Anatomy of the Breast

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Focus on the **Bold** and *underlined* points
The breasts are specialized accessory glands of the skin that secrete milk.

They are present in both sexes.

It is located in superficial fascia of pectoral region.

It is axillary tail (axillary tail of Spence) extends upward and laterally, pierces the deep fascia and enters the axilla.

The opening in the deep fascia is known as (foramen of langer)

Location: The base of the breast extends from the 2nd to 6th rib

The nipple is approximately at the 4th rib

From the lateral margin of the sternum (medially) to the midaxillary line (laterally).

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Pectoralis Major

Serratus Anterior

External Oblique

2nd rib

Pectoralis major

Skin

6th rib

Fat

Superficial | Deep

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Deep Relations:
The deep surface of the breast is related to the following structures in that order:

1) The retromammary space:
- It is loose areolar tissue between the gland and deep fascia (pectoral fascia)
- Below the superficial fascia
- Allows the free mobility of the breast over the deep fascia.

2) The deep fascia: covering the pectoralis major muscle + serratus anterior muscle (found in the lateral wall of the chest, covering the first 8 ribs) + external oblique muscle (anterior abdominal wall in the lower 6 ribs)

3) The flat base of the breast lies on the pectoralis major (medial 2/3) and serratus anterior (lateral 1/3)

4) The lower lateral part of the gland rests on the external oblique muscle of the abdomen
Structure of the breast
includes the skin, parenchyma and stroma.

1) Skin: covers the gland and fascia.

a) Nipple
- conical projection from just below the centre of the breast, Lies in the 4th intercostal Space
- Carries the opening of lactiferous ducts (15-20 openings)

Contains 2 types of cells:
a. Circular smooth muscle erect the nipple.
b. Longitudinal smooth muscle flatten the nipple.

b) Areola:
- Pigmented area of skin that surrounds the base of the nipple.
- It is rich in modified sebaceous gland particularly at the outer margin.

These become enlarged during pregnancy and lactation to form raised tubercles "tubercles of Montgomery" oily secretin, of these glands as of great importance to lubricate the nipple and areola and prevents them from cracking during lactation
- Fat is absent under the areola and nipple and both have no hair.

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2) **The stroma**: The gland has no capsule. It has a stroma which is divided into:

1) **Fibrous stroma**
- Forms **fibrous septa** known as suspensory ligaments of Cooper.
- The septa divide the gland into 15-20 lobules.
- The septa anchor the skin and the gland to the **pectoral fascia**.

2) **Fatty stroma**: 
- Forms the main bulk of the gland, the gland is embedded into it.
- It is responsible of the smooth contour of the breast.

3) **The parenchyma (mammary gland)**
- Consists of the glandular tissue which secretes milk.
- The glandular tissue is divided into 15-20 lobules.
- Each lobule has a lactiferous gland with a duct.
- The lactiferous duct dilates under the areola to form the lactiferous sinus then become narrow again to open on the summit of the nipple.
Pectoral fascia
Divide the breast into 4 quadrants and into “Clock” positions.
The purpose of this is to describe the present lumps/tumors. For example:

There is a mass in the:
1) Left breast
2) Upper lateral quadrant
3) At 1 o’clock
Arterial supply:

1) **The medial part.**
   
a) **Perforating branches** of the internal mammary artery
   
b) **Anterior intercostal** arteries from 2-6

2) **The upper lateral part**
   Pectoral branch of the thoraco acromial artery.
   (branch of axillary artery)

3) **The lower lateral part:**
   Lateral thoracic artery
   (branch of axillary artery).
Venous drainage:
1) The subcutaneous tissues → venous circle at the base
2) The gland and stroma → small veins that accompany the arteries → internal mammary and posterior intercostal and axillary veins
Lymphatic drainage of the female breast:

The superficial lymphatics, form a dense plexus deep to the areola which is called the subareolar plexus

The deep lymphatics form a plexus on the deep fascia of pectoralis major which is called the deep lymphatic plexus

- The central and lateral parts of the gland drain into the **pectoral (anterior)** group of axillary lymph nodes
- One or two large lymphatics from the upper part of the gland pierce the clavicular head of pectoralis major and the clavipectoral fascia to end in the **apical group of axillary lymph nodes**
- Lymphatics from the **medial part** of the gland pass through the intercostal spaces with the perforating branches of the internal mammary artery to end in the **internal mammary (parasternal) lymph nodes**
- Lymphatics from the **medial part** of the gland also cross the middle line to anastomose with the lymphatics of **the opposite breast**
- Lymphatics from the **inferomedial** part of the gland anastomose the lymphatics of the **rectus sheath, linea alba and subdiaphragmatic lymphatics**
## Lymphatic drainage of the female breast:

<table>
<thead>
<tr>
<th>Area</th>
<th>Lymph Group</th>
</tr>
</thead>
<tbody>
<tr>
<td>Central and lateral parts</td>
<td>Pectoral (anterior) group of axillary lymph nodes</td>
</tr>
<tr>
<td>Upper part</td>
<td>Apical group of axillary lymph nodes</td>
</tr>
<tr>
<td>Medial part</td>
<td>1) Internal mammary (parasternal) lymph nodes</td>
</tr>
<tr>
<td></td>
<td>2) Cross to opposite breast</td>
</tr>
<tr>
<td>Inferomedial part</td>
<td>Lymphatics of the rectus sheath, <em>linea alba</em> and subdiaphragmatic lymphatics</td>
</tr>
</tbody>
</table>
Lymphatic Drainage Of Breast

- Apical group
- Central group
- Anterior group
- Pectoralis minor
- Posterior group
- Lateral group
- Axillary vein

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Carcinoma of the breast may give rise to the following features:

1) Retraction or puckering of the skin due to invasion of the ligament of Cooper.
2) Peau d'orange or oedema with pitting oedema is due to obstruction of cutaneous lymphatics by cancer cells and pitting due to fixation of the hair follicles to subcutaneous tissue.
3) Retraction of the nipple is due to extension of the growth along the lactiferous ducts with accompanying fibrosis.
4) Breast may become fixed with the deep fascia, pectoral muscle and chest wall due to direct spread to the subjacent structures.
5) Axillary lymph nodes may be involved, these are stony, hard and fixed.

**Mammography**

Mammography is a radiographic examination of the breast. This technique is extensively used for screening the breasts for benign and malignant tumors and cysts.
Infiltration of the lactiferous duct

Infiltration of the ligament that holds the skin and deep fascia

IF IT WAS SEVERE

Puckering and retraction of the SKIN
• It looks like an **ORANGE**
• Why?
• Due to **OBSTRUCTION** of the lymphatics
• This lead to **EDEMA**
• but this edema is a pitting edema due to the fixation of the hair follicles to the subcutaneous tissue

Peau d'orange
Inverted nipple
Retracted nipple
Puckering of the skin
Peau d'orange
Normal Mammography

MASS
Development of the Breasts

- A linear thickening of **ectoderm** appears called the **milk ridge (mammary line)**, which extends from the **axilla** obliquely to the **inguinal region**.
- The ridge **disappears except** for a small part in the **pectoral region**.
- This localized area **thickens**, becomes slightly **depressed**, which **grow into/inva**des the underlying mesenchyme, and sends off 15 to 20 solid cords to form **lobules**.
- The underlying mesenchyme **proliferates** (to form lactiferous gland, duct and stroma), and the depressed ectodermal thickening **becomes raised** to form the **nipple**.
- At the fifth month, the **areola** is recognized as a circular pigmented area of skin around the future nipple.
Histology of the breast

The mammary gland is a compound tubule alveolar, apocrine gland, formed of lobes and lobules (the gland is surrounded by C.T.). The lobules are separated by dense & fatty C.T.

(1) Resting gland: (differs from lactating gland)
- Ducts (lactiferous ducts) are embedded in abundance of fatty C.T. and are considered the principal glandular elements
- The ductule epithelium cells show small alterations and vacuolation during the menstrual cycle.
- Alveoli are collapsed and represented by solid cords of cells

1- Sinus lactiferi but there is no secretion
2- Connective tissue sheath
3- Coarse fibrous collagenous connective tissue between the acini
(2) Lactating gland:
- Little amount of C.T. and many secretory acini and ducts.
- Some acini and ducts are distended with milk others are empty.
- The acini are lined by either tall columnar or low cuboidal cells depending on the state of activity
- Milk in acini appears interrupted with vacuoles of dissolved fat.
- Myoepithelial cells are found around the acini and beneath the terminal ductule epithelium. (for contraction to aid in secretion of the product)

1- Secretory product in gland cells (vacuoles)
2- Secretory product
3- Myoepithelial cells