Breast – Dissection

BREAST — DISSECTION

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1. Introduction

Dissection of the breast demonstrates the anatomical arrangement of the mammary gland, superficial fascia, suspensory ligaments, lactiferous ducts, blood vessels, nerves, lymphatic drainage and retromammary space.

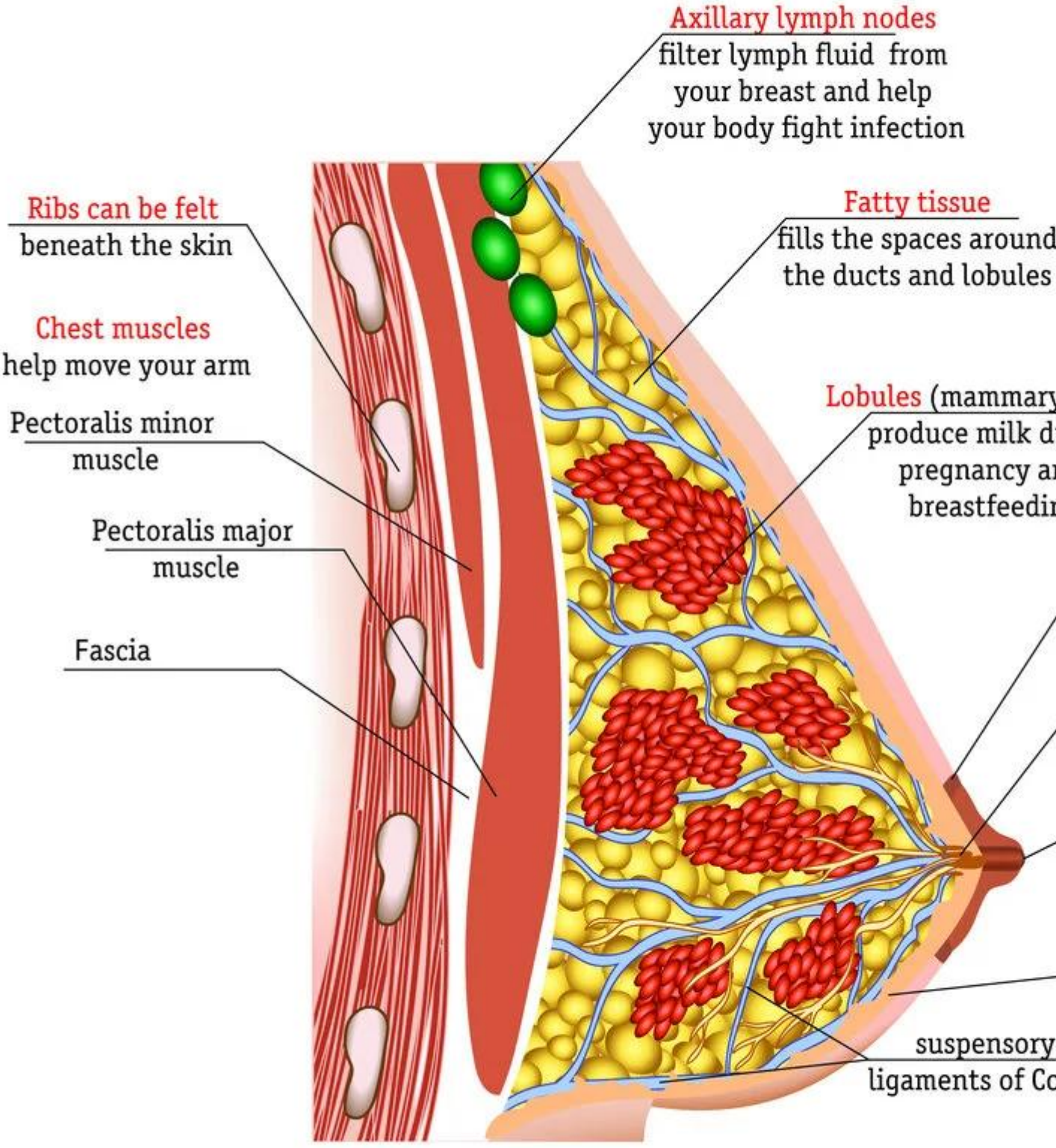
Learning objectives

After completing the dissection, students should be able to:

- Identify the nipple, areola and glandular tissue.
- Demonstrate the relationship of the breast to the superficial fascia.
- Identify Cooper's suspensory ligaments and the retromammary space.
- Study the arrangement of the lobes, lobules and lactiferous ducts.
- Describe the blood supply, nerve supply and lymphatic drainage.
- Identify the axillary tail of Spence.
- Explain the anatomical basis of important signs of breast carcinoma.

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MEDICAL STRUCTURE OF THE FEMALE BR



2. Steps of Dissection

Step 1 — Skin incisions and reflection

Procedure

1. Place the cadaver in the supine position with the upper limb appropriately abducted.
2. Identify the boundaries of the breast, nipple, areola and anterior axillary fold.
3. Follow the institution's prescribed dissection protocol for skin incisions around the breast.
4. Reflect the skin carefully to expose the superficial fascia and underlying breast tissue.
5. Preserve the nipple–areolar complex and representative skin attachments where possible.

A circular incision may be used in selected dissection demonstrations, but the incision pattern should be planned to preserve structures required for subsequent study.

Structures to observe

Nipple

- Projection situated near the centre of the breast.
- Contains the external openings of the lactiferous ducts.
- Composed of connective tissue and smooth muscle.
- The duct openings are very small and may require magnification to identify.

Areola

- Pigmented area surrounding the nipple.
- Contains enlarged sebaceous glands called Montgomery glands.
- The glands may produce small surface elevations called Montgomery tubercles.

Dissection precaution: Do not remove all skin attachments immediately, because this may destroy the suspensory ligaments that are important for demonstrating the anatomical basis of skin dimpling.

Step 2 — Superficial fascia and mammary gland

The breast is situated predominantly within the superficial fascial tissue of the anterior chest wall.

Procedure

1. Reflect the skin and subcutaneous tissue gradually.
2. Identify glandular tissue surrounded by adipose tissue.
3. Preserve fibrous connective tissue strands extending towards the skin.
4. Make a controlled section through the gland to examine its internal organisation.
5. Observe the relationship between the breast tissue and its superficial fascial envelope.

Important structures

STRUCTURE	DISSECTION FEATURES
Glandular lobes	Conventionally described as approximately 15–20 lobes arranged around the nipple
Lobules	Smaller subdivisions containing glandular units
Lactiferous ducts	Collecting ducts converging towards the nipple
Adipose tissue	Fat surrounding and separating glandular components
Cooper's ligaments	Fibrous septa connecting the dermis with supporting connective tissue and deep fascial structures

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Lactiferous ducts

- Larger ducts converge towards the nipple and open separately onto its surface.
- The conventional description of one major duct per lobe is a simplified anatomical model; actual duct branching and the number of nipple openings vary.
- Fine ducts and terminal duct lobular units cannot usually be identified individually by unaided gross dissection.

Suspensory ligaments of Cooper

- Dense fibrous septa traversing the breast tissue.
- Help maintain breast architecture and contour.
- Connect the breast stroma with the overlying skin and deep supporting fascia.

Clinical pearl: Fibrosis or tumour-related tethering of Cooper's ligaments can produce skin dimpling.

Step 3 — Retromammary space

The retromammary space is a plane of loose connective tissue between the posterior breast and underlying deep pectoral fascia.

Procedure

1. Carefully separate the posterior surface of the breast from the pectoral fascia.
2. Identify the loose connective tissue plane.
3. Observe the mobility of the breast over the underlying chest wall.
4. Demonstrate the pectoral fascia and pectoralis major deep to this plane.

Important features

- Contains loose areolar connective tissue.
- Allows movement of the breast over the underlying muscles.

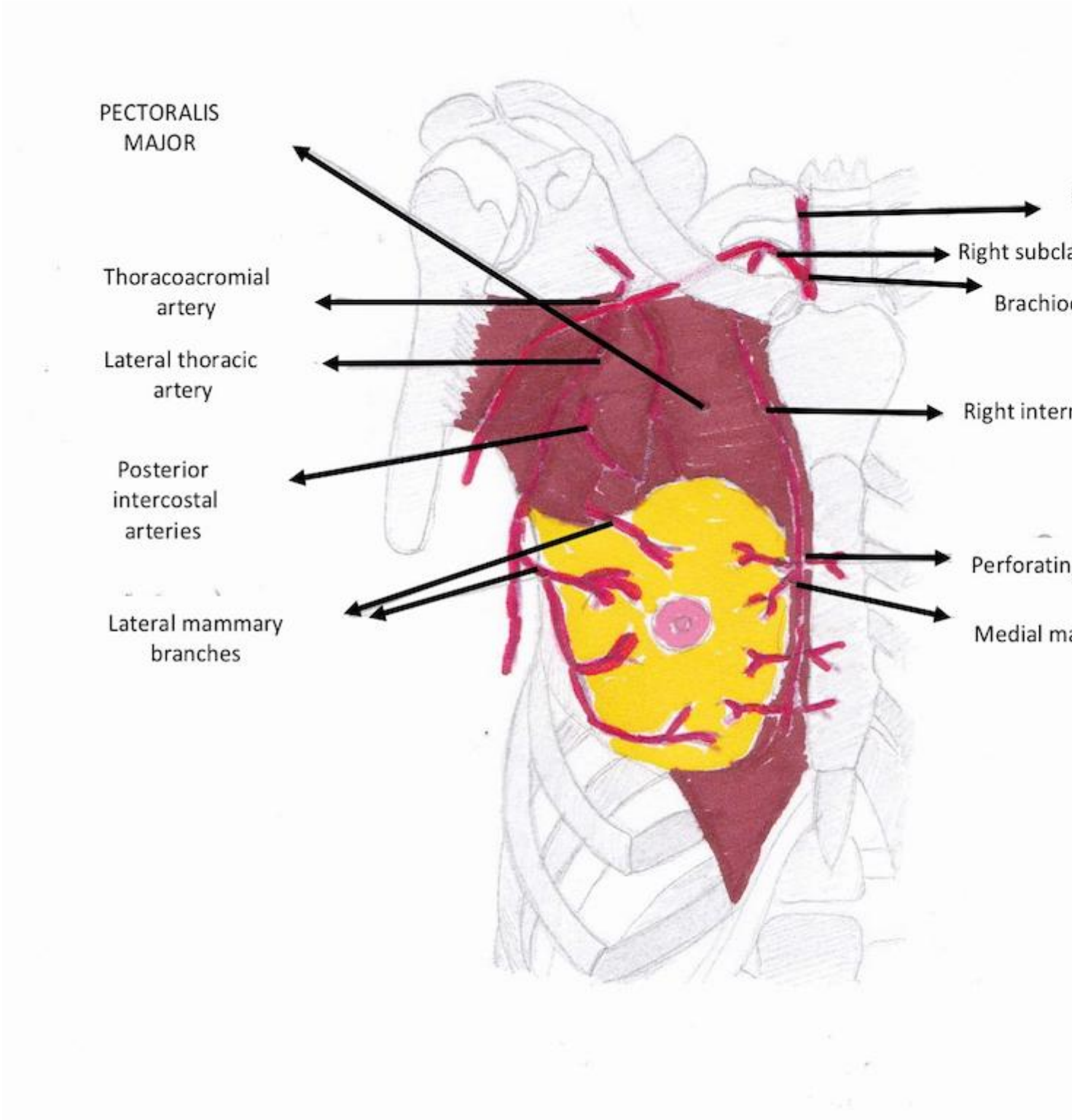
- Provides a surgical plane for certain breast procedures.

- Can occasionally be involved in deep breast infection or tumour invasion.

Clinical importance: Infiltration of deeper supporting tissues by carcinoma may reduce breast mobility and cause fixation to underlying structures.

Step 4 — Vascular supply

The breast receives arterial blood through several branches of the axillary, internal thoracic and intercostal arterial systems.



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Arterial supply

ARTERY	CONTRIBUTION
Internal thoracic artery	Perforating branches supply the medial breast
Lateral thoracic artery	Important supply to the lateral breast and axillary tail
Thoracoacromial artery	Pectoral branches supply superior and deep regions
Posterior intercostal arteries	Contribute to lateral and deeper breast vascularisation

Dissection procedure

- Identify the superficial vascular branches preserved during reflection.
- Trace the lateral thoracic vessels in relation to the axilla where accessible.
- Identify internal thoracic perforating branches near the parasternal region, if preserved.
- Observe smaller vascular branches entering the breast from the surrounding chest wall.

The main internal thoracic and posterior intercostal arteries lie deep to the breast and are not normally exposed by simple reflection of the mammary gland.

Venous drainage

- Veins generally accompany the arterial pathways.
- Drain primarily into the axillary, internal thoracic and intercostal venous systems.
- The superficial venous network around the nipple is traditionally described as the circulus venosus of Haller.

Step 5 — Nerve supply

The breast receives sensory innervation mainly from the cutaneous branches of the intercostal nerves.

Important nerves

NERVE	DISTRIBUTION
Anterior cutaneous branches of T2–T6	Medial breast skin
Lateral cutaneous branches of T2–T6	Lateral breast skin
Fourth intercostal nerve (T4)	Important contribution to nipple–areolar sensation
Supraclavicular nerves	May contribute to sensation over the superior breast region
Sympathetic fibres	Supply blood vessels and smooth muscle of nipple–areolar complex

Dissection procedure

1. Identify cutaneous branches of intercostal nerves as they emerge through the anterior and lateral thoracic walls.
2. Preserve any visible branches entering the breast.
3. Trace larger nerves where possible without destroying surrounding glandular structures.

Must know: The nipple is conventionally associated with the T4 dermatome.

Important distinction: Milk ejection is caused by circulating oxytocin acting on myoepithelial cells; it is not produced directly by sympathetic nerve stimulation.

Step 6 — Lymphatic drainage

The breast has extensive superficial and deep lymphatic networks that drain principally into the axillary and parasternal lymph nodes.

Principal lymphatic pathways

LYMPHATIC GROUP	AREA DRAINED / IMPORTANT FEATURES
Axillary lymph nodes	Receive most breast lymph, conventionally estimated at approximately 75%; particularly important for lateral breast regions
Parasternal (internal mammary) nodes	Receive lymph mainly from medial breast regions
Posterior intercostal nodes	Receive a smaller proportion from deep and posterior tissues
Subdiaphragmatic lymphatics	Minor connections from inferior breast and upper abdominal wall

Main axillary pathway

Breast lymphatic vessels

Anterior (pectoral) axillary nodes

Central axillary nodes

Apical axillary nodes

Subclavian lymphatic trunk

Subareolar plexus of Sappey

- A rich network of lymphatic vessels associated with the nipple–areolar region.
- Communicates with superficial and deeper lymphatic channels.
- Relevant to lymphatic mapping and sentinel lymph node biopsy.

Dissection procedure

1. Identify accessible anterior (pectoral) axillary lymph nodes within the axillary fat.
2. Observe their relationship to the lateral thoracic vessels.
3. Demonstrate the positions of the central and apical axillary nodes where accessible.
4. Study the parasternal lymph nodes along the internal thoracic vessels using an appropriate anatomical preparation or diagram.
5. Review the subareolar plexus of Sappey using illustrations or specially prepared specimens.

Practical limitation: Individual breast lymphatic vessels and Sappey's plexus are generally too fine to demonstrate reliably during routine undergraduate cadaveric dissection. Their detailed visualisation may require injection techniques, magnification or special preparations.



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Step 7 — Relations of the breast

The breast lies on the anterior thoracic wall, separated from the underlying deep fascia by loose retromammary connective tissue.

Structures deep to the breast

- Pectoralis major: Underlies approximately two-thirds of the breast.
- Serratus anterior: Underlies much of the remaining lateral portion.
- External oblique aponeurosis: Related to part of the inferior breast.
- Pectoral fascia: Lies deep to the retromammary tissue.

Dissection procedure

1. Reflect the breast carefully from the underlying pectoral fascia.
2. Observe the broad relationship with pectoralis major.
3. Identify serratus anterior towards the lateral thoracic wall.
4. Trace the superolateral extension of glandular tissue towards the axilla.

Axillary tail of Spence

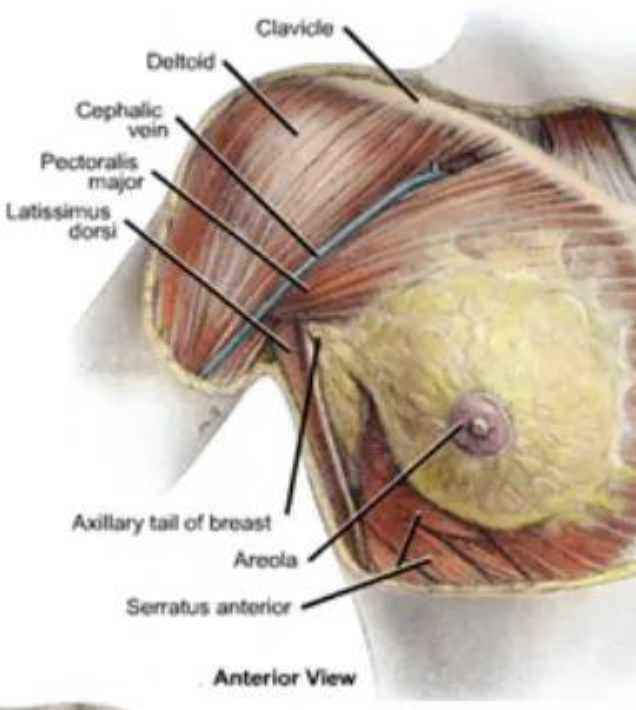
- Extension of mammary glandular tissue towards the axilla.
- May pass through the deep fascia into the axillary region.
- Important during clinical examination and breast surgery.
- May contain the same types of pathological lesions as the main breast.

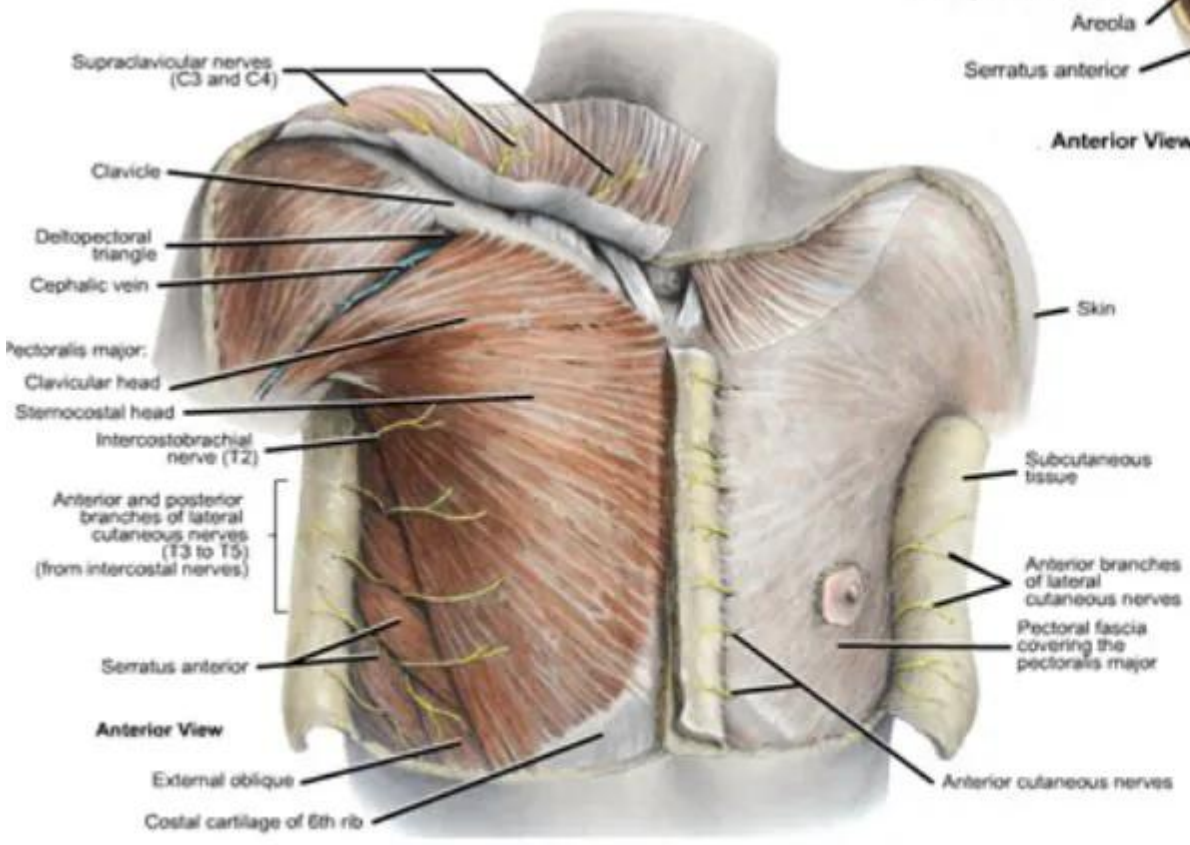
Thoracic wall

-Skin

-Superficial fascia

-deep fascia





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3. Clinical Demonstrations in Dissection

A. Carcinoma of the breast

The relationship between the mammary gland, suspensory ligaments, lactiferous ducts, skin and deep fascia explains several important signs.

CLINICAL SIGN	ANATOMICAL BASIS
Skin dimpling	Tethering and shortening of Cooper's suspensory ligaments
Peau d'orange	Dermal lymphatic obstruction causing skin oedema
Nipple retraction	Fibrosis and shortening of subareolar ducts and surrounding tissues
Fixed breast mass	Infiltration of deep supporting tissues or chest wall structures
Axillary lymphadenopathy	Possible lymphatic metastasis to regional nodes

B. Gynaecomastia

- Benign proliferation of glandular breast tissue in males.
- Usually presents as palpable tissue beneath the nipple–areolar complex.
- May be physiological or associated with endocrine disorders, medications or systemic illness.

C. Polymastia

- Presence of additional mammary glandular tissue.

- Commonly occurs in the axillary region.
- May undergo enlargement during pregnancy or lactation.

D. Polythelia

- Presence of one or more supernumerary nipples.
- Usually occurs along the embryonic mammary ridge (milk line).
- May occur with or without accessory glandular tissue.

4. Key Structures to Identify During Dissection

Practical dissection checklist

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Nipple and areola

Montgomery glands or tubercles

Superficial fascia

Glandular and adipose tissue

Cooper's suspensory ligaments

Larger lactiferous ducts (if visible)

Retromammary tissue plane

Pectoral fascia

Pectoralis major

Serratus anterior

Axillary tail of Spence

Accessible vessels and cutaneous nerves

Anterior axillary lymph nodes

Reset checklist

5. High-Yield Quick Revision

STRUCTURE	IMPORTANT DISSECTION POINT
Breast location	Superficial fascia
Nipple	Openings of lactiferous ducts
Areola	Montgomery glands

Glandular lobes	Conventionally 15–20
Cooper's ligaments	Supporting fibrous septa
Retromammary space	Loose connective tissue plane
Major underlying muscle	Pectoralis major
Lateral underlying muscle	Serratus anterior
Axillary extension	Tail of Spence
Main breast arterial supply	Internal thoracic and lateral thoracic arteries
Important nipple nerve	Fourth intercostal nerve
Main lymphatic drainage	Axillary nodes
Subareolar lymphatic network	Plexus of Sappey
Skin dimpling	Cooper's ligament tethering
Peau d'orange	Dermal lymphatic obstruction
Fixed breast	Possible deep tissue invasion

6. Exam Focus

University practical questions

1. Demonstrate the nipple, areola and internal structures of the breast.
2. Identify Cooper's suspensory ligaments and explain their clinical importance.
3. Demonstrate the retromammary space and its relationship to pectoral fascia.
4. Describe the blood supply and nerve supply of the breast.
5. Explain the lymphatic drainage of the breast using a labelled diagram.
6. Identify the axillary tail of Spence.

Viva questions

1. In which fascia is the breast situated? — Superficial fascia.
2. What are Cooper's ligaments? — Fibrous septa supporting the mammary gland.
3. What is the retromammary space? — Loose connective tissue plane between the posterior breast and underlying deep fascia.
4. Which muscle lies deep to most of the breast? — Pectoralis major.
5. What is the axillary tail of Spence? — The superolateral glandular extension of the breast towards the axilla.
6. What is Sappey's plexus? — A lymphatic network associated with the nipple–areolar complex.
7. Which intercostal nerve is important for nipple sensation? — Fourth intercostal nerve (T4).
8. Why does skin dimpling occur in breast carcinoma? — Fibrosis and tethering of Cooper's suspensory ligaments.

NEET PG / INI-CET Clinical Pearls

- Breast mobility over chest wall ? Retromammary loose connective tissue plane.
- Skin dimpling in breast carcinoma ? Cooper's ligament tethering.
- Peau d'orange ? Dermal lymphatic obstruction.
- Nipple retraction ? Fibrosis of subareolar ducts and tissues.
- Most breast lymphatic drainage ? Axillary lymph nodes.
- Subareolar plexus ? Plexus of Sappey.
- Axillary extension of glandular tissue ? Tail of Spence.
- Accessory nipple ? Polythelia.
- Accessory glandular tissue ? Polymastia.
- Fixed breast mass ? Consider deep fascial or chest wall invasion.

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