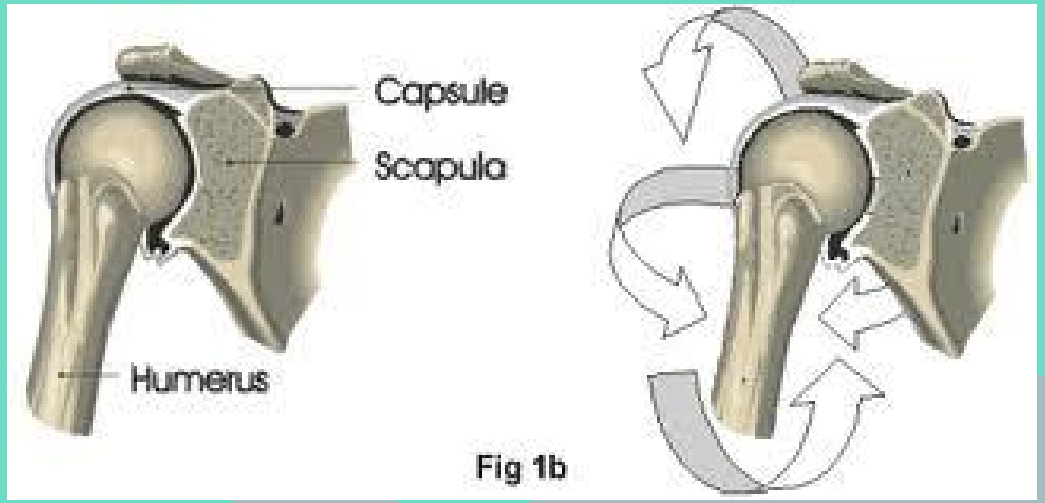
- Triaxial joints

allows movements on three different axes

flexion-extension, abduction-adduction, and rotation-circumduction,medial

and lateral

rotation



Laura

Diarthroses: freely movable joint

Functional Classification:

Diarthroses

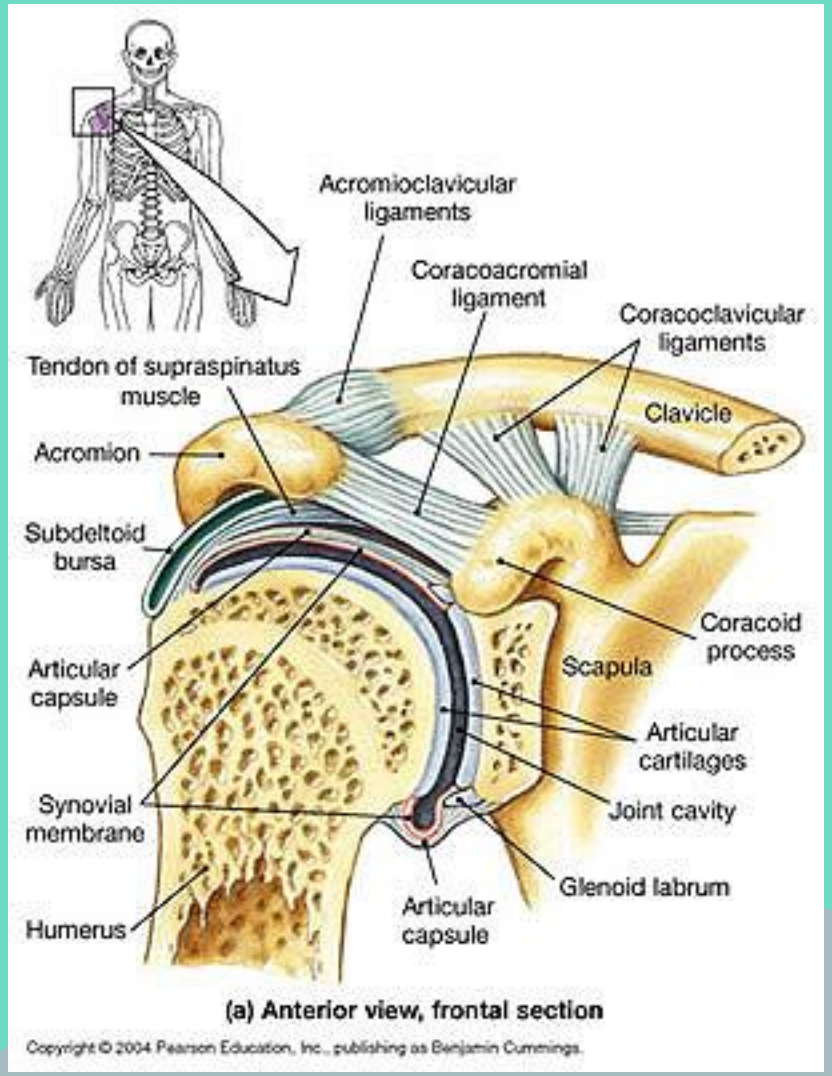
- The joints are freely movable

Structural Classification:

Synovial Joint

- Has a joint cavity, containing synovial fluid,ligaments, and cartilage to provide extra support.

(other examples of diarthrosis and synovial joints include fingers, hips, knees, and elbows)



Laura

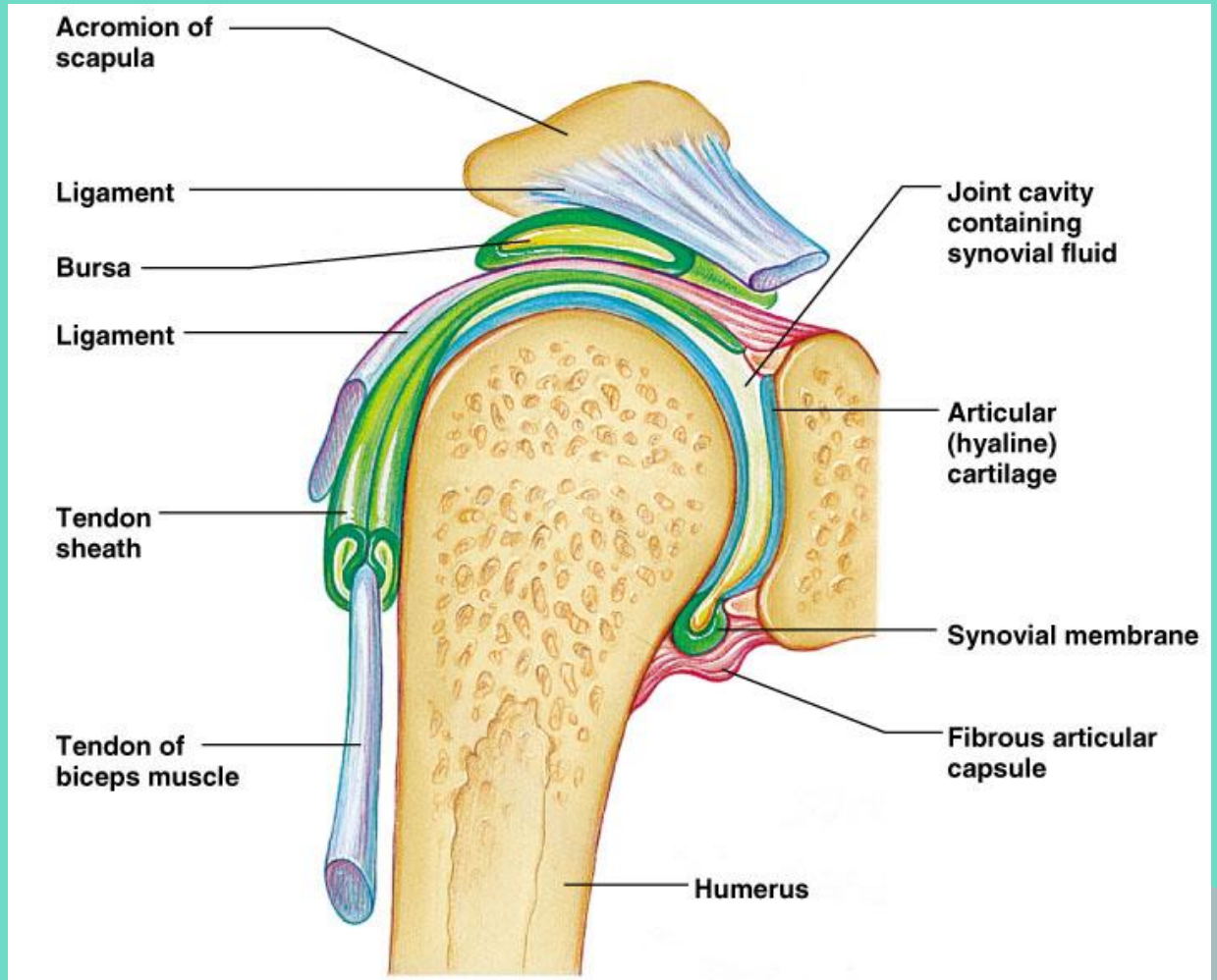
Synovial Joints

Synovial Fluid:

Contained in the joint cavity. It consists of hydrochloric acid. It's a viscous clear or pale yellow similar to "uncooked egg whites"

Function

Reduces the friction by lubricating the joint; absorbs the shock from weight and movement; supplies oxygen and nutrients; removes metabolic waste from chondrocytes within the articular cartilage.



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Laura

Synovial joint

Synovial fluid:

Becomes gel-like if immobile for a while, and becomes less visceral when there is movement.



Warming up before exercise helps stimulate the production and secretion of the synovial fluid.

Laura

Clinical Concern with Synovial Joints

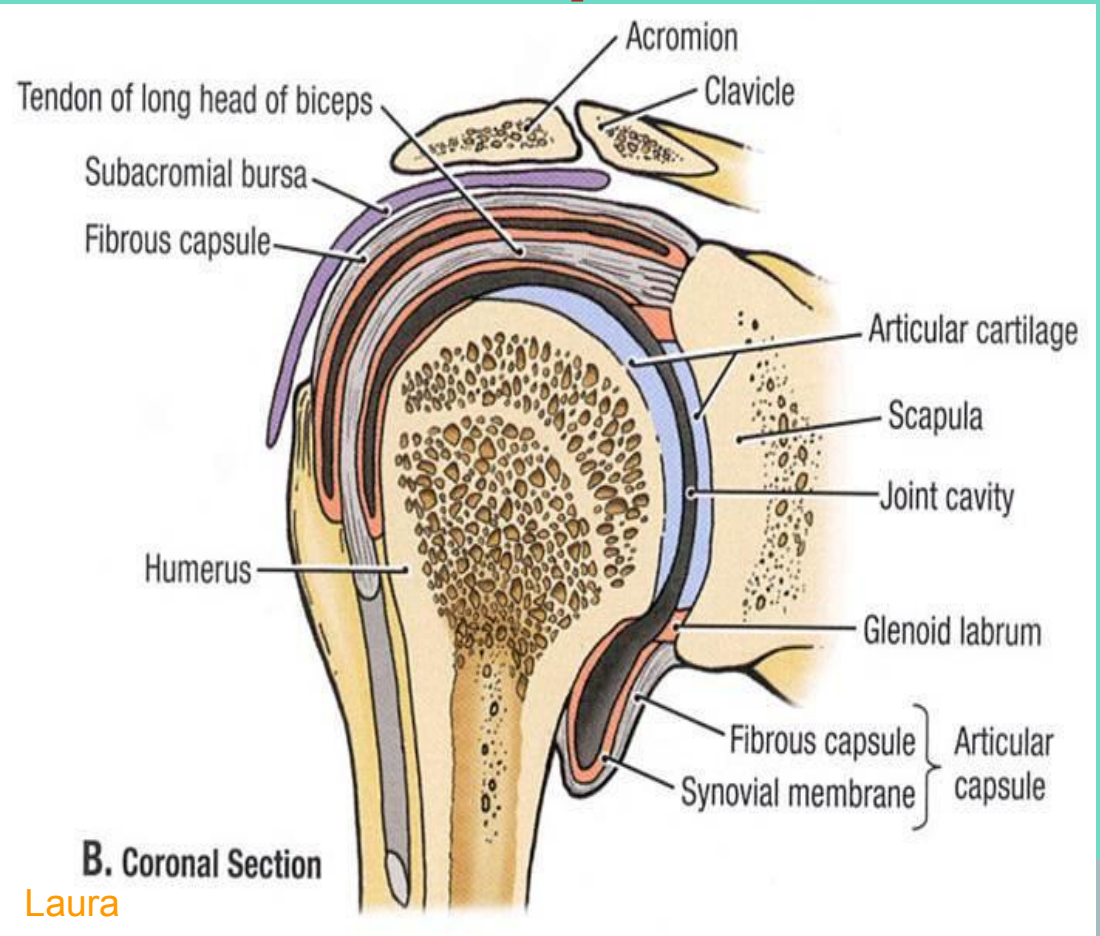
Synovitis -- affects the synovial membrane of the joint capsule. The synovium becomes inflamed, it can feel swollen and a person can feel pain in the affected area when touch or when there is any movement in that area.

Caused by infections, blows to joint like fall or sprain. Rheumatoid arthritis, or gout.

Treatment:anti-inflammatory medications, oral steroids, or cortisone steroid injections.Some causes may require surgery to remove the inflamed synovium.

Laura

Articular Capsule



Articulating Capsule:

Surrounds the synovial joint, encloses the synovial cavity and unites articulating bones.

Capsule is composed of two layers

- **Fibrous Capsule** (outermost layer)
- **Synovial Membrane** (innermost layer)

Laura

Articular Capsule

Fibrous Membrane- (outermost layer) is a thicken continuation of the periosteum between bones.

- Consist of dense irregular connective tissue (mostly collagen) and attaches to the periosteum of articulating bones.
- Function- permits considerable movement at the joint and is resistant to stretching which helps prevent dislocation.

Synovial Membrane-(innermost layer)

- Composed of areolar connective tissue with elastic fibers. Usually adipose tissue surrounds the synovial membrane these are called articular fat pads.
- Function- fibroblast like cells produce synovial fluid

Laura

A person who is “double jointed” means that they have greater flexibility in their articulating capsules and ligaments which then gives them a greater flexibility.



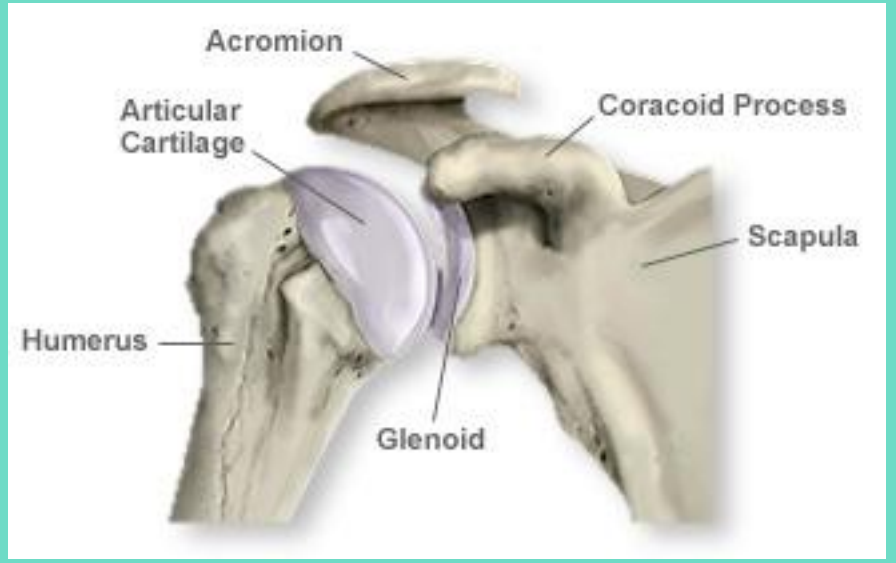
Laura

Cartilage of the Glenohumeral Joint

Articular Cartilage

- Surrounds the humeral head and the glenoid cavity.

- Function: reduce friction between the humerus and the glenoid cavity during movement and helps absorb shock.



Laura

Clinical Concerns with Articular Cartilage

Osteoarthritis

Osteoarthritis -- also known as degenerative joint disease -- occurs when the cartilage that covers the tops of bones, known as articular cartilage, degenerates or wears down. This causes swelling, pain, and sometimes the development of osteophytes -- bone spurs -- when the ends of the two bones rub together.

Treatment:

A person should rest the shoulder; take ibuprofen or aspirin; perform ROM exercises; apply moist heat; ice every 20 mins 2 X a day; if needed surgery.

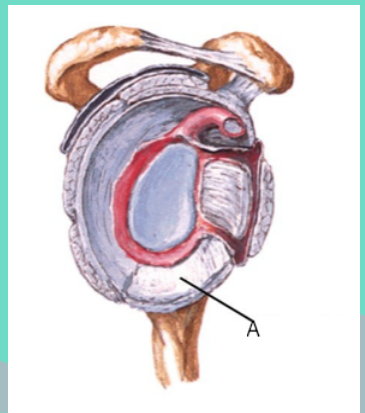
Laura

Cartilage of the Glenohumeral Joint

Glenoid labrum- Narrow rim of fibrocartilage around the edge of the glenoid cavity



Function- slightly deepen and enlarge the glenoid cavity also it help stabilize the joint and serves as an attachment site for ligaments. (the humerus head is larger than the glenoid cavity so the glenoid labrum surrounds the the socket to help stabilize the joint. The rim deepen the socket by 50% so the head can fit better in the cavity.



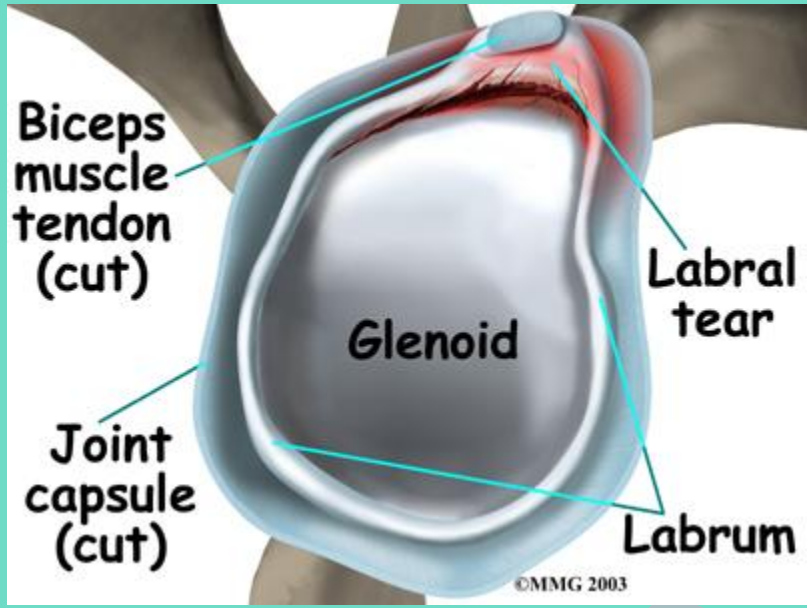
Laura

Clinical Concerns with Glenoid Labrum

Tear of the glenoid labrum

Cause: falling on an outstretched arm; direct blow to the shoulder; sudden pull like trying to lift something to heavy.

Treatment: anti-inflammatory medications; resting the arm- wearing sling 3-5 weeks; strengthening exercises for rotator muscles and surgery to repair the tear, reattach ligaments and tighten the shoulder socket.



Laura

Bursae of the Glenohumeral Joint

Bursae-- fluid filled sac lined with a synovial membrane that produces a viscous fluid-- synovial fluid

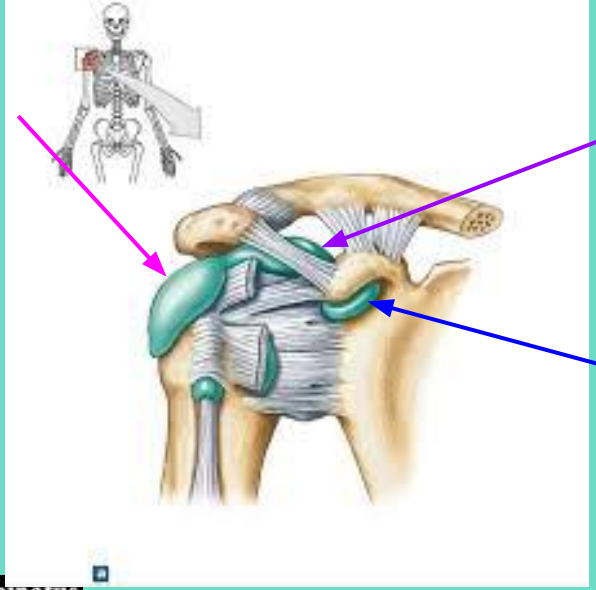
Function-

Creates a lubrication for muscles and tendons at frictions points: prevents unwanted friction, absorbs shock



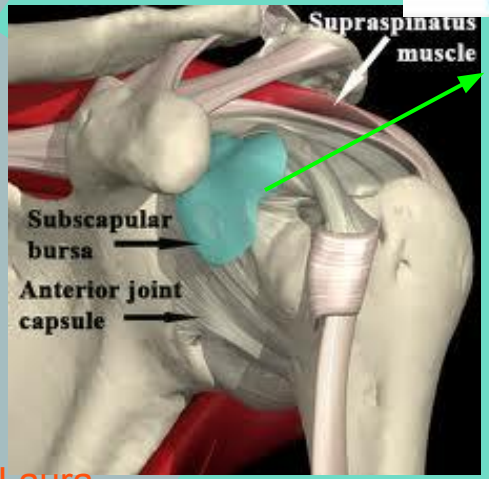
Laura

Subdeltoid bursa located between the joint capsule and the deep surface of the deltoid muscle

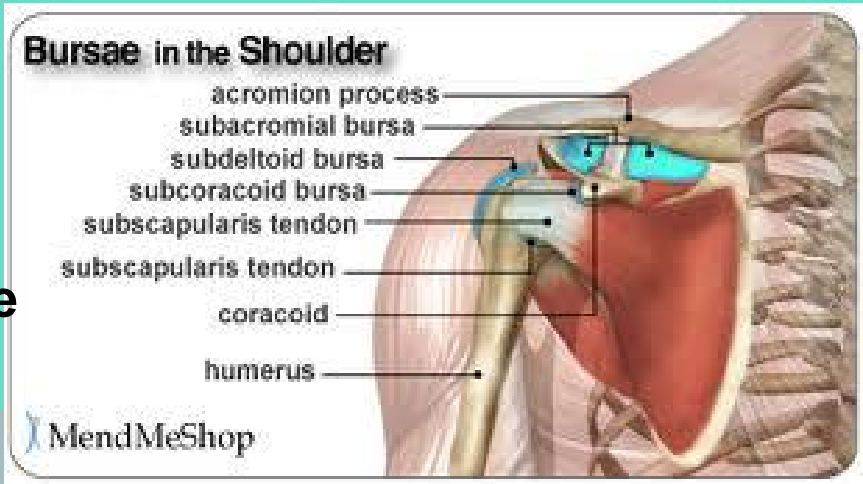


Subacromial bursa- located inferior to the acromion

Subcoracoid bursa- located anterior to the subscapularis muscle and inferior to the coracoid process



Subscapular bursa- located between the joint capsule and tendon of the subscapularis muscle continuous with the synovial cavity.



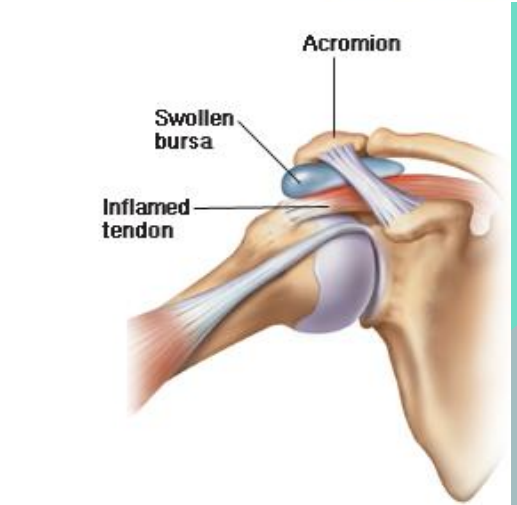
Laura

Clinical Concerns: Bursitis

Cause: overuse, rheumatoid arthritis, gout or an infection, being overweight, trauma and occasionally scoliosis.

Treatment: ice, compression with a bandage, ibuprofen, avoiding repetitive movements, rehabilitation exercises to keep joint mobile, shots of corticosteroids, getting the bursa drained, or removed if necessary





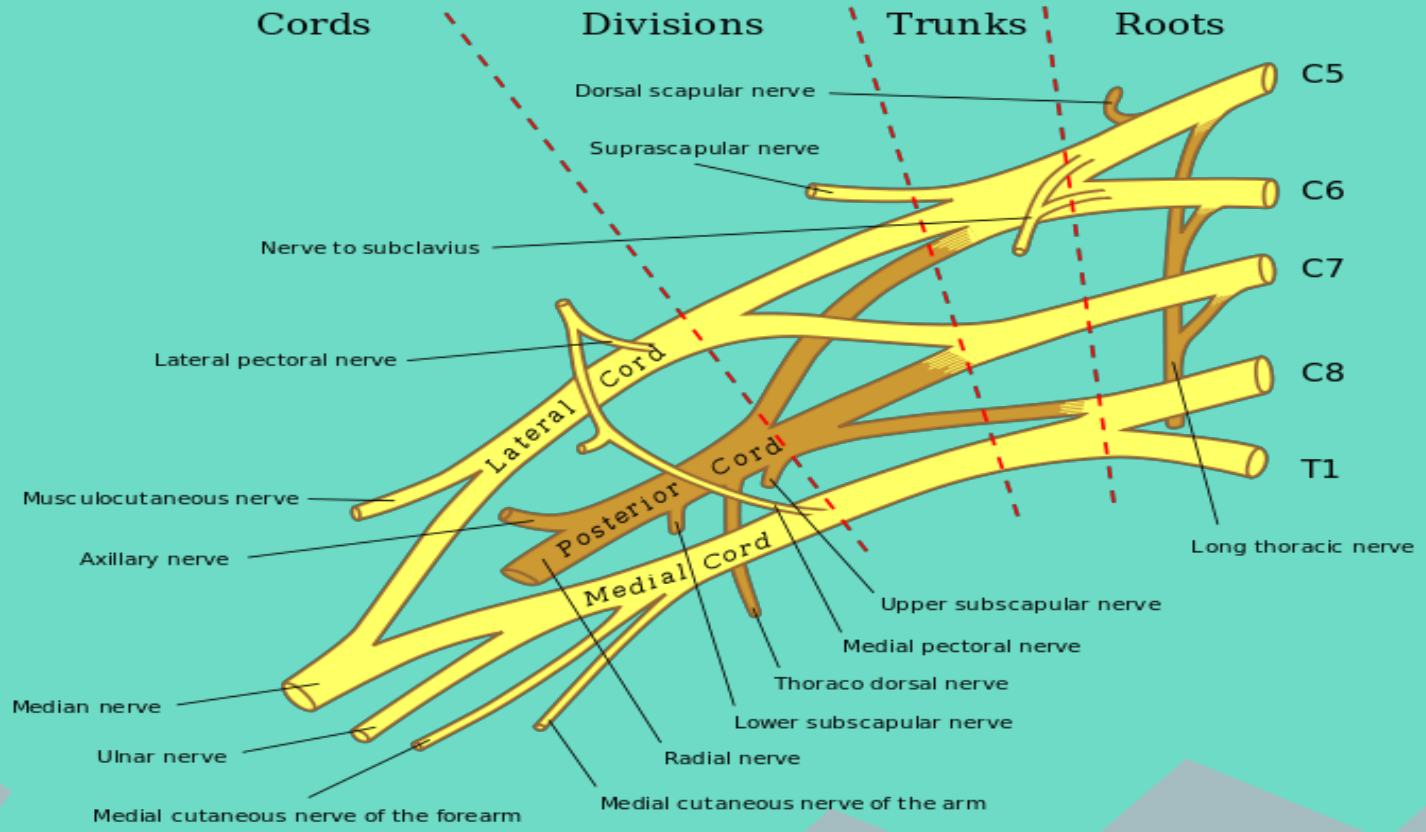
Laura

Spinal cord anatomy

The roots of several spinal nerves unite to form trunks in the inferior part of the neck. These are the superior, middle, and inferior trunks. Posterior to the clavicles, the trunks divide into divisions. In the axillae, the divisions unite to form cords called the lateral, medial and posterior cords. The principal nerves of the brachial plexus branch from the cords.

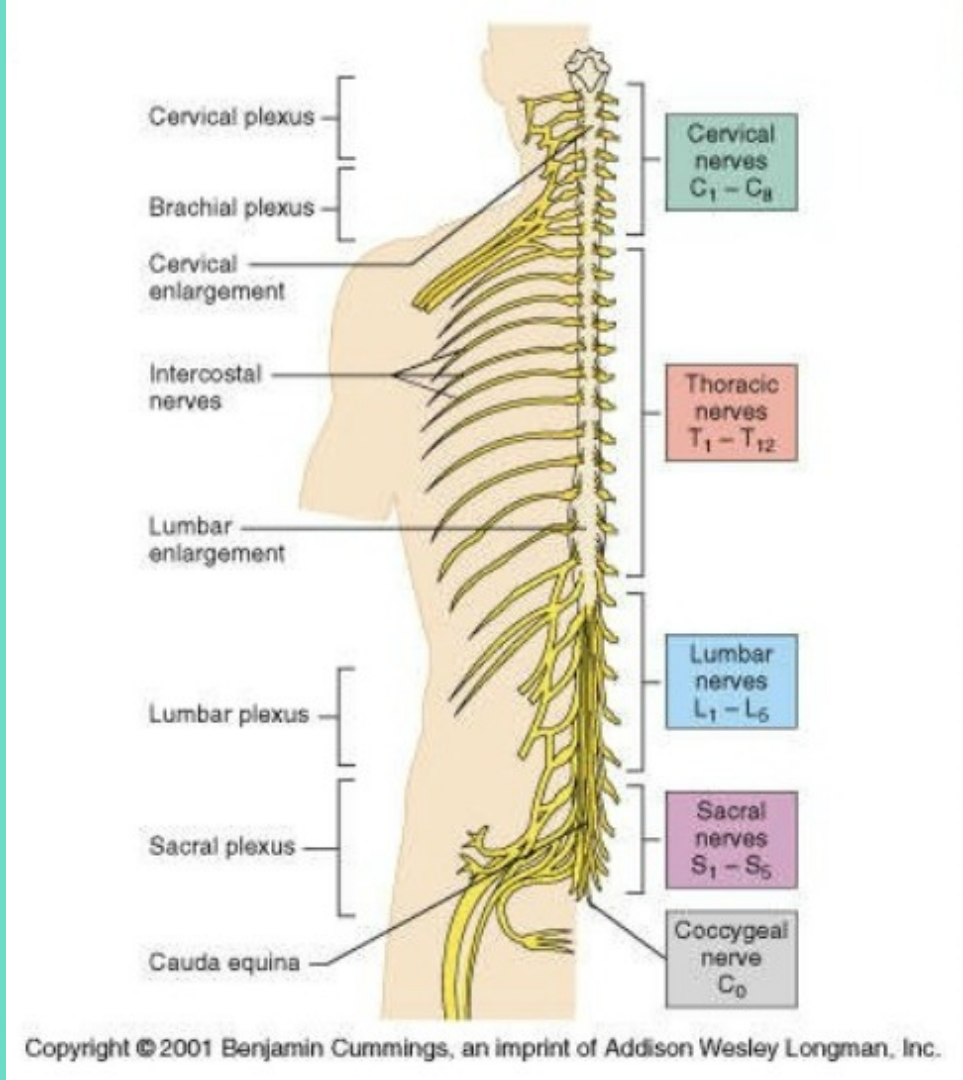
Genna

Spinal Cord anatomy cont'd



Genna

- **Cervical Plexus -**
  - Originates from spinal nerves C1 – C4.
  - Innervate head, superficial neck structures, and superior portions of shoulders and chest.
- **Brachial Plexus -**
  - originates from spinal nerves C5 - T1
  - provides entire nerve supply of the shoulder and upper limbs
- **plexus - “braid,” intermingling of roots**

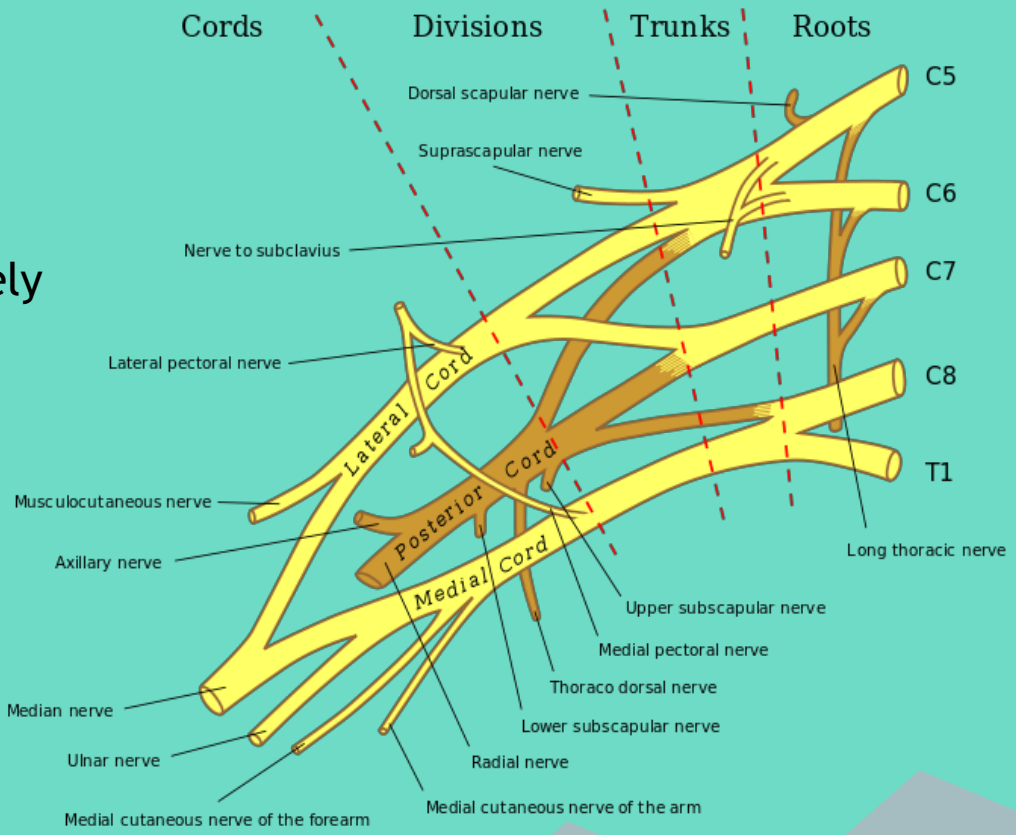


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Genna

Brachial Plexus

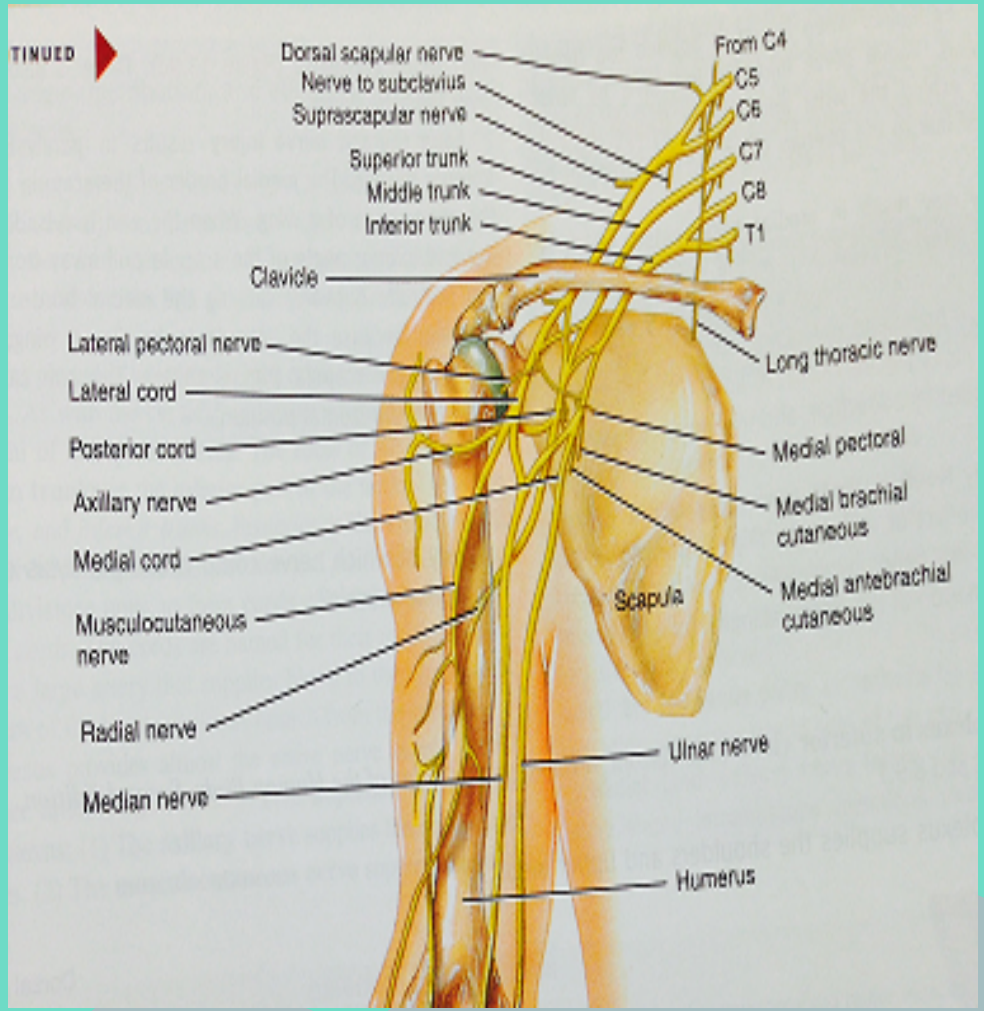
All of the nerves that travel down the arm pass through the axilla (armpit) under the shoulder joint are collectively known as the Brachial Plexus before dividing into the individual nerves. These nerves carry the signals from the brain to the muscles that move the arm. The nerves carry signals back to the brain about sensations such as touch, pain, and temperature.



Genna

Brachial Plexus

- responsible for the innervation of the muscles of the upper extremity.



Genna

Brachial Plexus

Nerve	Origin	Muscle Innervated
Dorsal Scapula	C4 - C5	Rhomboids, levator scapulae
Long Thoracic	C5 - C7	Serratus Anterior
Suprascapular	Superior Trunk, C4 - C6	Supraspinatus and infraspinatus, shoulder joint
Lateral Pectoral	Lateral Cord C5 - C7	Pectoralis major and minor
Medial Pectoral	Medial Cord C8, T1	Pectoralis minor and sternocostal of pectoralis major
Axillary	Posterior Cord C5, C6	Glenohumeral joint, teres minor, deltoid muscles, (sensory) skin of superolateral arm
Musculocutaneous	Lateral Cord C5 - C7	Coracobrachialis, biceps brachi, brachialis, (sensory) skin of lateral forearm
Thoracodorsal	Posterior Cord C6 - C8	Lattissimus dorsi
Subscapular	Posterior Cord C5, C6	Subscapularis, Teres Major

Genna

Nerves - Clinical Concerns

- **Brachial plexus injury - Injury to the network of nerves that sends signals from the spine to the shoulder, arm and hand. This injury occurs when the nerves are stretched or torn. This type of nerve damage is a result of the shoulder being pressed down forcefully while the head is pushed up and away from that shoulder. Brachial plexus injuries often happen in contact sports, vehicular accidents, falls, and breeching in childbirth.**
- **Brachial neuritis – Form of peripheral neuropathy, which is a disease that causes pain or loss of function in nerves that carry signals to and from the spinal cord.**
- **Shoulder dislocation - The axillary nerve is the most commonly injured nerve in shoulder dislocations. Numbness along outer shoulder and extreme weakness occur.**

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Nerves - Clinical Concerns

Long Thoracic nerve injury

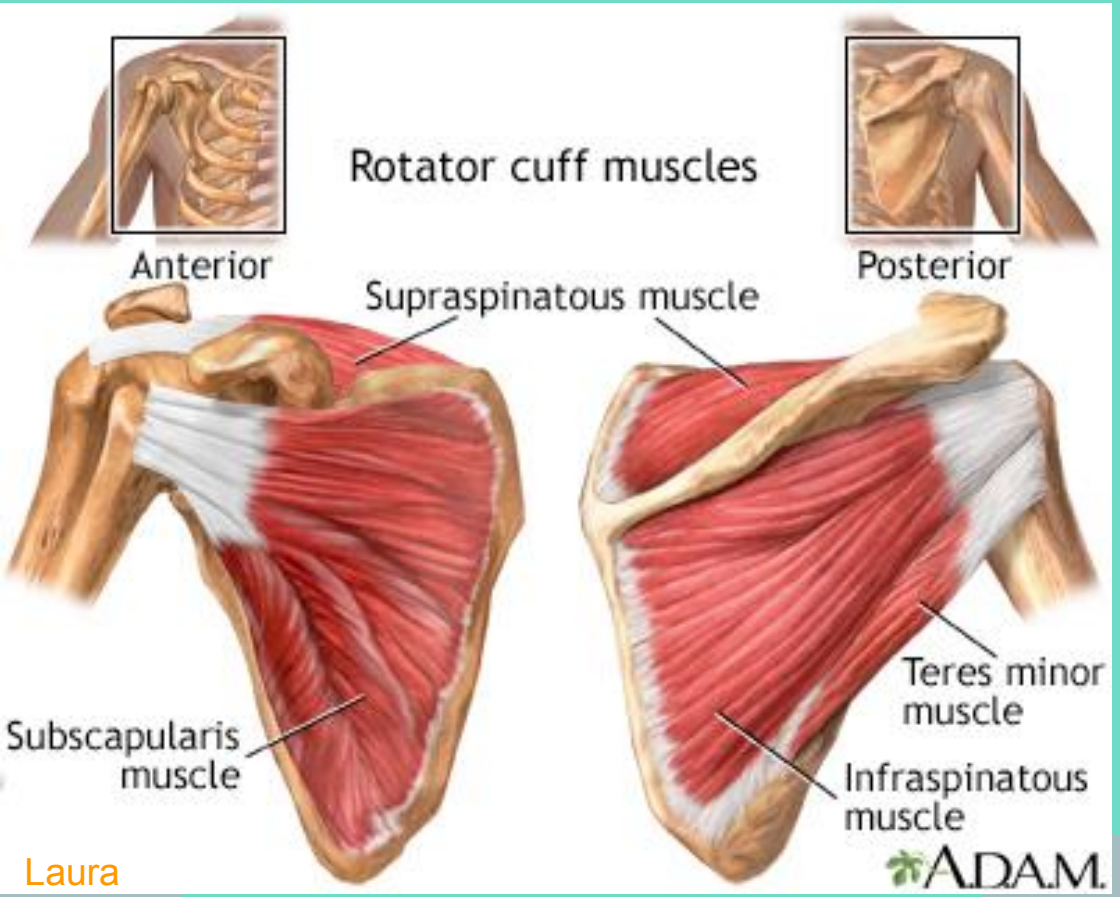
- Limits movement
- weakness or paralysis of Serratus Anterior muscle
- Shoulder blade protrudes
- Viral illness
- Repetitive injury
- Poor posture - myth?
- Poor physical conditioning
- Damage or contusion to the long thoracic nerve of the shoulder
- Blunt trauma or contusion of shoulder

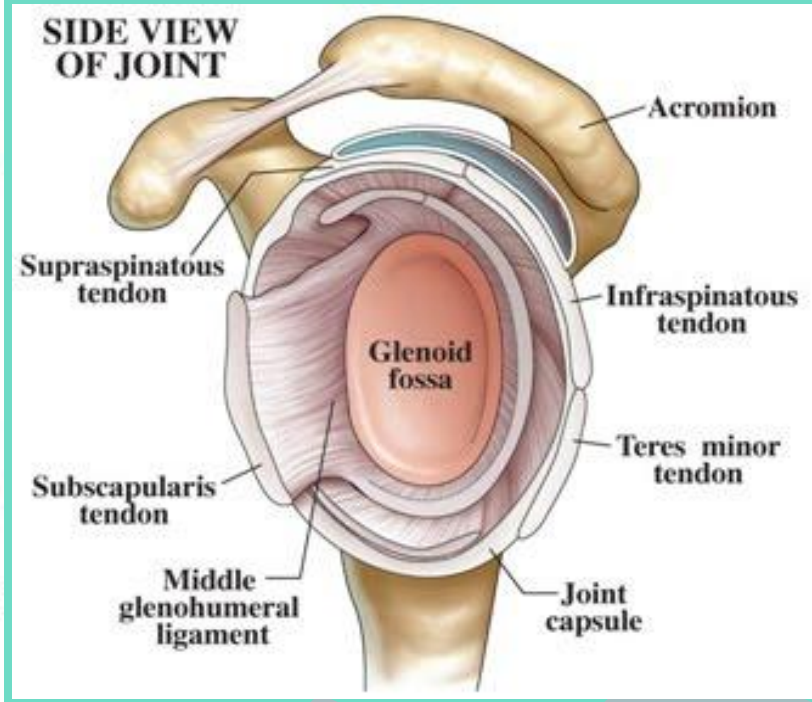


Treatment - Rest and antiinflammatory medications. The nerve usually spontaneously recovers within 12 - 24 months. Performing ROM exercises is extremely essential. If condition persists, surgery may be required.

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Four Rotator Cuff Muscles

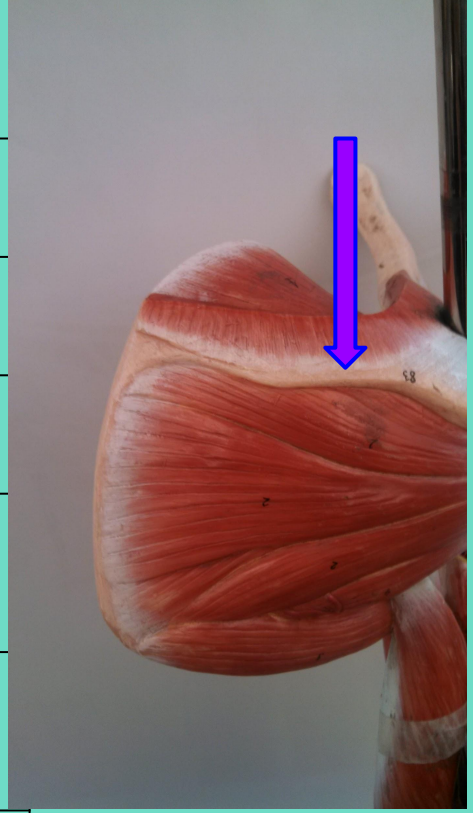




Laura

Supraspinatus

Origin	Supraspinous fossa of the scapula
Insertion	Greater tubercle of the humerus
Action	Shoulder abduction
Innervation/ Roots	Suprascapular nerve C5-C6
Vascular Supply	Suprascapular artery
Synergist	Deltoids
Antagonist	Pectoralis major, Teres Major, Subscapularis, Pectoralis Major, Anterior Deltoid



Laura

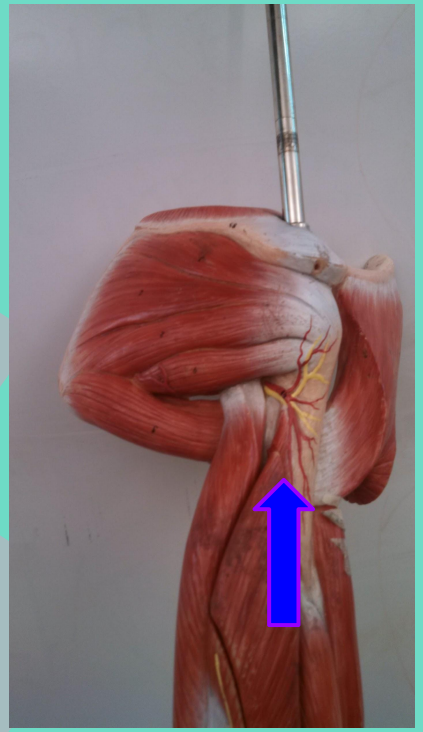
Infraspinatus



Origin	Infraspinous fossa of scapula
Insertion	Greater tubercle of the humerus
Action	Lateral rotation at the shoulder, helps to hold humeral head in the glenoid cavity of scapula
Nerve innervation/ Roots	Subscapular Nerve C5 &C6
Vascular Supply	Suprascapular artery
Synergist	Teres minor, posterior deltoid
Antagonist	Latissimus , dorsi, Teres major, subscapularis, pectoralis major, anterior deltoid

Laura

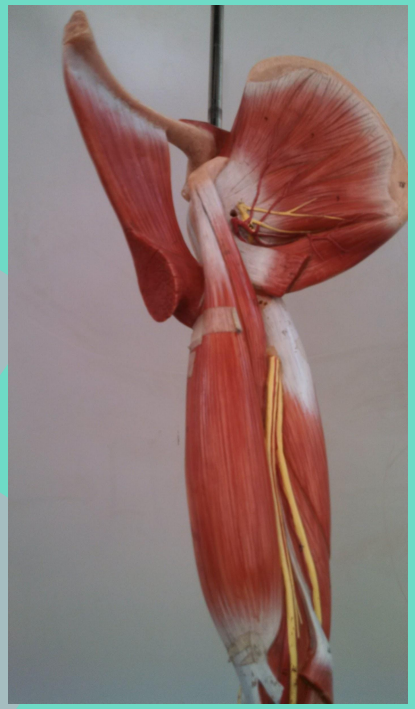
Teres Minor



Origin	Axillary border of scapula
Insertion	Greater tubercle of the humerus
Action	Lateral rotations of arms, helps to hold humeral head in glenoid cavity of scapula
Nerve Innervation/ Roots	Axillary Nerve C5 & C6
Vascular Supply	Circumflex scapular artery
Synergist	Infraspinatus, posterior deltoid
Antagonist	Latissimus dorsi, teres major, subscapularis, pectoralis major, anterior deltoid

Laura

Subscapularis



Origin	Subscapular fossa of the scapula
Insertion	Lesser tubercle of humerus
Action	Shoulder medial rotation
Nerve Innervation/ Roots	Subscapular Nerve C5-C7
Vascular Supply	Subscapular artery
Synergist	Pectoralis major, Teres major, Latissimus dorsi
Antagonist	Deltoid, Supraspinatus

Laura

Rotator Cuff Injury

Causes: any type of irritation or damage to your rotator cuff muscles or tendons. Many injuries are caused from falling, lifting in repetitive motions.

Symptoms: pain and tenderness in your shoulder. Especially when reaching overhead, behind your back, lifting, pulling or sleeping on the affected side. You will experience shoulder weakness and loss of ROM.

Prevention: Do regular shoulder exercises and strengthening, take breaks at work if your job requires repetitive arm and shoulder motions. Apply cold packs and heat pads when you experience any shoulder pain or inflammation.

Treatment: **Most common is to use exercise therapy to help heal your injury, improve flexibility, and improve muscle strength. Other treatment can include steroid injection, surgery and a partial (hemiarthroplast) or total (prosthetic arthroplasty) shoulder replacement.**

Taylor

Put down your juice box!!!



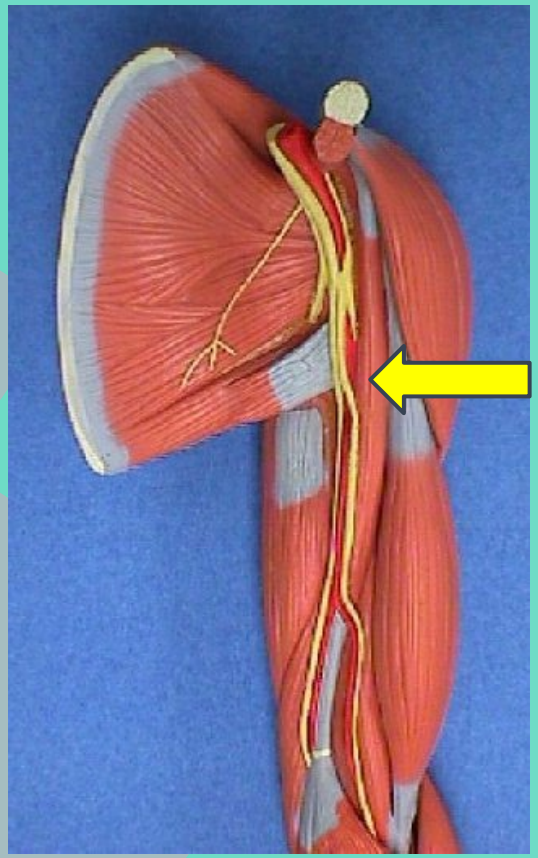
Teres Major



Origin	Lower lateral border and inferior angle of scapula
Insertion	Medial lip of intertubercular groove of humerus
Action	Adducts, medially rotates, and extends arm at shoulder
Nerve/Innervation roots	Lower subscapular nerve, C6 - C7
Vascular supply	Circumflex artery
Synergist	Latissimus dorsi
Antagonist	Deltoid, Infraspinatus, Teres minor

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Coracobrachialis

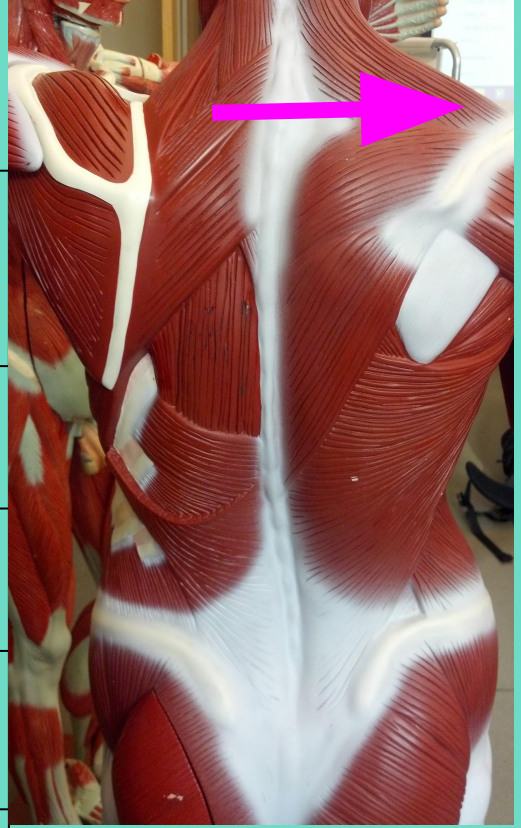


Origin	Coracoid process of scapula
Insertion	Mid-medial surface of humerus
Action	Flexes and adducts arm at shoulder
Nerve/Innervation roots	Musculocutaneous nerve, C6 - C7
Vascular supply	Brachial artery
Synergist	Biceps brachii, Pectoralis major, anterior Deltoid
Antagonist	Posterior Deltoid, Latissimus dorsi, Teres major

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Upper Trapezius

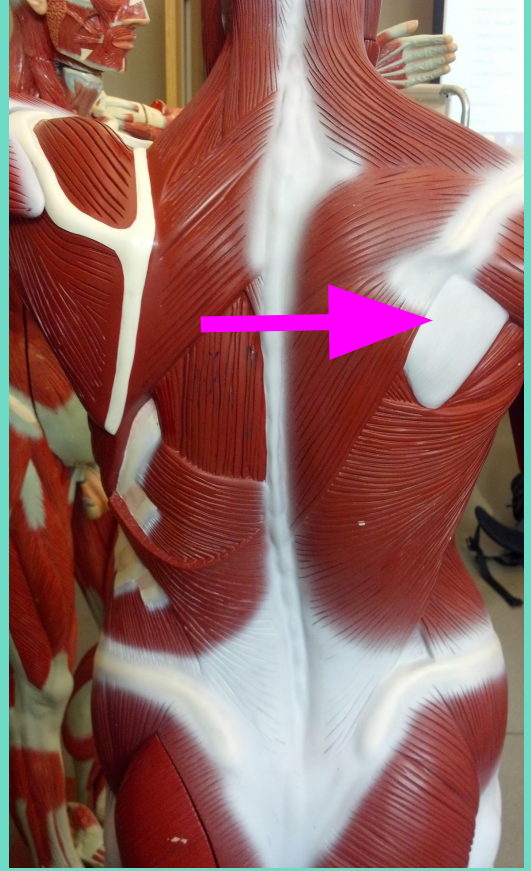
Origin	Occipital bone, nuchal ligament
Insertion	Outer third of clavicle, acromion process
Innervation/ Roots	Spinal Accessory/ C3-C4
Vascular Supply	Transverse cervical artery
Action	Scapular elevation and upward rotation
Synergist	Levator Scapulae
Antagonist	Lower Trapezius, Rhomboid Major & Minor



Taylor

Middle Trapezius

Origin	Spinous processes of C7-T3
Insertion	Scapular spine
Innervation/ Roots	Spinal accessory/ C3-C4
Vascular Supply	Transverse cervical artery
Action	Scapular retraction
Synergist	Pectoralis Major, Teres Major, Latissimus Dorsi
Antagonist	Deltoid, Suprespinatous



Lower Trapezius

Origin	Spinous processes of middle and lower thoracic vertebrae
Insertion	Base of the scapular spine
Innervation/ Roots	Spinal Accessory/ C3-C4
Vascular Supply	Transverse cervical artery
Action	Scapular depression and upward rotation
Synergist	Lower Trapezius, Rhomboid Major & Minor
Antagonist	Levator Scapulae

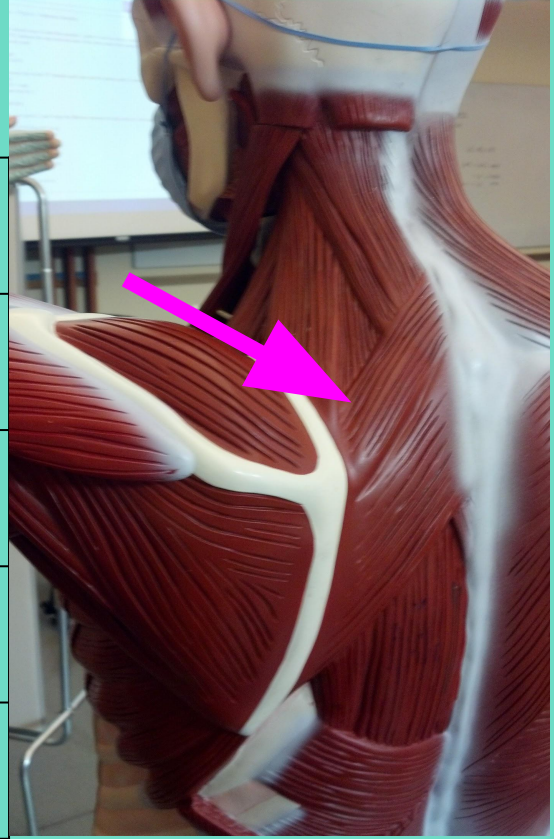


Taylor

Taylor

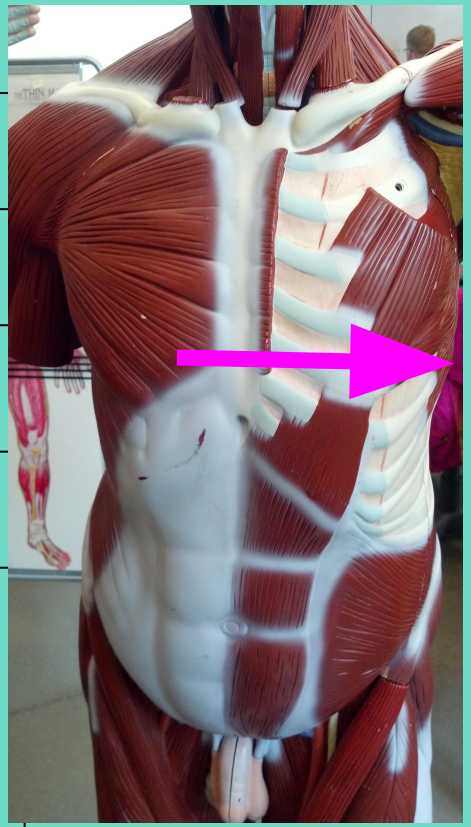
Levator Scapulae

Origin	Transverse process of first four cervical vertebrae
Insertion	Vertebral border of scapula between the superior angle and spine
Innervation/ Roots	Third and fourth cervical nerve/ C3-C5
Vascular Supply	Dorsal scapular artery
Action	Scapular elevation and downward rotation
Synergist	Upper Trapezius
Antagonist	Lower Trapezius



Pectoralis Minor

Origin	Anterior surface 3-5th ribs
Insertion	Coracoid process of the scapula
Innervation/ Roots	Medial pectoral nerve/ C8 & T1
Vascular Supply	Axillary nerve
Action	**With ribs fixed:** draws the scapula forward (abducts) and rotates scapula downward against the thoracic wall **With scapula fixed:** elevated the rib cage
Synergist	Serratus Anterior
Antagonist	Rhomboid Major & Minor, Pectoralis Major

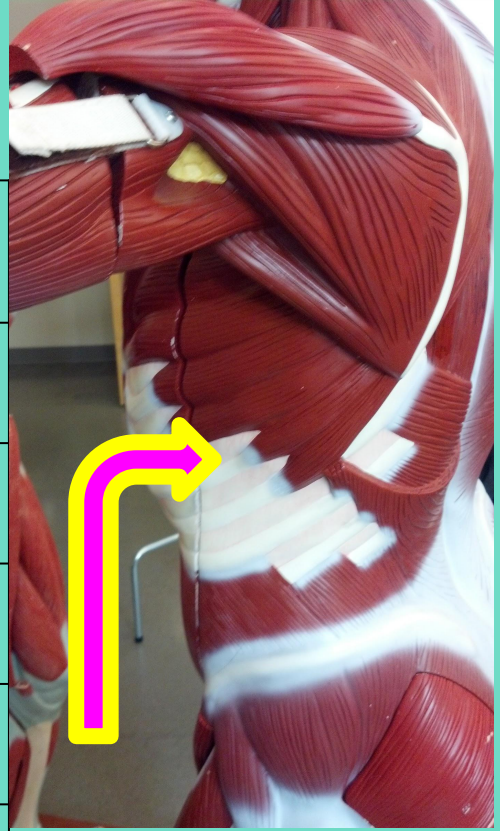


Censored

Taylo

Serratus Anterior

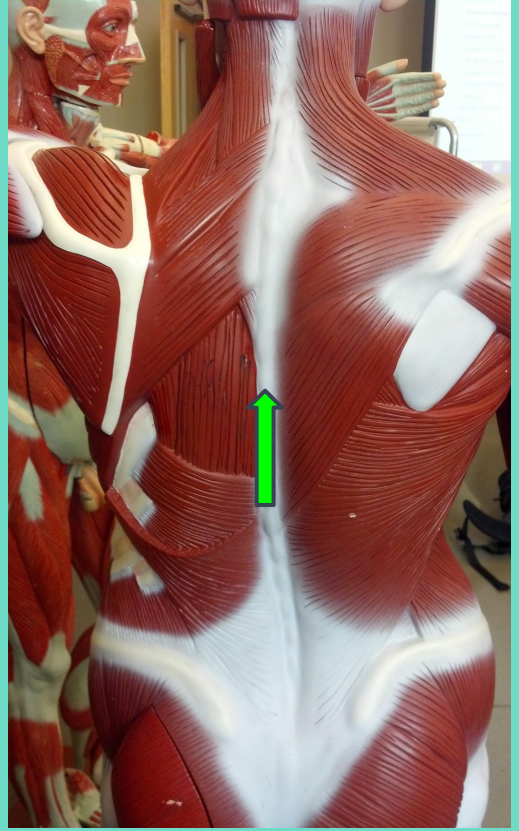
Origin	Lateral surface of the upper 8 ribs
Insertion	Vertebral border of the scapula, anterior surface
Innervation/ Roots	Long thoracic nerve/ C5-C7
Vascular Supply	Lateral thoracic artery
Action	Scapular protraction and upward rotation
Synergist	Deltoid, Supraspinatus, Pectoralis Major
Antagonist	Rhomboid Major & Minor, Pectoralis Major



Taylor

Rhomboideus major

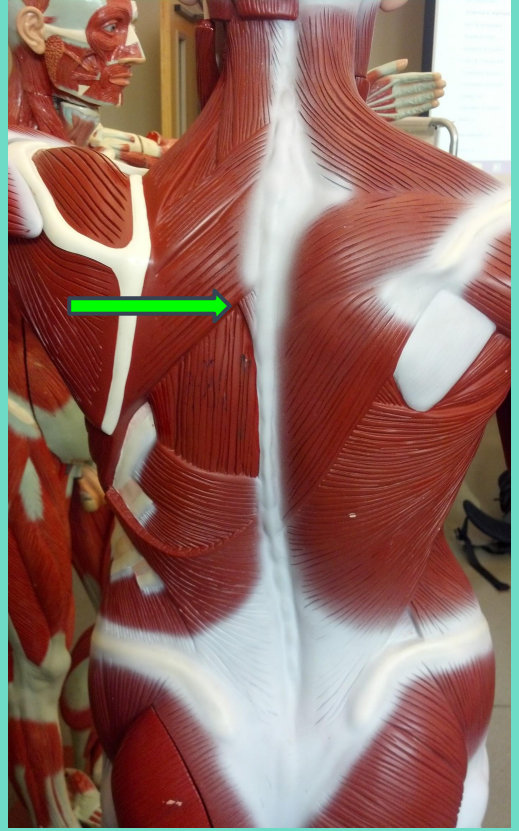
Origin	Spinous processes of T2 - T5
Insertion	Spinous processes of C7 - T1
Innervation/ Roots	Dorsal Scapular nerve
Vascular Supply	Dorsal Scapular artery
Action	Scapular retraction and downward rotation
Synergist	Pectoralis major, Teres Major, Latissimus Dorsi
Antagonist	Deltoid, Supraspinatus



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Rhomboideus Minor

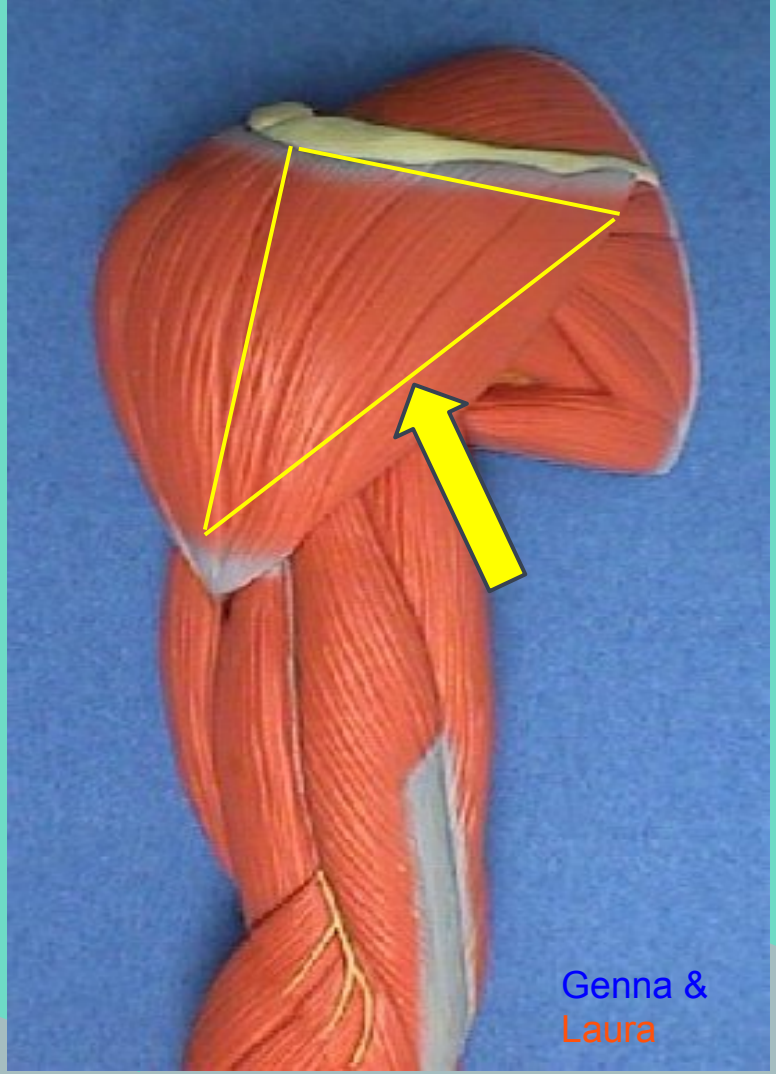
Origin	Spinous processes of T1 - T7
Insertion	Vertebral border of scapula between the spinous process
Innervation/ Roots	Dorsal Scapular nerve
Vascular Supply	Dorsal Scapular artery
Action	Scapular retraction and downward rotation
Synergist	Infraspinatus, Posterior Deltoid
Antagonist	Latissimus Dorsi, Teres Major, Subscapularis, Pectoralis Major



Genna

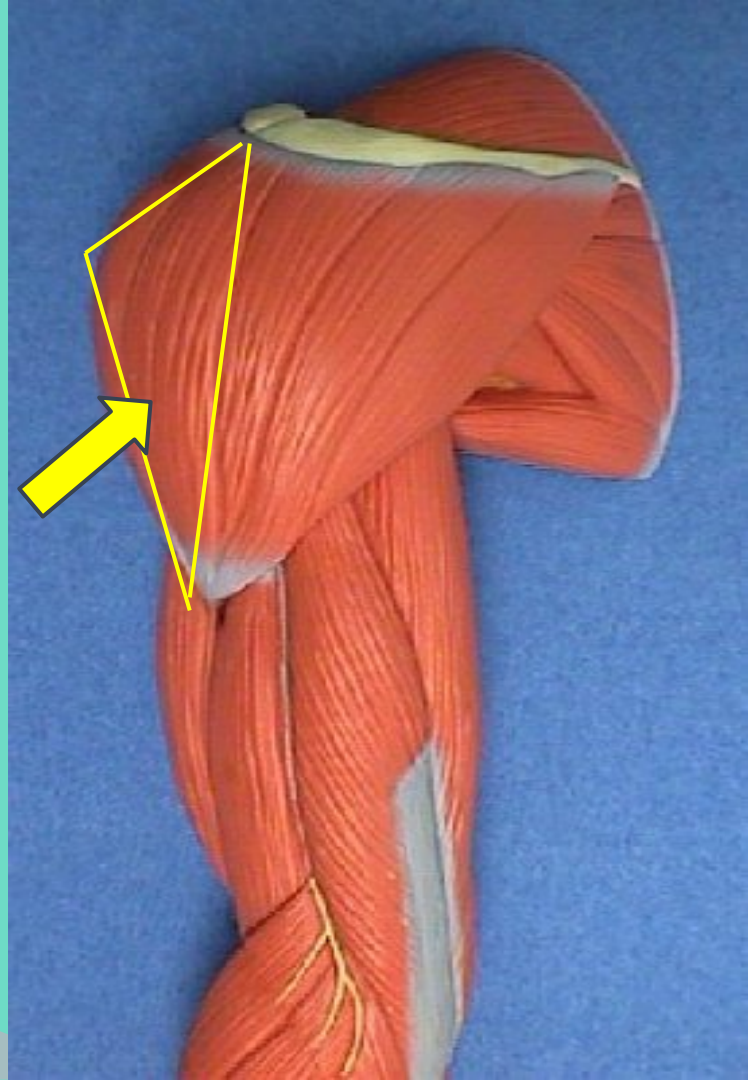
Anterior Deltoid

Origin	Lateral third of the clavicle
Insertion	Deltoid tuberosity
Innervation/ Roots	Axillary Nerve C5-C6
Vascular Supply	Posterior Circumflex Artery
Action	Shoulder flexion, medial rotation, horizontal adduction
Synergist	Supraspinatus, pectoralis major, latissimus dorsi, subscapularis
Antagonist	Pectoralis major, teres major, latissimus dorsi, posterior deltoid, teres minor, infraspinatus



Middle Deltoid

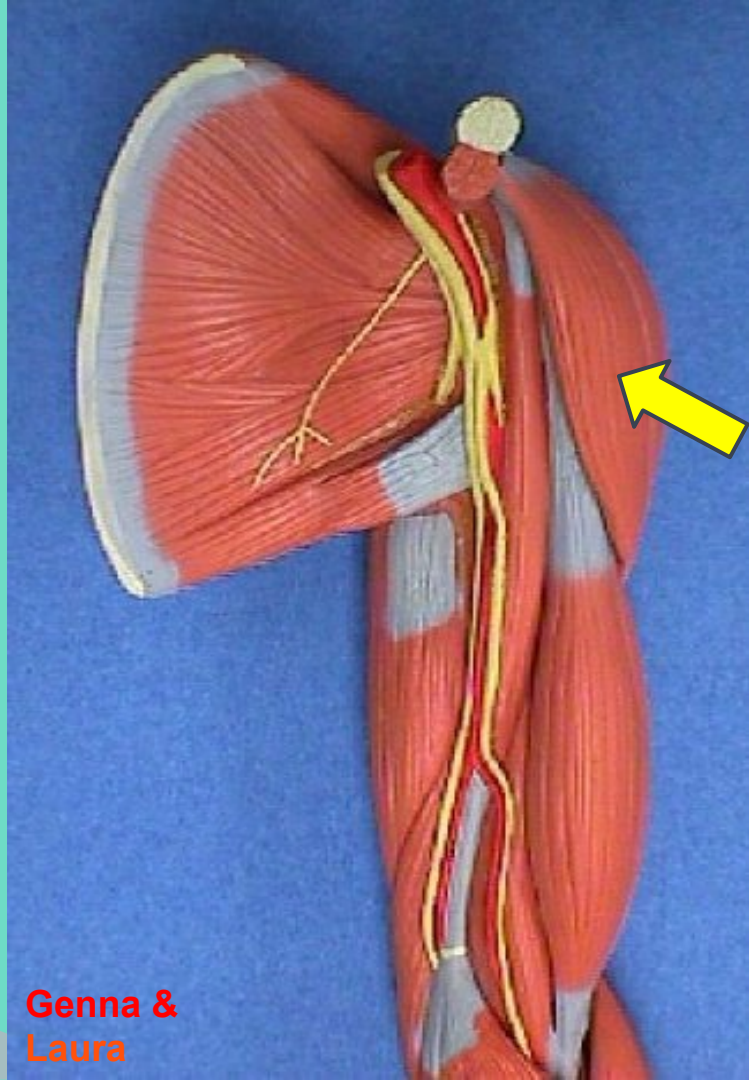
Origin	Acromion process
Insertion	Deltoid tuberosity
Action	Shoulder abduction
Innervation/ Roots	Axillary nerve C5-C6
Vascular Supply	Posterior circumflex artery
Synergist	Supraspinatus
Antagonist	Pectoralis major, teres major, latissimus dorsi



Genna & Laura

Posterior Deltoid

Origin	Spine of scapula
Insertion	Deltoid tuberosity
Action	Shoulder extension, hyperextension. lateral rotation, horizontal abduction
Nerve innervation/ Roots	Lateral and medial pectoral nerve C5-C6
Vascular Supply	Posterior circumflex artery
Synergist	Supraspinatus, latissimus dorsi, teres major, pectoralis major, infraspinatus
Antagonist	Pectoralis major, teres major, latissimus dorsi, anterior deltoid



Pectoralis Major - Clavicular portion

Origin	Medial third of the clavicle, sternum, costal cartilage of first six ribs
Insertion	Lateral lip of bicipital groove of humerus
Action	Shoulder adduction, medial rotation, horizontal adduction
Nerve innervation/ Roots	Lateral and medial pectoral nerve C5-C6
Vascular Supply	Lateral thoracic artery
Synergist	Deltoid, latissimus dorsi, teres major, subscapularis
Antagonist	Latissimus dorsi, pectoralis minor



Laura & Genna

Latissimus Dorsi

Origin	Spinous processes of T7 through L5 (via dorsolumbar fascia) posterior surface of sacrum, iliac crest, and lower three ribs
Insertion	Medial lip of bicipital groove of humerus
Action	Shoulder extension, adduction, medial rotation, hyperextension
Nerve innervation/ Roots	Thoracodorsal Nerve C6-C8
Vascular Supply	Deep Scapular Artery
Synergist	Anterior and posterior deltoid, latissimus dorsi, teres major, pectoralis major, subscapularis
Antagonist	Anterior and posterior deltoid, pectoralis major, infraspinatus

Laura



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