MEDICAL EDUCATION RESOURCE

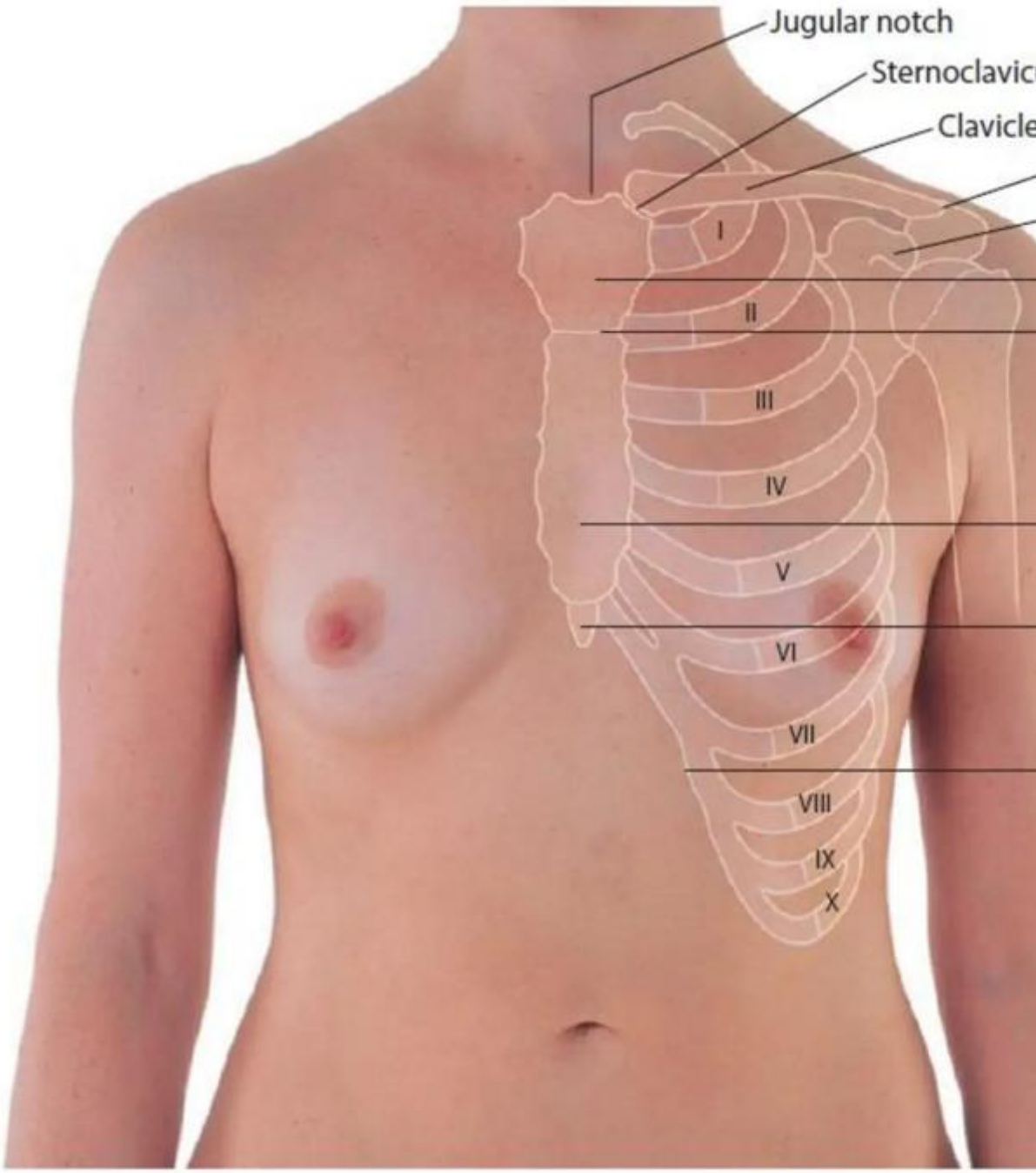
Pectoral Region – Surface Landmarks

PECTORAL REGION — SURFACE LANDMARKS

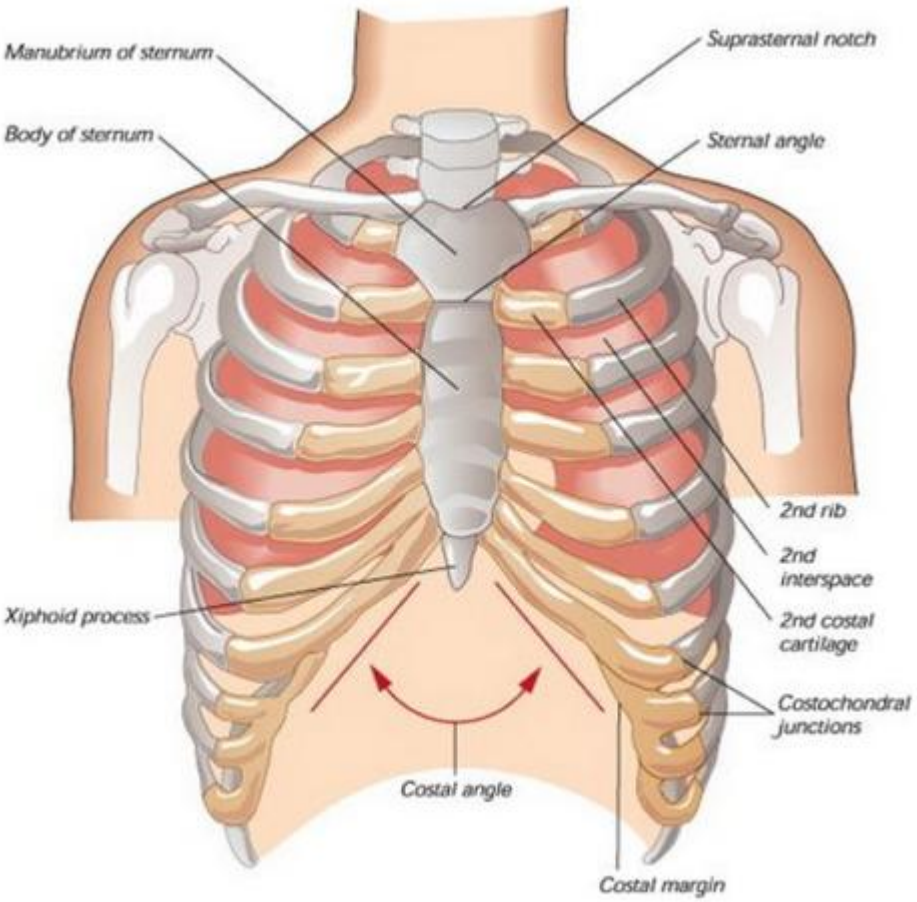
MEDMENTOR EDU | UPPER LIMB ANATOMY | MBBS • NEET PG • INI-CET

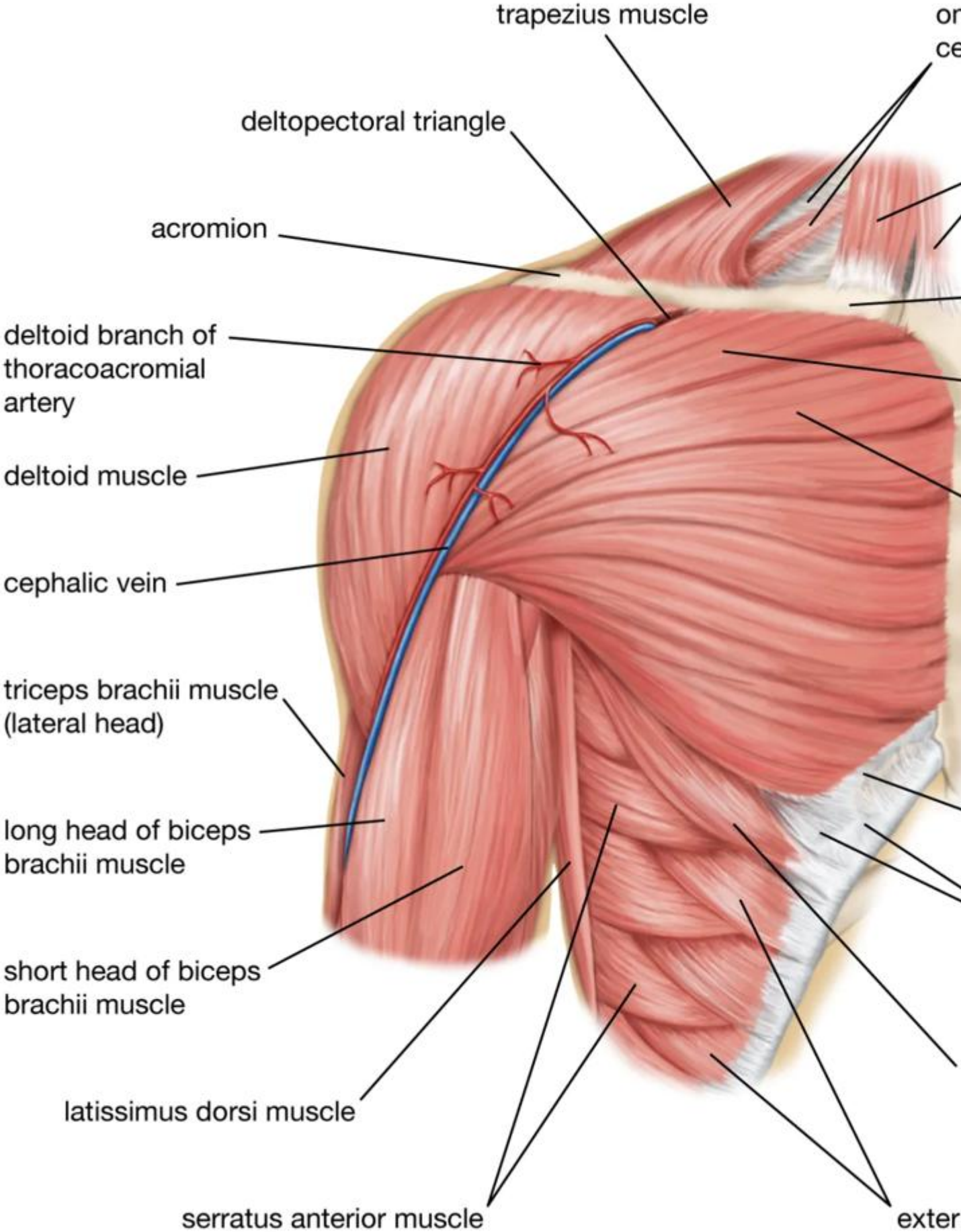
1. General Overview

- Surface anatomy is the study of anatomical structures identified by inspection, palpation and their projection onto the body surface.
- The pectoral region contains important bony, muscular, vascular, neural and breast landmarks.
- These landmarks are useful during clinical examination, surgical procedures, regional anaesthesia and radiological interpretation.
- The clavicle, sternum and anterior axillary fold are among the most important palpable landmarks.



Anterior chest wall in a woman


Manubrium of sternum
Body of sternum
Xiphoid process
Suprasternal notch
Sternal angle
2nd rib
2nd interspace
2nd costal cartilage
Costochondral junctions
Costal angle
Costal margin


trapezius muscle
deltopectoral triangle
acromion
deltoid branch of thoracoacromial artery
deltoid muscle
cephalic vein
triceps brachii muscle (lateral head)
long head of biceps brachii muscle
short head of biceps brachii muscle
latissimus dorsi muscle
serratus anterior muscle

2. Bony Landmarks

A. Clavicle

- Subcutaneous and palpable throughout its entire length.
- Extends from the sternoclavicular joint medially to the acromioclavicular joint laterally.
- Medial two-thirds are convex anteriorly; lateral one-third is concave anteriorly.
- An important landmark for the shoulder girdle, subclavian vessels and brachial plexus.

Clinical importance: Clavicular fractures commonly occur near the junction of its medial two-thirds and lateral one-third.

B. Sternoclavicular joint

- Located at the medial end of the clavicle.
- Formed between the sternal end of the clavicle, manubrium and first costal cartilage.
- It is the only true synovial articulation connecting the upper limb to the axial skeleton.
- Can be palpated adjacent to the jugular notch.

C. Acromioclavicular joint

- Located at the lateral end of the clavicle.
- Formed between the acromial end of the clavicle and the acromion of the scapula.
- Palpable near the superior aspect of the shoulder.

Clinical importance: Dislocation or separation may produce a step deformity at the lateral clavicle.

D. Coracoid process

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- Hook-shaped projection arising from the scapula.
- Palpable deep to the soft tissues approximately 2–3 cm inferior to the lateral clavicular region, near the deltopectoral triangle.
- Usually felt as a firm, localised bony prominence.

Clinical importance:

- Landmark for shoulder examination.
- Used in selected brachial plexus block techniques.
- Important reference during anterior shoulder surgery.

E. Jugular (suprasternal) notch

- Depression located between the medial ends of the clavicles.
- Forms the superior midline border of the manubrium.
- Lies approximately at the T2 vertebral level, with some anatomical variation.



Complete Anatomy

Clinical importance:

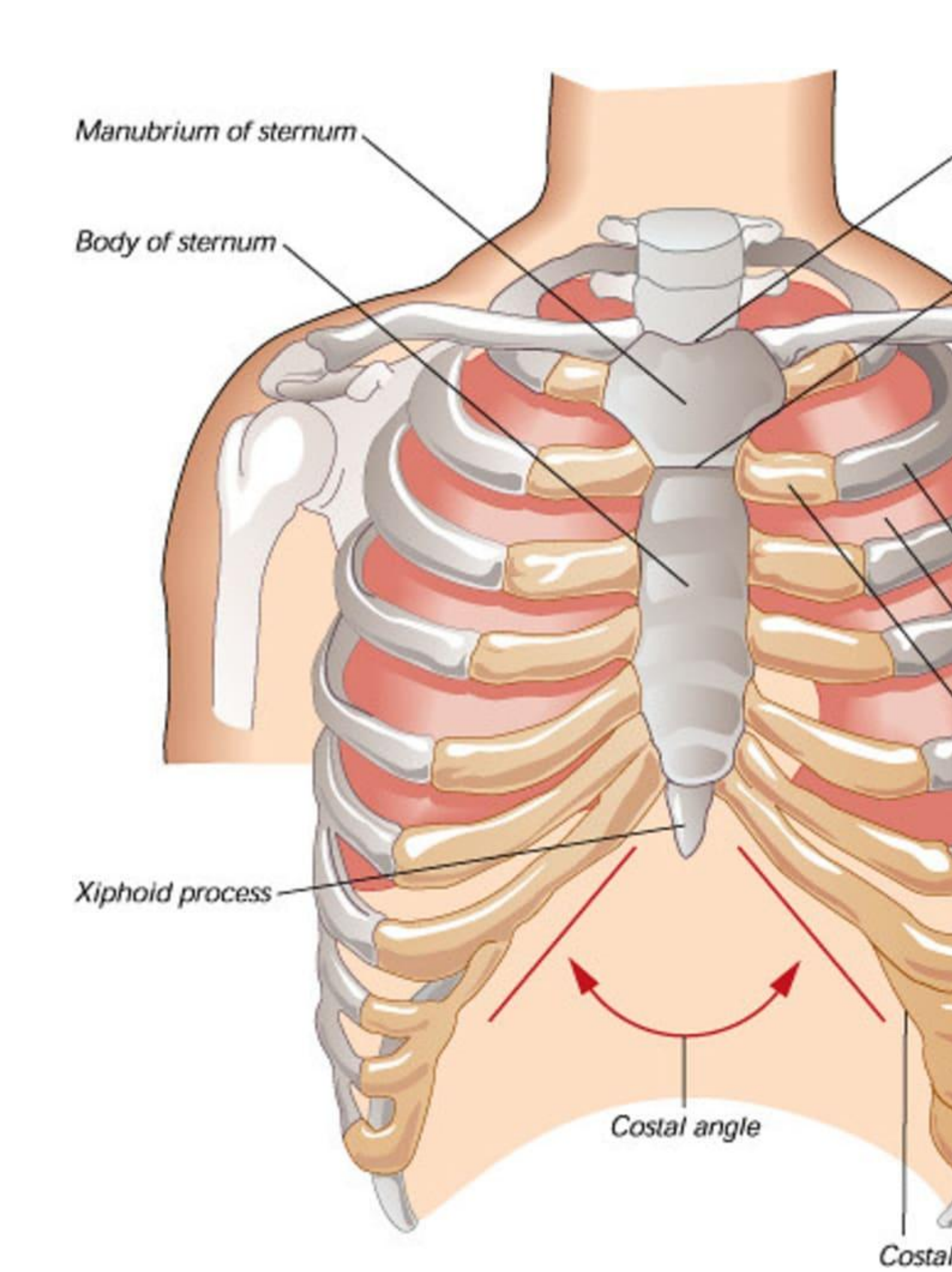
- Helps identify the midline of the upper thorax.
- Used in assessment of tracheal position.
- Serves as a reference point for measurements during airway assessment and central venous access planning.

F. Sternal angle (Angle of Louis)

- Palpable transverse ridge at the junction of the manubrium and body of the sternum.
- Corresponds posteriorly to the T4–T5 intervertebral disc.
- Located at the level of the second costal cartilage.
- Used as the starting point for counting ribs and intercostal spaces.



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Manubrium of sternum
Body of sternum
Xiphoid process
Costal angle
Costal

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Important structures at the sternal angle

ANATOMICAL STRUCTURE / EVENT	RELATIONSHIP
Second costal cartilage	Articulates at the sternal angle
Vertebral level	T4–T5 intervertebral disc
Transverse thoracic plane	Passes through this level
Tracheal bifurcation	Approximately at this level
Aortic arch	Begins and ends approximately at this plane
Superior mediastinum	Inferior boundary lies at this plane
Azygos vein arch	Joins superior vena cava near this level



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Must know: The sternal angle identifies the second rib, allowing systematic counting of the intercostal spaces.

G. Xiphoid process and costal margin

- The xiphoid process forms the inferior part of the sternum.

- The xiphisternal joint lies approximately at vertebral level T9.
- The costal margin is formed by the costal cartilages of ribs 7–10.
- These are useful inferior landmarks during examination of the thorax and upper abdomen.

3. Soft Tissue Landmarks

A. Anterior axillary fold

- Formed primarily by the inferolateral border of pectoralis major.
- Extends from the anterior chest wall towards the humerus.
- Becomes prominent during resisted adduction of the arm.

Clinical importance:

- Landmark for the anterior wall of the axilla.
- Useful during axillary lymph node examination.
- Loss of its normal contour may indicate pectoralis major rupture.

B. Posterior axillary fold

- Formed by latissimus dorsi and teres major.
- Marks the posterior boundary of the axillary region.
- More prominent during resisted extension and adduction of the arm.

C. Deltopectoral groove

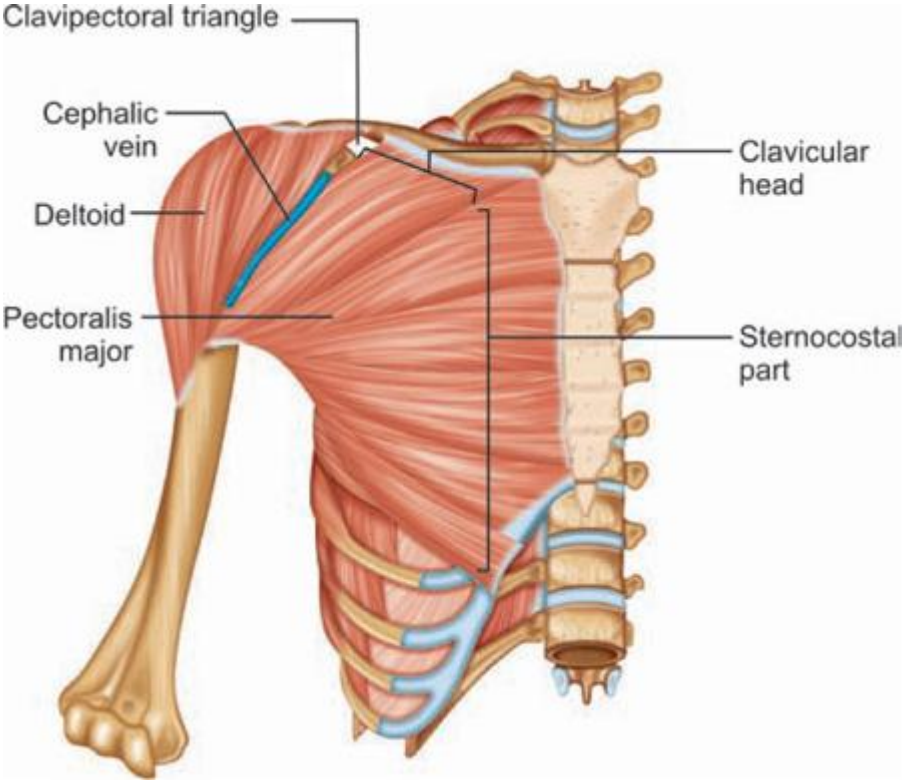
- A depression between the deltoid muscle laterally and pectoralis major medially.

- Contains the cephalic vein, accompanied by small arterial branches and lymphatics.
- Widened superiorly into the deltopectoral triangle.

Clinical importance: Used as a surgical interval for approaches to the shoulder.

D. Inframammary fold

- Skin crease at the junction of the inferior breast and chest wall.
- Its position varies with breast size, shape, age and body habitus.
- Important in breast examination and reconstructive surgery.



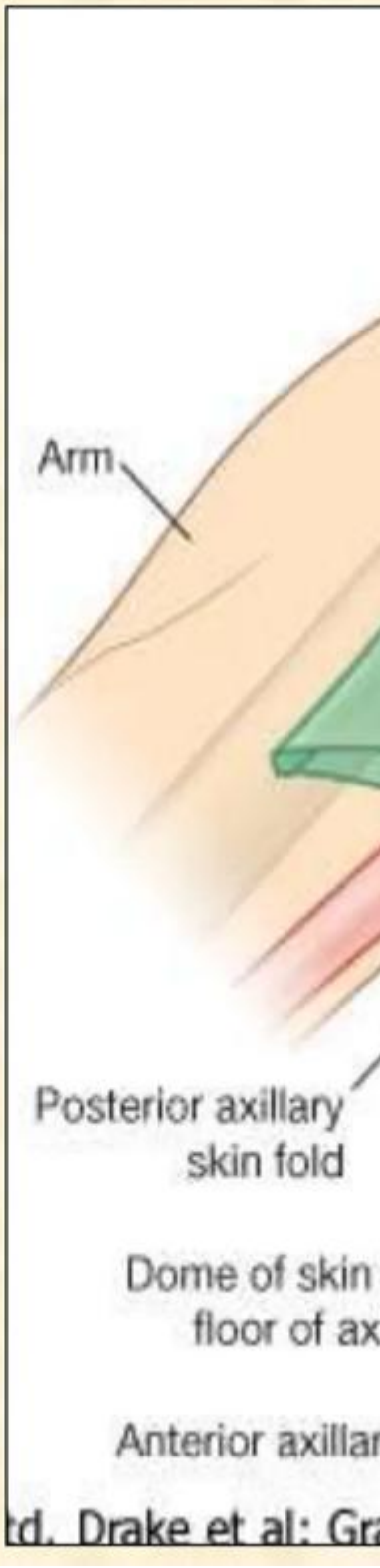
Anterior and posterior axilla

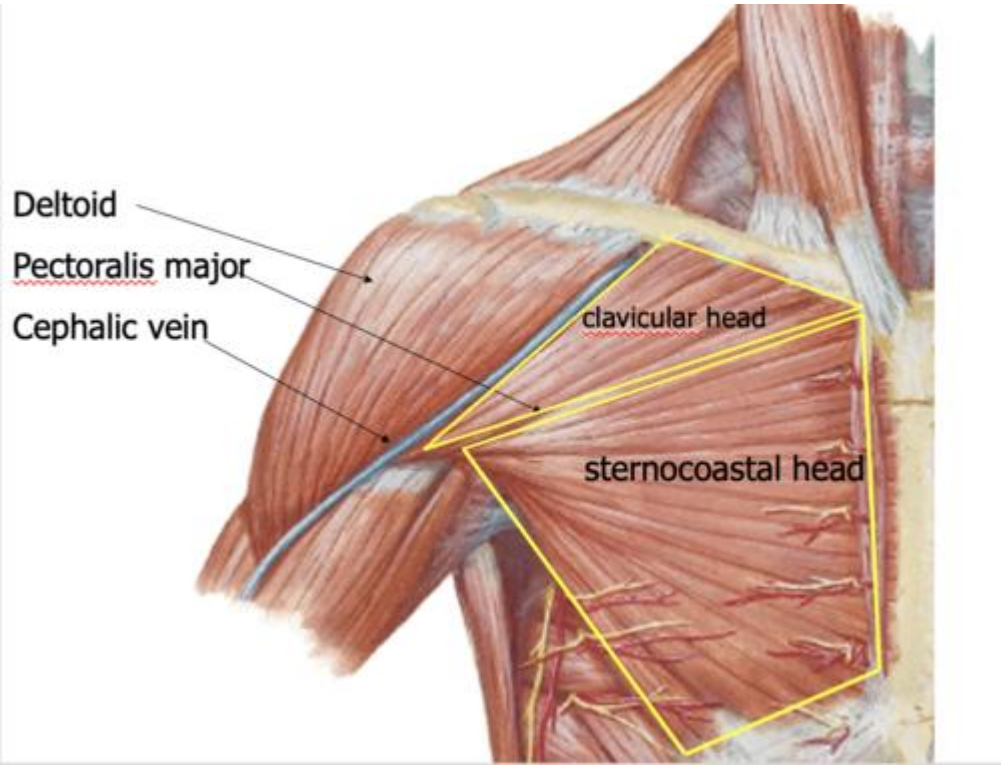
Muscle that produces anterior axillary skin fold is:

- pectoralis major

Muscles that produce posterior axillary skin fold are:

- latissimus dorsi & teres major





7

4. Breast Surface Markings

Extent of the breast

In standard anatomical descriptions, the adult female breast typically extends:

DIRECTION	APPROXIMATE EXTENT
Superior	Second rib
Inferior	Sixth rib
Medial	Lateral border of sternum

Lateral	Towards the midaxillary line

- The breast lies predominantly over pectoralis major and partly over serratus anterior.
- Its superolateral extension into the axilla is called the axillary tail of Spence.
- Breast dimensions and surface position vary considerably between individuals.



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Nipple and areola

- In adult males, the nipple is commonly located near the fourth intercostal space, although its position varies.
- In females, nipple position is variable, particularly following puberty, pregnancy and changes in breast size.
- The fourth intercostal nerve (T4) is an important contributor to nipple sensation.
- The areola surrounds the nipple and contains specialised sebaceous glands, including Montgomery glands.

Clinical pearl: The fourth intercostal space is a useful conventional landmark for the male nipple, but it is not a fixed landmark for the adult female nipple.

5. Vascular Surface Landmarks

A. Cephalic vein

- Ascends along the lateral side of the upper limb.
- Enters the deltopectoral groove.

- Pierces the clavipectoral fascia and drains into the axillary vein.
- May be visible or palpable in individuals with prominent superficial veins.

B. Thoracoacromial artery

- Usually arises from the second part of the axillary artery.
- Passes anteriorly through the clavipectoral fascia.
- Divides into pectoral, deltoid, clavicular and acromial branches, with anatomical variation.

Important distinction: The thoracoacromial artery is a deep vascular structure identified by anatomical projection, rather than a routinely palpable surface landmark.

C. Axillary artery

- Continuation of the subclavian artery beyond the lateral border of the first rib.
- Becomes the brachial artery at the inferior border of teres major.
- Its second part lies posterior to pectoralis minor.

Clinical importance: The axillary artery can be assessed within the axilla, and its course is relevant to regional anaesthesia and vascular procedures.

6. Nerve and Lymphatic Surface Landmarks

A. Pectoral nerves

- Lateral pectoral nerve (C5–C7): Supplies pectoralis major.
- Medial pectoral nerve (C8–T1): Supplies pectoralis minor and pectoralis major.
- These are deep motor nerves and cannot normally be palpated directly.

B. Intercostal nerves

- Supply sensation to the skin of the anterior and lateral thoracic wall.
- The upper thoracic dermatomes provide important clinical sensory landmarks.

LANDMARK	APPROXIMATE DERMATOME
Upper anterior chest	T2–T3
Nipple level	T4
Xiphisternal region	T6

C. Pectoral (anterior) axillary lymph nodes

- Situated deep along the anterior wall of the axilla.
- Associated with the lateral thoracic vessels.
- Receive lymph from much of the anterior and lateral thoracic wall, including a large part of the breast.
- May be enlarged and palpable during examination of the axilla.

Important: Normal axillary lymph nodes are not necessarily palpable. Palpable nodes should be assessed according to their size, consistency, mobility and clinical context.

7. Surface Anatomy in Clinical Examination

Identifying intercostal spaces

How to count ribs using the sternal angle

1. Palpate the jugular notch at the superior border of the manubrium.
2. Move inferiorly along the sternum to identify the transverse ridge of the sternal angle.
3. Move laterally to palpate the second costal cartilage.
4. Identify the second intercostal space immediately below the second rib, and continue counting inferiorly.

Surface examination of the axilla

- Identify the anterior and posterior axillary folds.
- Support the patient's relaxed arm to permit deeper examination.
- Palpate systematically for axillary lymph nodes.
- Assess the surrounding breast and chest wall when clinically indicated.

Coracoid process as a landmark

- Located inferior to the lateral clavicle.
- Helps orient the examiner during anterior shoulder examination.
- Relevant to surgical procedures involving the coracoid process and brachial plexus.

8. Clinical Anatomy

A. Acromioclavicular joint injury

- Fall onto the shoulder may disrupt the acromioclavicular and coracoclavicular ligaments.
- Produces pain and tenderness at the lateral clavicle.
- Severe injury may cause a visible step deformity.

B. Pectoralis major rupture

- Commonly occurs during forceful eccentric loading, such as heavy bench pressing.
- May produce bruising and weakness of adduction or medial rotation.
- Loss of the normal anterior axillary fold is an important clinical clue.

C. Breast carcinoma

- May spread to the pectoral group of axillary lymph nodes.
- Can produce palpable axillary lymphadenopathy.
- Skin dimpling may occur due to involvement of suspensory ligaments.
- Dermal lymphatic obstruction may cause peau d'orange.

D. Clavicular fractures

- The clavicle is easily palpable and vulnerable to direct trauma.
- Fractures may cause localised deformity or swelling.
- The subclavian vessels and brachial plexus lie deep to the clavicle and may rarely be injured in severe displacement.

E. Brachial plexus block

- The coracoid process and clavicle provide useful orientation for selected infraclavicular approaches.
- Modern regional anaesthesia generally relies on ultrasound-guided identification of the plexus and surrounding vessels rather than surface landmarks alone.

9. High-Yield Quick Revision

LANDMARK	IMPORTANT ANATOMICAL FACT
Clavicle	Palpable throughout its length
Sternoclavicular joint	Medial clavicular articulation
Acromioclavicular joint	Lateral clavicular articulation
Coracoid process	Palpable inferior to lateral clavicle
Jugular notch	Approximately T2 level
Sternal angle	T4–T5 disc level
Second costal cartilage	Articulates at sternal angle
Xiphisternal joint	Approximately T9 level
Anterior axillary fold	Pectoralis major
Posterior axillary fold	Latissimus dorsi and teres major
Deltopectoral groove	Cephalic vein

Breast extent	Approximately second to sixth ribs
Male nipple	Commonly fourth intercostal space
Nipple dermatome	T4
Axillary tail of breast	Tail of Spence
Pectoral axillary lymph nodes	Along lateral thoracic vessels

10. Exam Focus

University short-note questions

- Surface landmarks of the pectoral region.
- Sternal angle and its anatomical importance.
- Deltopectoral groove and its contents.
- Surface markings of the breast.
- Anterior and posterior axillary folds.
- Coracoid process as a clinical landmark.

Viva questions

1. At what vertebral level does the sternal angle lie? — T4–T5 intervertebral disc.
2. Which rib is identified using the sternal angle? — Second rib.

3. What forms the anterior axillary fold? — Pectoralis major.
4. What forms the posterior axillary fold? — Latissimus dorsi and teres major.
5. Which vein lies in the deltopectoral groove? — Cephalic vein.
6. Where is the coracoid process palpated? — Inferior to the lateral clavicular region.
7. What is the conventional nipple dermatome? — T4.
8. What is the axillary extension of the breast called? — Axillary tail of Spence.

NEET PG / INI-CET Clinical Pearls

- Sternal angle + second costal cartilage ? Starting point for rib counting.
- T4–T5 transverse thoracic plane ? Divides superior and inferior mediastinum.
- Deltopectoral groove ? Contains cephalic vein.
- Loss of anterior axillary fold after weightlifting ? Suspect pectoralis major rupture.
- Step deformity at lateral clavicle ? Acromioclavicular joint separation.
- T4 sensory level ? Conventionally associated with the nipple.
- Palpable axillary lymph nodes in breast carcinoma ? May represent regional lymphatic involvement.
- Coracoid process ? Important landmark in shoulder surgery and selected regional anaesthetic approaches.