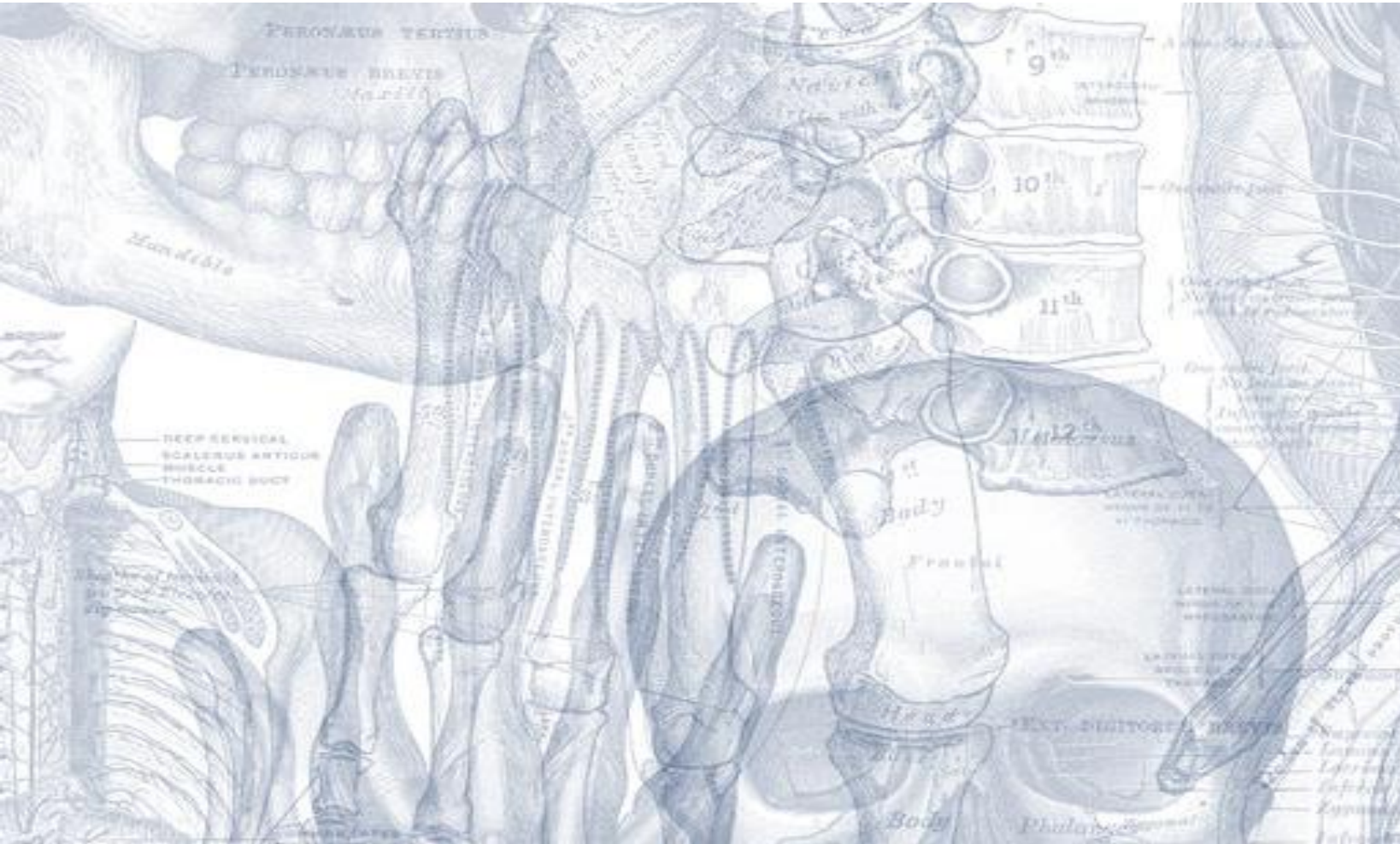


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Anatomy of the Breast

Please view our [Editing File](#) before studying this lecture to check for any changes.

Color Code

- Important
- Doctors Notes
- Notes/Extra explanation

Objectives

By the end of the lecture, the student should be able to:

- ✓ Describe the shape and position of the female breast.
- ✓ Describe the structure of the mammary gland.
- ✓ List the blood supply of the female breast.
- ✓ Describe the lymphatic drainage of the female breast.
- ✓ Describe the applied anatomy in the female breast.

Introduction

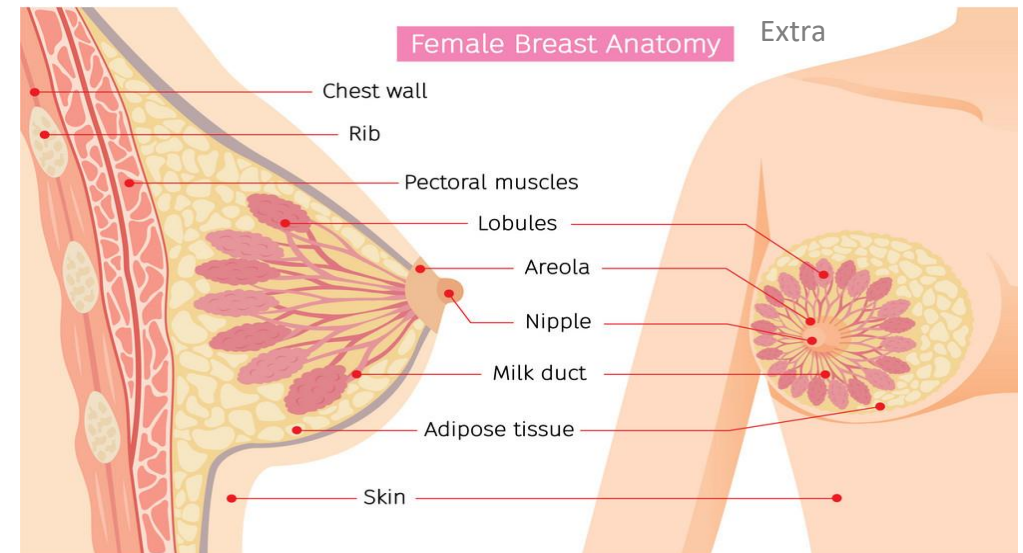
Highly recommended →



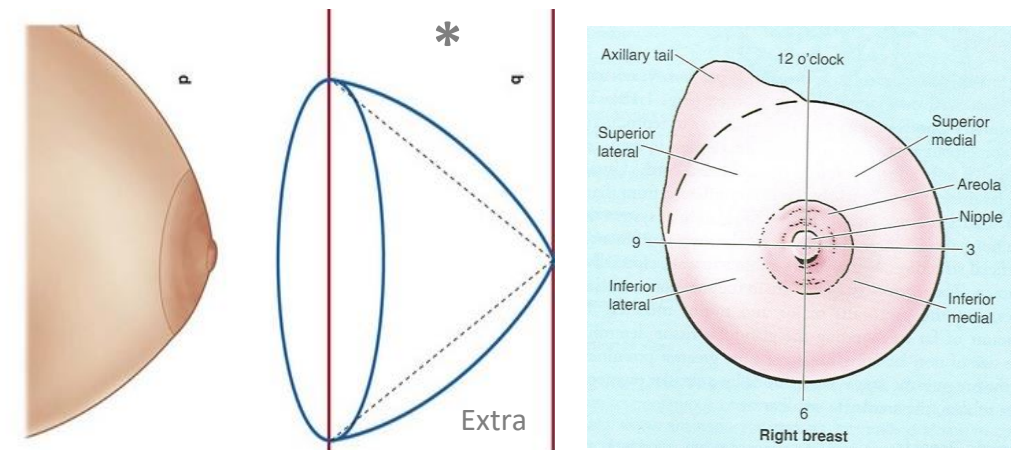
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Overview of the breast:

- The breast (consists of mammary glands + associated skin & connective tissue) is a **gland** made up of lobes arranged radially (شعاعيا) around the nipple.
- Each lobe is further divided into lobules. Between the lobes and lobules we have fat & ligaments called ligaments of Cooper
- These ligaments attach the skin to the muscle (beneath the breast) to give support to the breast.



- **Shape:** it is **conical*** (مخروطي) in shape
- **Position:** It lies in **superficial fascia** of the front of chest.
- **Parts:** It has a:
 1. **Base** → lies on muscles,
 2. **Apex** → nipple (حلمة الثدي)
 3. **Tail** → extend into axilla

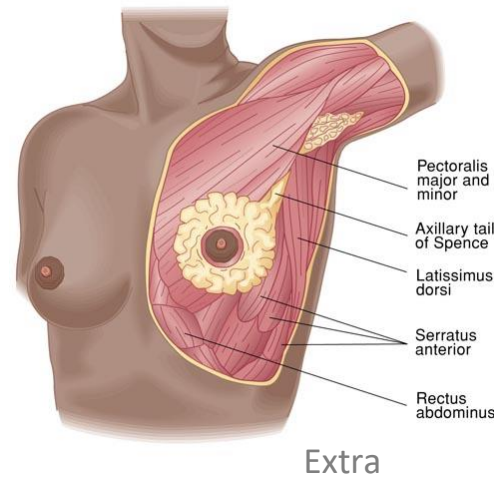
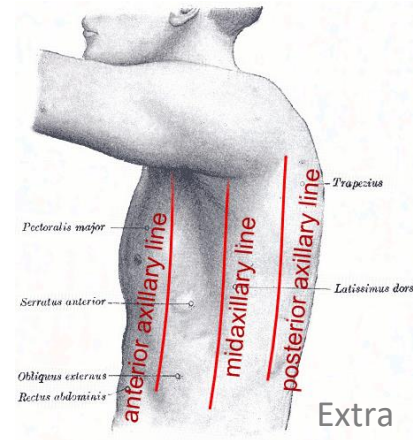


Position of Female Breast

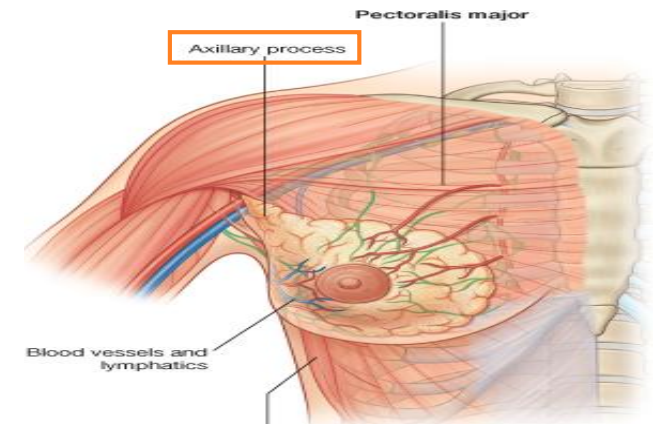
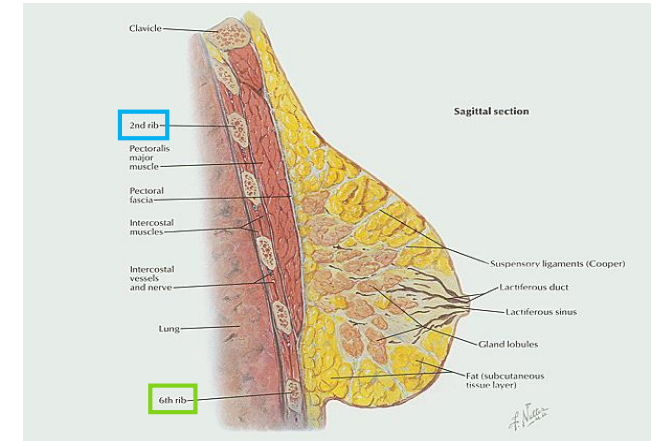
Base

- Extends from 2nd to 6th ribs.
- It extends from the lateral margin of **sternum** *medially* to the **midaxillary** line *laterally*.
- It has **no capsule**.
- It lies on 3 muscles:
 - 2/3 of its base on → (1) **pectoralis major*** muscle,
 - inferolateral 1/3 on → (2) **Serratus anterior** & (3) **External oblique muscles** (muscle of anterior abdominal wall).
- Its superolateral part sends a process into the axilla called the **axillary tail** or **axillary process**.

Nipple



Areola (حلقة ملونة)



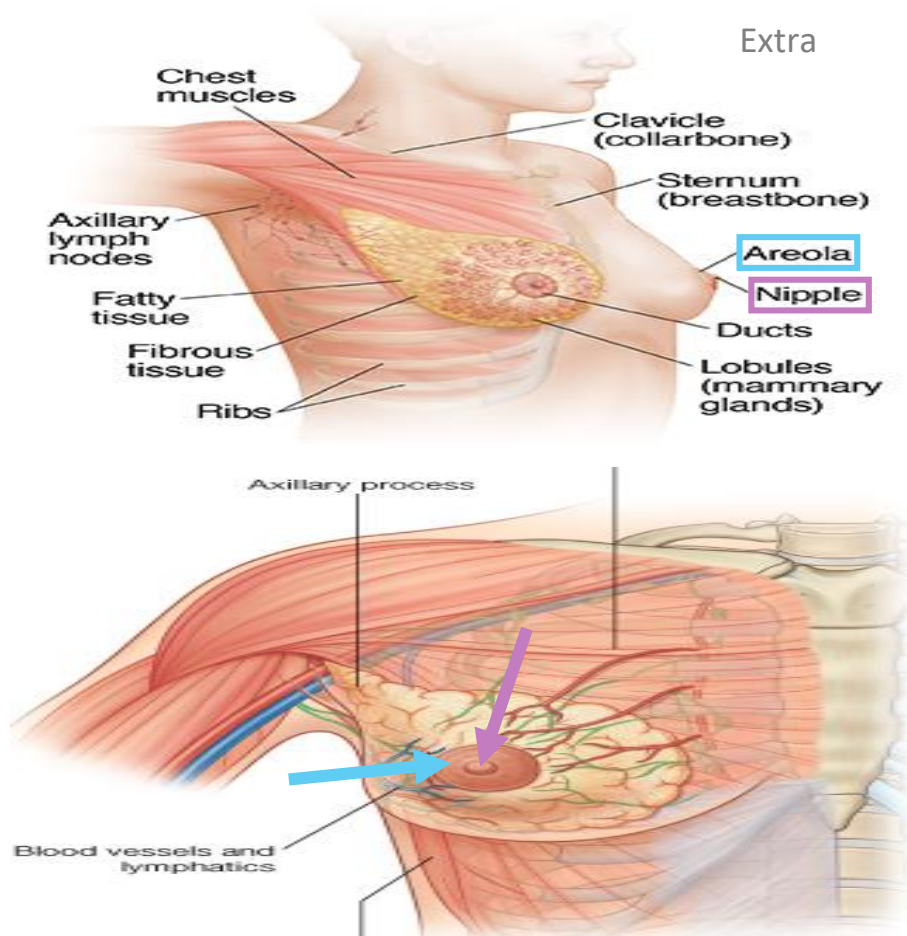
*The **majority** of the breast lies on pectoralis **major**.

Position of Female Breast

Base

Nipple

Areola (حلقة ملونة)



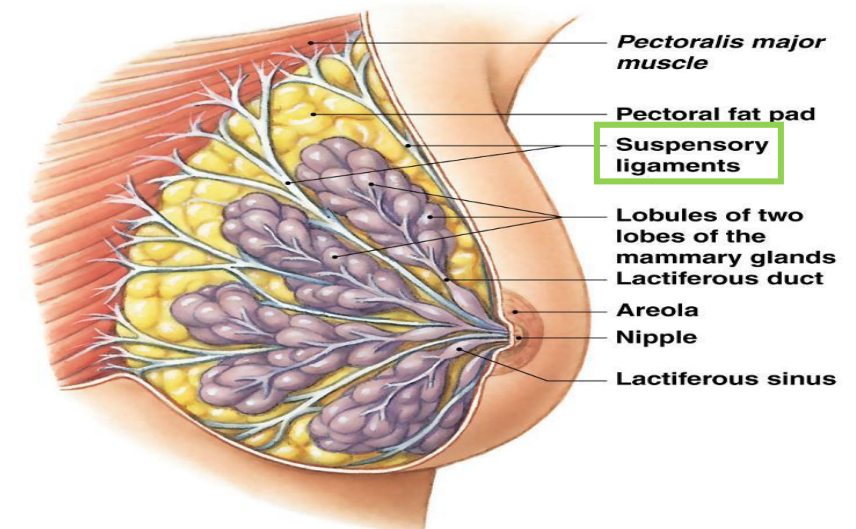
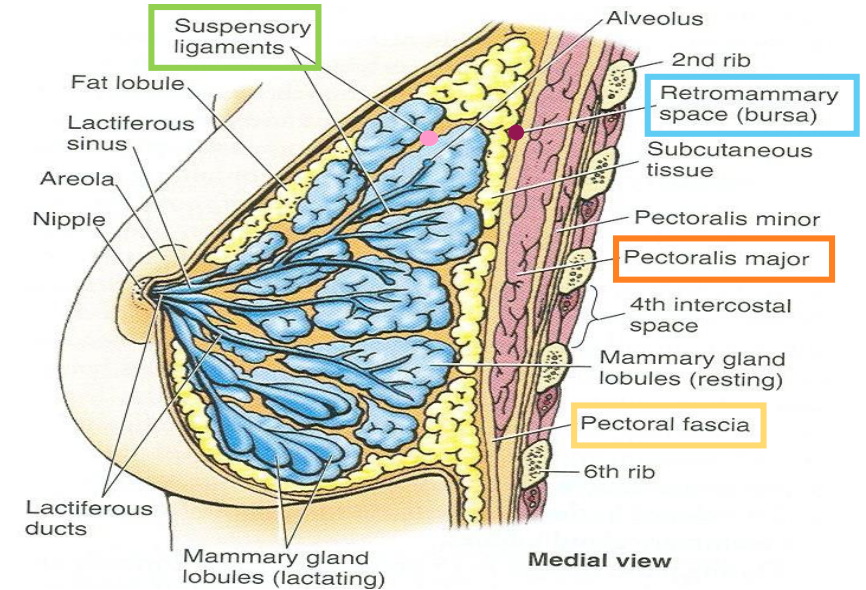
- It is a **conical eminence** that projects forwards from the anterior surface of the breast.
- **The nipple lies opposite 4th intercostal space.** (normally this is in a woman who has not breast fed. The position is not constant & may change after breastfeeding)
- It carries **15-20** narrow pores (openings) of the **lactiferous ducts.**

- It is a **dark pink brownish circular area of skin** that surrounds the nipple.
- The **subcutaneous tissues of nipple & areola** are devoid of fat.

Structure of Mammary Gland



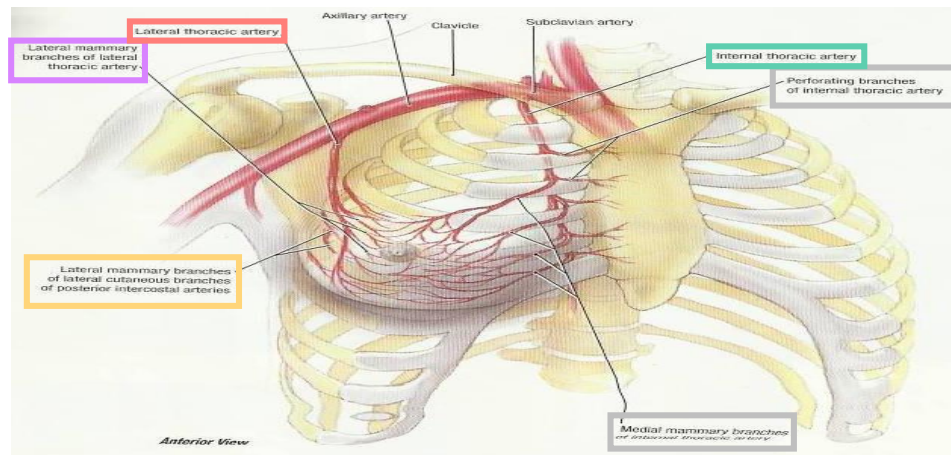
Capsule	<ul style="list-style-type: none"> ○ It is non capsulated modified sweat gland.
Divisions	<ul style="list-style-type: none"> ○ It is formed of 15-20 lobes and each lobe is formed of a number of lobules. ○ The lobes and lobules are embedded in the subcutaneous fatty tissue of superficial fascia. ○ The lobes and lobules are <u>separated</u> from each other by interlobar and interlobular fatty tissue & fibrous strands called ligaments of Cooper or <u>suspensory ligaments</u>. ○ Importance? These ligaments run radially & give the breasts support by connecting the skin of the breast to the deep fascia of underlying pectoralis muscle. Invasion of these ligaments causes peau d'orange.
Space	<ul style="list-style-type: none"> ○ The gland is separated from the deep fascia of the underlying muscle (pectoralis major) by a layer of loose areolar tissue which forms the retromammary space. ○ What is its Importance? (allows the breast to move freely).
Ducts	<ul style="list-style-type: none"> ○ It has from 15-20 lactiferous ducts which open by the same number of openings on the summit (قمة) of the nipple. (each duct has its own opening)



Female Breast Blood Supply

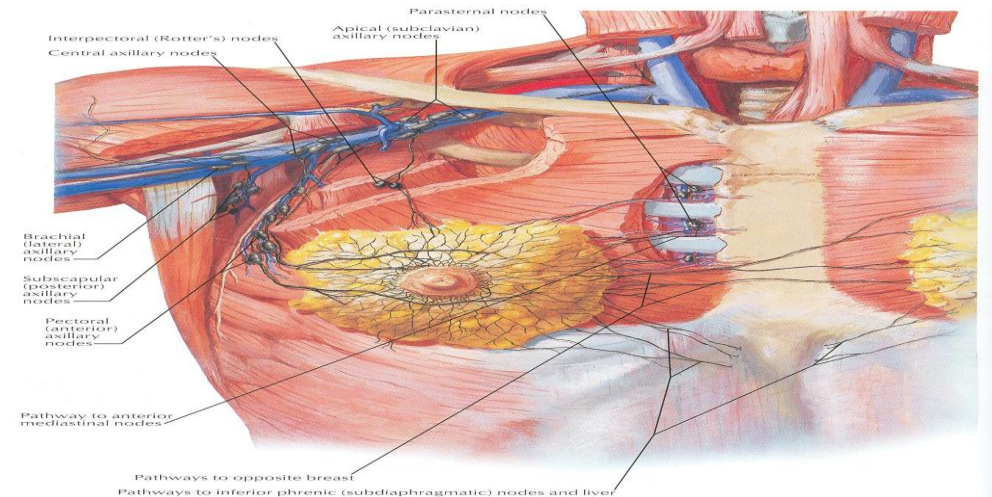
Arterial supply **Important!**

1. Perforating branches and mammary branches of **internal thoracic** (internal mammary) **artery**.
2. Mammary branches of **lateral thoracic** **artery**.
3. Mammary branches of **Intercostal** **arteries**.



Venous drainage

- Veins are corresponding to the arteries.
- **Circular venous plexus** are found at the base of nipple (called **superficial venous plexus**).
- Finally, veins of this plexus drain into **axillary* & internal thoracic veins**.



*axillary vein continues as subclavian at level of the first rib

Axillary Lymph Nodes **Important!**

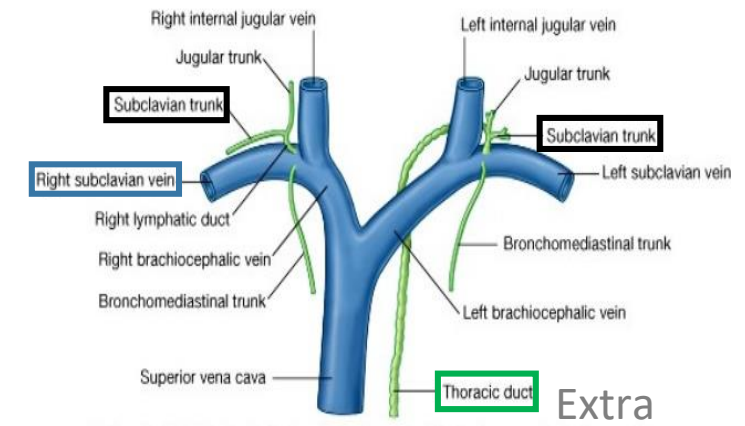
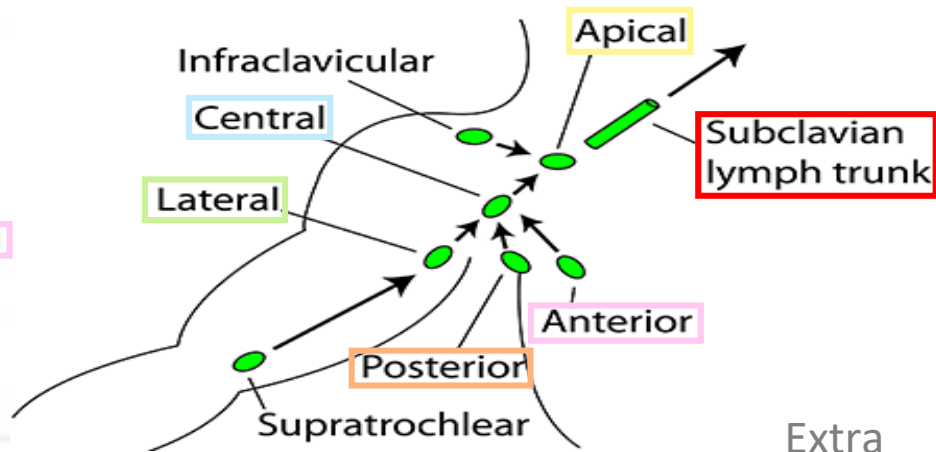
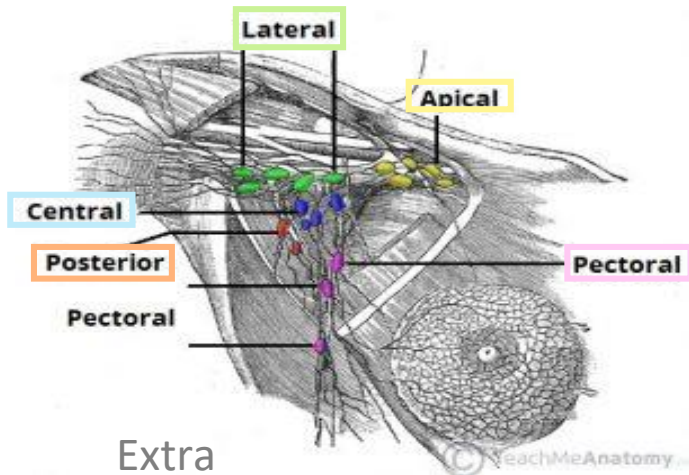
Before we talk about lymphatic drainage of the breast, let's see the axillary nodes since most of the breast drains into them.

- They are arranged into 5 groups which lie in axillary fat:

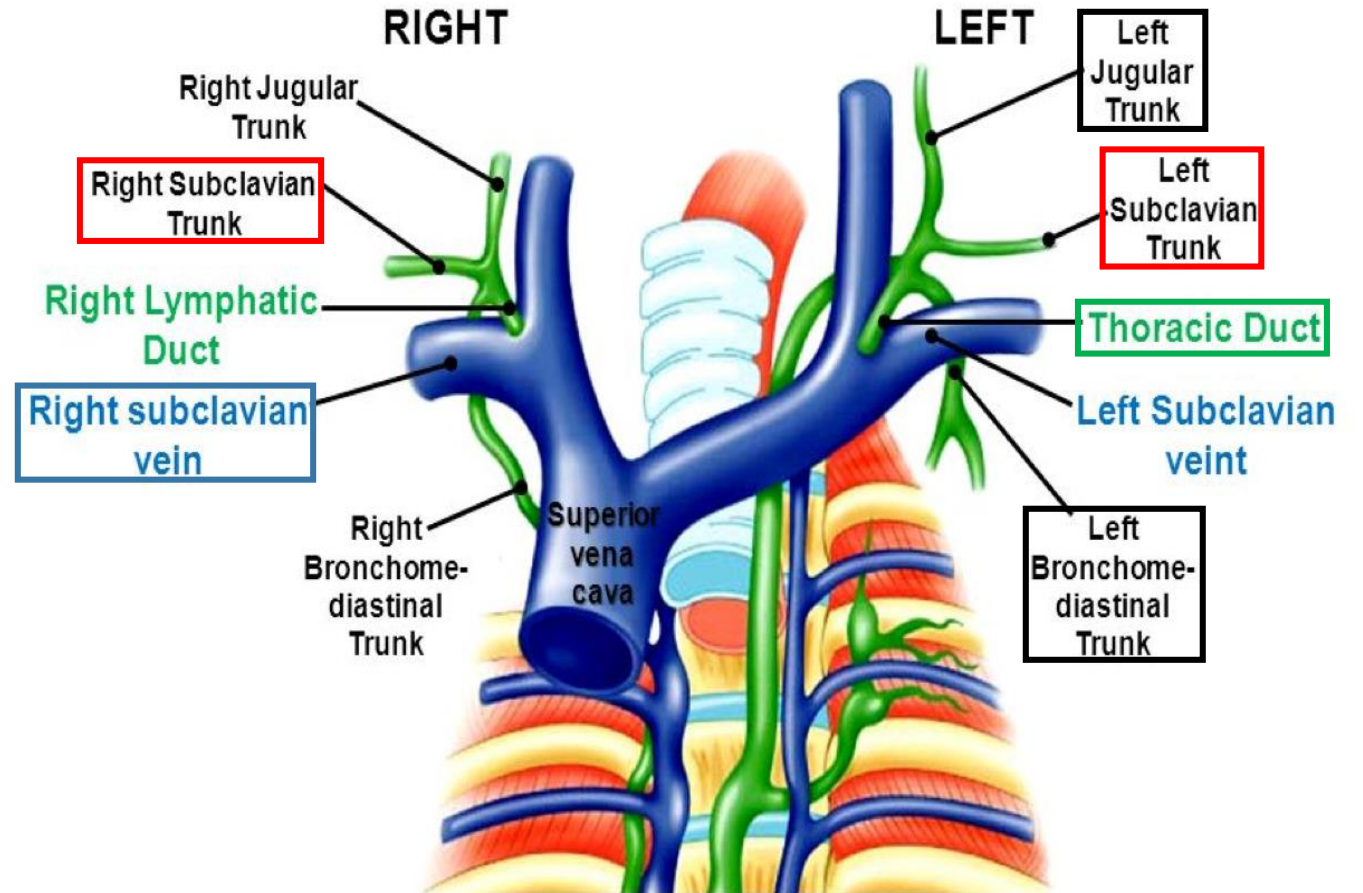
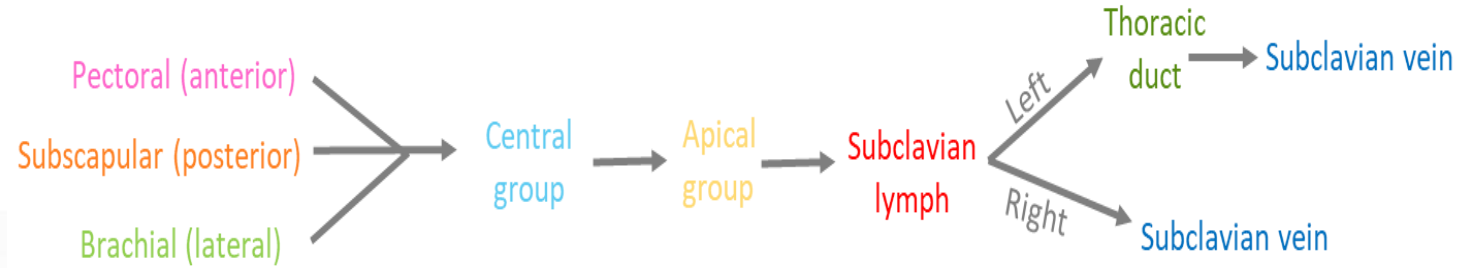
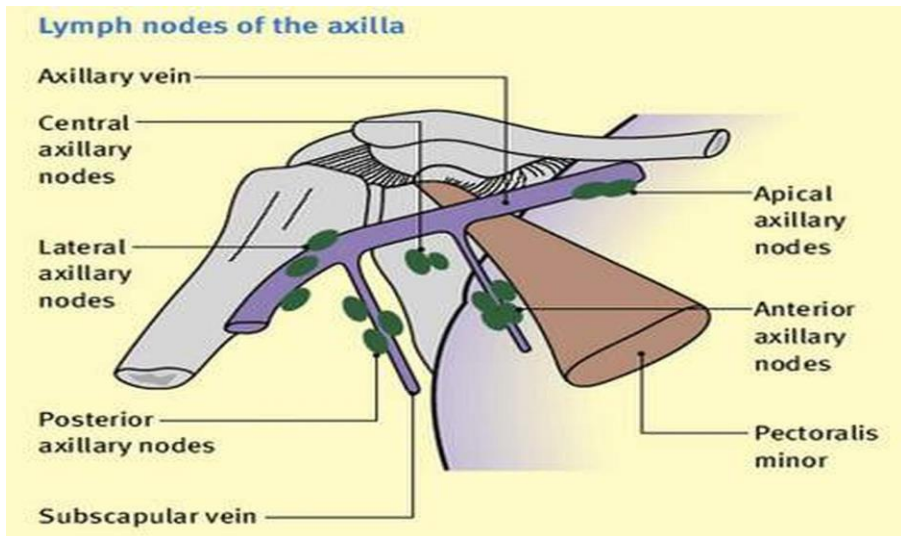
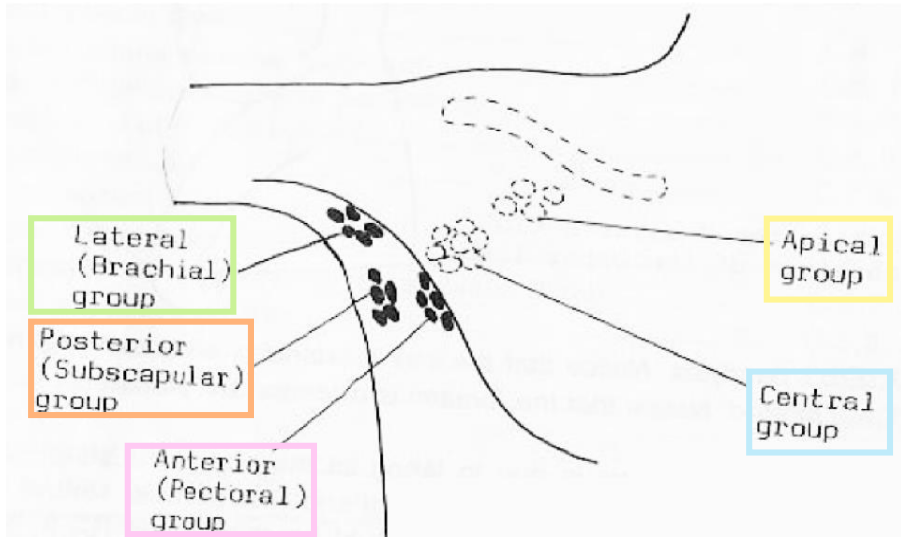
Pectoral Group (Anterior)	Subscapular Group (Posterior)	Brachial Group (Lateral/ Humeral)	Central Group	Apical Group
Which lies on the <u>pectoralis minor*</u> along lateral thoracic vessels . <small>*Breast → pectoralis major Axillary nodes → pectoralis minor</small>	Which lies on <u>posterior wall of axilla</u> on lower border of <u>subscapularis</u> along subscapular vessels .	Lies on <u>lateral wall of axilla</u> along 3rd part of axillary vessels .	Lies in <u>axillary fat</u> at the <u>base of axilla</u> . They receive lymph from the pectoral, subscapular and humeral axillary lymph node groups.	Lies at <u>apex of axilla</u> . They receive lymph from the central axillary lymph nodes, therefore from all axillary lymph node groups.

All of them will go to: **Subclavian lymph trunk**: It is formed by **union of efferent lymph vessels of apical group**.

- On the **right** side, It usually opens in the **subclavian vein** (directly).
- On the **left** side it usually opens into the **thoracic duct** then into the **left subclavian**.



Axillary Lymph Nodes

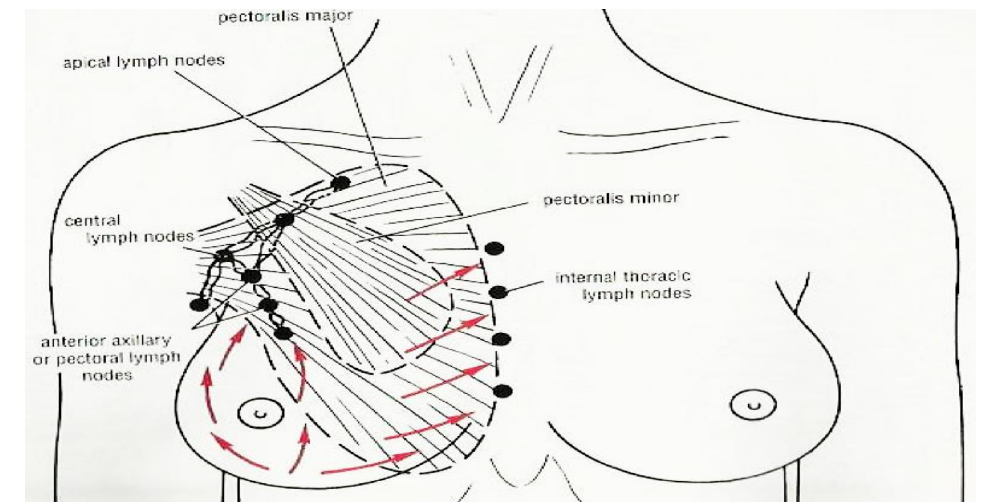
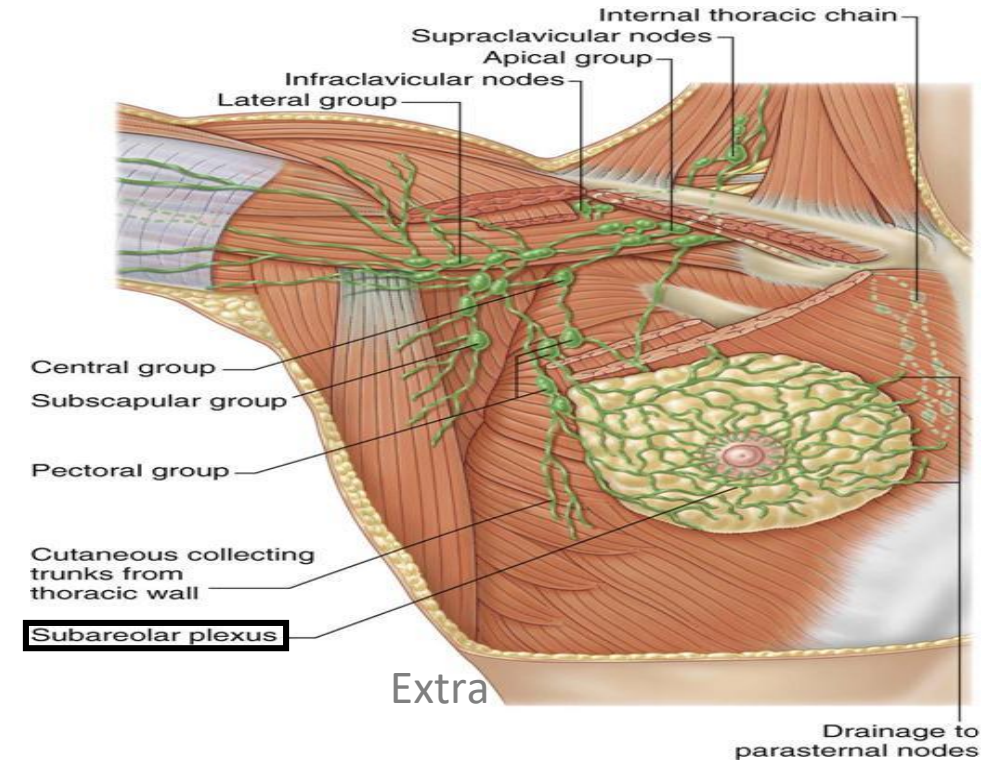


Female Breast Lymphatic Drainage of Breast



Lymphatic drainage

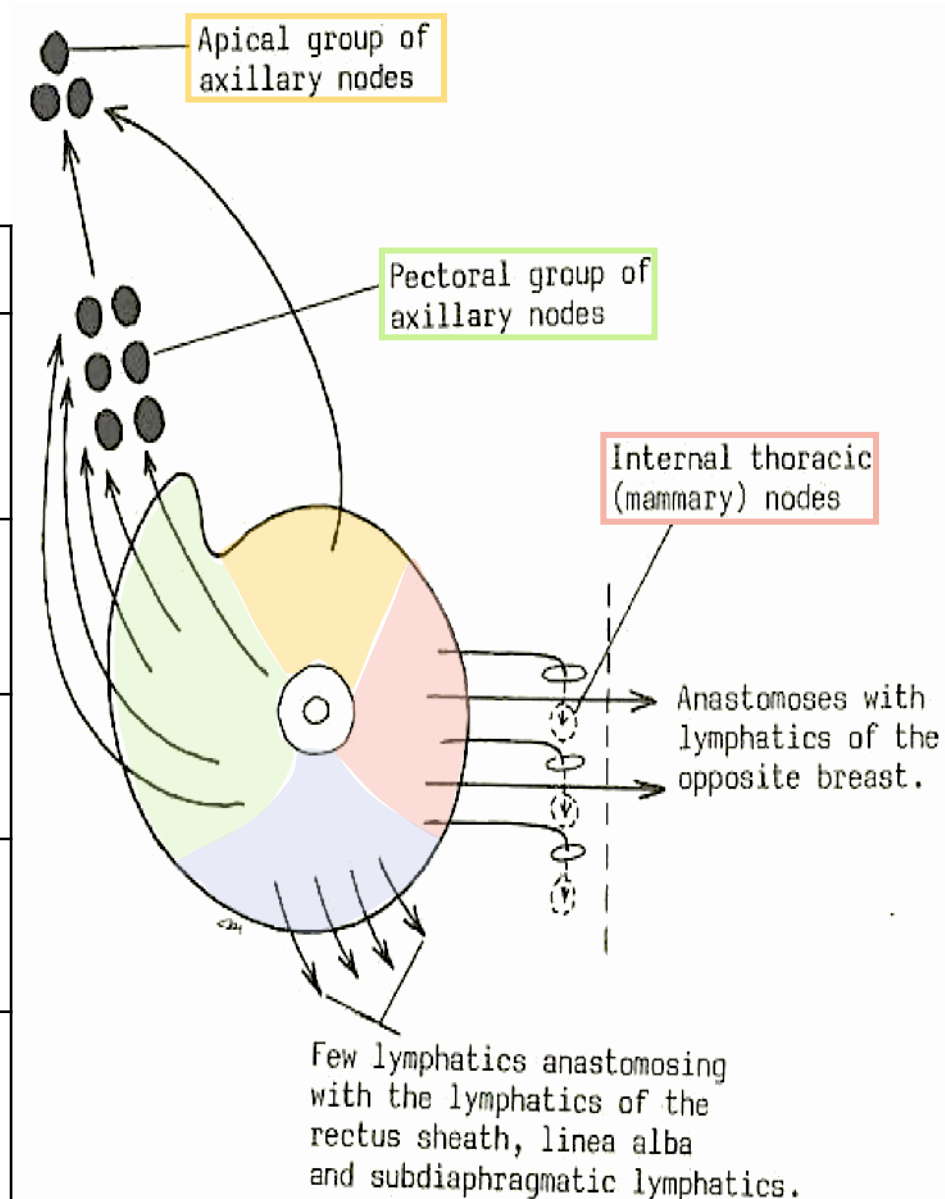
- 1. Subareolar lymphatic plexus:**
Lies beneath the areola.
 - 2. Deep lymphatic plexus:**
Lies on the deep fascia covering pectoralis major.
- Both plexuses radiate in many directions and drain into different lymph nodes (**axillary groups** (mainly) + **internal thoracic** lymph nodes).



Female Breast Lymphatic Drainage

The breast is divided into parts (each has different drainage):

Gland Part	Drainage
1. Central & Lateral Parts	75% drain into pectoral group of axillary lymph nodes then into apical
2. Upper Part	Drains into apical group (directly) of axillary lymph nodes.
3. Medial Part	Drains into internal thoracic (parasternal) lymph nodes, forming a chain along the internal thoracic vessels. Some lymphatics from the medial part of the gland pass across the front of sternum to anastomose with that of opposite side . So cancer can spread from one breast to the other.
4. Inferomedial Part	Anastomose with lymphatics of rectus sheath & linea alba , and some vessels pass deeply to anastomose with the subdiaphragmatic lymphatics .

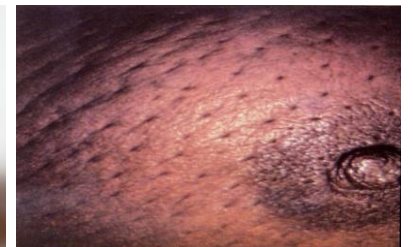
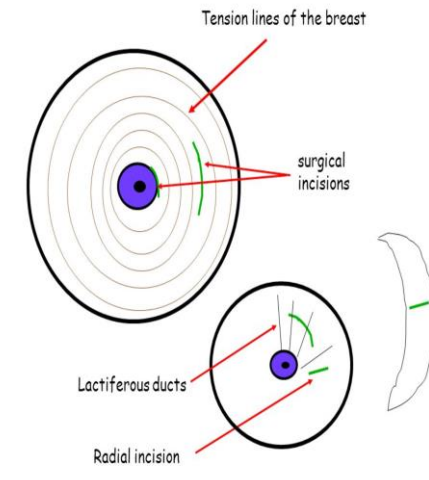
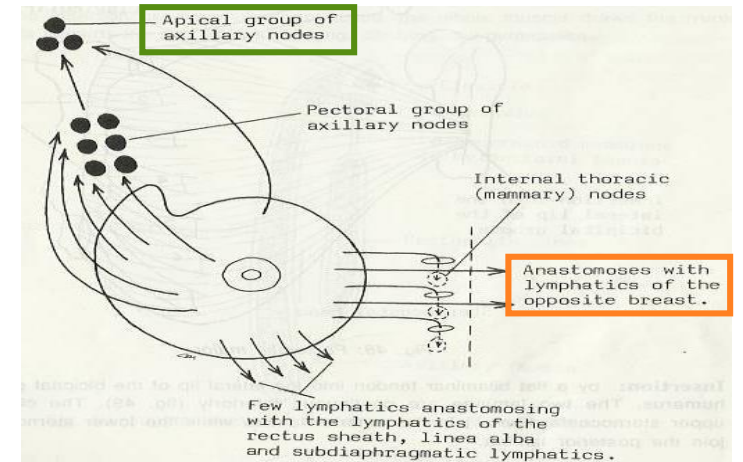


Applied Anatomy Important for SAQs

Breast Cancer

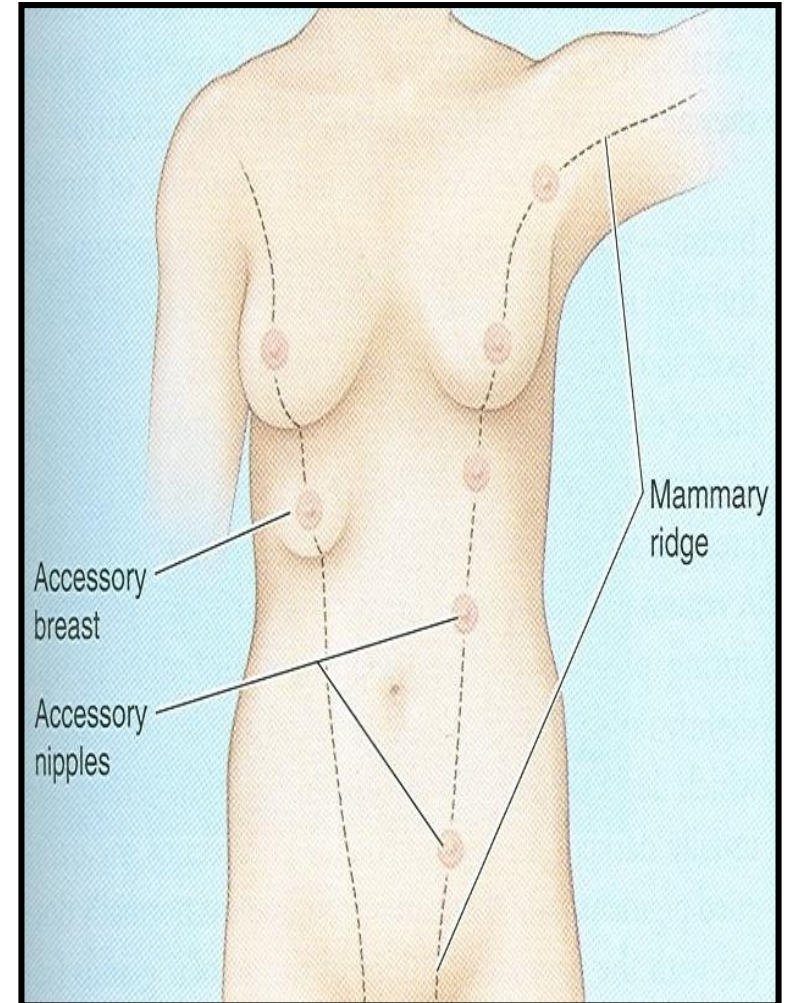
- It is a common surgical condition.
- 60% of carcinomas of breast occur in the **upper lateral quadrant** (which goes to the pectoral group).
- 75% of lymph from the breast drains into the **axillary lymph nodes**.
- In case of carcinoma of one breast, the **other breast** and the **opposite axillary lymph nodes are affected** because of the **anastomosing** lymphatics between both breasts.
- In patients with **localized cancer breast**, a simple mastectomy (**surgical removal of breast**), followed by radiotherapy or chemotherapy to the axillary lymph nodes is the **treatment of choice**.
- The lactiferous ducts are **radially arranged** (شعاعيا) from the nipple, so **incision** of the gland should be made in a **radial direction** to avoid cutting through multiple ducts.
- Infiltration of the **ligaments of Cooper** by breast cancer leads to its shortening (so it pulls the skin inside) giving **peau de'orange*** (dimpling of skin) appearance of the breast.

* It is a French word meaning skin of orange



Mammary Ridge

- Mammary ridge extends from the axilla to the groin (inguinal region).
- In human, the ridge disappears **EXCEPT** for a small part in the **pectoral region**. (that's why we have only 1 nipple on each side)
- If some parts did not disappear the patient will have extra (accessory) nipples.
- In animals (example: cats) it persists, so several mammary glands are formed along this ridge: and they have multiple nipples.



Summary

<p>FEMALE BREAST</p>	<p>It has a <u>base</u>, <u>apex</u> and a <u>tail</u>. Base: extends from 2nd to 6th ribs. It extends from the sternum to the midaxillary line laterally. No capsule - 2/3 of its base lies on the pectoralis major muscle. - inferolateral 1/3 lies on: Serratus anterior & External oblique muscles. It has a process into the axilla called the axillary tail or axillary process. Nipple : conical eminence, lies opposite 4th intercostal space. Areola : It is a dark pink brownish circular area of skin that surrounds the nipple. • The subcutaneous tissues of nipple & areola are devoid of fat.</p>	
<p>MAMMARY GLAND</p>	<ul style="list-style-type: none"> • non capsulated modified sweat gland. • It consists of lobes and lobules which are embedded in the subcutaneous fatty tissue. • It has fibrous strands (ligaments of cooper) which connect the skin with deep fascia of pectoralis major. • It is separated from the deep fascia by retromammary space. • It is formed of 15-20 lobes, each has a number of lobules. • The lobes and lobules are separated by interlobar and interlobular fatty tissue & fibrous stands called ligaments of Cooper. • It has from 15-20 lactiferous ducts which open by the same number of openings on the summit of the nipple. 	
<p>Arterial & venous supply</p>	<ol style="list-style-type: none"> 1. Perforating branches and mammary branches of internal thoracic (internal mammary) artery. 2. Mammary branches of lateral thoracic artery. 3. Mammary branches of Intercostal arteries. <p>-----</p> <ul style="list-style-type: none"> - Veins are corresponding to the arteries. - Circular venous plexus are found at the base of nipple, drain into axillary & internal thoracic veins. 	
<p>Lymphatic drainage</p>	<p>AXILLARY LYMPH NODES:</p> <ul style="list-style-type: none"> - Pectoral (anterior) group. - Subscabular (posterior) group. -brachial (lateral)group. - Central group. - Apical group: Its vessels union form subclavian lymph trunk. 	<p>LYMPHATIC DRAINAGE OF BREAST:</p> <ol style="list-style-type: none"> 1. Central & lateral → pectoral group 2. Upper → apical group 3. Middle → internal thoracic (parasternal) lymph nodes + <u>anastamose</u>. 4. Inferiomedial → lymphatics of rectus sheath & linea alba + subdiaphragmatic lymphatics

MCQs

1. Where is the circular venous plexus are found?

- A. At the apices of nipple
- B. At the base of nipple
- C. At the base of the breast
- D. Lateral to thoracic lymph nodes

2. Along lateral thoracic vessel located the pectoral group of axillary lymph nodes which lies on which of the following structure?

- A. Serratus anterior
- B. Subscapularis
- C. Pectoralis minor
- D. Pectoralis major

3. Most of the carcinoma of breast occur in which quadrant?

- A. Upper lateral
- B. Lower lateral
- C. Upper medial
- D. Lower medial

4. The appearance of peau d'orange is caused by infiltration of what?

- A. Lactiferous duct
- B. Mammary ridge
- C. Retromammary space
- D. Ligament of Cooper

5. The left subclavian trunk usually open into?

- A. Internal thoracic vein
- B. Internal jugular vein
- C. Thoracic duct
- D. Subclavian vein

6. The lactiferous ducts of mammary gland are:

- A. Less than 10.
- B. From 10-15.
- C. From 15-20.
- D. More than 20.

7. 2/3 of the breast's base lies in which one of the following muscles?

- A. Serratus anterior
- B. External oblique
- C. Pectoralis minor
- D. Pectoralis major

8. The nipple of the breast lies opposite of?

- A. 3rd costal cartilage
- B. 3rd intercostal space
- C. 4th intercostal space
- D. 4th costal cartilage

SAQs

Q1: Enumerate the **five** groups of the axillary lymph nodes:

1. Pectoral (Anterior) group
2. Supscapular (posterior) group
3. Brachial (Lateral) group
4. Central group
5. Apical group

Q2: A patient had a tumor in the upper part of the breast, in which nodes will the surgeon find metastasis?

- The apical group of the axillary lymph nodes.

Q3: How carcinoma of one breast **spread** to the opposite breast and its lymph nodes become affected?

- Through the anastomosing lymphatics between both breasts.

Q4: A 44 year old female presented with a mass. Investigations showed it to be invasive ductal carcinoma. In which quadrant do the majority of breast carcinoma occur?

- Upper lateral quadrant.

Q5: During mastectomy the incision should be made in which direction?

- Radially.



Leaders:

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Feedback



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References:

- 1- Girls' & Boys' Slides
- 2- Greys Anatomy for Students
- 3- TeachMeAnatomy.com

THANK YOU!

تم بحمدالله! كل الشكر و التقدير لكل من ساهم في إنجاز هذا العمل
إن أصبنا فمن الله وإن أخطأنا فمن انفسنا ومن الشيطان

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