

## Pectoral region & Mammary gland

- \* Extension & structure of mammary gland.
- \* Arterial supply — " " " "
- \* Lymphatic drainage " " " "
- \* Clinical note — Radial incision, Peau d'orange
- \* Origin, insertion, nerve supply action of—  
Pectoralis major, pectoralis minor, subclavius  
& Serratus anterior.
- \* Short note on — clavipectoral fascia (from BD)
- \* Winging of scapula (From BD after the action of  
serratus anterior)

The breast is found in both sexes, but is rudimentary in the male. It is well developed in the female after puberty. It forms an important accessory organ of the female reproductive system, and provides nutrition to the newborn in the form of milk. Its shape may be hemispherical, conical, pyriform, pendulous or flat.

#### Situation

The breast lies in the superficial fascia of the pectoral region. It is divided into four quadrants, i.e. upper medial, upper lateral, lower medial and lower lateral. A small extension of the upper lateral quadrant, called the *axillary tail of Spence*, passes through an opening in the deep fascia and lies in the axilla (Fig. 3.5). The opening is called *foramen of Langer*. Its base is circular.

#### Extent of the Base

- Vertically, it extends from the second to the sixth ribs.
- Horizontally, it extends from the lateral border of the sternum to the midaxillary line.

#### Deep Relations

The deep surface of the breast is related to the following structures in that order (Fig. 3.6).

- 1 (The breast lies on the deep fascia) pectoral fascia covering the pectoralis major.
- 2 Still deeper there are the parts of three muscles, namely the *pectoralis major*, the *serratus anterior*, and the *external oblique muscle of the abdomen*.

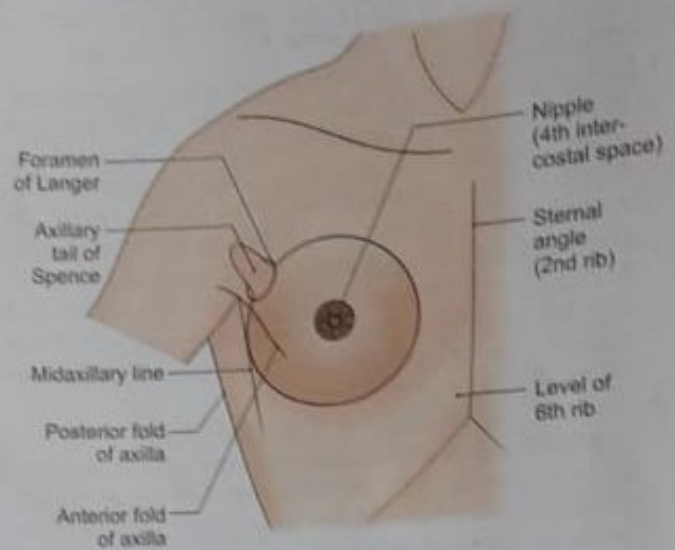
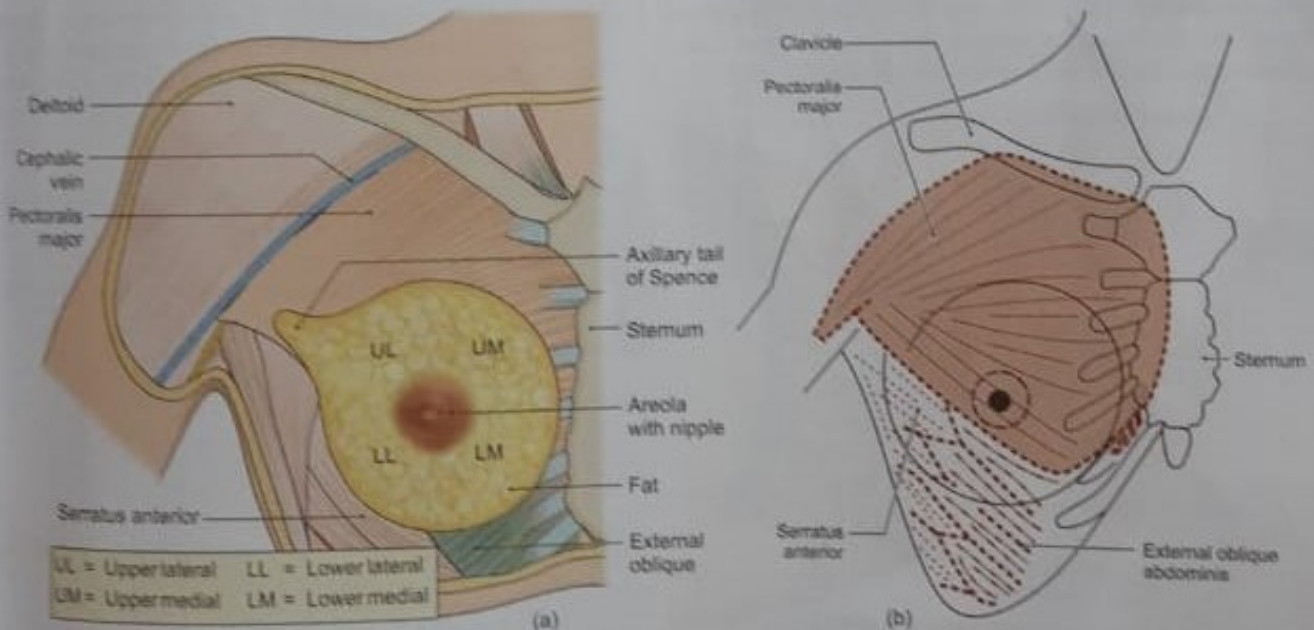


Fig. 3.5: Extent of the breast

- 3 The breast is separated from the pectoral fascia by loose areolar tissue, called the *retromammary space*. Because of the presence of this loose tissue, the normal breast can be moved freely over the pectoralis major.

#### Structure of the Breast

The structure of the breast may be conveniently studied by dividing it into the skin, the parenchyma, and the stroma. The parenchyma is known as the mammary gland.



Figs 3.6a and b: (a) Axillary tail and the four quadrants of breast, and (b) the muscles situated deep to the breast

11/12 write structure of breast and draw fig 3.7.  
 " lymphatic drainage of breast and draw fig 3.9

SKIN

structure  
 - skin  
 - parenchyma  
 - stroma

It covers the gland and presents the following features.

- 1 A conical projection, called the *nipple*, is present just below the centre of the breast (at the level of the fourth intercostal space 10 cm from the midline). The nipple is pierced by 15 to 20 lactiferous ducts. It contains circular and longitudinal smooth muscle fibres which can make the nipple stiff or flatten it, respectively. It has a few modified sweat and sebaceous glands. It is rich in nerve supply and has many sensory end organs at the termination of nerve fibres.
- 2 The skin surrounding the base of the nipple is pigmented and forms a circular area called the *areola*. (This region is rich in modified *sebaceous glands*, particularly at its outer margin). (These become enlarged during pregnancy and lactation to form raised *tubercles of Montgomery*). Oily secretions of these glands lubricate the nipple and areola, and prevent them from cracking during lactation. Apart from sebaceous glands, the areola also contains some sweat glands, and accessory mammary glands. The skin of the areola and nipple is devoid of hair, and there is no fat subjacent to it. Below the areola lie lactiferous sinus where stored milk is seen.

**Parenchyma (Mammary Gland) epithelial tissue**

Mammary gland is a compound tubuloalveolar gland which secretes milk. As it lies in superficial fascia, there is no capsule. Mammary gland is a modified sweat gland. (The gland consists of 15 to 20 lobes. Each lobe is a cluster of alveoli, and is drained by a lactiferous duct). The lactiferous ducts converge towards the nipple and open on it. Near its termination, each duct has a dilatation called a *lactiferous sinus* (Figs 3.7a and b).

**Stroma connective tissue**

It forms the supporting framework of the gland. (It is partly fibrous and partly fatty.)  
 (The fibrous stroma forms septa, known as the *suspensory ligaments of Cooper*, which anchor the skin and gland to the pectoral fascia) (Fig. 3.7a).  
 (The fatty stroma forms the main bulk of the gland. It is distributed all over the breast, except beneath the areola and nipple)

**Blood Supply**

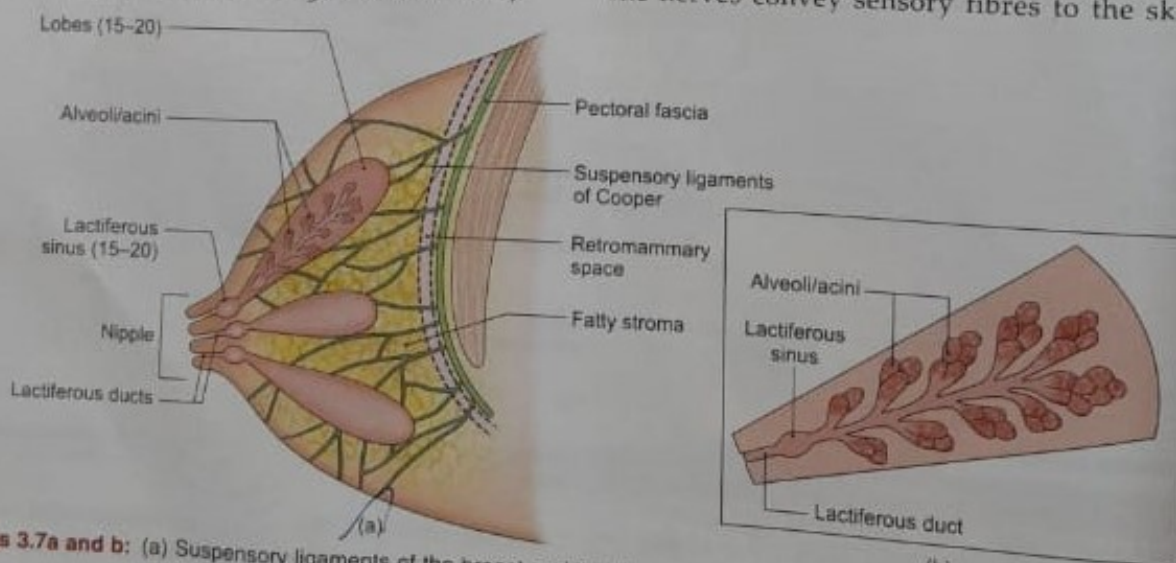
- (The mammary gland is extremely vascular) It is supplied by branches of the following arteries (Fig. 3.8).
- 1 Internal thoracic artery, a branch of the subclavian artery, through its perforating branches.)
  - 2 The lateral thoracic, superior thoracic and acromio-thoracic (thoracoacromial) branches of the axillary artery.)
  - 3 Lateral branches of the posterior intercostal arteries.)
- The arteries converge on the breast and are distributed from the anterior surface. The posterior surface is relatively avascular.

The veins follow the arteries. They first converge towards the base of the nipple where they form an anastomotic venous circle, from where veins run in superficial and deep sets.

- 1 The superficial veins drain into the internal thoracic vein and into the superficial veins of the lower part of the neck.
- 2 The deep veins drain into the axillary and posterior intercostal veins.

**Nerve Supply**

The breast is supplied by the anterior and lateral cutaneous branches of the 4th to 6th intercostal nerves. The nerves convey sensory fibres to the skin, and



**Figs 3.7a and b:** (a) Suspensory ligaments of the breast and its lobes, and (b) structure of one lobe of the mammary gland

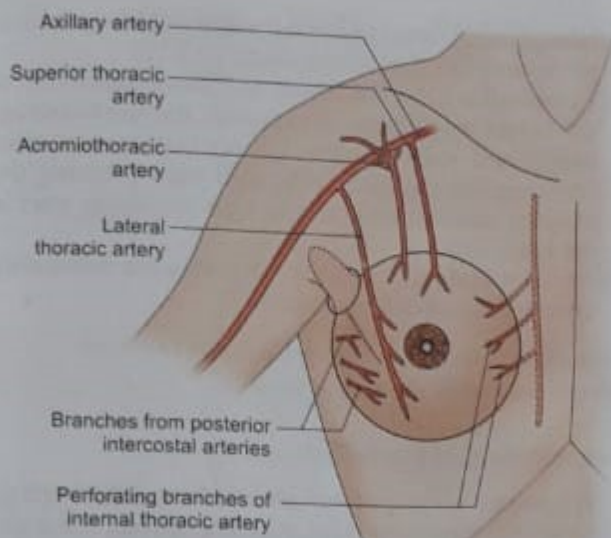


Fig. 3.8: Arterial supply of the breast

autonomic fibres to smooth muscle and to blood vessels. The nerves do not control the secretion of milk. Secretion is controlled by the hormone *prolactin*, secreted by the *pars anterior* of the *hypophysis cerebri*. The diagnosis and management of breast disease should be done carefully.

*Competency achievement:* The student should be able to:

AN 10.4 Describe the anatomical groups of axillary lymph nodes and specify their areas of drainage.<sup>3</sup>

AN 10.7 Explain anatomical basis of enlarged axillary lymph nodes.<sup>4</sup>

### Lymphatic Drainage

(Lymphatic drainage) of the breast assumes great importance to the surgeon because carcinoma of the breast spreads mostly along lymphatics to the regional lymph nodes. The subject can be described under two heads—the lymph nodes, and the lymphatic vessels.)

#### 1. Lymph Nodes

Groups of lymph nodes are shown in Fig. 3.9. (Lymph from the breast drains into the following lymph nodes) (Fig. 3.9). *lymph - tissue fluid collected by lymph vessels (cellular debris) carried to heart by superior vena cava*

- 1 (The axillary lymph nodes, chiefly the anterior) (or pectoral) (group). The posterior, lateral, central and apical groups of nodes also receive lymph from the breast either directly or indirectly.)
- 2 (The anterior thoracic) (parasternal) (nodes which lie along the internal mammary) (thoracic) (vessels) (Fig. 3.10).
- 3 (Some lymph from the breast also reaches the supraclavicular nodes, the cephalic (deltopectoral) node, the posterior intercostal nodes (lying in front of the heads of the ribs), the subdiaphragmatic and subperitoneal lymph plexuses.)

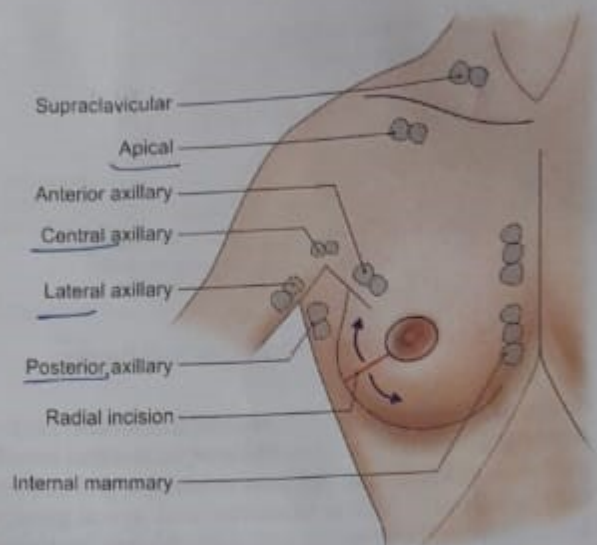


Fig. 3.9: Lymph nodes draining the breast. Radial incision is shown to drain breast abscess

### 2. Lymphatic Vessels

1 (The superficial lymphatics drain the skin over the breast except for the nipple and areola. The lymphatics pass radially to the surrounding lymph nodes (axillary, anterior thoracic, supraclavicular and cephalic).

2 (The deep lymphatics drain the parenchyma of the breast. They also drain the nipple and areola) (Fig. 3.11).

Some further points of interest about the lymphatic drainage are as follows.

- 1 About (75% of the lymph from the breast drains into the axillary nodes) (20% into the anterior thoracic

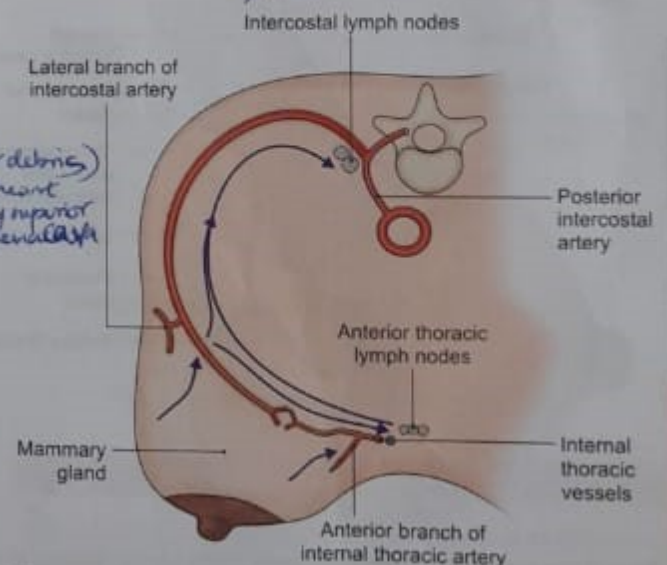


Fig. 3.10: The routes of lymph from the breast. The arrows show the direction of lymph flow

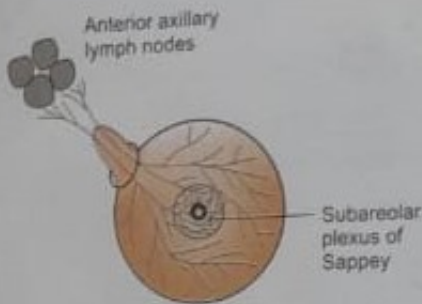


Fig. 3.11: Subareolar lymph plexus of Sappey

nodes; and 5% into the posterior intercostal nodes. Among the axillary nodes, the lymphatics end mostly in the anterior group (closely related to the axillary tail), and partly in the posterior and apical groups. Lymph from the anterior and posterior groups passes to the central and lateral groups, and through them to the apical group. (Finally, it reaches the supraclavicular nodes.)

- 2) The anterior thoracic nodes drain the lymph not only from the inner half of the breast, but from the outer half as well.
- 3) A plexus of lymph vessels is present deep to the areola. This is the subareolar plexus of Sappey (Fig. 3.11). Subareolar plexus and most of lymph from the gland drain into the anterior or pectoral group of lymph nodes.
- 4) The lymphatics from the deep surface of the gland pass through the pectoralis major muscle and the

clavipectoral fascia to reach the apical nodes, and also to the anterior thoracic nodes (Fig. 3.12).

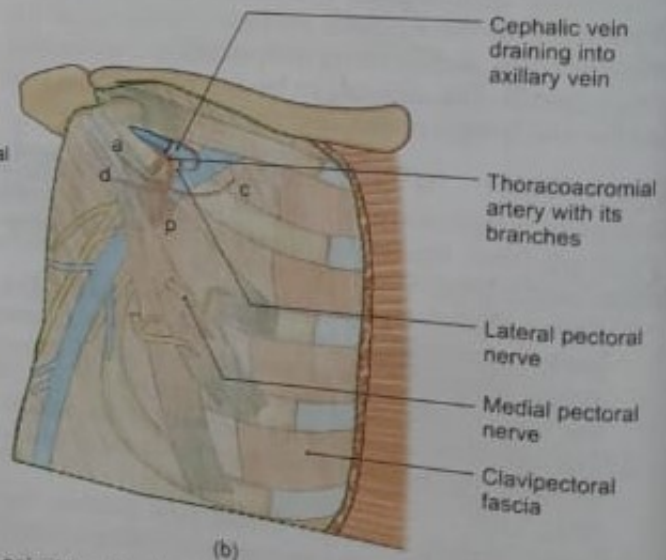
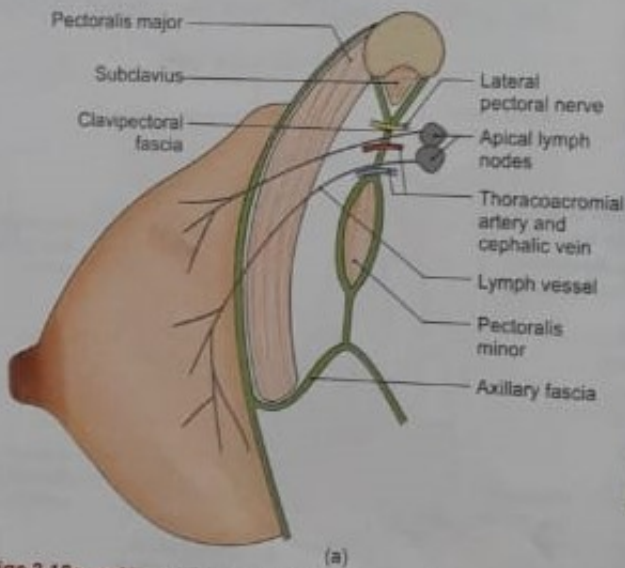
5) Lymphatics from the lower and inner quadrants of the breast may communicate with the subdiaphragmatic and subperitoneal lymph plexuses after crossing the costal margin and then piercing the anterior abdominal wall through the upper part of the linea alba.

6) Anterior and central groups of nodes are commonly involved in carcinoma breast.

Competency achievement: The student should be able to:  
**AN 9.3** Describe development of the breast.<sup>5</sup>

### Development of the Breast

- 1 The breast develops from an ectodermal thickening, called the *mammary ridge*, *milk line*, or *line of Schultz* (Fig. 3.13). This ridge extends from the axilla to the groin. It appears during the fourth week of intrauterine life, but in human beings, it disappears over most of its extent persisting only in the pectoral region. The gland is ectodermal, and the stroma mesodermal in origin.
- 2 The persisting part of the mammary ridge is converted into a *mammary pit*. Secondary buds (15-20) grow down from the floor of the pit. These buds divide and subdivide to form the lobes of the gland. The entire system is first solid, but is later canalised. At birth or later, the nipple is everted at the site of the original pit.



Figs 3.12a and b: (a) Deep lymphatics of the breast passing to the apical lymph nodes and the structures piercing the clavipectoral fascia, and (b) structures piercing the clavipectoral fascia. Branches of thoracoacromial artery: a—acromial, p—pectoral, d—deltoid