

Upper Limb Anatomy Part 1: The Rotator Cuff

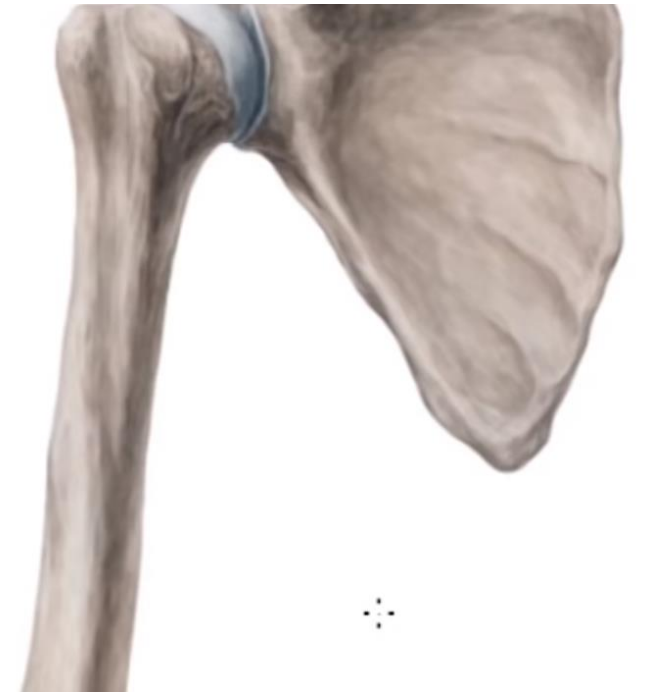
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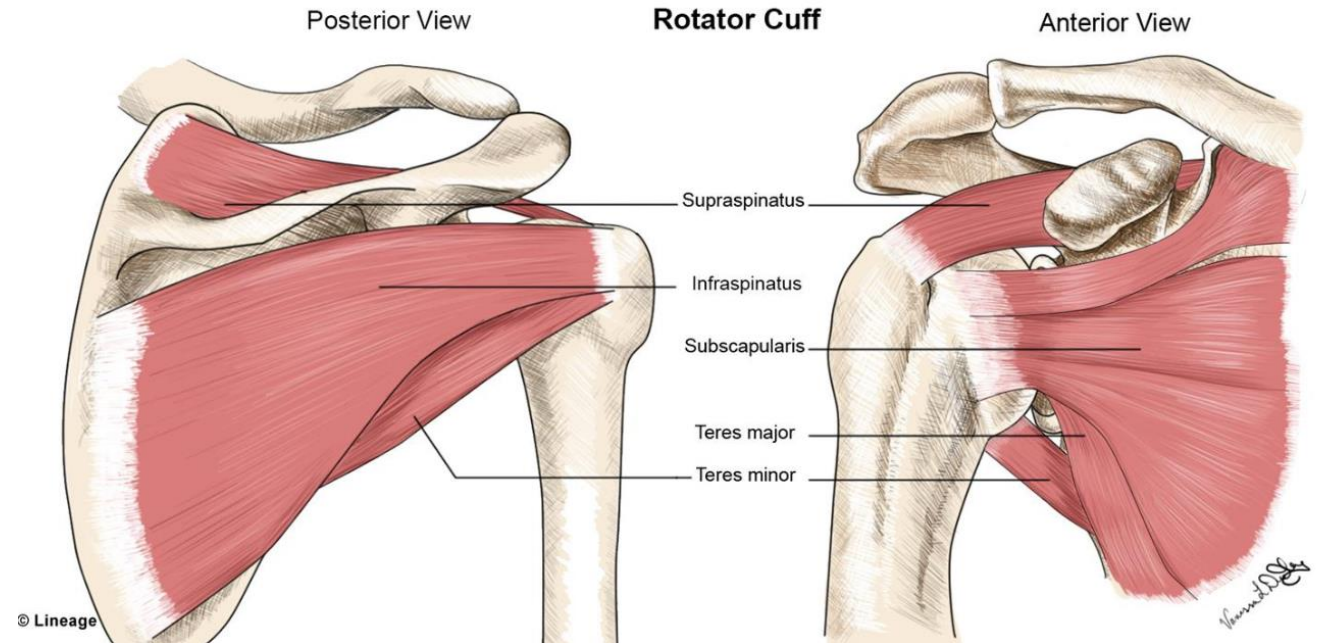
Closer Peek at the Shoulder Joint- For Reference!

- Ball & Socket joint- allows for large ROM
 - Humerus (ball), glenoid/labrum (socket)
- Made up of **3 bones**: clavicle, scapula, humerus
- Articular cartilage allows for joint to slide freely with minimal friction and absorbs shock
- Shoulder stabilized by muscles of **rotator cuff**
 - Also supported by several ligaments



Muscles of the Rotator Cuff

- 4 Muscles: **SITS**
 - **S**upraspinatus
 - **I**nfraspinatus
 - **T**eres Minor
 - **S**ubscapularis
- ❖ All help hold humeral head in glenoid cavity



- Rotator Cuff injury= injury to one of the muscles
 - Can cause **impingement** when inflammation of the muscles compresses nerve
 - Innervation of RCM via upper and middle trunks of brachial plexus
 - Most commonly from **tendinopathy** or **tear**
- **Supraspinatus** is most commonly torn rotator cuff muscle

Tackling those pesky Rotator Cuff Q's

- Rotator cuff pathologies will require you to be comfortable with:
 - Muscles of the rotator cuff and their **functions**
 - The nerves that innervate RCM
 - Interpreting physical exam in vignette
- For example: **Man/Woman** presents with **shoulder pain**. Found to have weakness or pain with **physical exam maneuver**. Question is likely to ask:
 - 1) What RCM is likely to have been affected?
 - 2) The muscle in question is innervated by what nerve/originates from what nerves roots?
 - 3) What other motions will patient have trouble doing?
 - 4) What is the primary role of the muscle involved?
 - 5) Where does the muscle in question insert?

Supraspinatus



- **Function:** Initiates and assists in first **15° of abduction** of shoulder
 - Stabilizes humeral head in glenoid
- **Innervation:** Suprascapular nerve, C5-C7
- **Pathology:** pain with resisted abduction of shoulder, (+) Empty can test
- Suspect a full thickness tear if the patient has minimal passive strength and unable to keep arm abducted

Time for a Question!

62 y/o lady presents to her PCP c/o left shoulder pain, worse with any sort of movement. She does not recall any trauma but does report some increased discomfort after helping her granddaughter move into college few weeks back. The patient is asked to abduct the shoulders to 90 degrees and flex them to 30 degrees with thumbs facing the floor. Downward force on the arms elicits pain in pt's left shoulder and left sided weakness when compared to right. The muscle most likely affected in this patient is innervated by what nerve?

- A) Thoracodorsal nerve
- B) Radial Nerve
- C) Subscapular nerve
- D) Suprascapular nerve
- E) Musculocutaneous nerve



Infraspinatus and Teres Minor



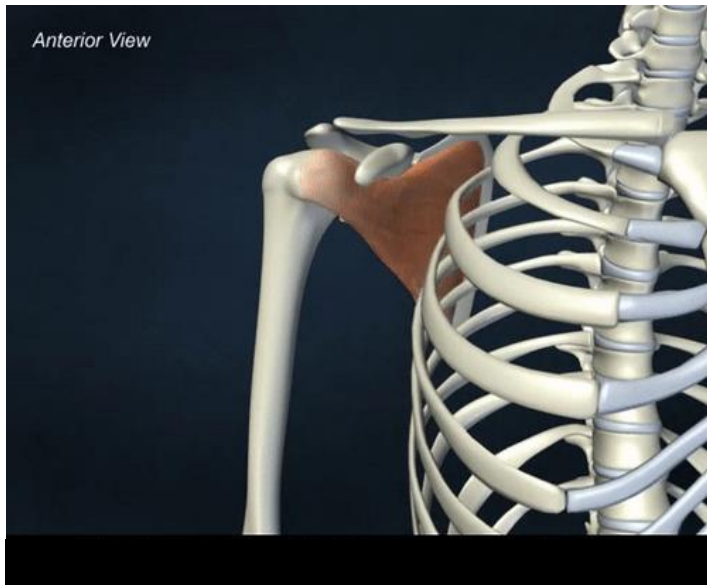
- **Function:** Main **lateral (external) rotators** of arm
 - Rotation of forearm away from the body
- **Innervation:** Infraspinatus: **Suprascapular** nerve, C5-C6
Teres Minor: **Axillary** nerve, C5-C6
- **Pathology:** Common with excess overhead motions
- How to tell the difference if they both Externally Rotate!?
 - Infraspinatus: ER weakness at 0 degrees abduction (elbow by side)
 - Teres Minor: ER weakness at 90 degrees abduction and elbow flexed at 90 degrees

Infraspinatus/Teres Minor Examination

Patient attempts to externally rotate the arm against resistance while the arms are at the sides and the elbows are flexed to 90 degrees.



Subscapularis



- **Function:** Medially (internally) rotates and adducts the arm
 - With your arm bent at 90 degrees with your elbow at your side, touch your abdomen with your hand, this is medial rotation
- **Innervation:** Upper and Lower Subscapular nerve, C5-C7
- **Pathology:** incredibly uncommon to tear subscapularis in isolation

Let's Recap!

- 4 Rotator Cuff Muscles: **SITS**
- High Yield motions to be familiar with:
 - *Initial* abduction of arm: **supraspinatus**
 - Internal/medial rotation and adduction of arm: **subscapularis**
 - External/lateral rotation of arm: **teres minor/infraspinatus**
 - Think of the two muscles together
- SUPRAspinatus and infraspinatus innervated by SUPRAscapular nerve
- SUBscapularis innervated by SUBscapular nerve
- Teres minor innervated by axillary nerve
 - Think of the teres minor pair as the odd man out



Q2. A 47-year-old man is evaluated in the office for right lateral shoulder pain. He has been pitching during batting practice for his son's baseball team for the past 3 weeks. He has shoulder pain when lifting his right arm overhead and also when lying on the shoulder while sleeping. Acetaminophen does not relieve the pain.

On physical examination, he has no shoulder deformities or swelling. Range of motion is normal. He has subacromial tenderness to palpation and has shoulder pain elicited with resisted abduction of the R shoulder. He has no pain with resisted elbow flexion or forearm supination. He is able to lower his right arm smoothly from a fully abducted position, and his arm strength for abduction and external rotation against resistance is normal.

Which of the following is the most likely diagnosis?

A Adhesive capsulitis

B Glenohumeral arthritis

C Complete tear in the supraspinatus

D Rotator cuff tendonitis

34 y/o F presents to the ED s/p MVA where she was a restrained driver. On exam, she is unable to abduct her left arm. Her exam indicates damage to what portion of the brachial plexus?

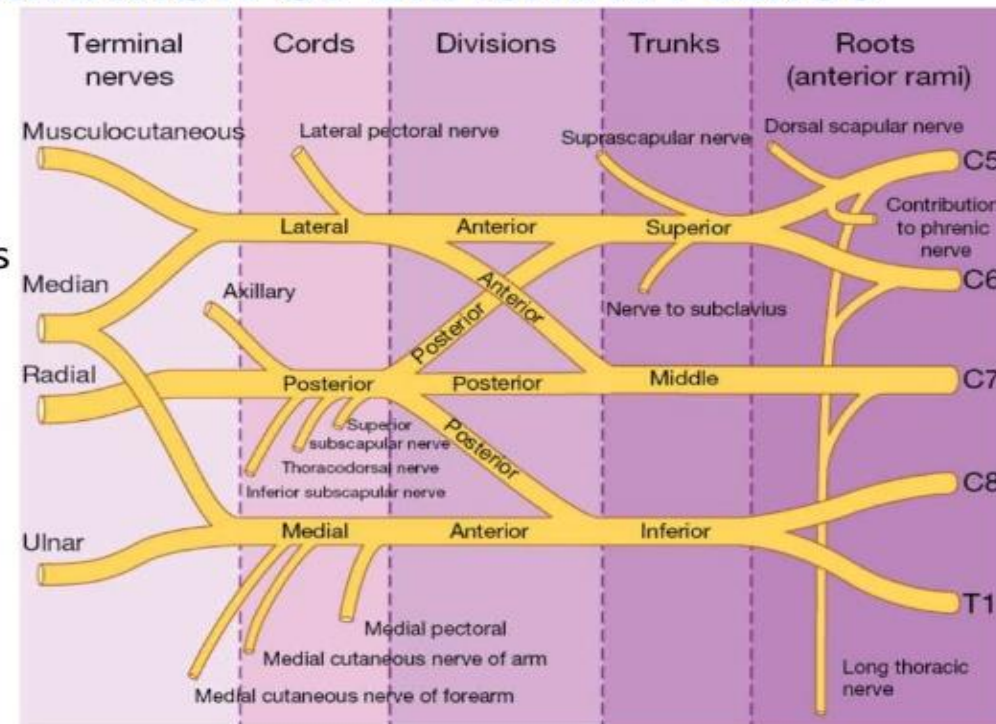
- A) Upper (superior) trunk and posterior cord
- B) Lower (inferior) trunk and posterior cord
- C) Middle trunk and lateral cord
- D) Middle trunk and anterior cord

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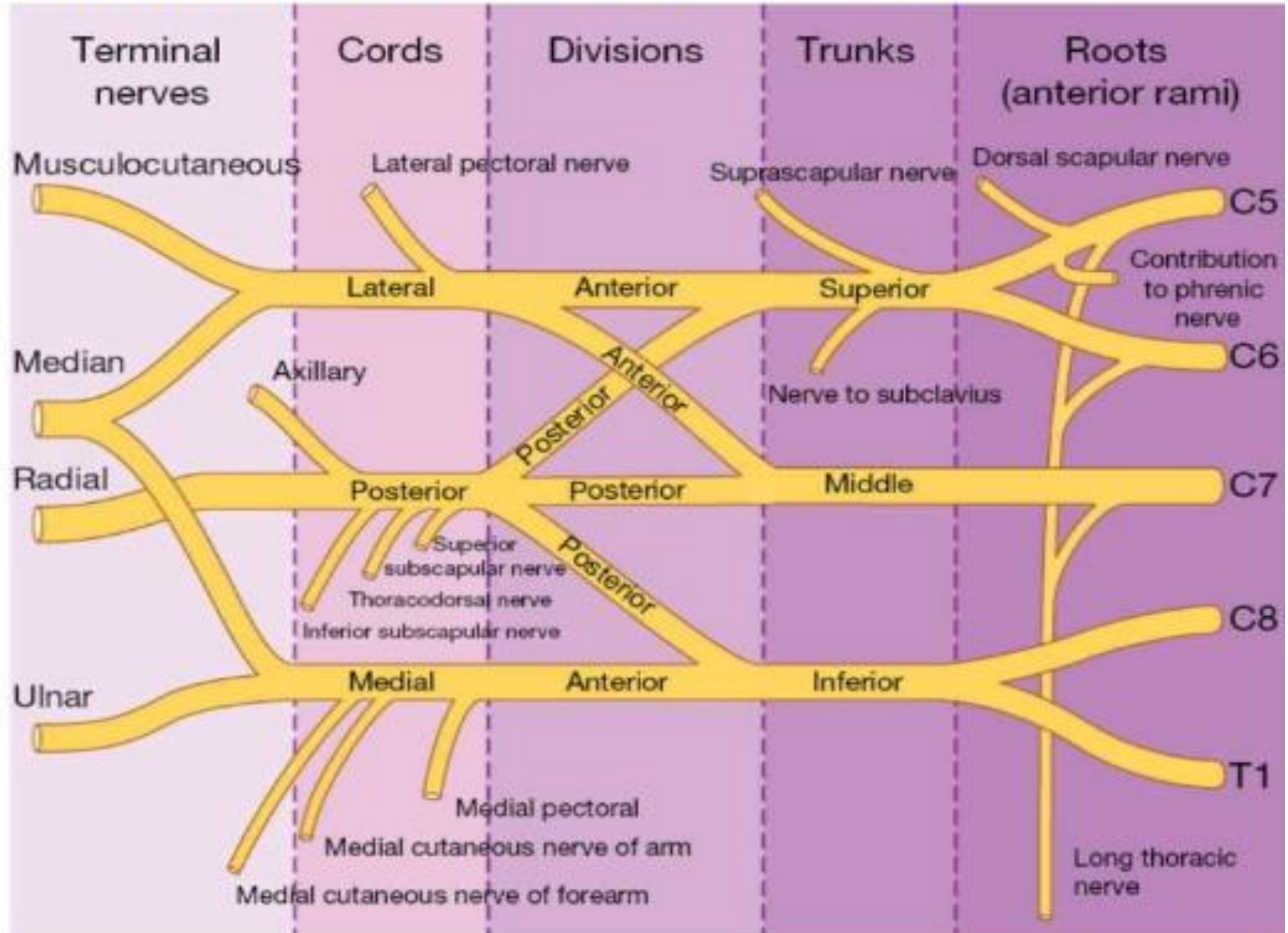
FORMATION OF BRACHIAL PLEXUS

- Roots
- Trunks
- Divisions
- Cords
- Nerves



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Thank you for
watching!!