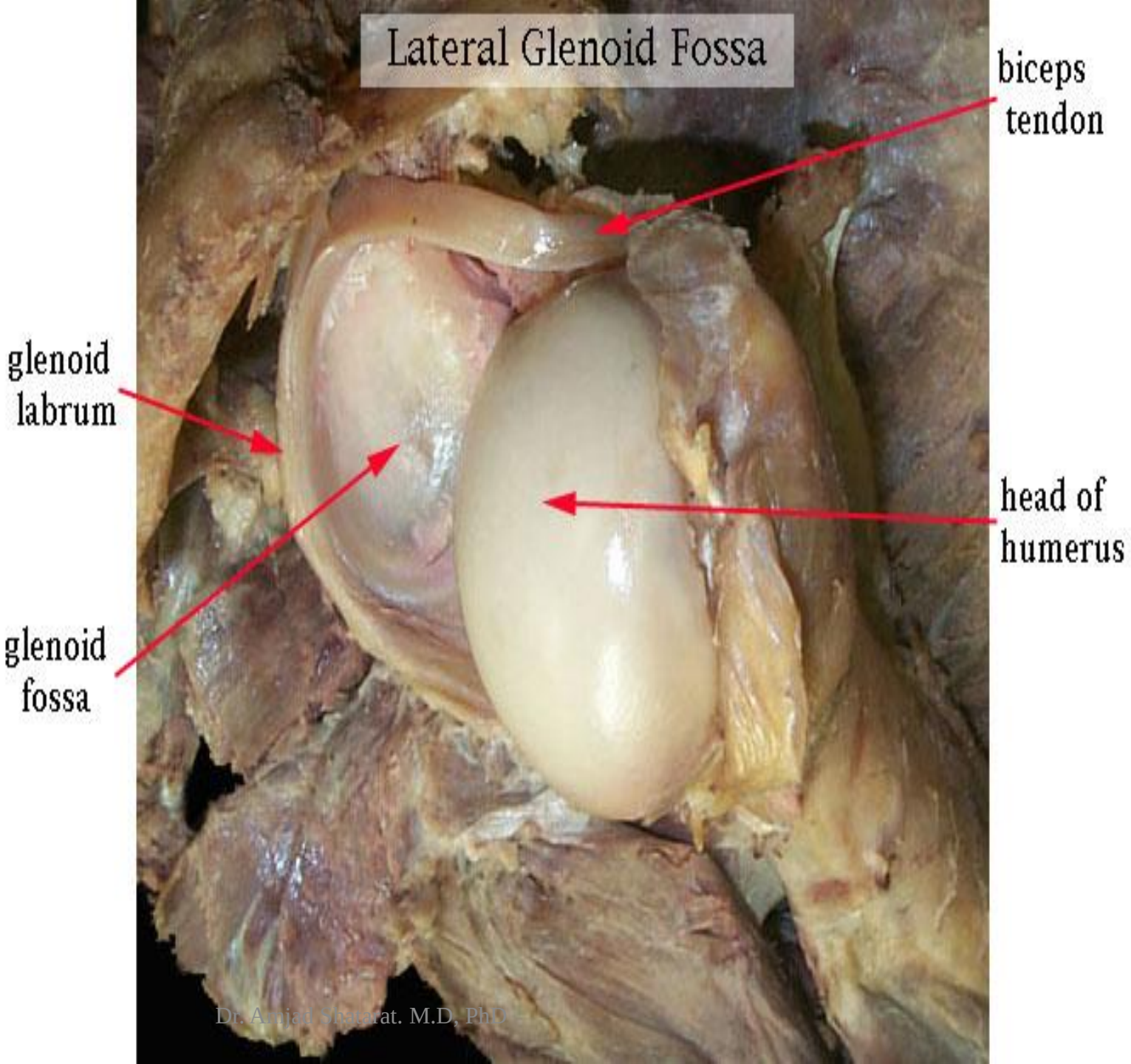
Shoulder Joint



Objectives

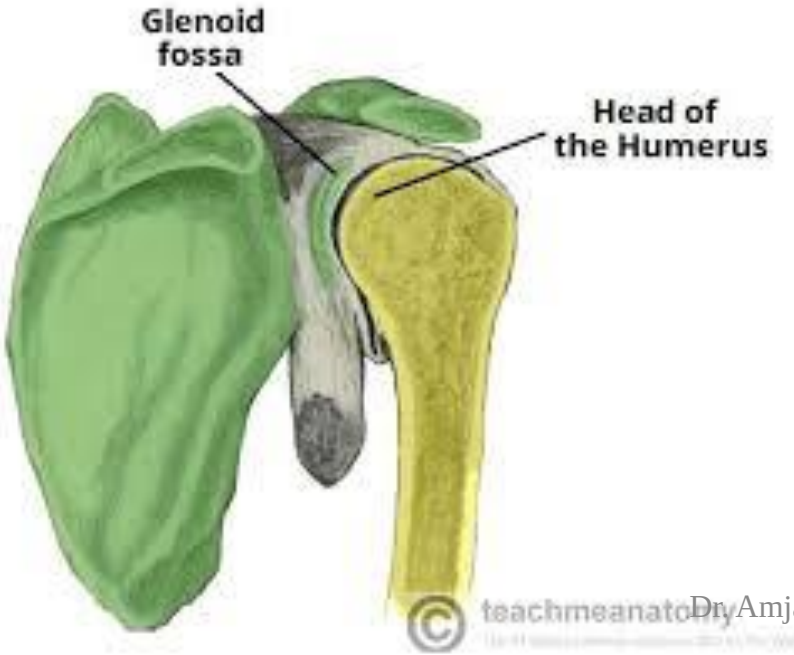
1. Introduction
2. Capsule, Ligaments and Bursae surrounding the Glenohumeral Joint
3. Movements of the Glenohumeral Joint
4. Muscles of the Glenohumeral Joint
5. Neurovascular supply
6. Clinical Points
7. References
8. Gateways to the posterior scapular region

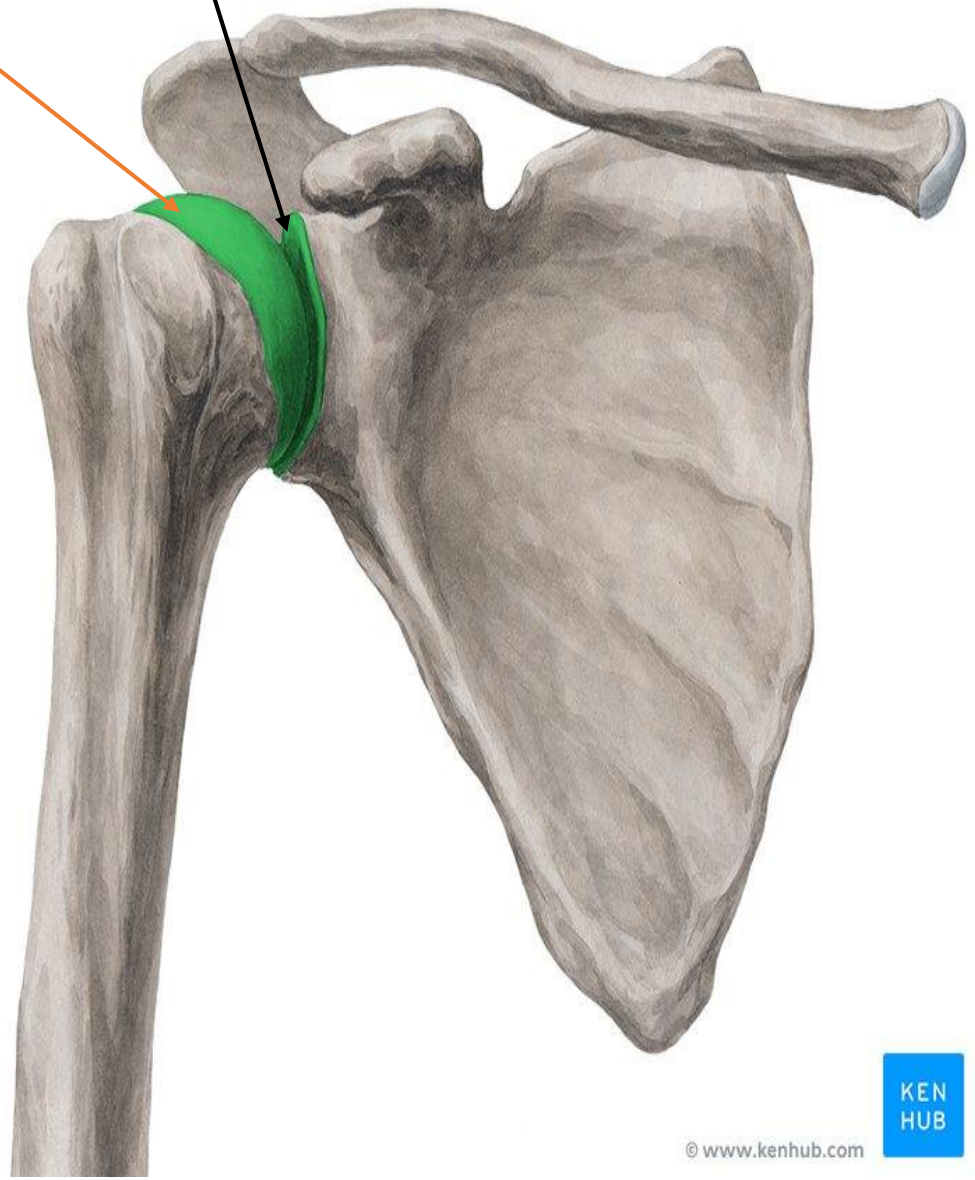
Shoulder Joint

1-Articulation:
Between the rounded head of the humerus and the shallow, pear-shaped **glenoid cavity** of the scapula.

➢ The articular surfaces are covered by hyaline articular cartilage, and the glenoid cavity is deepened by the presence of a **fibrocartilaginous** rim called the **glenoid labrum**

2-**Type:** Synovial ball-and-socket joint



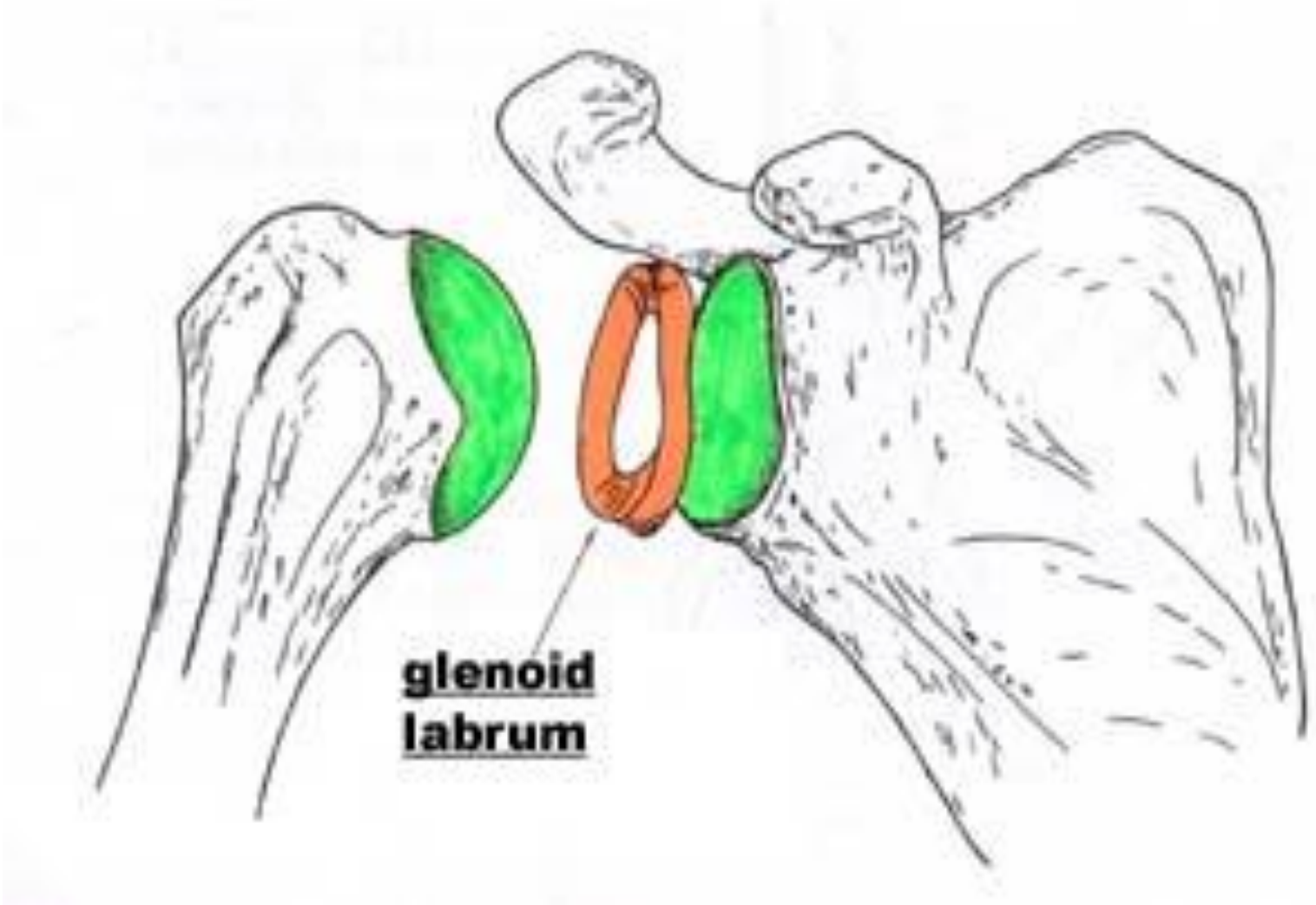


- The head of the humerus is much larger than the glenoid fossa, giving the joint inherent instability.

To reduce the disproportion in surfaces, the glenoid fossa is ***deepened and expanded*** by a fibrocartilaginous collar, called

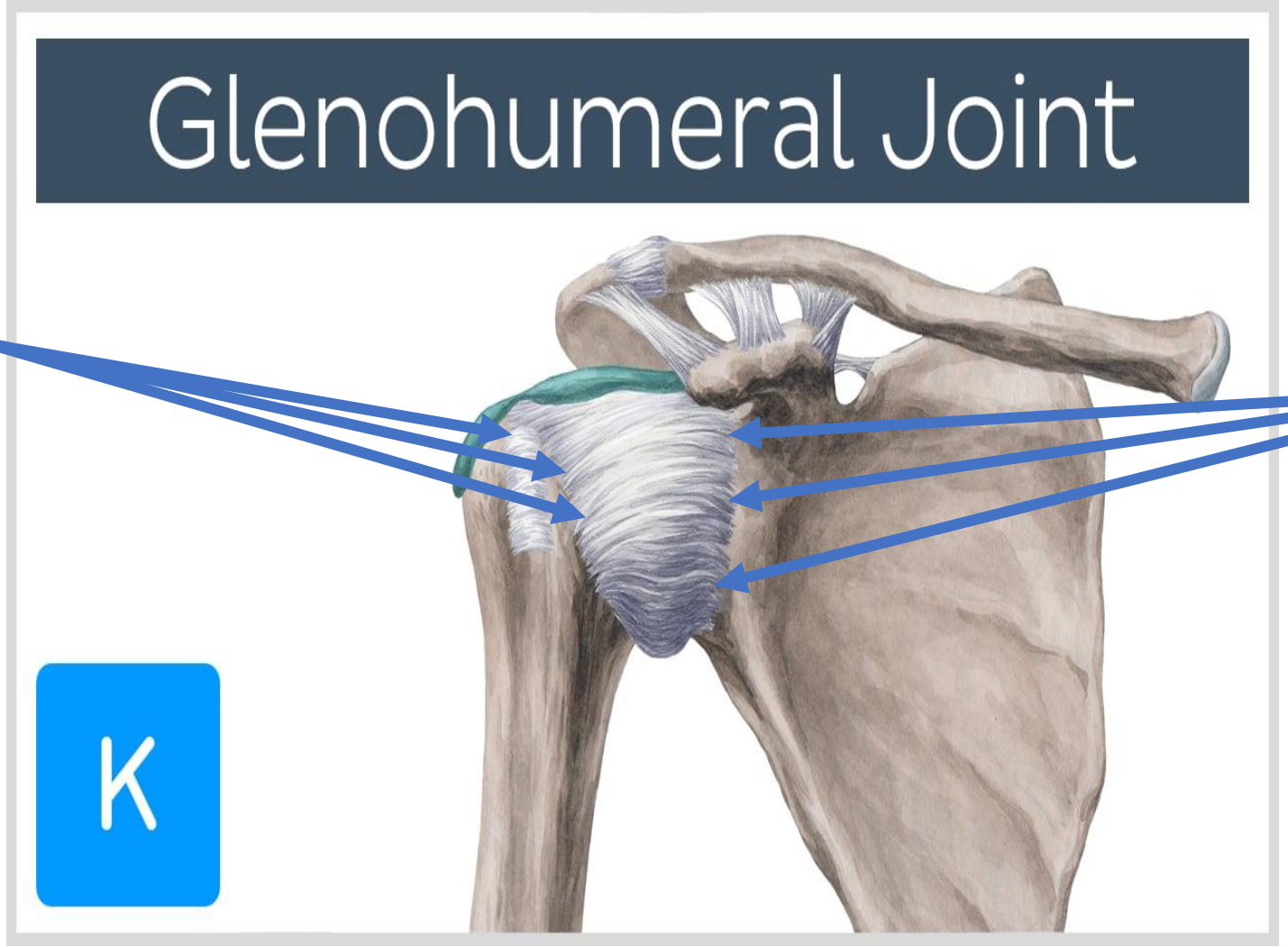
the **glenoid labrum**

which attaches to the margin of the fossa.



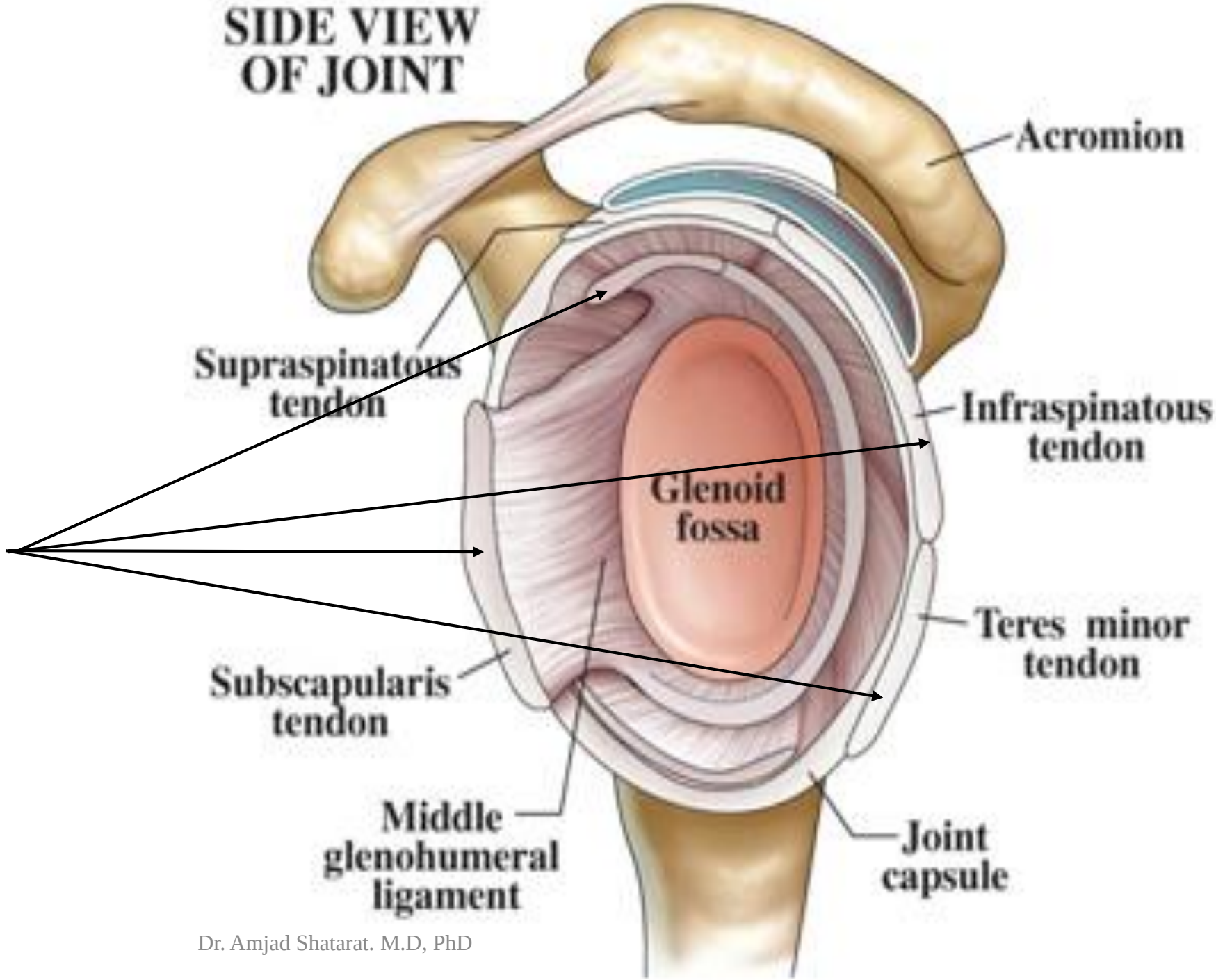
3- **Capsule:** surrounds the joint and:

- Attached laterally to the anatomic neck of the humerus



- attached medially to the margin of the glenoid cavity outside the labrum;.

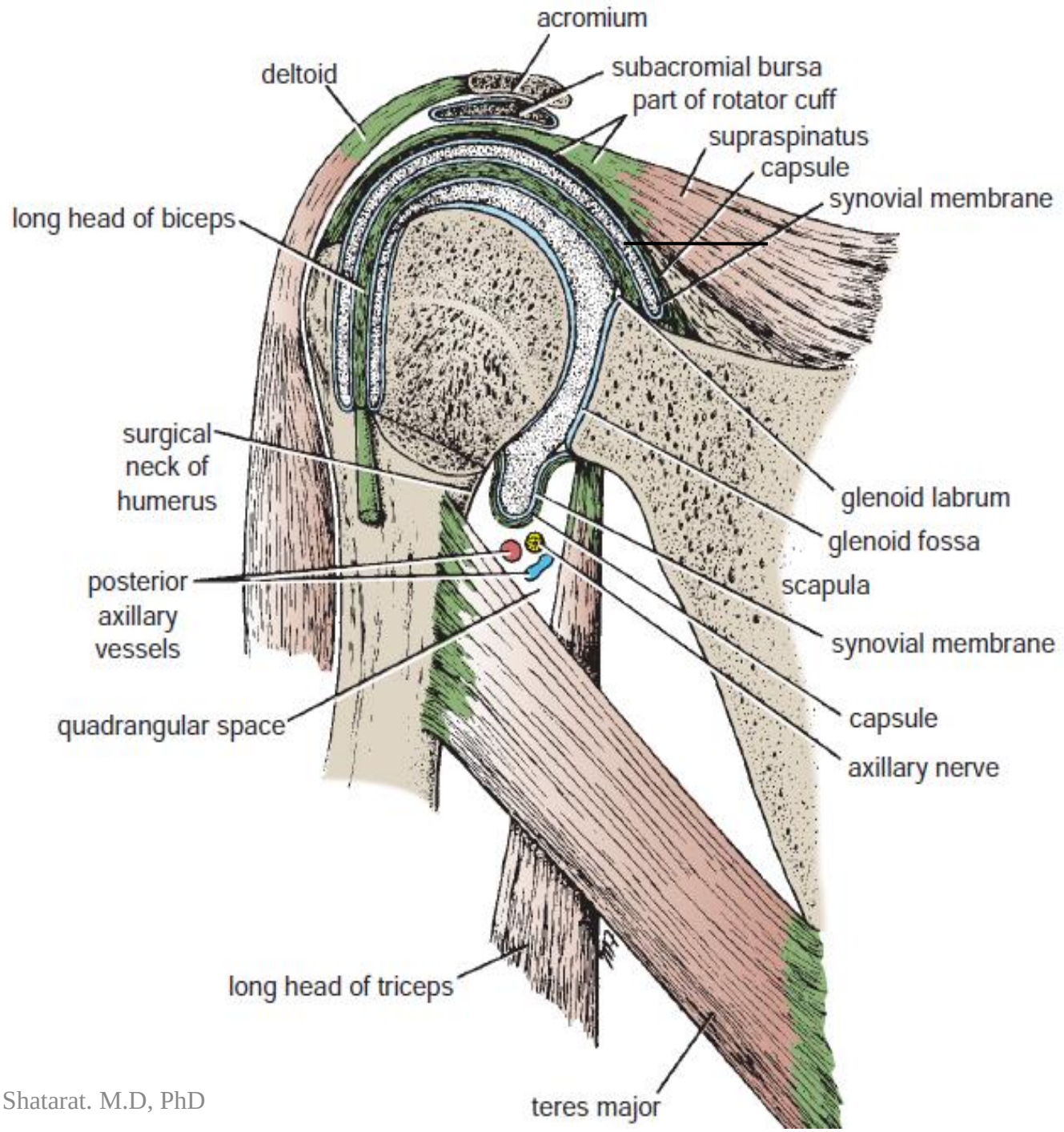
The capsule **is thin and lax,** allowing a wide range of movement.
It is strengthened by fibrous slips from the tendons of the subscapularis, supraspinatus, infraspinatus, and teres minor muscles
(**the rotator cuff muscles**)



4- Synovial membrane: This lines the capsule and is attached to the margins of the cartilage covering the articular surfaces and It forms a tubular sheath around the tendon of the long head of the biceps brachii.

READ ONLY

➢It extends through the anterior wall of the capsule to form the **subscapularis bursa beneath the** subscapularis muscle.

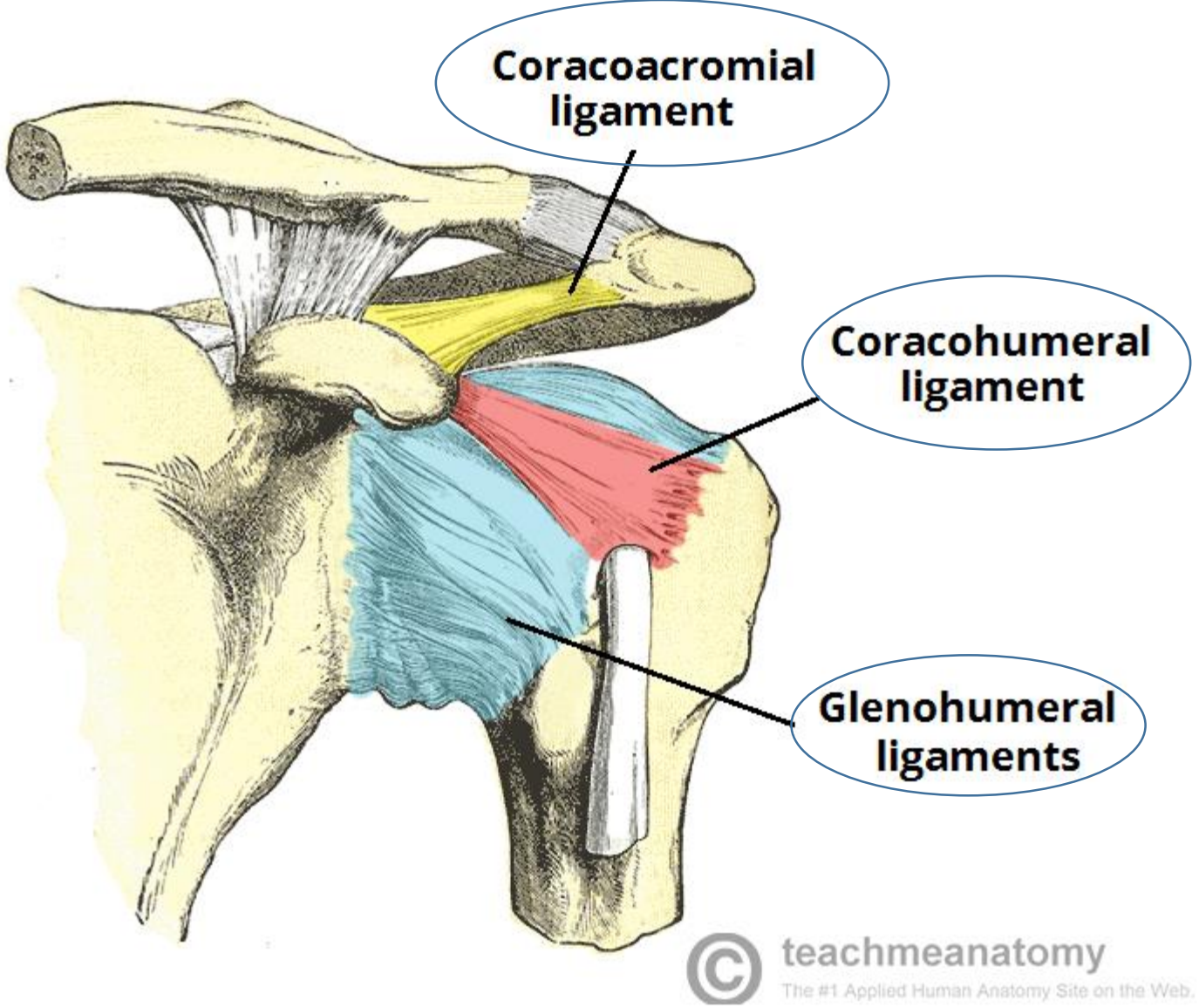


5-Ligaments

1. **The glenohumeral ligaments are three** weak bands of fibrous tissue that strengthen the front of the capsule.

2. **The transverse humeral ligament strengthens** the capsule and bridges the gap between the two tuberosities .

3. **The coracohumeral ligament** strengthens the capsule above and stretches from the root of the coracoid process to the greater tuberosity of the humerus.

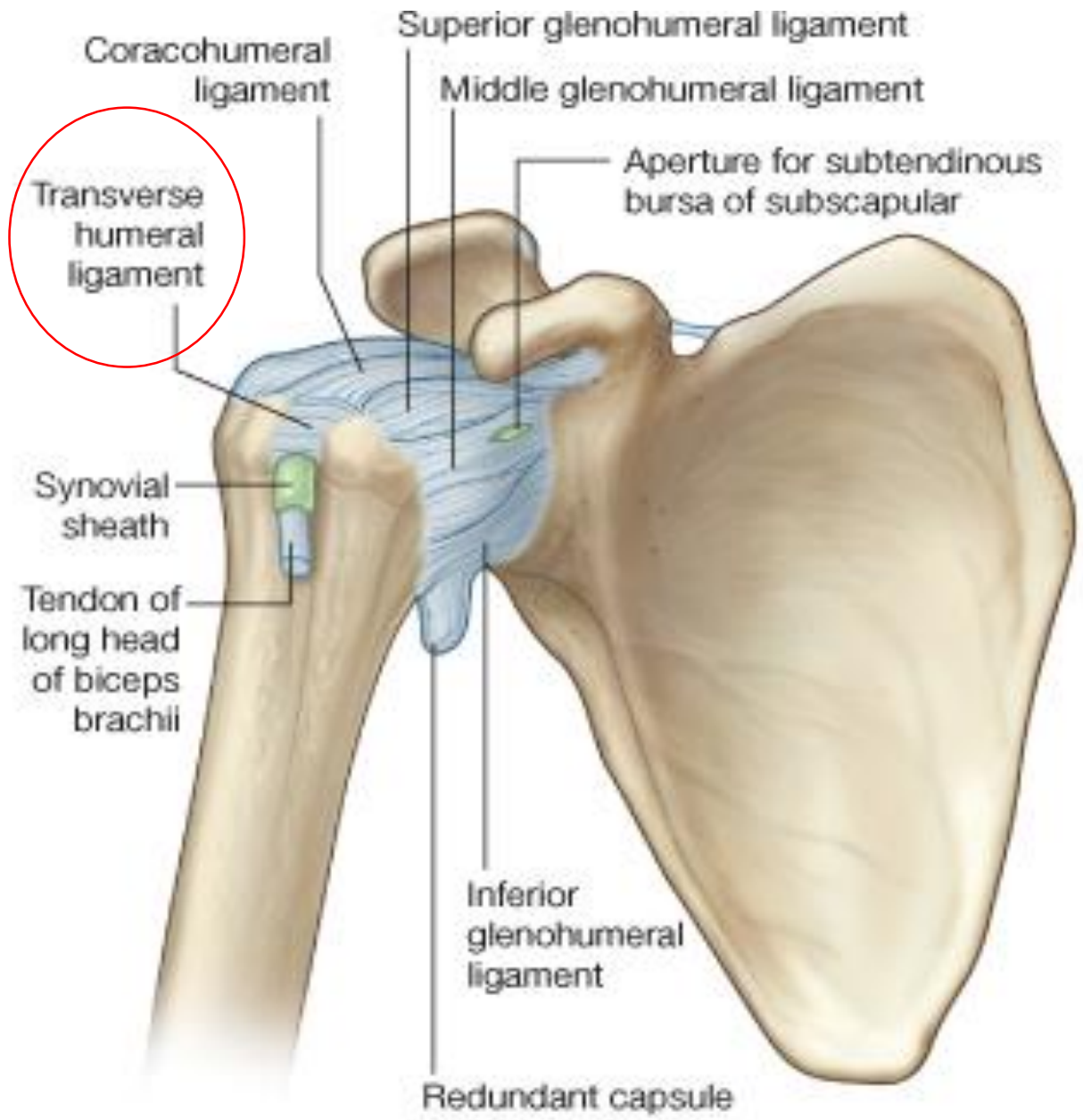


Accessory ligaments

➢**The coracoacromial ligament** extends between the coracoid process and the acromion.

➢Its function is to protect the superior aspect of the joint

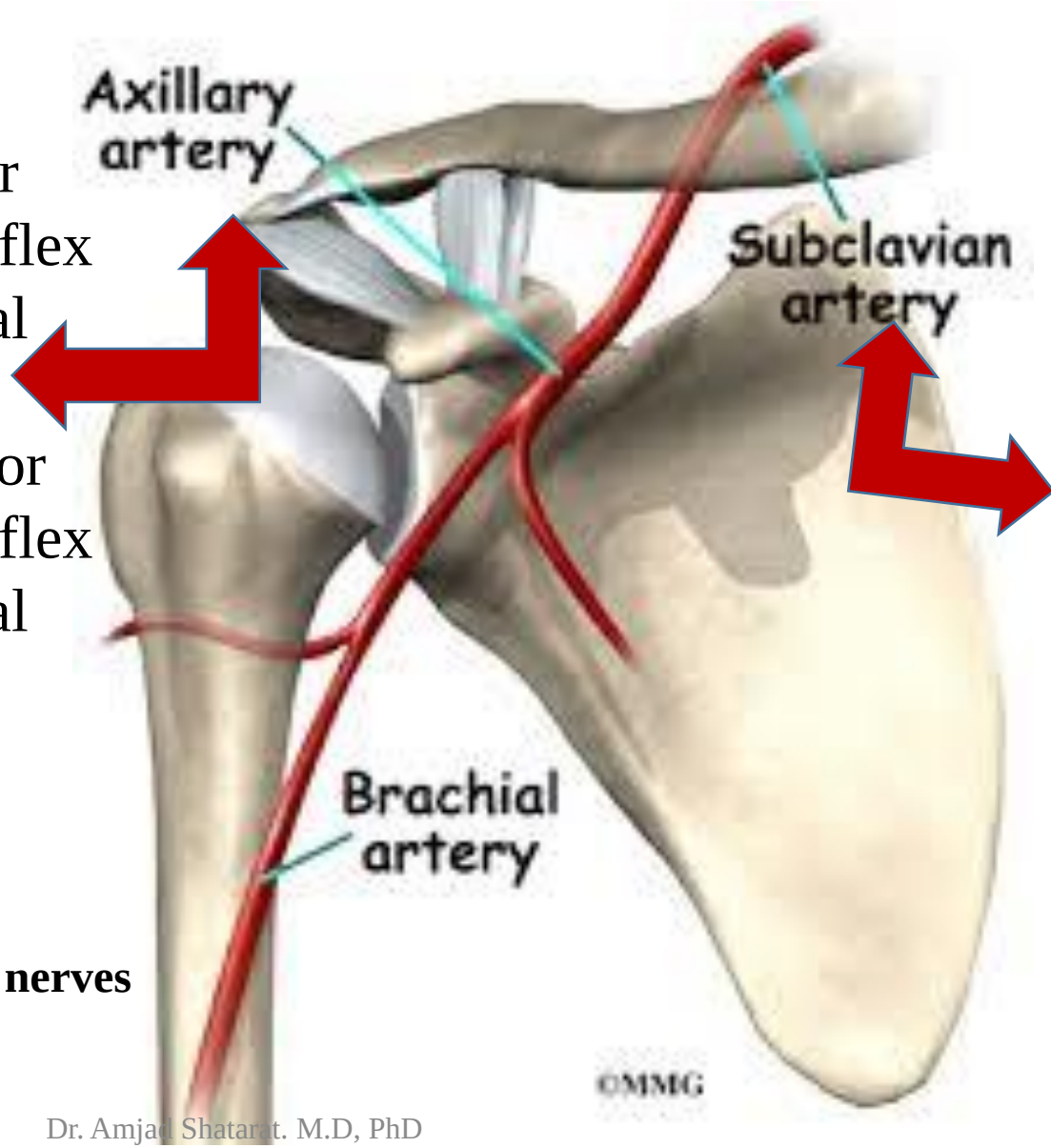
The transverse humeral ligament



6- Blood supply

❑ **<u>Blood Supply to the Shoulder Joint</u>:**
Branches of the anterior and
posterior **circumflex humeral arteries** from the axillary
❑**suprascapular artery from the subclavian.**

1. anterior circumflex humeral artery
2. posterior circumflex humeral arteriy



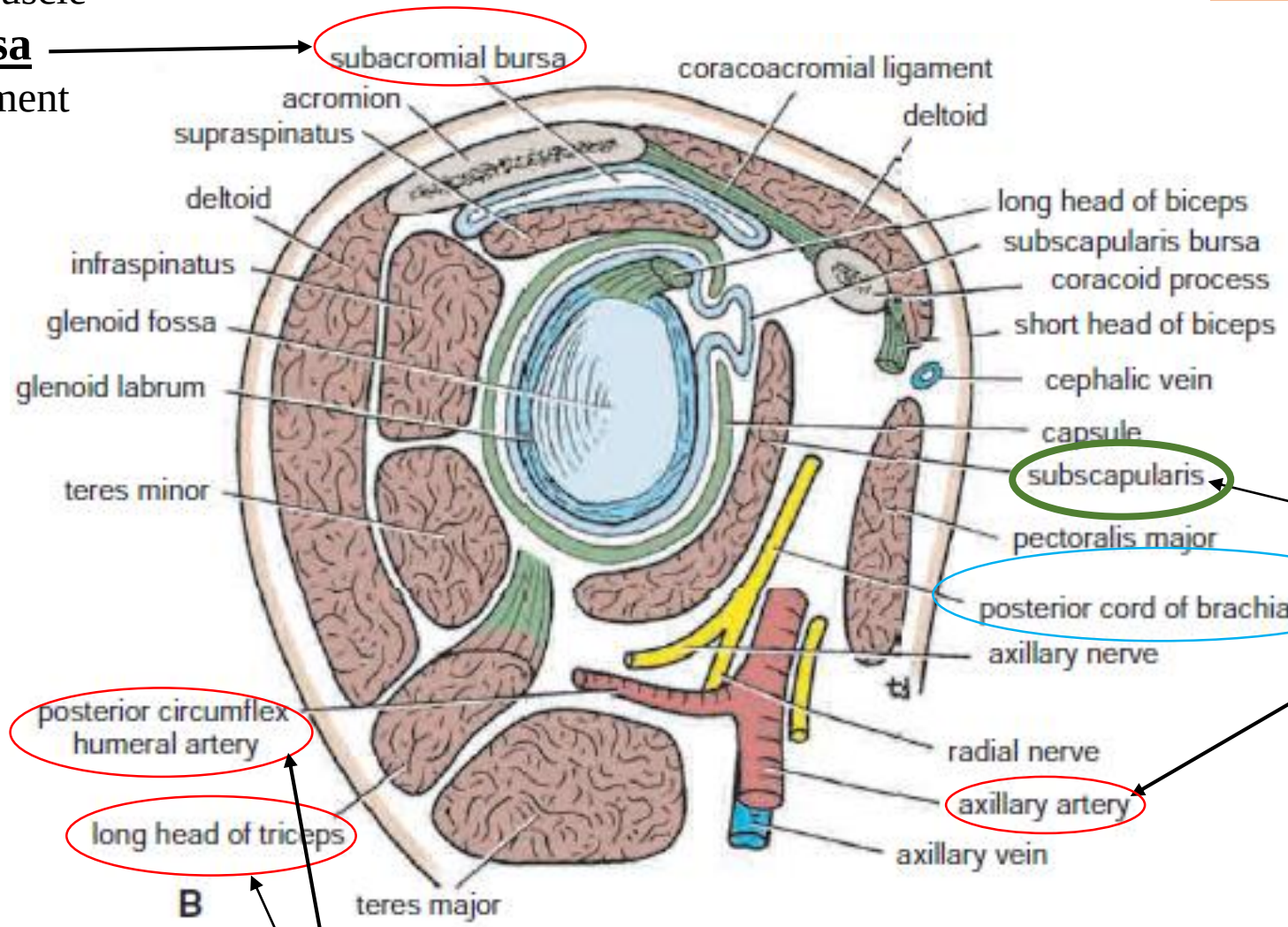
suprascapular artery

<u>7- Nerve supply</u>: The axillary and suprascapular nerves

8-Important Relations

Superior

The supraspinatus muscle
Subacromial bursa
coracoacromial ligament
deltoid muscle.



Posterior

The infraspinatus and teres minor muscles

Anterior

The subscapularis muscle
brachial plexus
The axillary vessels

The long head of the triceps muscle
the axillary nerve
the posterior circumflex humeral vessels

Inferior

9-Movements

2. Extension:

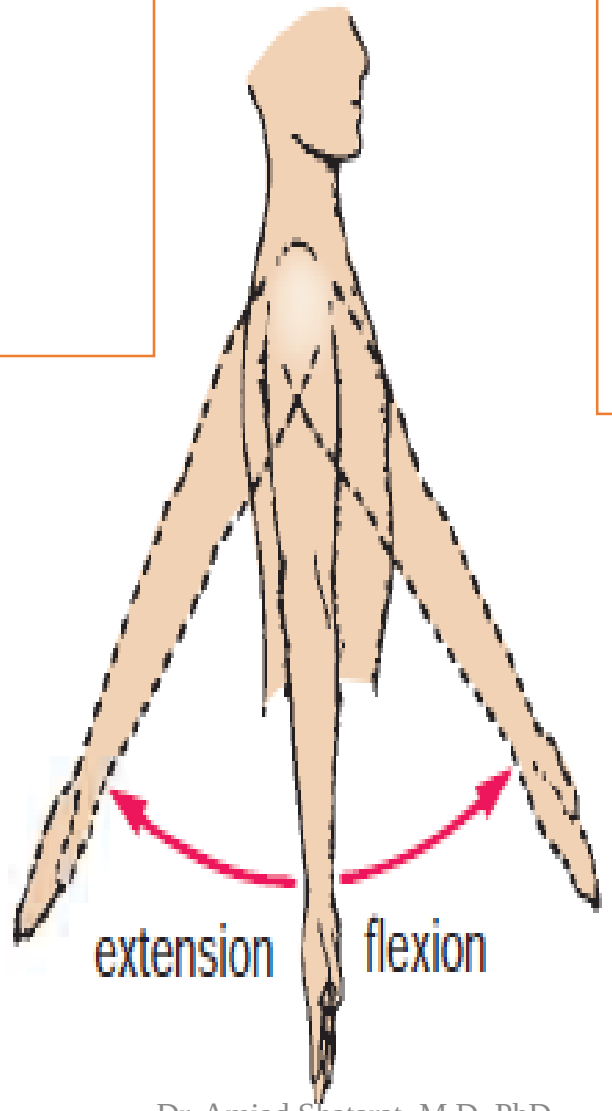
✓**Normal extension is about 45°**

is performed by:

The <u>posterior fibers of the deltoid</u>

latissimus dorsi

Teres major muscles



1. Flexion:

✓ **Normal flexion is about 90°**

is performed by

✓ The anterior fibers of the deltoid

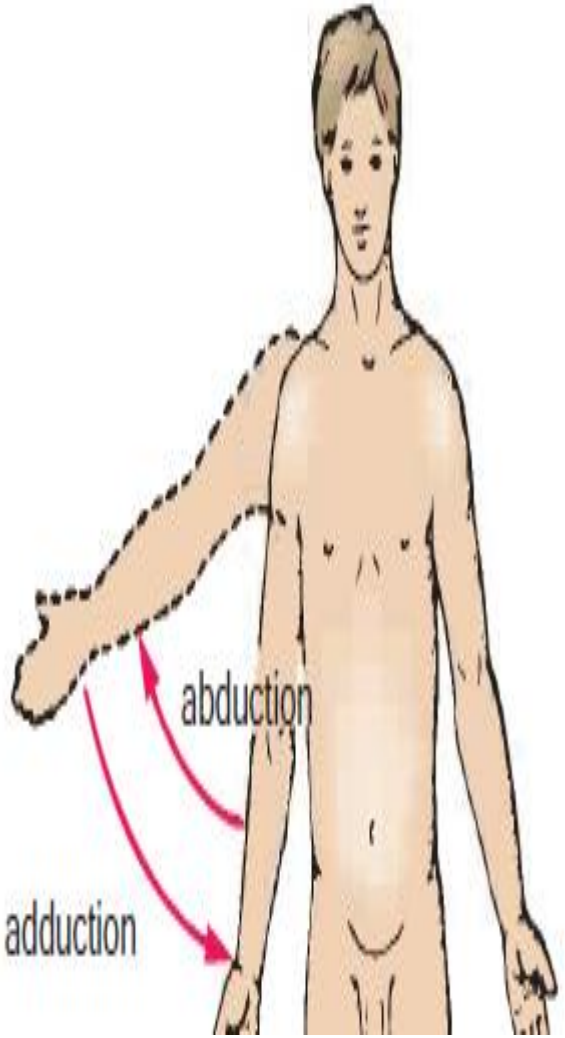
✓ Pectoralis major (clavicular head)

✓ Biceps

✓ coracobrachialis muscles.

3. Abduction: Abduction of the upper limb occurs both at the shoulder joint and between the scapula and the thoracic wall (scapular-humeral mechanism)

- **The middle fibers of the deltoid**, assisted by the supraspinatus, are involved.
- **The supraspinatus muscle** initiates the movement of abduction and holds the head of the humerus against the glenoid fossa of the scapula;
- This latter function allows the deltoid muscle to contract and abduct the humerus at the shoulder joint.



4. Adduction:

✓ **Normally, the upper limb can be swung** 45° across the front of the chest.

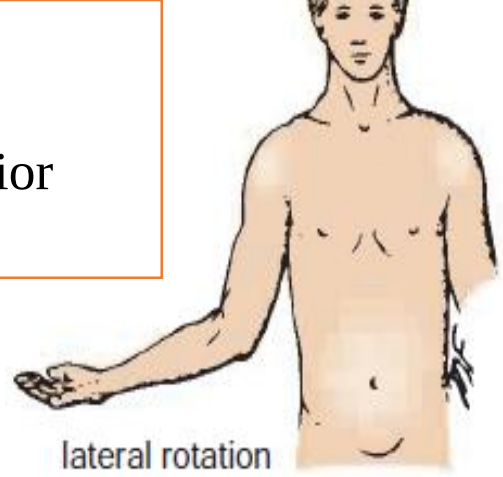
✓ This is performed by

✓the pectoralis major, latissimus dorsi, teres major, and teres minor muscles.

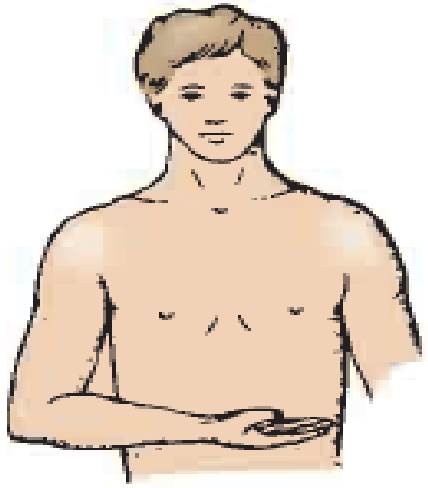
5. Lateral rotation:

✓ **Normal lateral rotation is 40° to** 45°.

✓This is performed by the infraspinatus, the teres minor, and the posterior fibers of the deltoid muscle.



lateral rotation



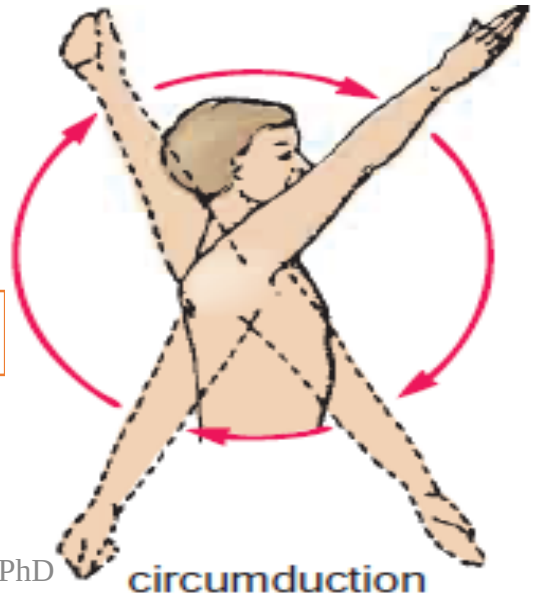
medial rotation

6.Medial rotation:

✓**Normal medial rotation is about** 55°.

✓This is performed by the subscapularis, the latissimus dorsi, the teres major, and the anterior fibers of the deltoid muscle.

7. Circumduction : combination of movements.



circumduction

10-Factors that contribute to mobility:

1. Bony surfaces – shallow glenoid cavity and large humeral head
2. laxity of the joint capsule.

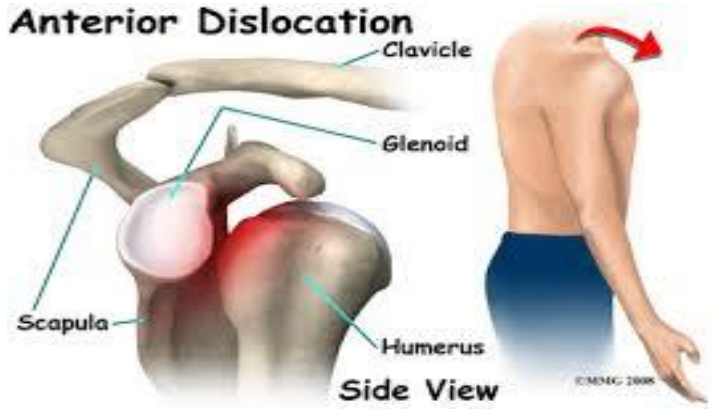
Factors that contribute to stability:

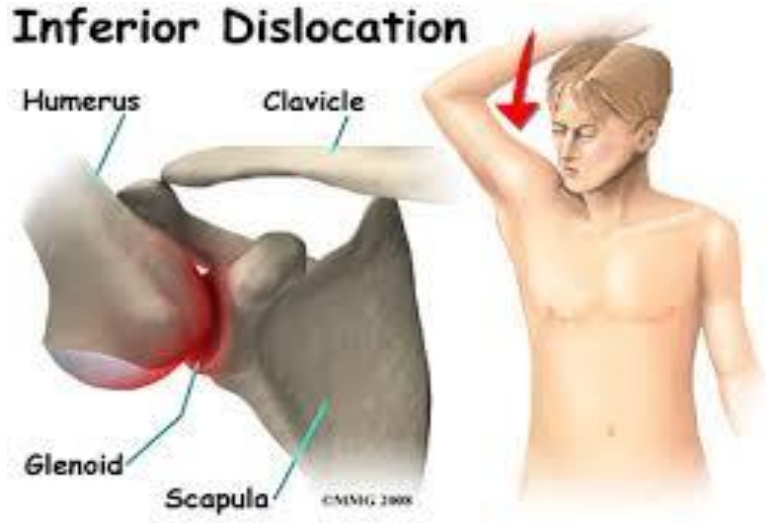
1. **Rotator cuff muscles**
2. **Glenoid labrum**
3. Ligaments
4. Biceps tendon

11-Clinical notes

Highly mobile joint easily dislocated joint

Dislocations of the Shoulder Joint
The shoulder joint is the most commonly dislocated large joint.

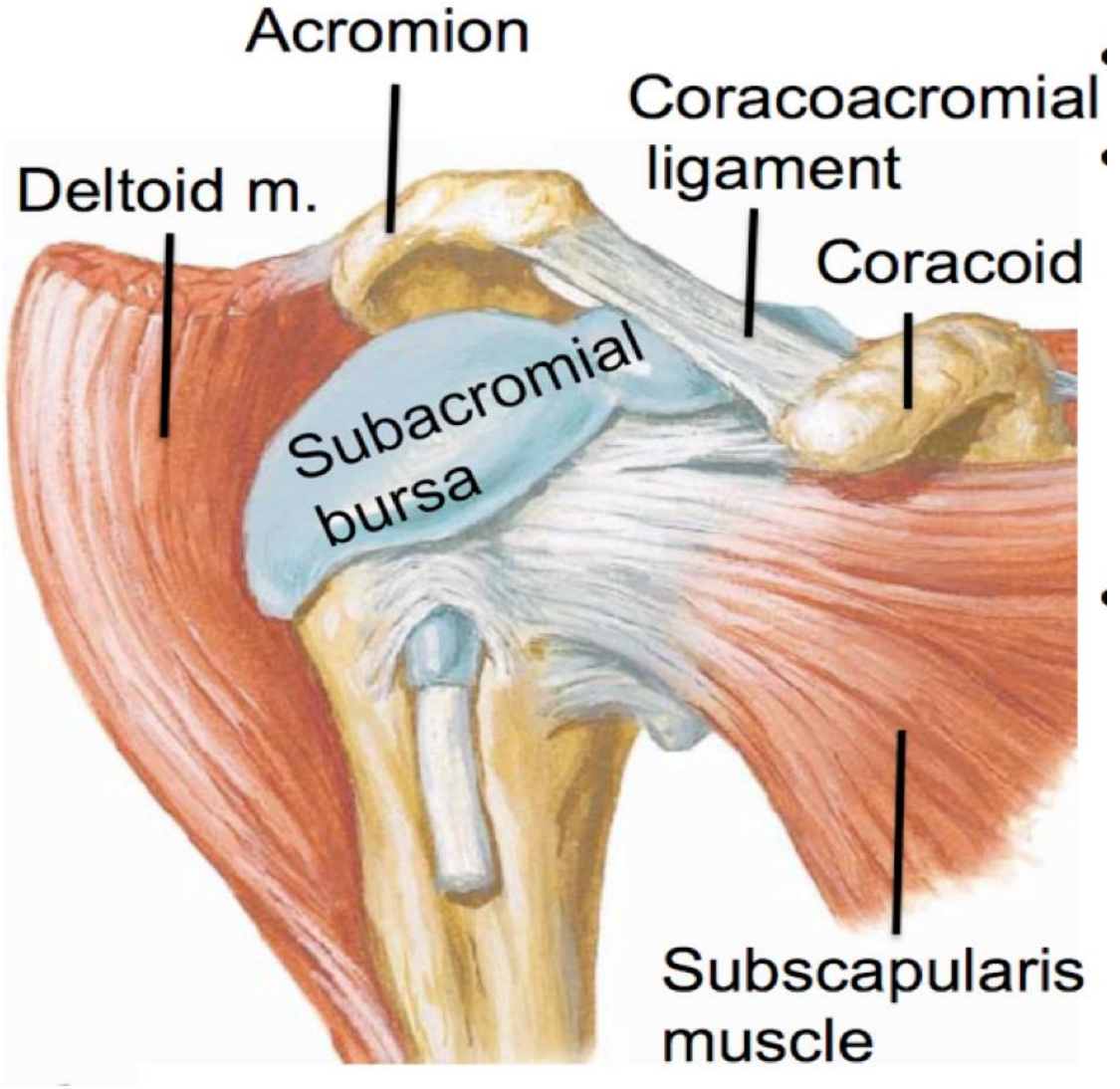




important

Subacromial Bursae

- Located inferiorly to the deltoid and acromion, and superiorly to the supraspinatus tendon and the joint capsule.
- It supports the deltoid and supraspinatus muscles.
- Inflammation of this bursa is the cause of several shoulder problems.
- Inflammation of this bursa is usually a result of injury to surrounding structures, most commonly the rotator cuff.
- Bursitis around the shoulder can be caused by a repeated minor trauma such as overuse of the shoulder joint and muscles or a single more significant trauma such as a fall.



In subacromial bursitis,

pressure over the deltoid below the acromion with the arm by side causes pain. However, when the arm

Is abducted pressure over the same point causes no pain , because the bursa disappears under the acromion **(Dawbarn's sign).**

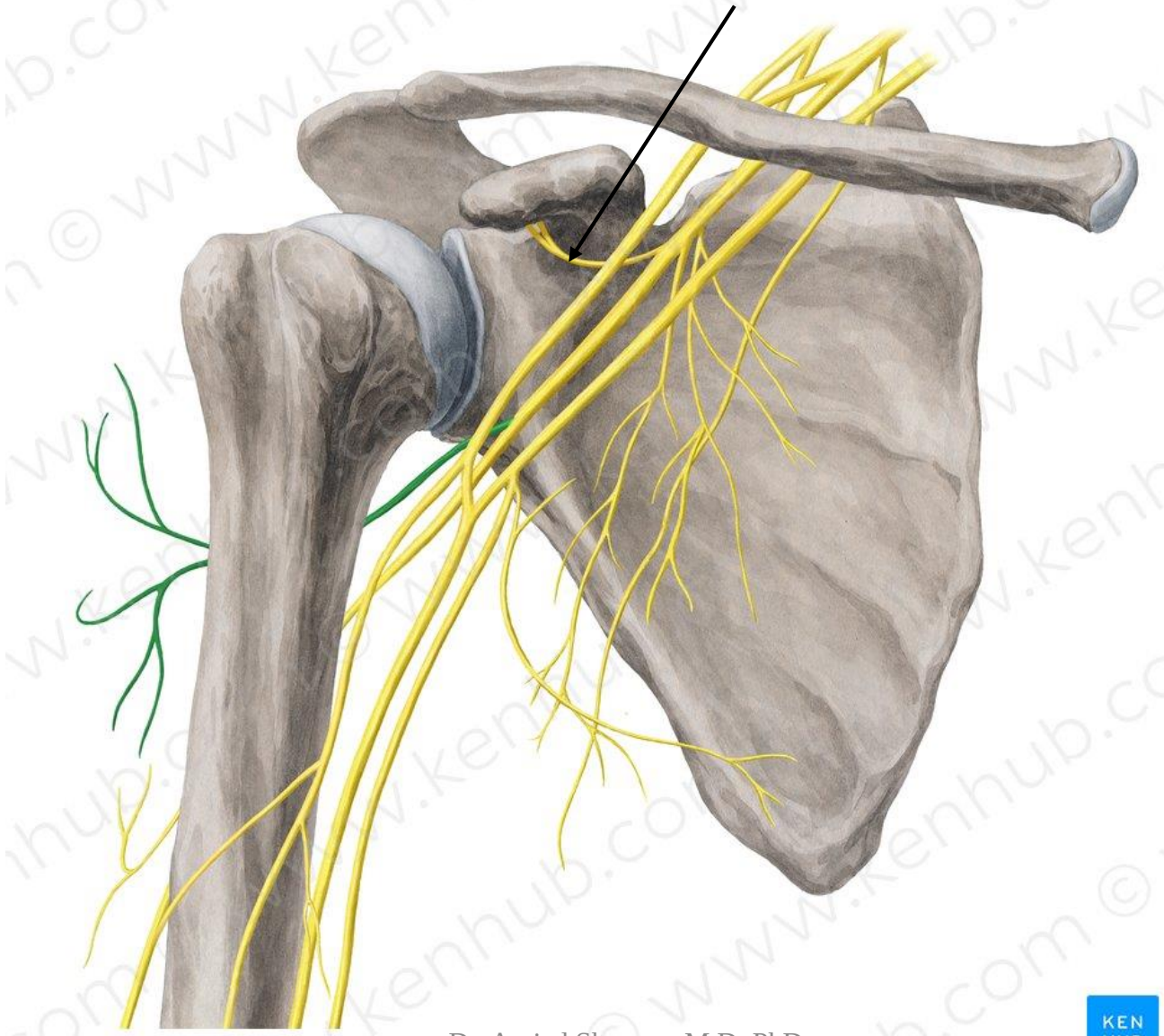
Subacromial or subdeltiod bursitis is usually secondary to inflammation of the supraspinatus tendon

Recommended videos

https://youtu.be/VcCAHbiEcZo

https://youtu.be/xn-c2goYzLE

11-How **the suprascapular nerve** reaches the Supraspinous fossa ?

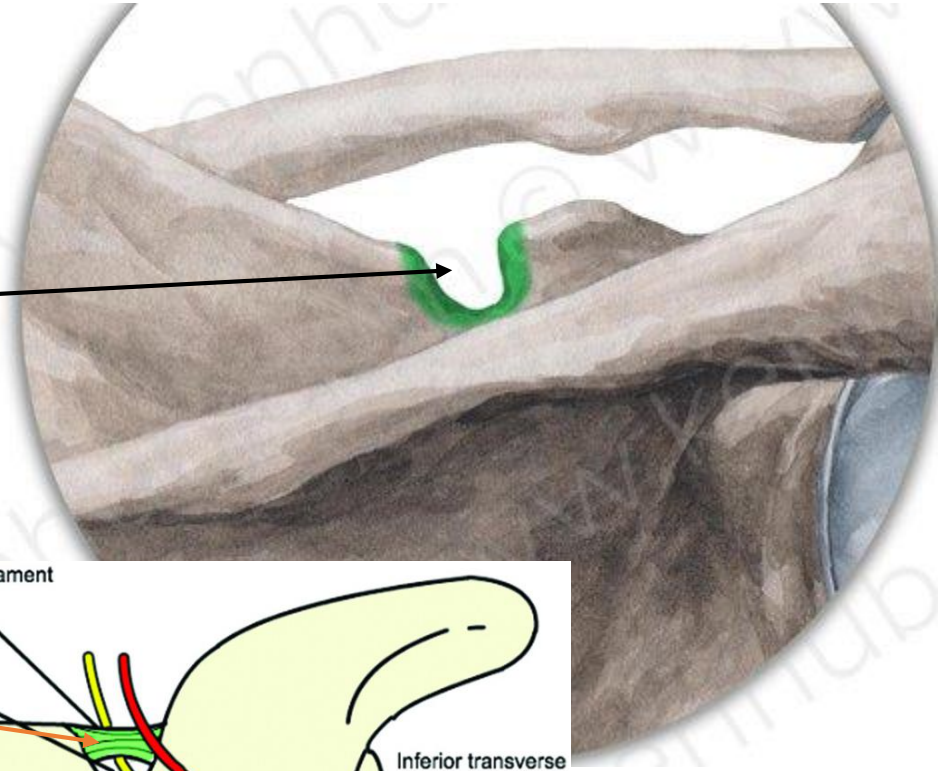


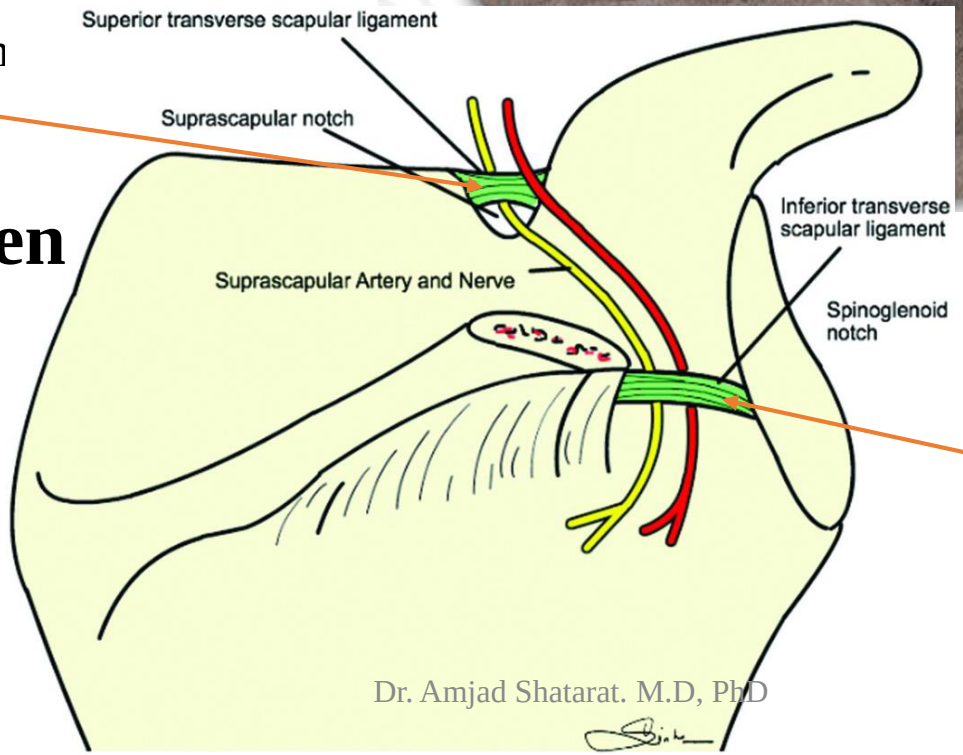
Through → Gateways to the posterior scapular region

Suprascapular foramen

It is formed by the suprascapular **notch of the scapula and the superior transverse scapular ligament**, which converts th notch into

Suprascapular foramen



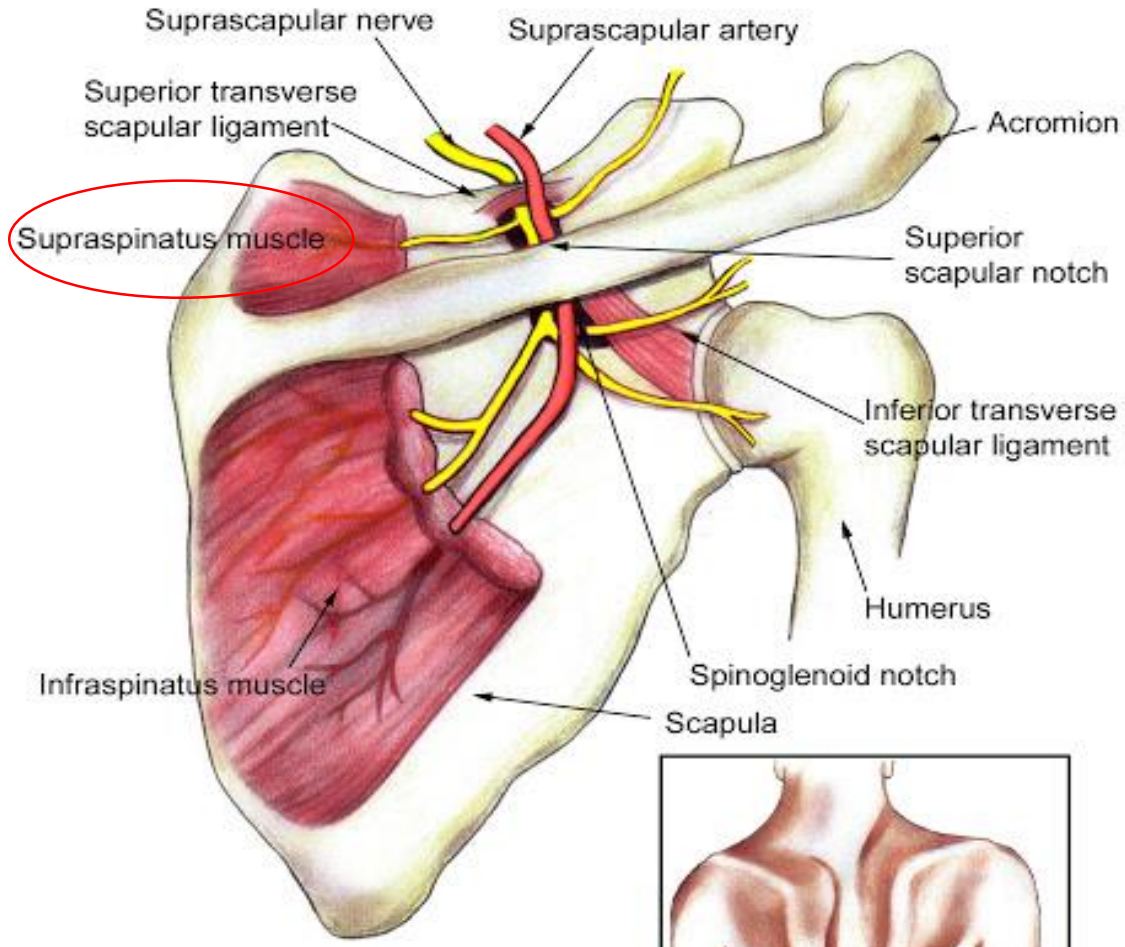


In nearly 50% of humans there is a thick ligament—the inferior transverse scapular (spinoglenoid) ligament

Sometimes the ligament is ossified!!!

Gateways to the posterior scapular region

- The Suprascapular foramen is the route through which structures pass between ***the base of the neck and the posterior scapular region.***



- It Serves for the passage of

the suprascapular nerve

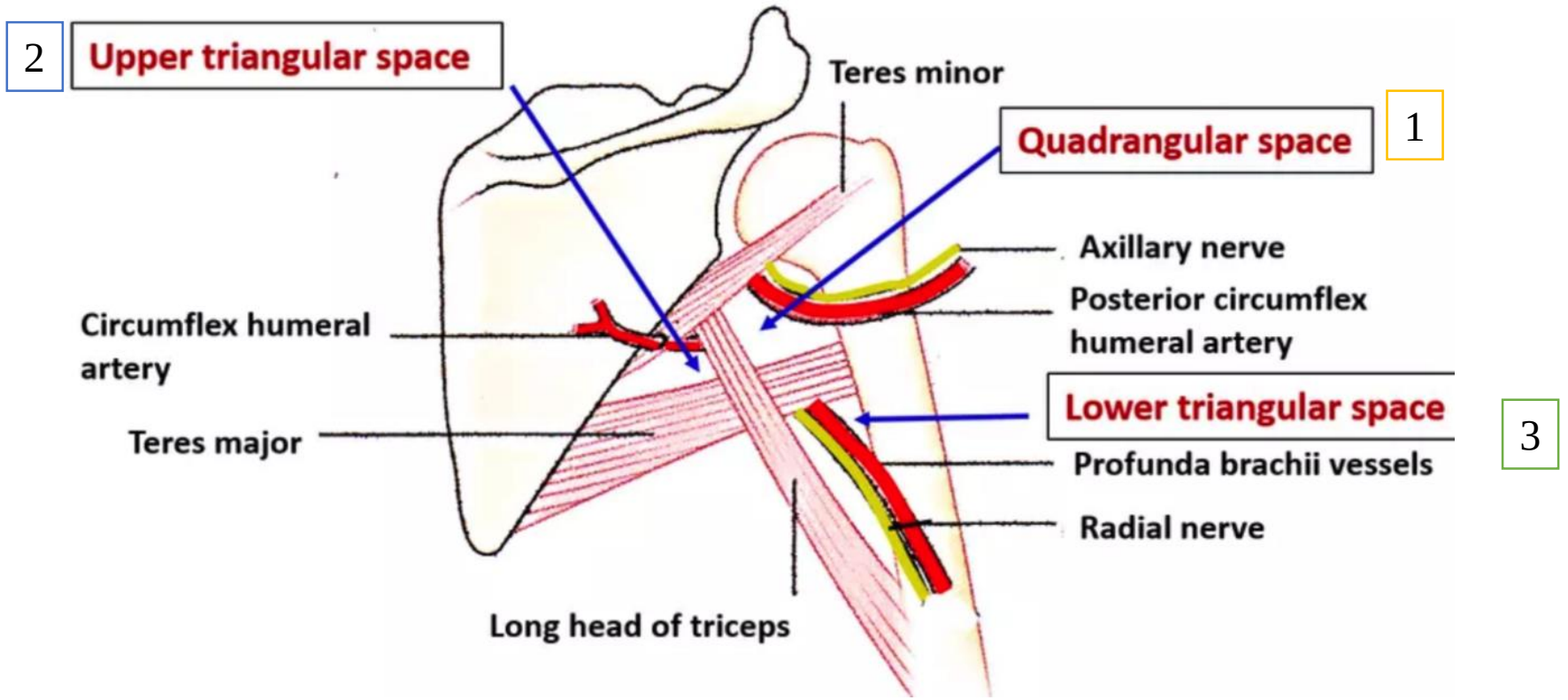
- (but not suprascapular artery and vein)

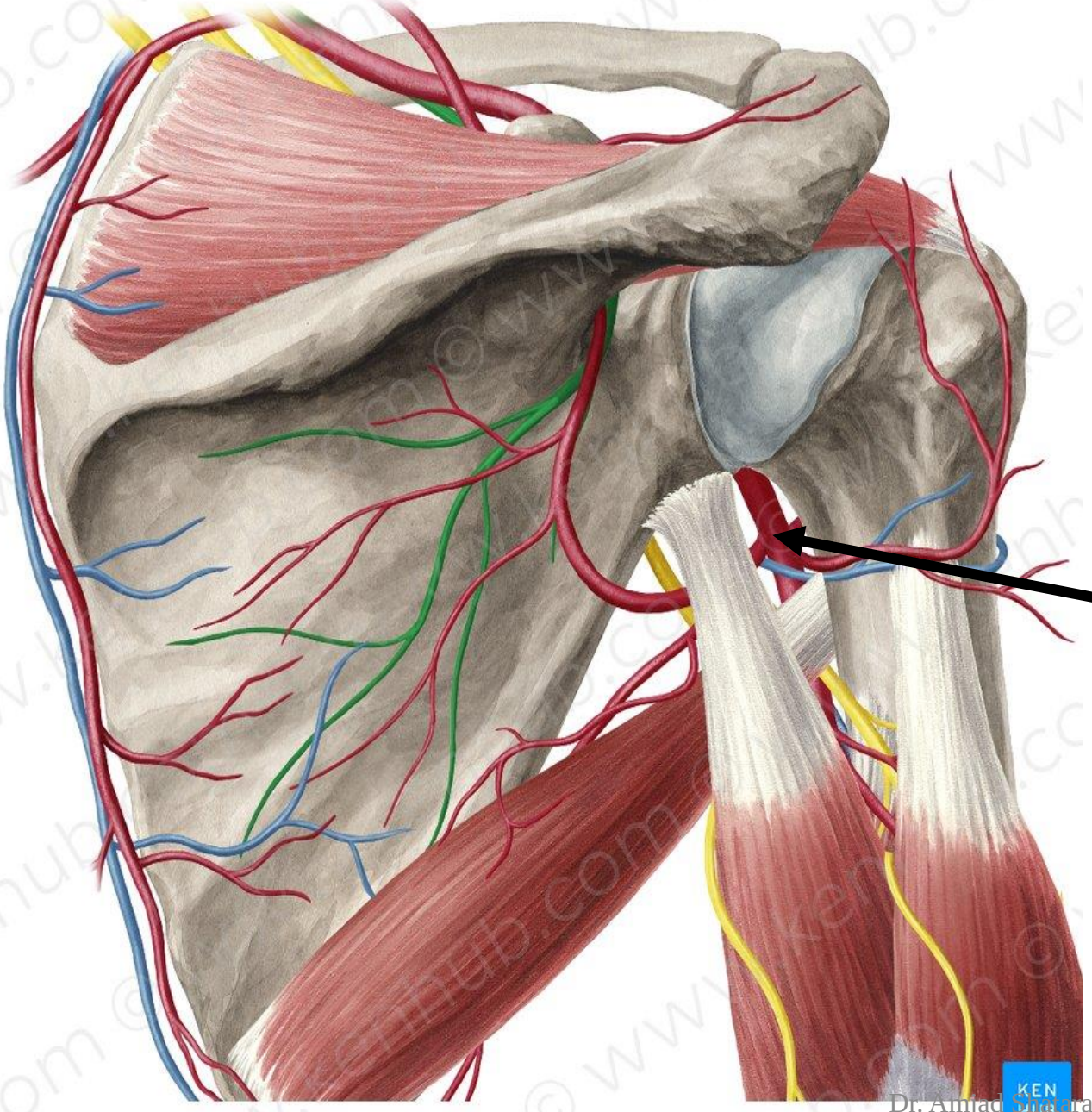
The suprascapular artery and vein travels ***superiorly to the superior transverse ligament***

They (the suprascapular nerve, artery and the vein) supply the Supraspinatus muscle then they all;
The suprascapular nerve, artery and the vein run between the ligament and the base of the scapular spine to distribute motor branches deep **to the infraspinatus.**

12-How the Axillary nerve and posterior circumflex humeral artery and other structures pass from the axilla to the scapular region?

Three gates



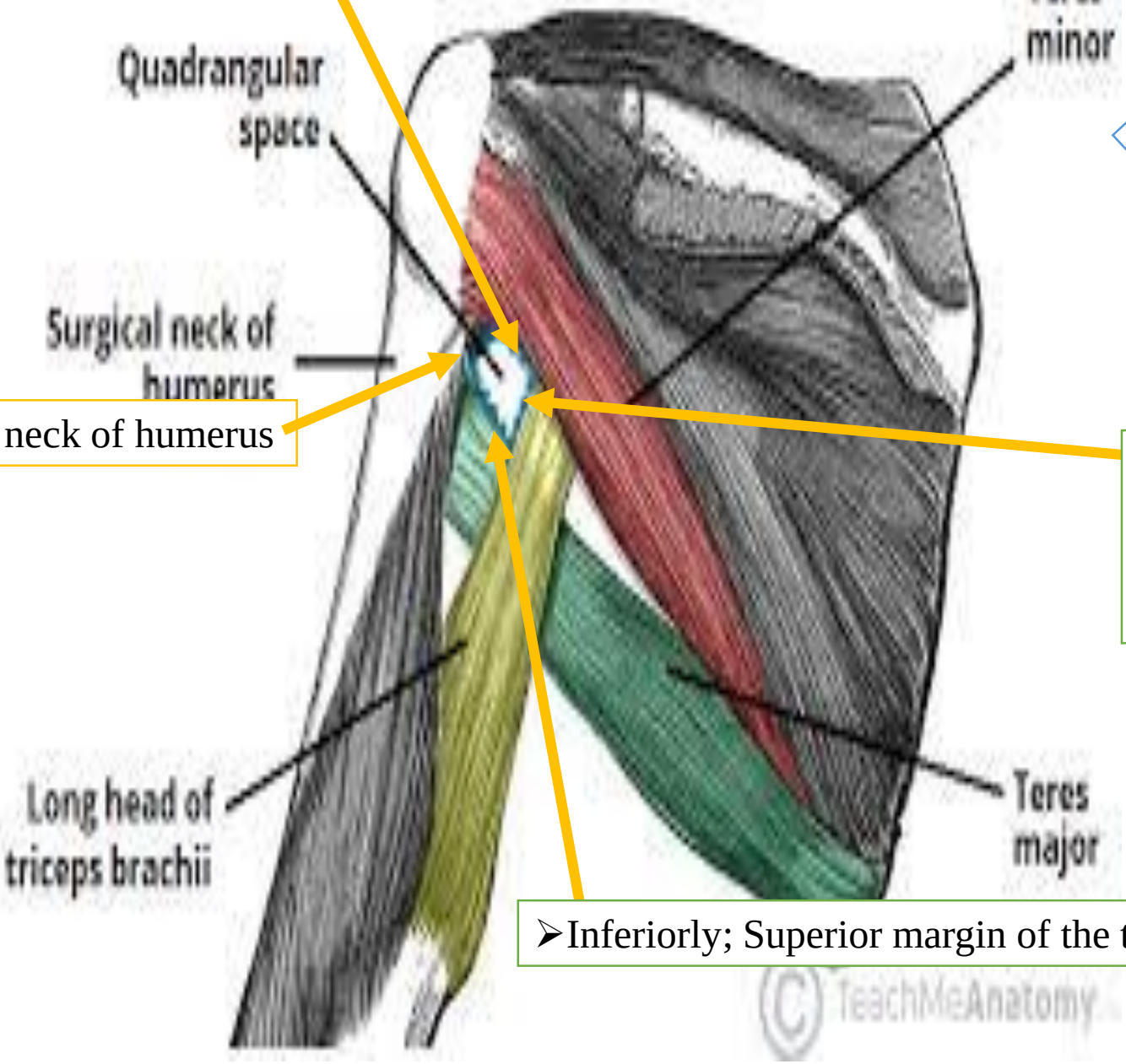


Quadrangular space

Provides a passageway for the nerves and vessels passing between more anterior regions and the posterior scapular region.
(Axillary nerve and posterior circumflex humeral artery will pass through this space)

- Boundaries of Quadrangular space

Superiorly; Inferior margin of the teres minor



Laterally; Surgical neck of humerus

Medially; Lateral margin of the long head of triceps brachii

➢Inferiorly; Superior margin of the teres major

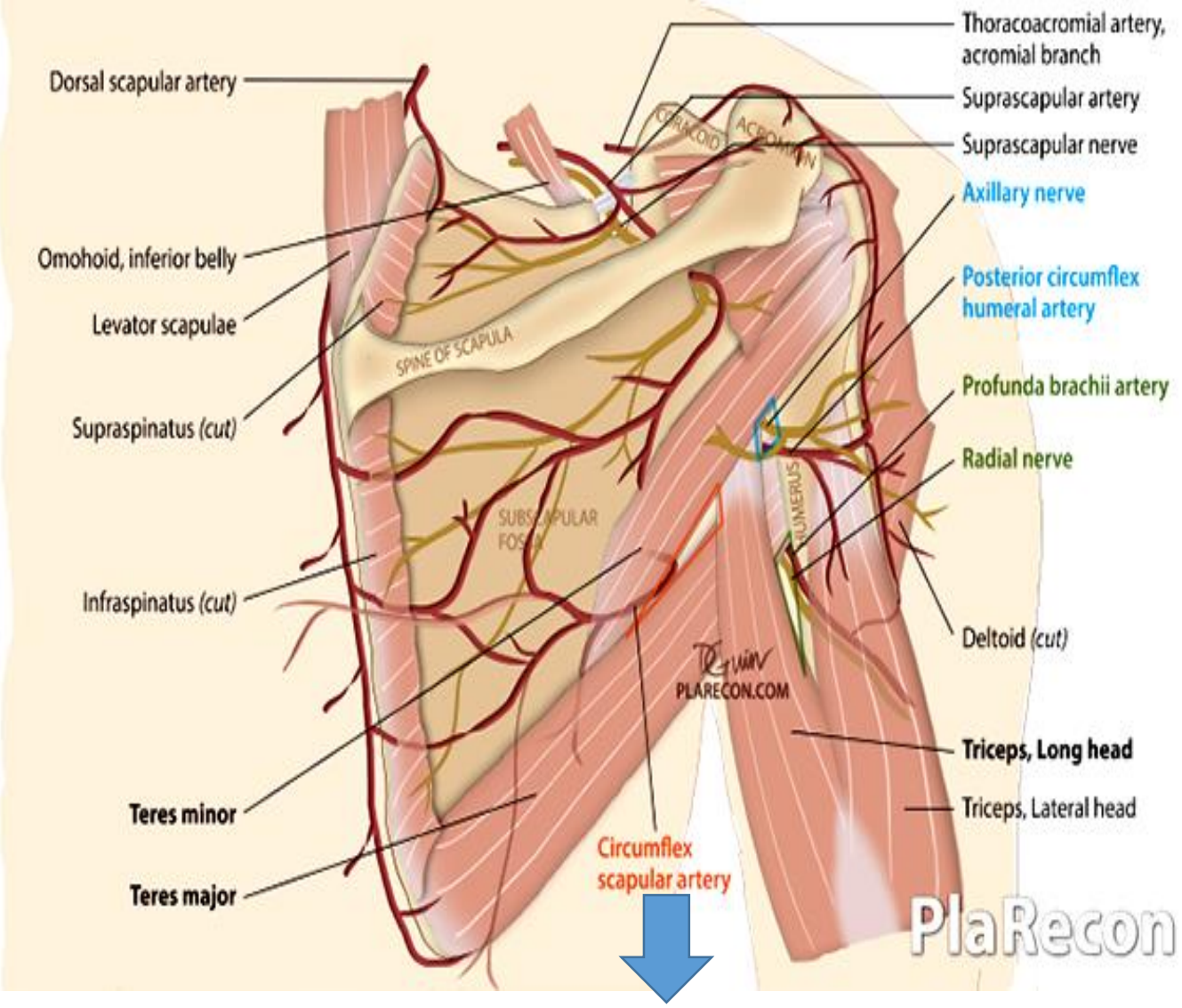
Triangular Space

- Is an area of communication between the axilla and the posterior scapular region.
- *The circumflex scapular artery and vein pass through this gap*
- When viewed from the posterior scapular region, it is formed by :

➢Medial margin of the long head of triceps brachii

➢Superior margin of the teres major

➢Inferior margin of the teres minor



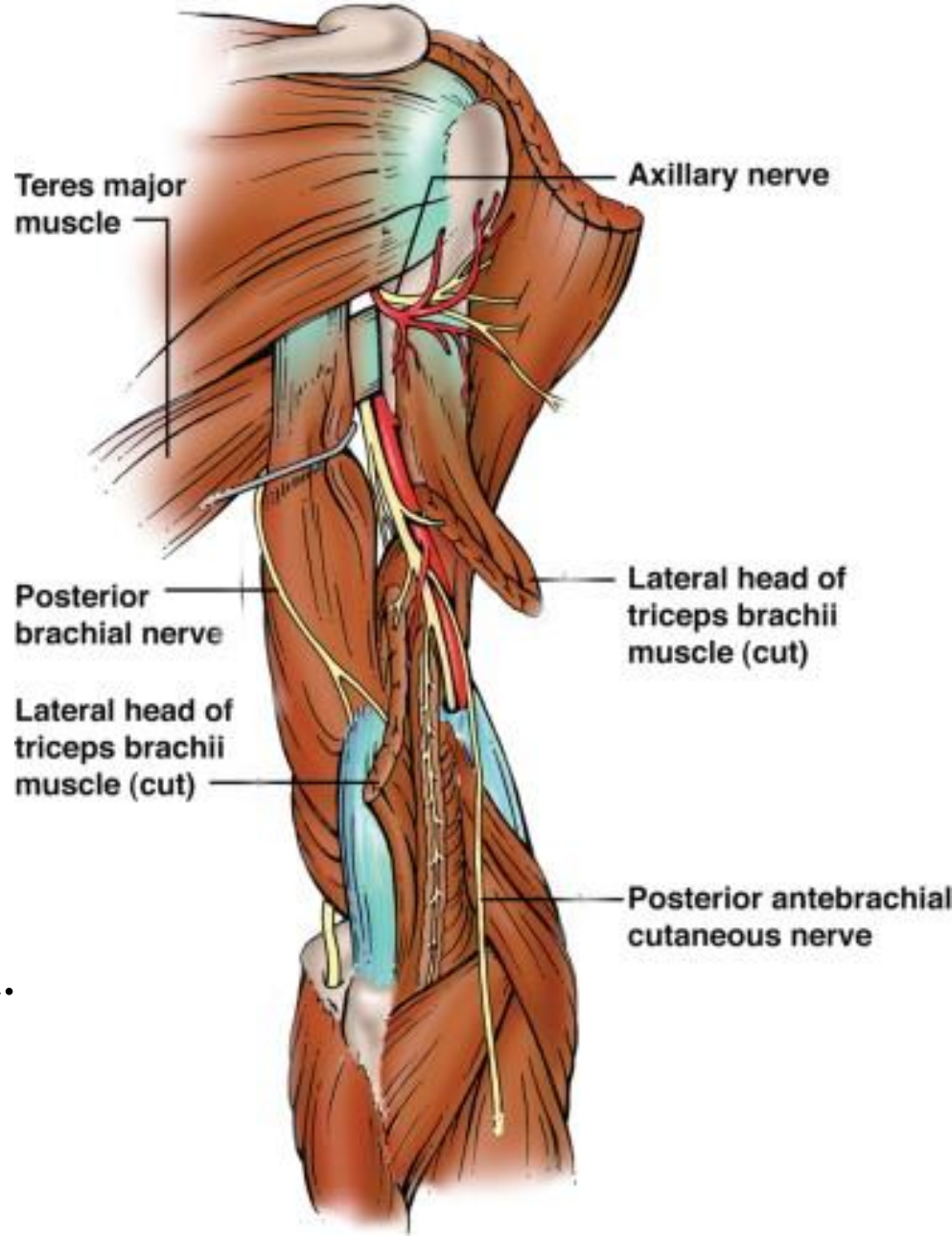
The circumflex scapular artery is the largest terminal branch of the subscapular artery. It courses through the posterior aspect of the shoulder, within the infraspinous fossa of the scapula.

Triangular Interval

- It is formed by:

- The lateral margin of the long head of triceps brachii
- The shaft of the humerus
- The inferior margin of the teres major

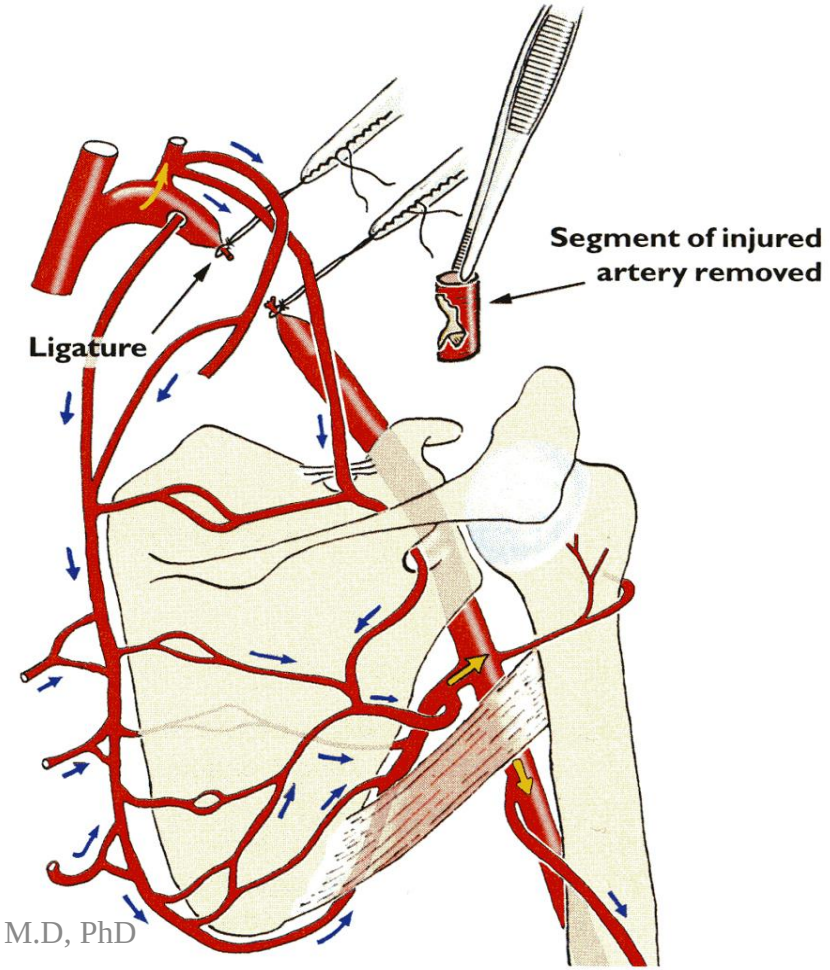
- This space is just below the inferior margin of the teres major and defines the inferior boundary of the axilla, the triangular interval serves as a passageway between the anterior and posterior compartments of the arm and axilla.
- The radial nerve, the **profunda brachii artery (deep artery of the arm) and associated veins pass through here.**

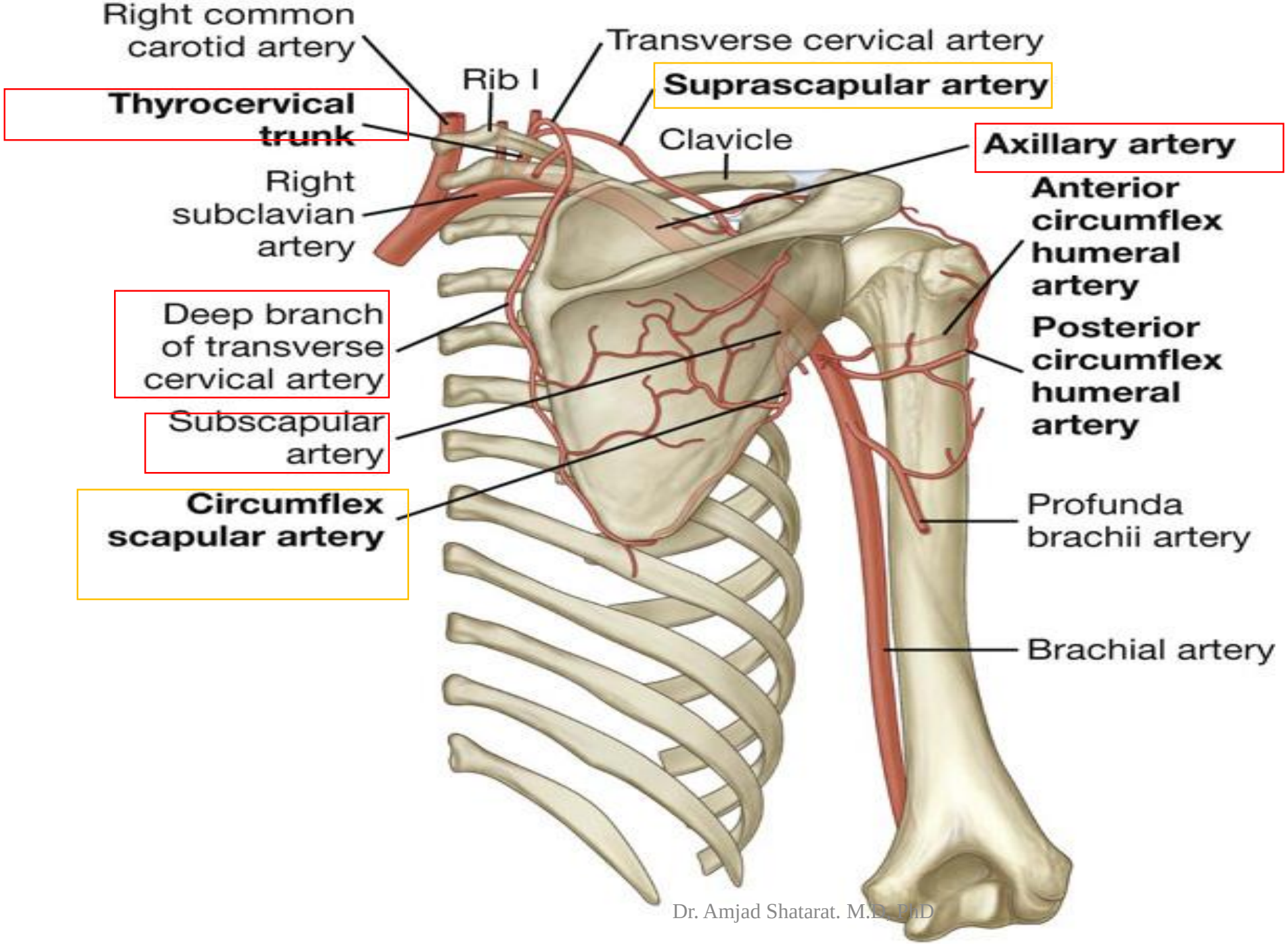



Teres Minor
Quadrangular Space
Triangular Space
Teres Major
Triceps (long head)
Triceps Hiatus
HUMERUS

13-Arterial Anastomosis and Ligation of the Axillary Artery

- The existence of the anastomosis around the shoulder joint is vital to preserving the upper limb should it be necessary to ligate the axillary artery.




Right common carotid artery
Transverse cervical artery
Rib I
Suprascapular artery
Thyrocervical trunk
Clavicle
Axillary artery
Right subclavian artery
Anterior circumflex humeral artery
Posterior circumflex humeral artery
Deep branch of transverse cervical artery
Subscapular artery
Circumflex scapular artery
Profunda brachii artery
Brachial artery