The upper limb

ANATOMY OF THE UPPER LIMB

1- Bones of the upper limb.

2- Muscles of the upper limb.

3- Vesseles of the upper limb.

4- Nerves of the upper limb.

5- Joints of the upper limb.

❖The upper limb is a multijointed lever that is freely movable on the trunk at the shoulder joint.

❖At the distal end of the upper limb is the important organ, the hand. Much of the importance of the hand depends on the pincerlike action of the thumb, which enables one to grasp objects between the thumb and index finger.

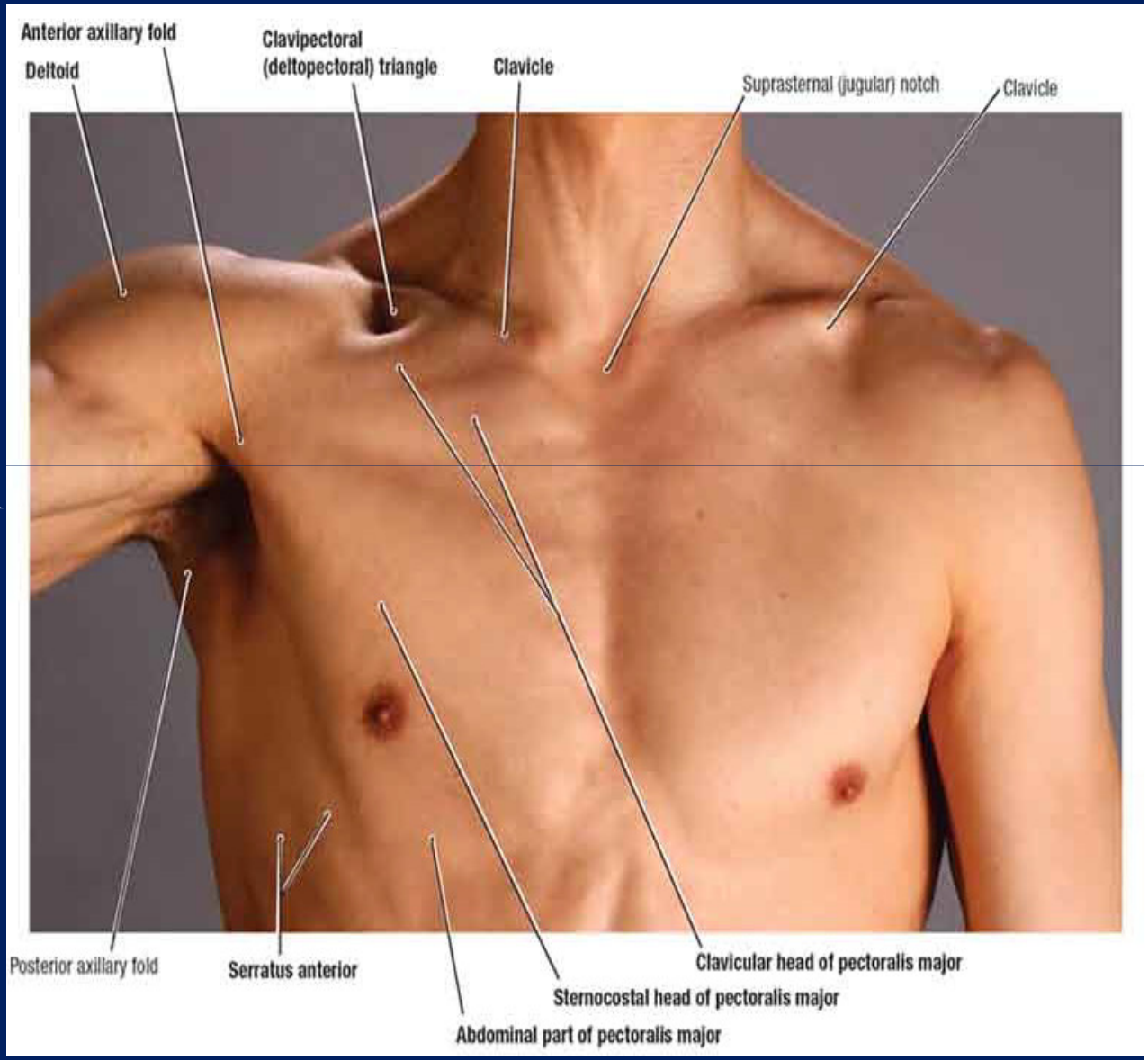
❖The upper limb is divided into:

The upper limb is divided into:

Region	Subdivisions	Bones of Region	Joints of Regionn
Shoulder	Anterior: Pectoral region & breast Posterior: scapular region Lateral: axilla	Clavicle Scapula	Sternoclavicular Acromioclavicular
Arm	Anterior compartment Posterior compartment	Humerus	Shoulder (glenohumeral)
Forearm	Anterior compartment Posterior compartment	Radius Ulna	Elbow Proximal & distal radio-ulnar
Hand	Wrist (carpus)	Carpal bones (8)	Wrist (radiocarpal) Intercarpal Carpometacarpal Metacarpophalangeal Proximal & distal interphalangeal
	Hand proper (metacarpus)	Metacarpal bones (5)	
	Fingers (digits)	Phalanges (14)	

The Pectoral Region

The pectoral region is that part of the trunk extending from the clavicle superiorly to the level of the 7th costal cartilage inferiorly the and from midline to the midaxillary line *(an imagiary line that passes longitudinally through the middle of the armpit when the arm is fully abducted).*



The following (imaginary) lines are used to describe surface anatomy of the pectoral region & axilla

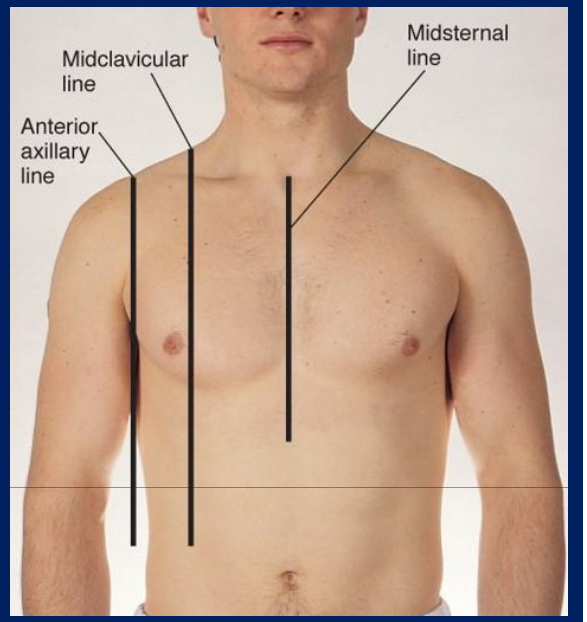
1. Midsternal line runs vertically in the median plane on the front of the sternum.

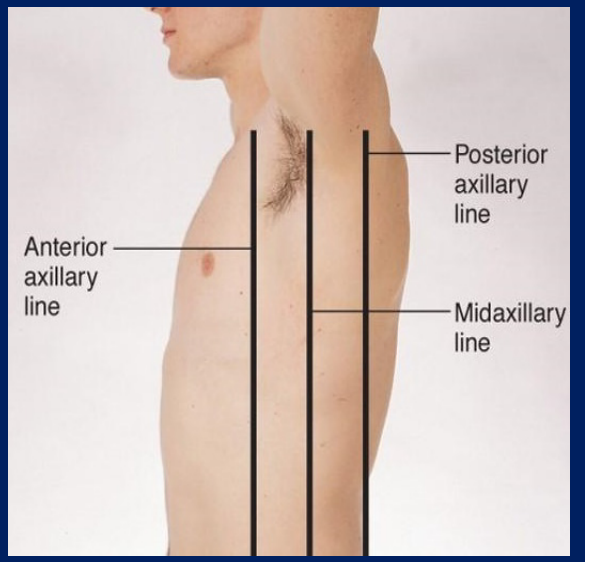
2. Midclavicular line runs vertically from the midpoint of the clavicle to the midinguinal point.

3. Anterior axillary line runs vertically downwards from the anterior axillary fold.

4. Posterior axillary line runs vertically downwards from the posterior axillary fold.

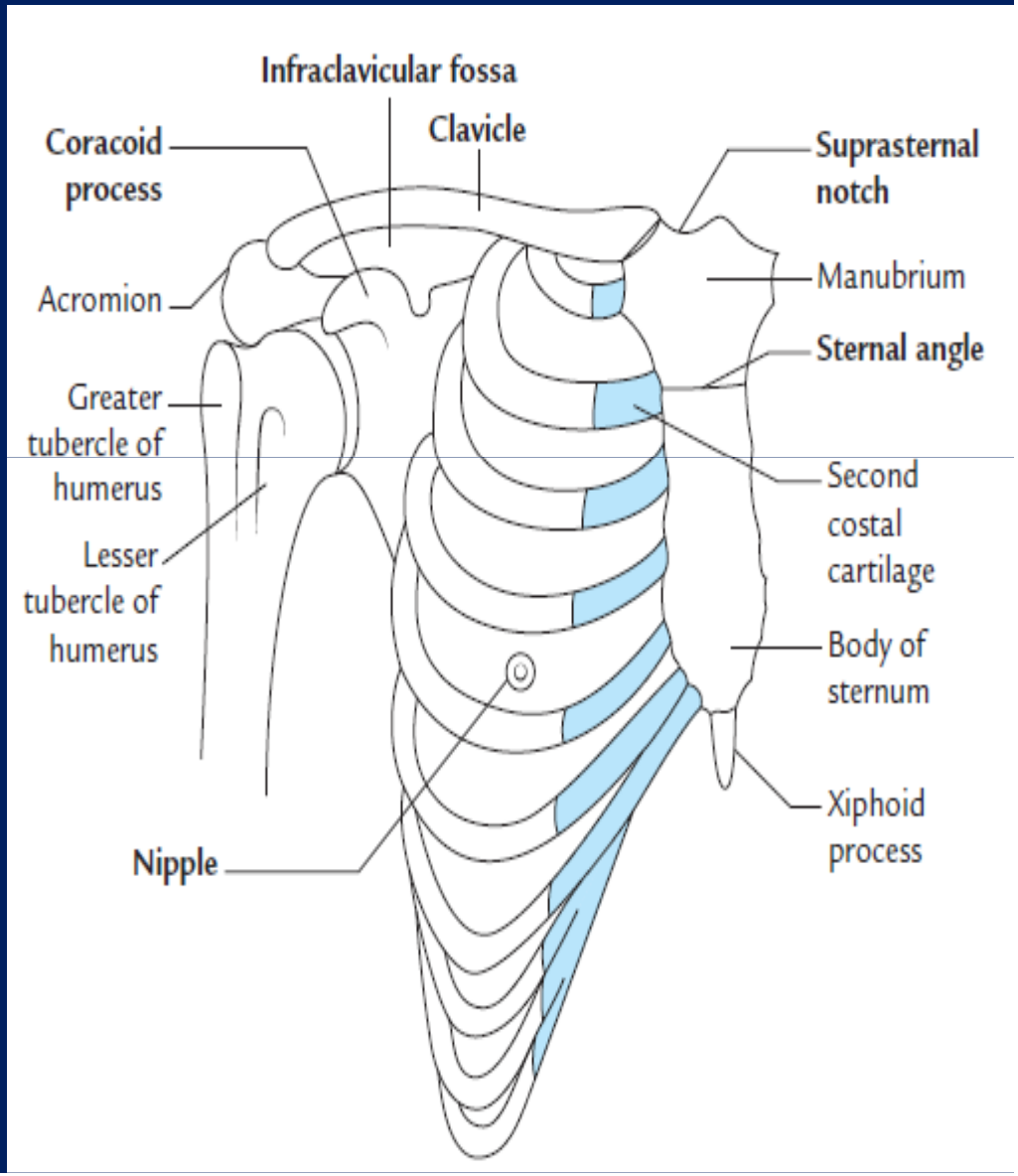
5. Midaxillary line runs vertically downwards midway between the anterior and posterior axillary folds.





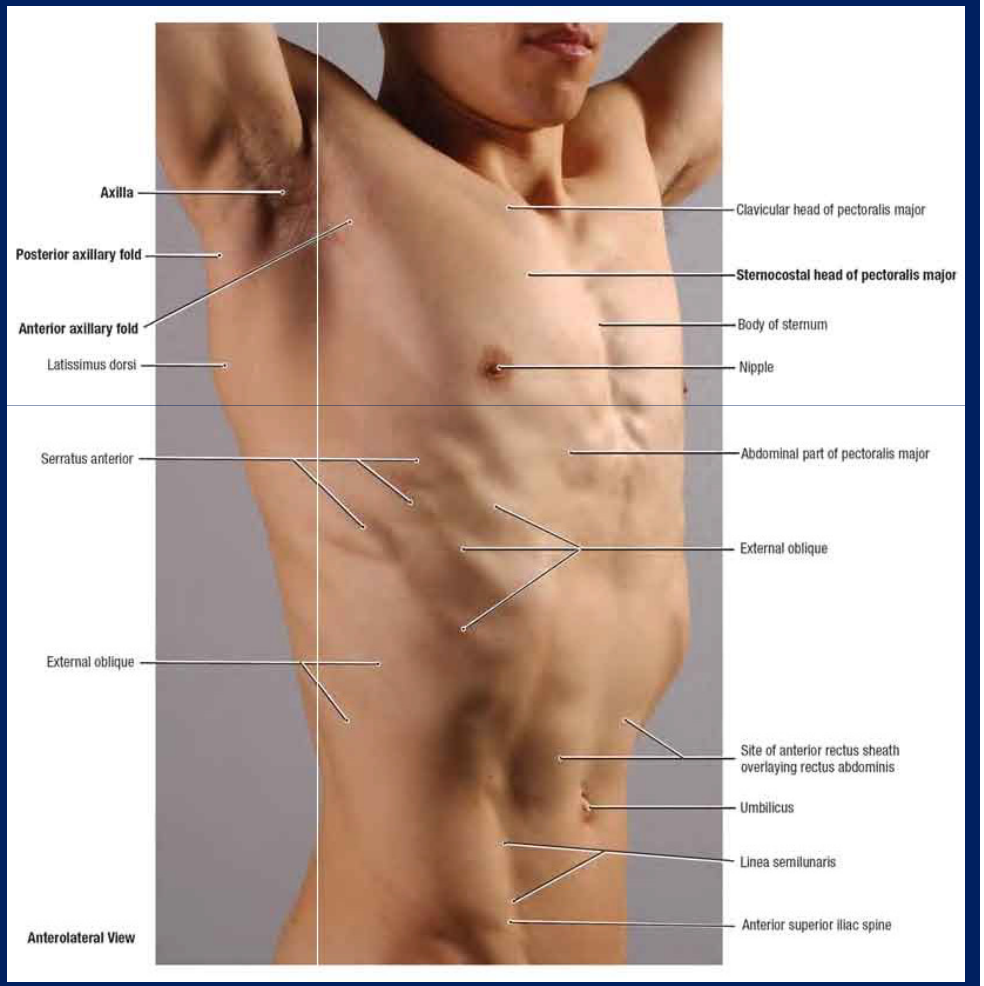
The following landmarks can be felt on the surface of the body in the pectoral region

1. **Clavicle** is palpable.
2. **Suprasternal notch** (jugular notch).
3. **Infraclavicular** fossa is a triangular depression below the junction of middle and lateral third of the clavicle.
4. **Coracoid process:** The tip of coracoid process is felt in the infraclavicular fossa,2.5 cm below clavicle.
5. **The acromion.**
6. **Nipple.**



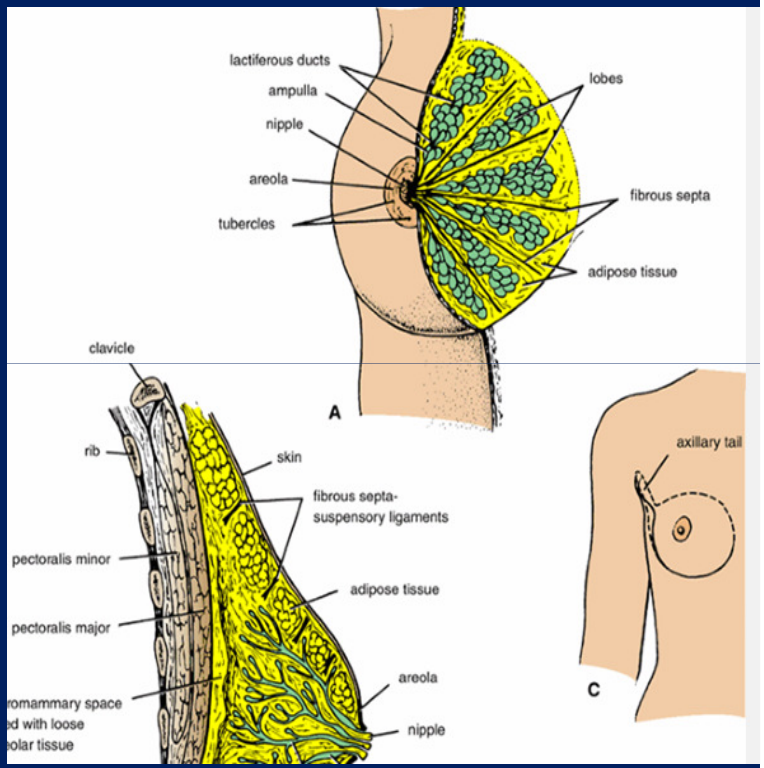
The Breasts

- The breasts are specialized accessory glands of the skin that secrete milk .
- They are present in **both sexes**. In males(immature) and females, they are similar in structure.
- The **nipples** are small and surrounded by a colored area of skin called the **areola**.

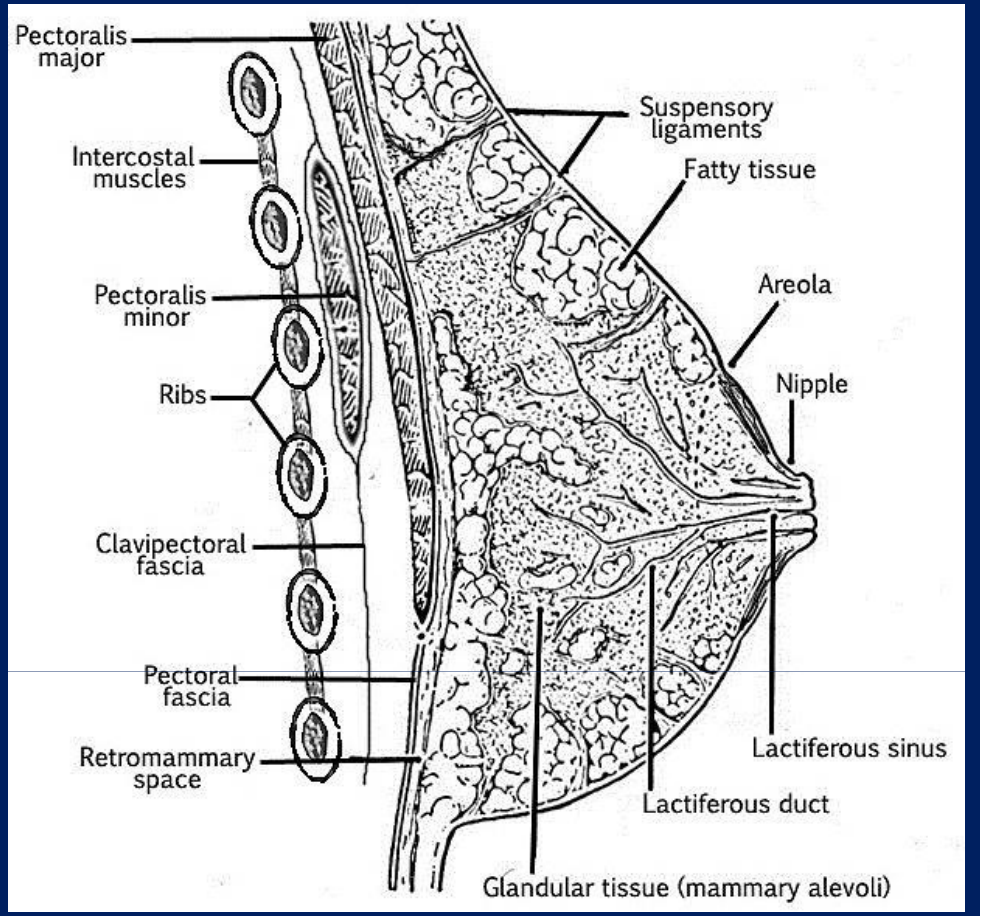


The Breasts

- the breasts gradually enlarge and assume their hemispherical shape under the influence of the ovarian hormones .
- **The ducts** elongate, but the increased size of the glands is mainly from the deposition of fat.
- **The base** of the breast extends from the ***second*** to the ***sixth*** rib and from the lateral margin of the sternum to the midaxillary line.
- The greater part of the gland lies in the superficial fascia.
- A small part, called the axillary tail extends and enters the axilla.



- Each breast consists of **15** to **20** lobes, which radiate out from the nipple.
- The main duct from each lobe opens separately on the summit of the nipple and possesses a dilated ampulla just before its termination.
- The base of the nipple is surrounded by the areola . Tiny tubercles on the areola are produced by the underlying areolar glands.



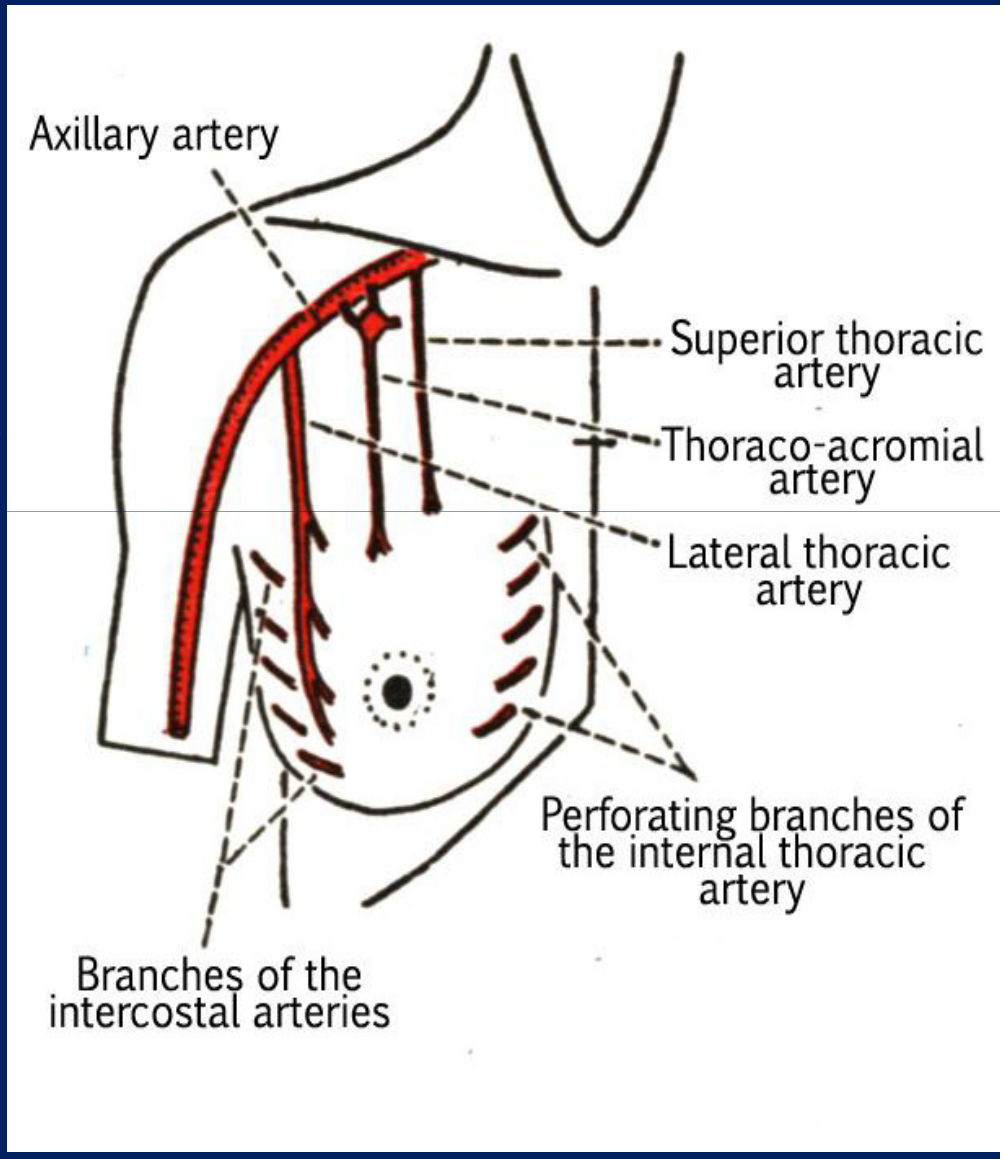
- The lobes of the gland are separated by fibrous septa that serve as suspensory ligaments.
- Behind the breasts is a space filled by loose connective tissue called the retromammary space

Blood supply of the breast

The breast is supplied by **branches from the following arteries:**

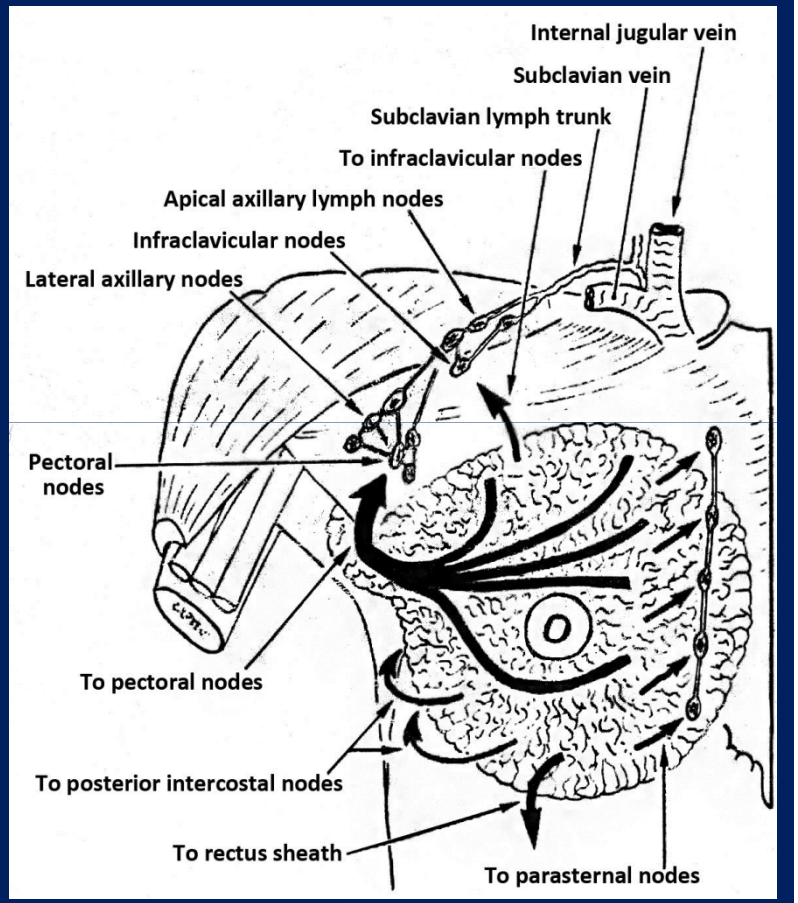
- Internal thoracic artery (medially).
- Lateral thoracic artery (Laterally).
- Thoracoacrmial artery. (superolaterally)
- Anterior intercostal arteries (posteriorly).
- Posterior intercostal arteries (inferolaterally).

The corresponding veins pass to the internal thoracic, axillary and intercostal veins.

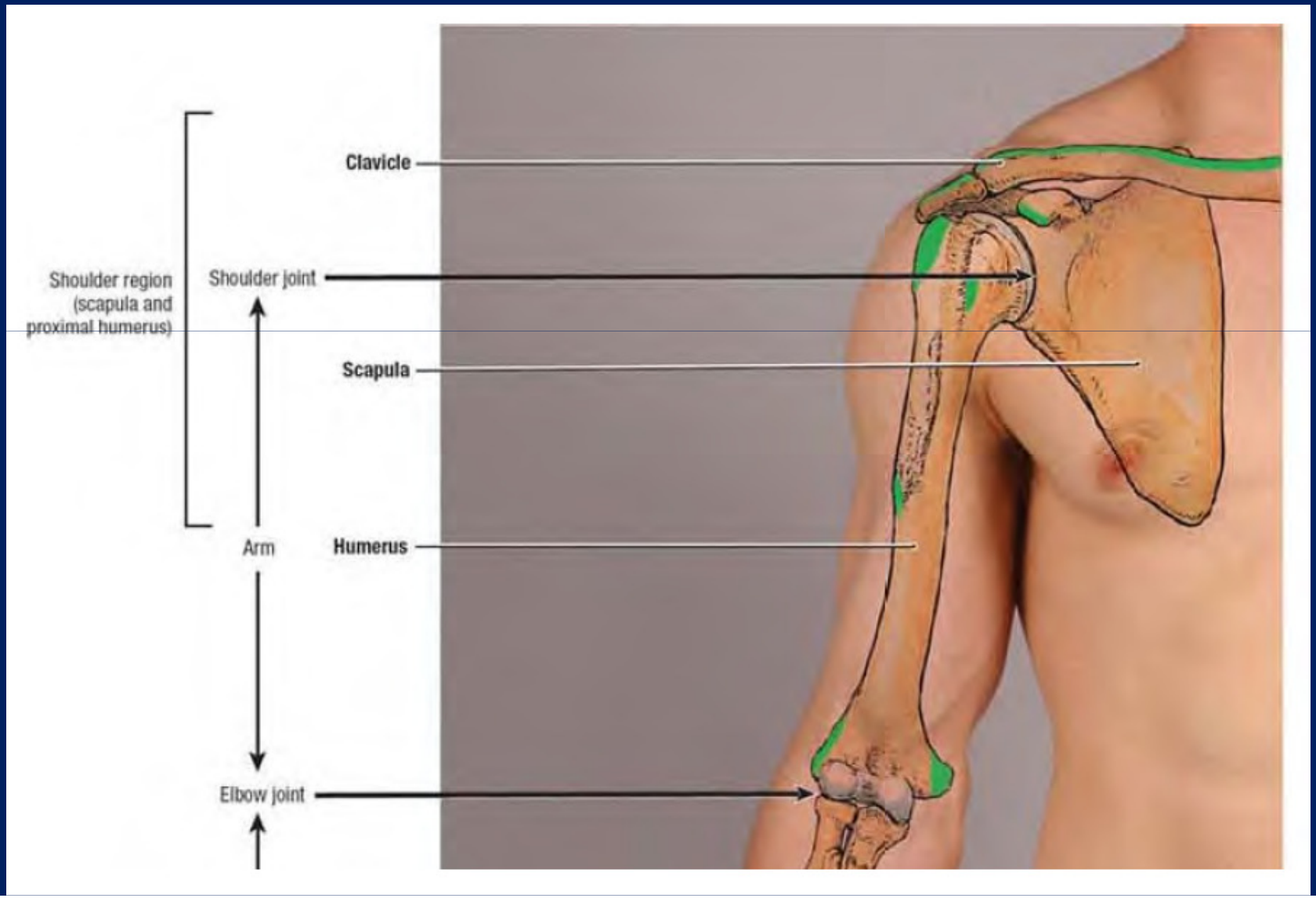


Lymphatic drainage of the breast

1. The pectoral lymph(anterior axillary) nodes; receive lymph from most of the lateral part of the breast through lymph vessels which run along the axillary tail.
2. The parasternal(internal thoracic group) nodes (around the internal thoracic artery) receive lymph of the medial side of breast.
3. The posterior intercostal nodes (situated along the course of the posterior intercostal arteries) drain posteriorly of breast.
4. Some vessels communicate with the lymph vessels of the opposite breast and with those of the anterior abdominal wall.

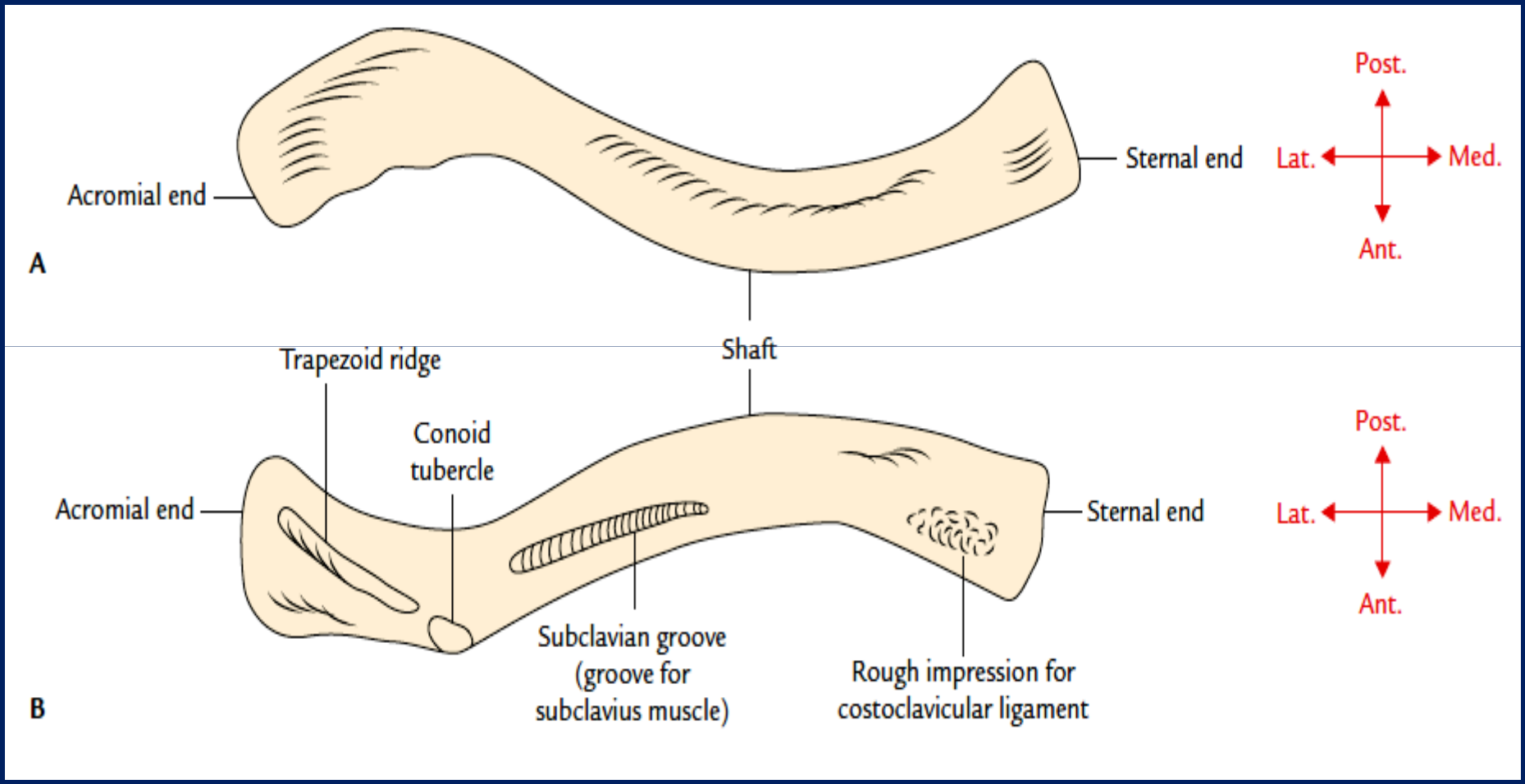


Bones of the Shoulder Girdle and Arm



CLAVICLE

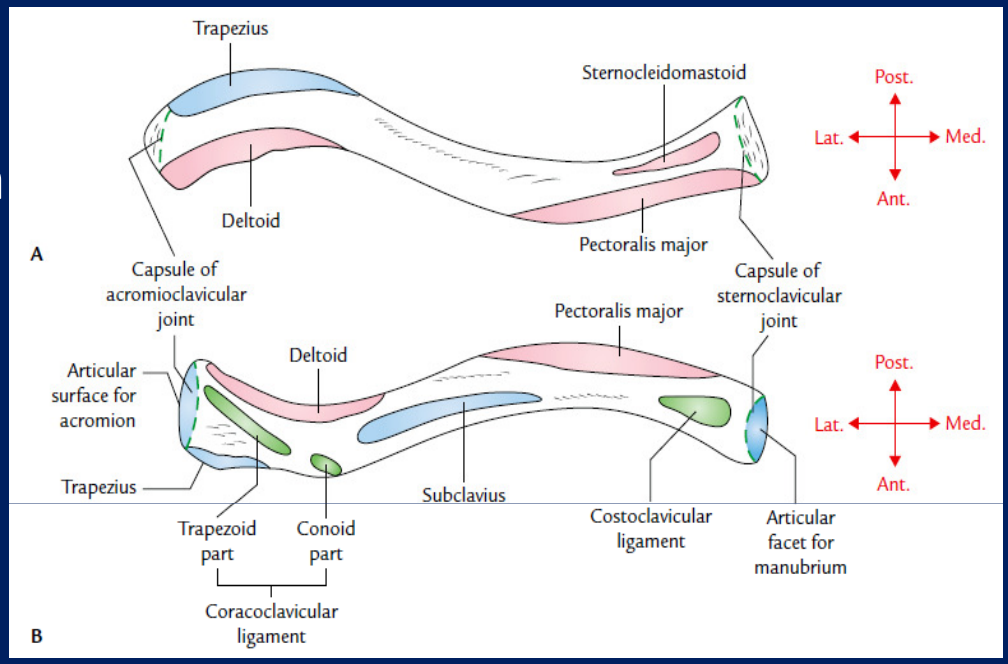
- The clavicle is a long, slender bone that lies horizontally across the root of the neck just beneath the skin.
- It articulates with the sternum and first costal cartilage medially and with the acromion process of the scapula laterally .
- The medial two thirds of the clavicle is convex forward and its lateral third is concave forward.


Acromial end
Sternal end
Shaft
A
Post.
Lat.
Med.
Ant.
Trapezoid ridge
Conoid tubercle
Acromial end
Sternal end
Subclavian groove (groove for subclavius muscle)
Rough impression for costoclavicular ligament
B
Post.
Lat.
Med.
Ant.

Muscular and ligamentous attachments

- **Three muscles take origin from the clavicle :**

1. **Sternocleidomastoid; from the superior surface medially.**
2. **Pectoralis major; from the medial ½ of the shaft.**
3. **Deltoid; from the lateral part of the shaft.**



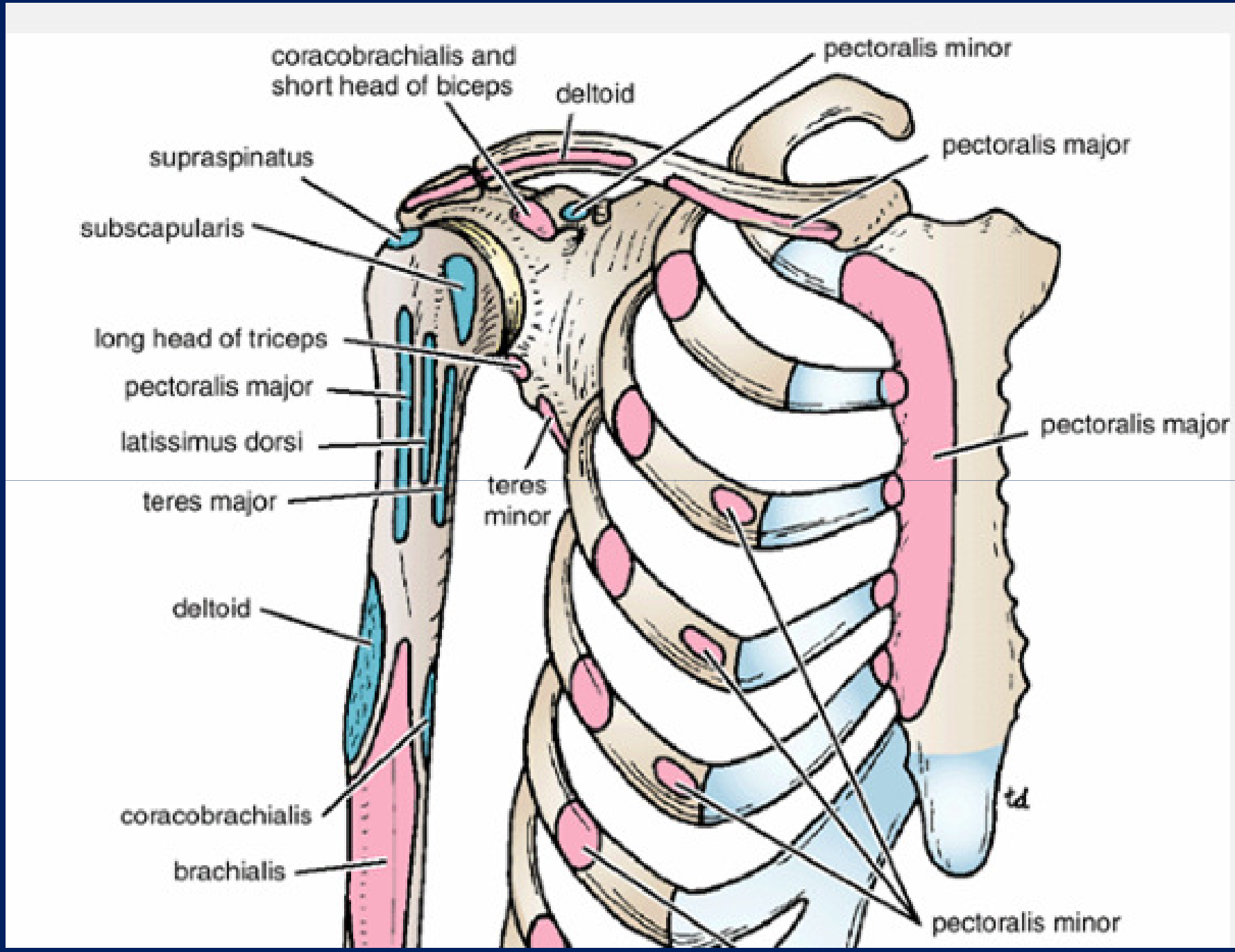
- **Two muscles are inserted:**

1. **Trapezius; to the posterior border laterally.**
2. **Subclavius; to the inferior surface medially.**

- **Two ligaments attach to the clavicle :**

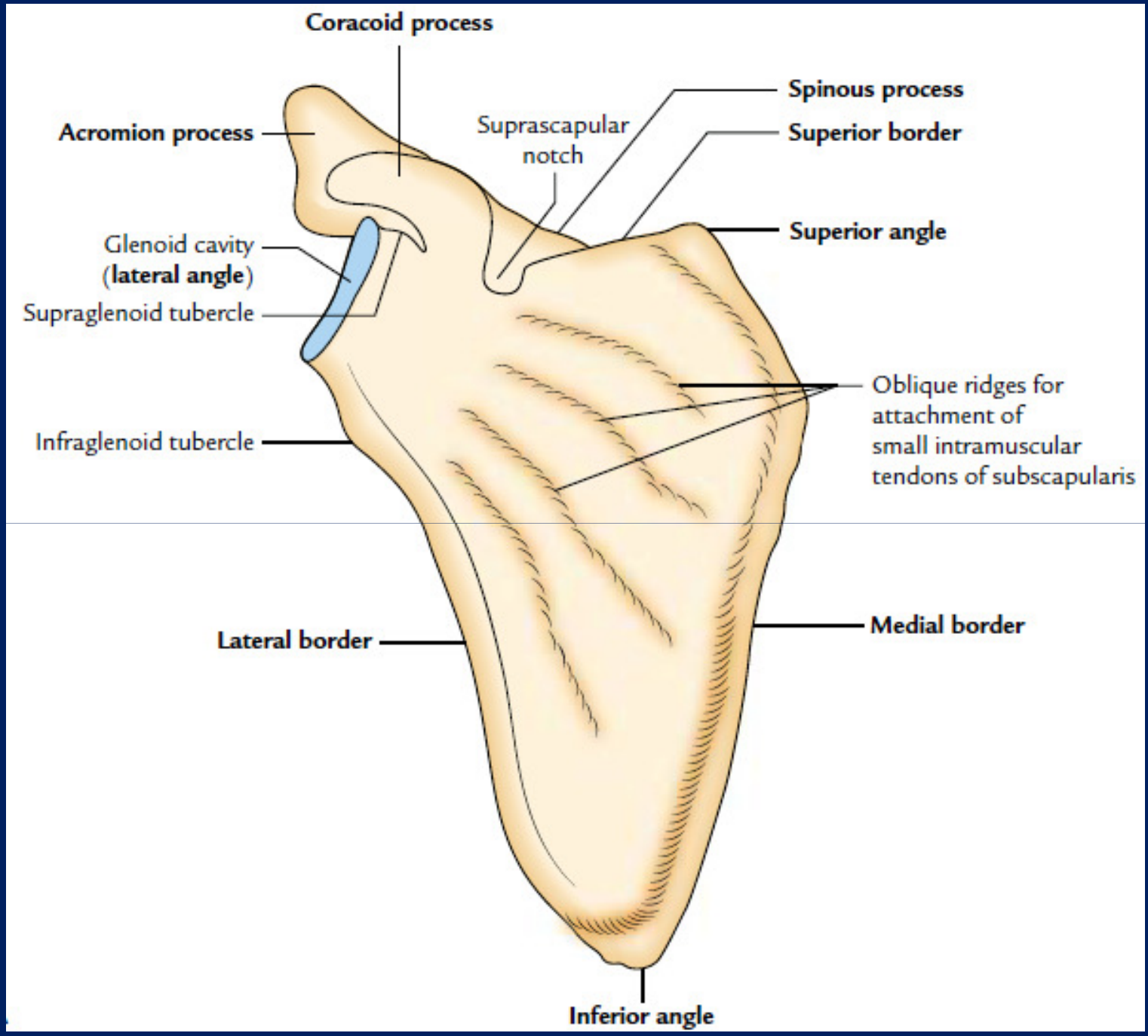
1. **The costoclavicular ligament from the first costal cartilage.**
2. **The coracoclavicular ligament consists of 2 parts;**

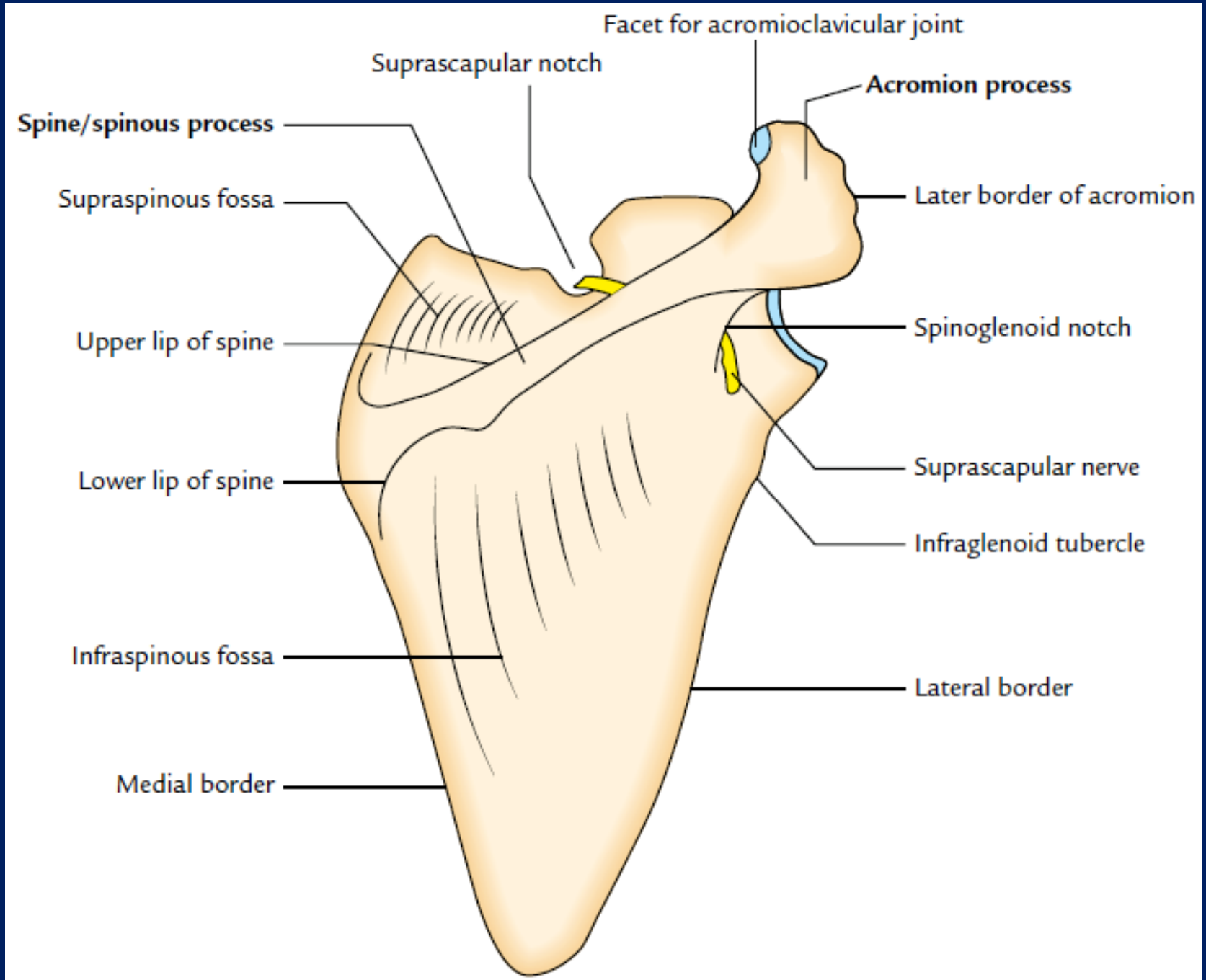
- The **trapezoid part attaches to the inferior surface laterally .**
- The **conoid part attaches to the conoid tubercle.**


coracobrachialis and
short head of biceps
deltoid
pectoralis minor
supraspinatus
pectoralis major
subscapularis
long head of triceps
pectoralis major
latissimus dorsi
teres major
teres
minor
pectoralis major
deltoid
coracobrachialis
brachialis
pectoralis minor

Scapula

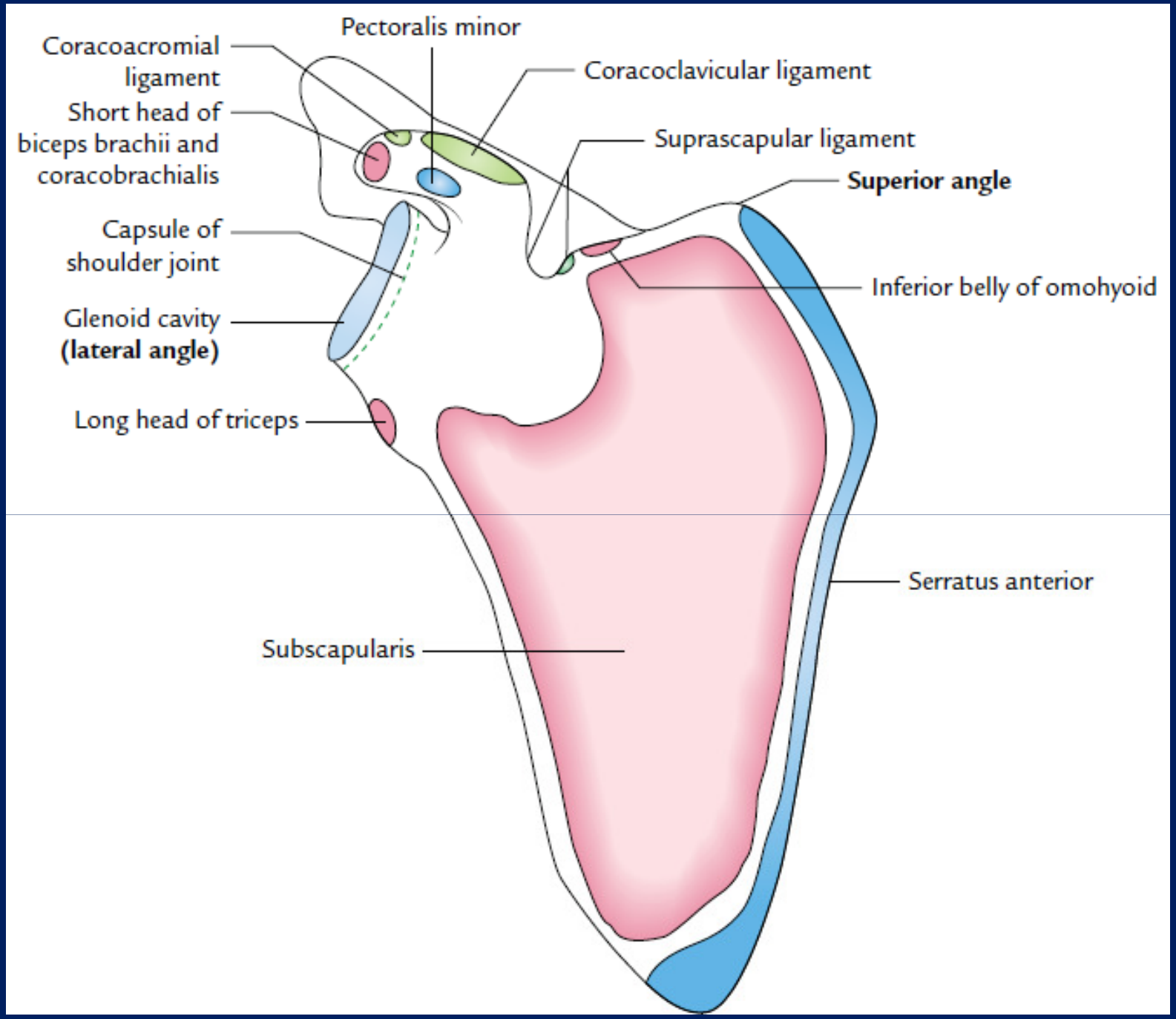
- The scapula is a flat triangular bone that lies on the **posterior** chest wall between the **2nd** and **7th** ribs.
- On its posterior surface, the **spine** of the scapula projects backward The lateral end of the spine is free and forms the **acromion process,** which articulates with the clavicle at the acromioclavicular joint.
- The superolateral angle of the scapula forms **glenoid cavity**, which articulates with the head of the humerus at the shoulder joint.
- The **coracoid** process projects upward and forward above the glenoid cavity and provides attachment for muscles and ligaments.
- Medial to the base of coracoid process is the suprascapular notch.
- The **anterior** surface of the scapula is concave and forms the shallow **subscapular** fossa.
- The **posterior** surface of the scapula is divided by the spine into the supraspinous fossa above and an infraspinous fossa below.

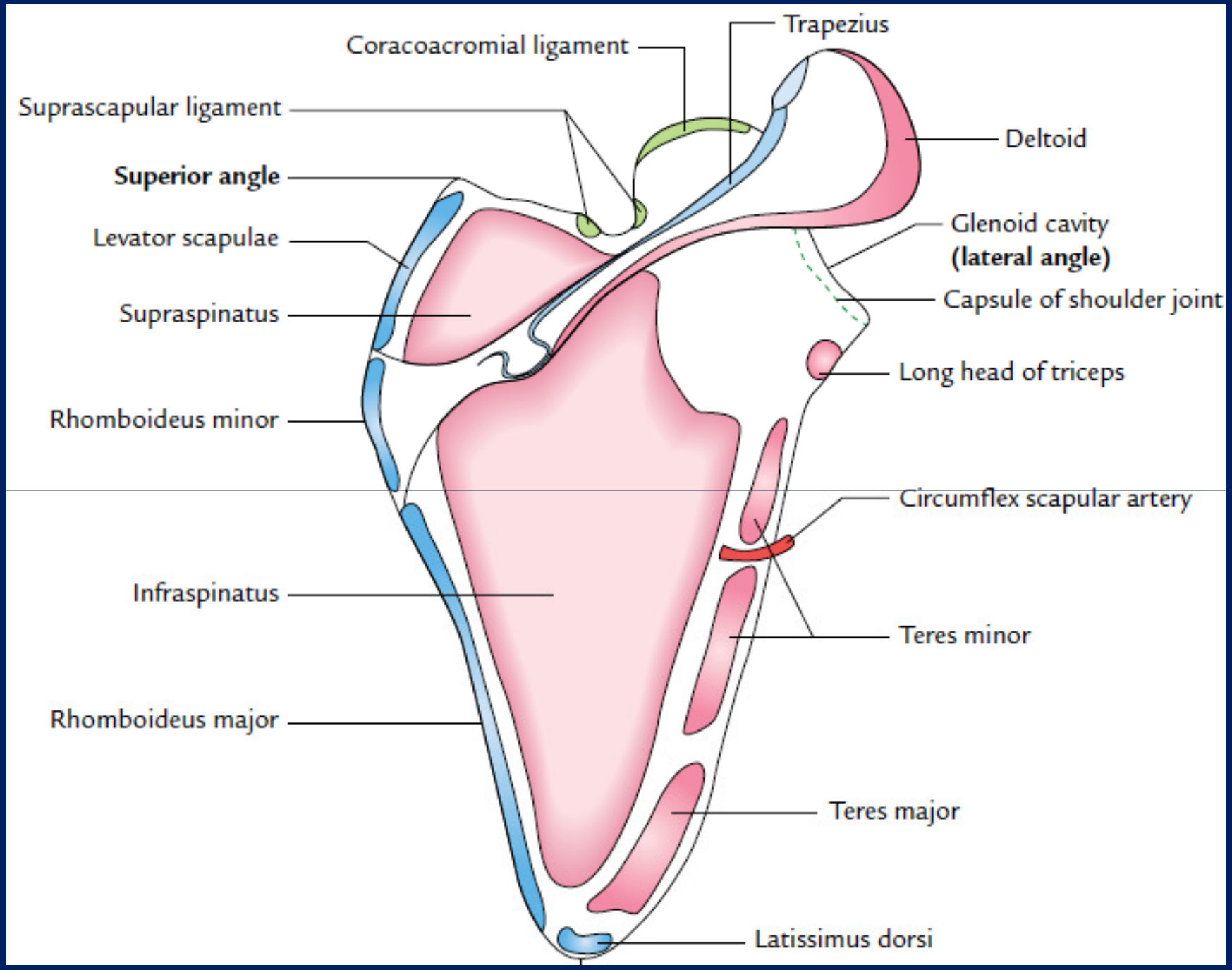

Coracoid process
Acromion process
Suprascapular notch
Spinous process
Superior border
Superior angle
Glenoid cavity (lateral angle)
Supraglenoid tubercle
Infraglenoid tubercle
Oblique ridges for attachment of small intramuscular tendons of subscapularis
Lateral border
Medial border
Inferior angle


Facet for acromioclavicular joint
Suprascapular notch
Acromion process
Spine/spinous process
Supraspinous fossa
Later border of acromion
Upper lip of spine
Spinoglenoid notch
Lower lip of spine
Suprascapular nerve
Infraglenoid tubercle
Infraspinous fossa
Lateral border
Medial border

Muscular and ligamentous attachments

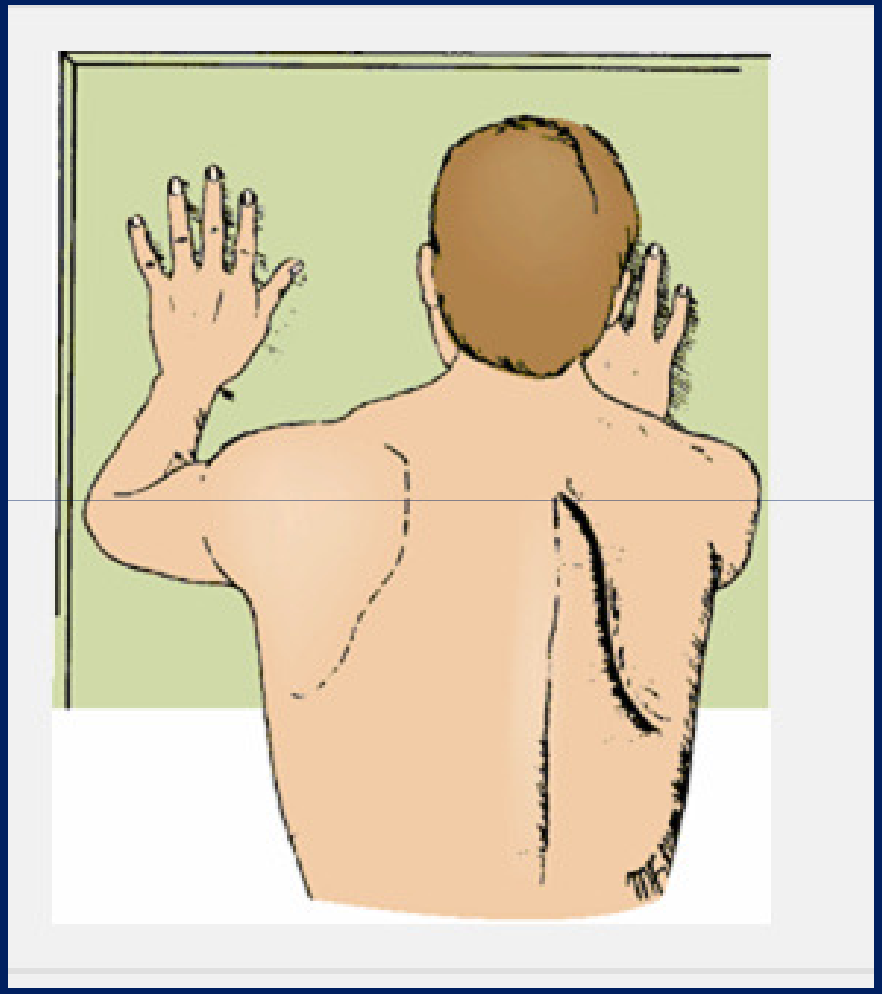
- **Muscles inserted into scapula (from trunk to medial border)**
  - Serratus anterior.
  - Levator scapulae.
  - Rhomboid minor.
  - Rhomboid major.
  - Trapezius.
  - Pectoralis minor.
  - Latissimus dorsi.
- **Muscles origin from scapula (surfaces and lateral border)**
  - Subscapularis.
  - Supraspinatus.
  - Infraspinatus.
  - Teres minor. Teres major.
  - Long & Short head of biceps.
  - Long head of triceps. Deltoid.
  - Coracobrachilais. Omohyoid.
- **Ligaments attached to the scapula include;**
  - Coracoclavicular ligament; from coracoid process to the clavicle.
  - Glenohumeral ligaments.
  - Coracohumeral ligament.
  - Coracoacromial ligament;between coracoid process and acromion.


Pectoralis minor
Coracoacromial ligament
Coracoclavicular ligament
Short head of biceps brachii and coracobrachialis
Suprascapular ligament
Superior angle
Capsule of shoulder joint
Inferior belly of omohyoid
Glenoid cavity (lateral angle)
Long head of triceps
Serratus anterior
Subscapularis


Coracoacromial ligament
Trapezius
Suprascapular ligament
Deltoid
Superior angle
Levator scapulae
Glenoid cavity
(lateral angle)
Capsule of shoulder joint
Supraspinatus
Long head of triceps
Rhomboideus minor
Circumflex scapular artery
Infraspinatus
Teres minor
Rhomboideus major
Teres major
Latissimus dorsi

Clinical Notes

- **Fractures of the Scapula**
- Fractures of the scapula are usually the result of severe trauma, such as occurs in run-over accident victims or in occupants of automobiles involved in crashes. Injuries are usually associated with fractured ribs. Most fractures of the scapula require little treatment because the muscles on the anterior and posterior surfaces adequately splint the fragments.
- **Dropped Shoulder and Winged Scapula**
- The position of the scapula on the posterior wall of the thorax is maintained by the tone and balance of the muscles attached to it. If one of these muscles is paralyzed, the balance is upset, as in dropped shoulder, which occurs with paralysis of the trapezius, or winged scapula ,caused by paralysis of the serratus anterior. Such imbalance can be detected by careful physical examination.



Thank You & Good Luck