Pectoral Region

- The pectoral region is the anterior aspect of the shoulder. Although this area may be considered part of the anterior thoracic wall, several structures here (e.g., pectoral muscles) connect with and function as part of the upper limb, thus uniting these areas. The pectoral region also houses the breasts. The general topography of the pectoral region is shown in

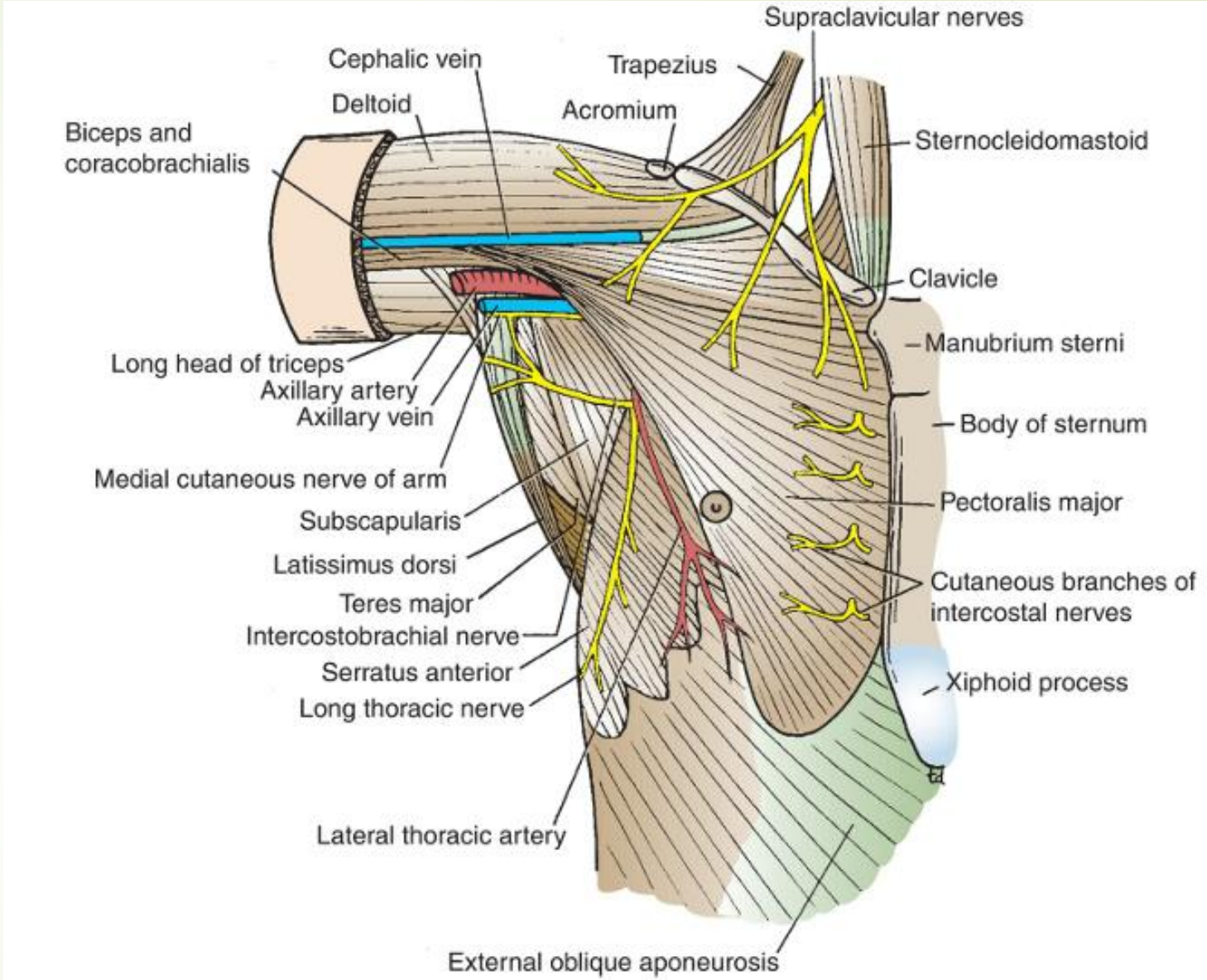


Figure 3.11 Pectoral region and axilla.

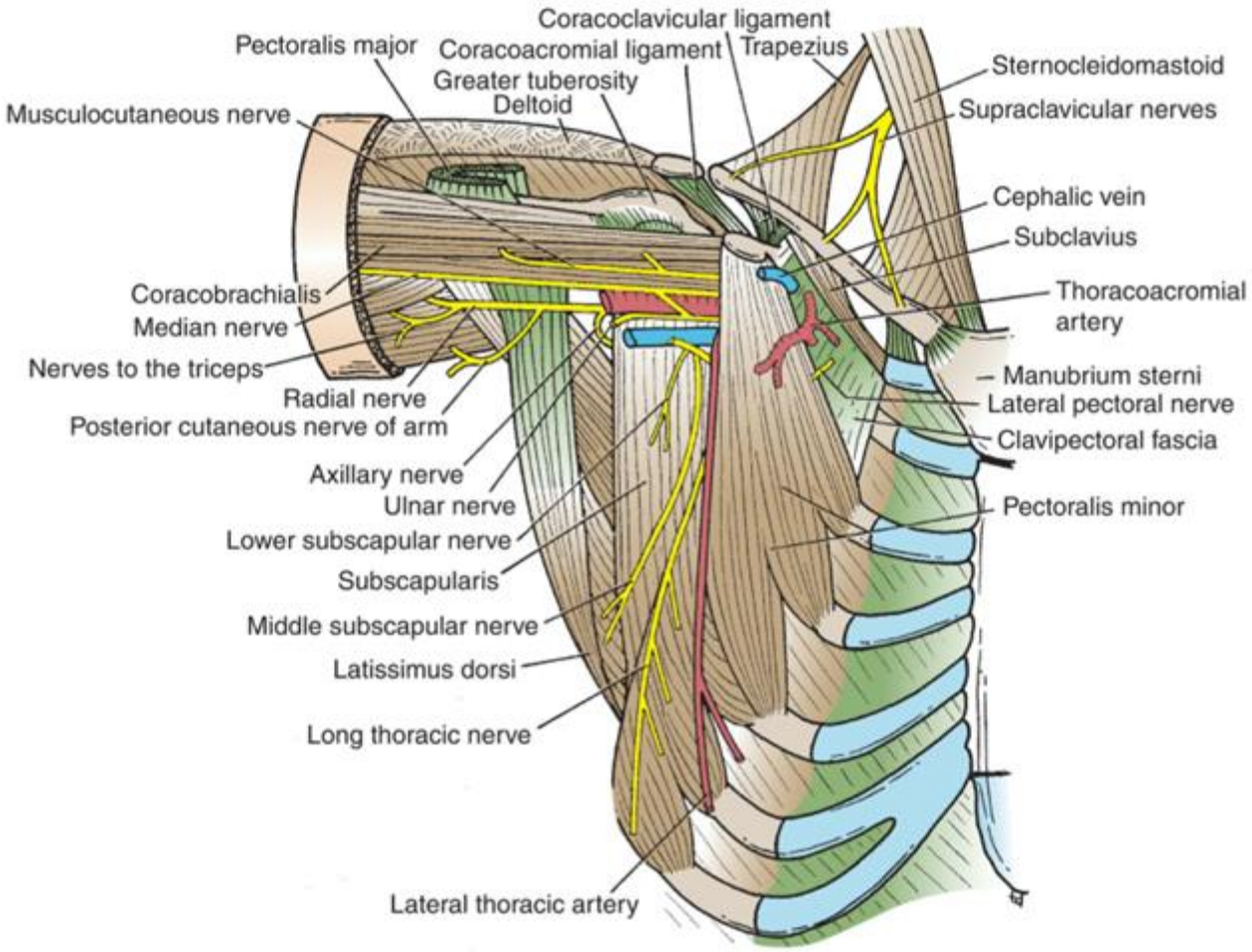


Figure 3.12 Pectoral region and axilla; the pectoralis major muscle has been removed to display the underlying structures.

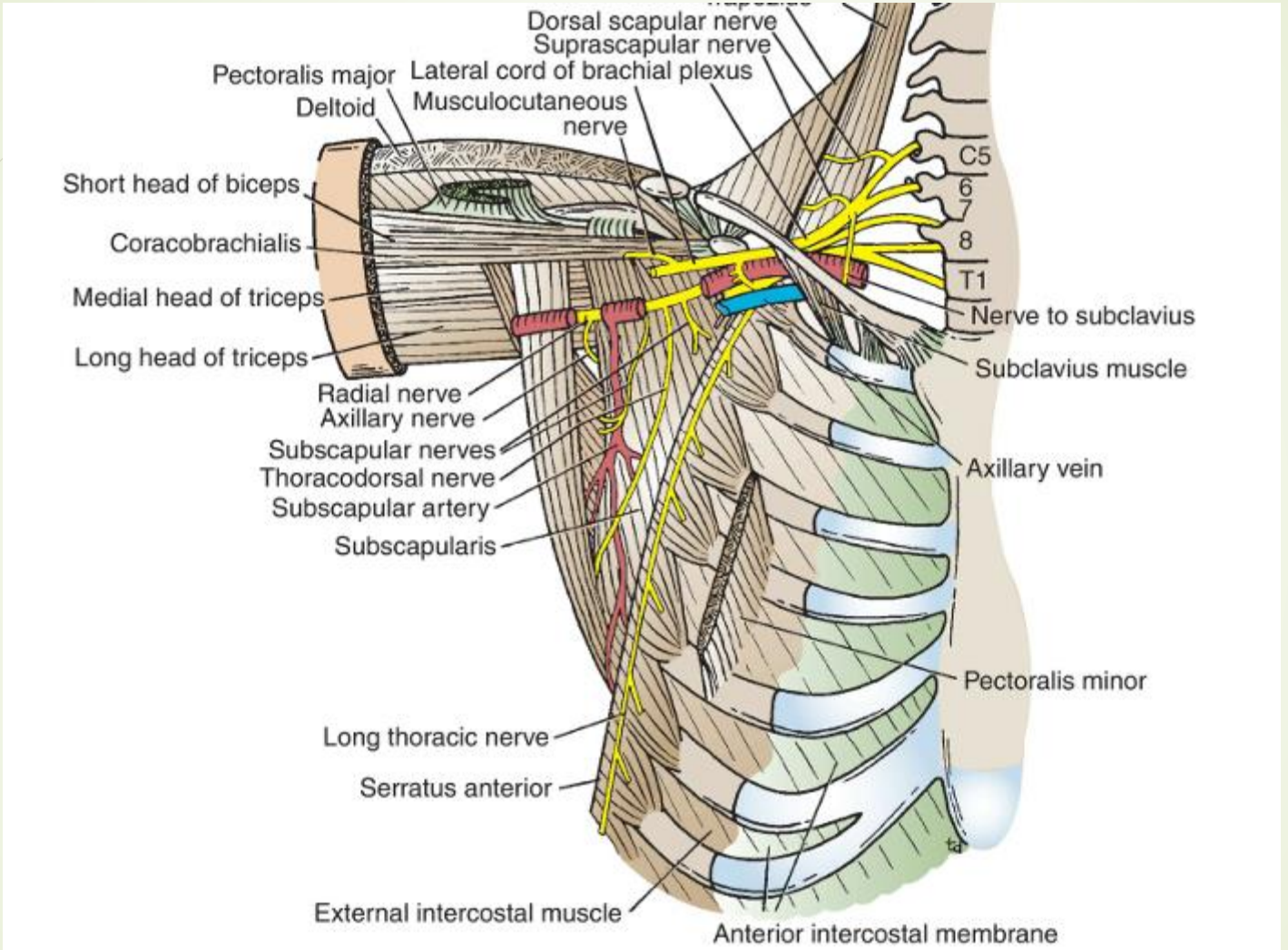


Figure 3.13 Pectoral region and axilla; the pectoralis major and minor muscles and the clavipectoral fascia have been removed to

Breasts

Breasts Strictly speaking, the breasts are not anatomically part of the upper limb. However, they are situated in the pectoral region, and their blood supply and lymphatic drainage are largely related to the armpit. The clinical importance of the breasts cannot be overemphasized.

Location and Description

The breasts are specialized accessory glands of the skin that secrete milk. They are present in both sexes and share similar structure in males and immature females. The nipples are small and surrounded by a colored area of skin called the areola (Fig. 3.14). The breast tissue consists of a system of ducts embedded in connective tissue that does not

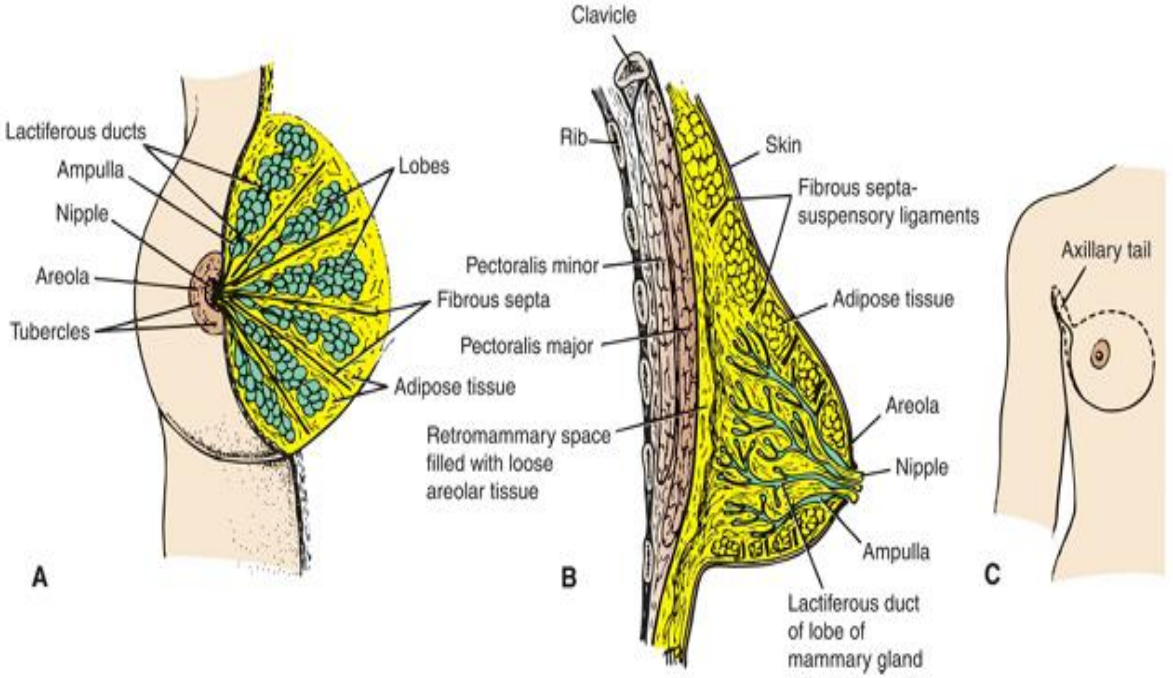
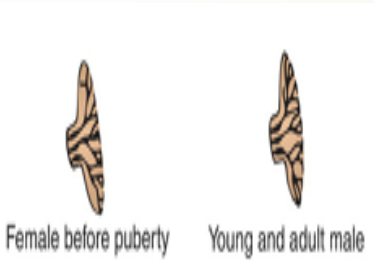
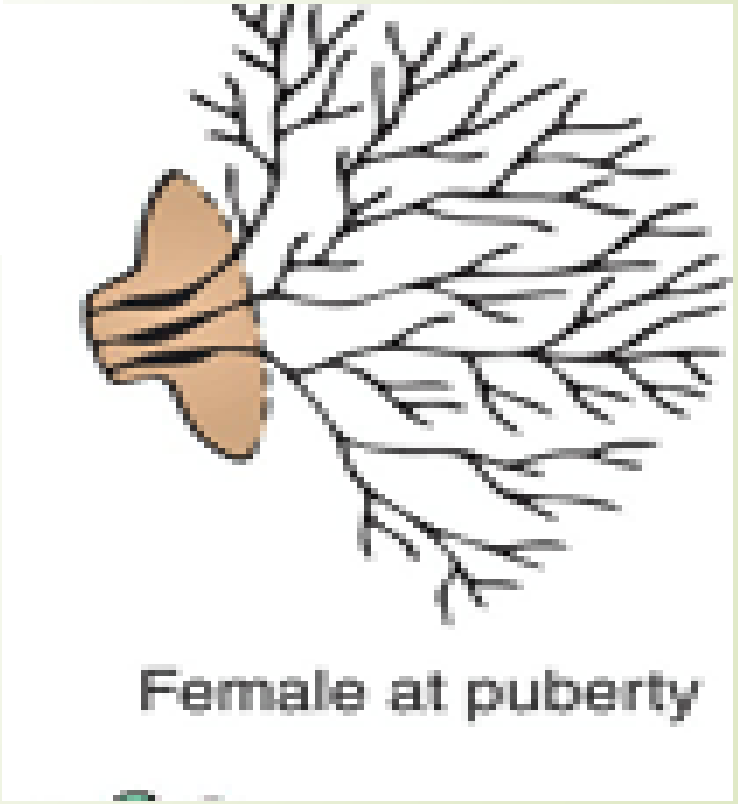


Figure 3.14 Mature breast in the female. **A.** Anterior view with skin partially removed to show internal structure. **B.** Sagittal section. **C.** The axillary tail, which pierces the deep fascia and extends into the axilla.

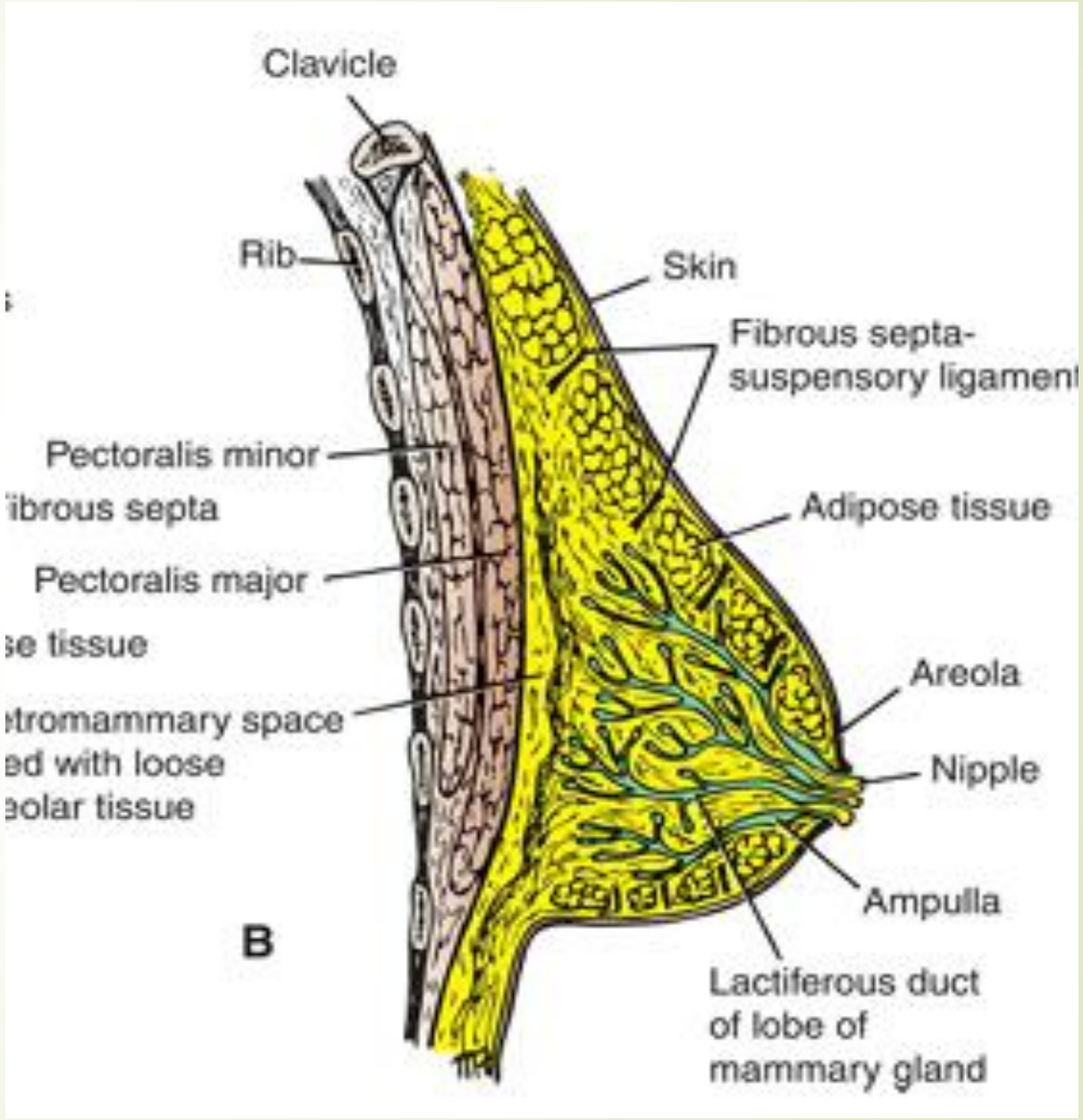
Puberty

At puberty in females, the breasts gradually enlarge and assume their hemispherical shape under the influence of ovarian hormones. The ducts elongate, but the increased size of the glands is mainly from the deposition of fat. The base of the breast extends from the second to sixth rib and from the lateral margin of the sternum to the midaxillary line. The greater part of the gland lies in the superficial fascia. An extension of the gland called the axillary tail (see Fig. 3.14C) continues upward and laterally, pierces the deep fascia at the lower border of the pectoralis



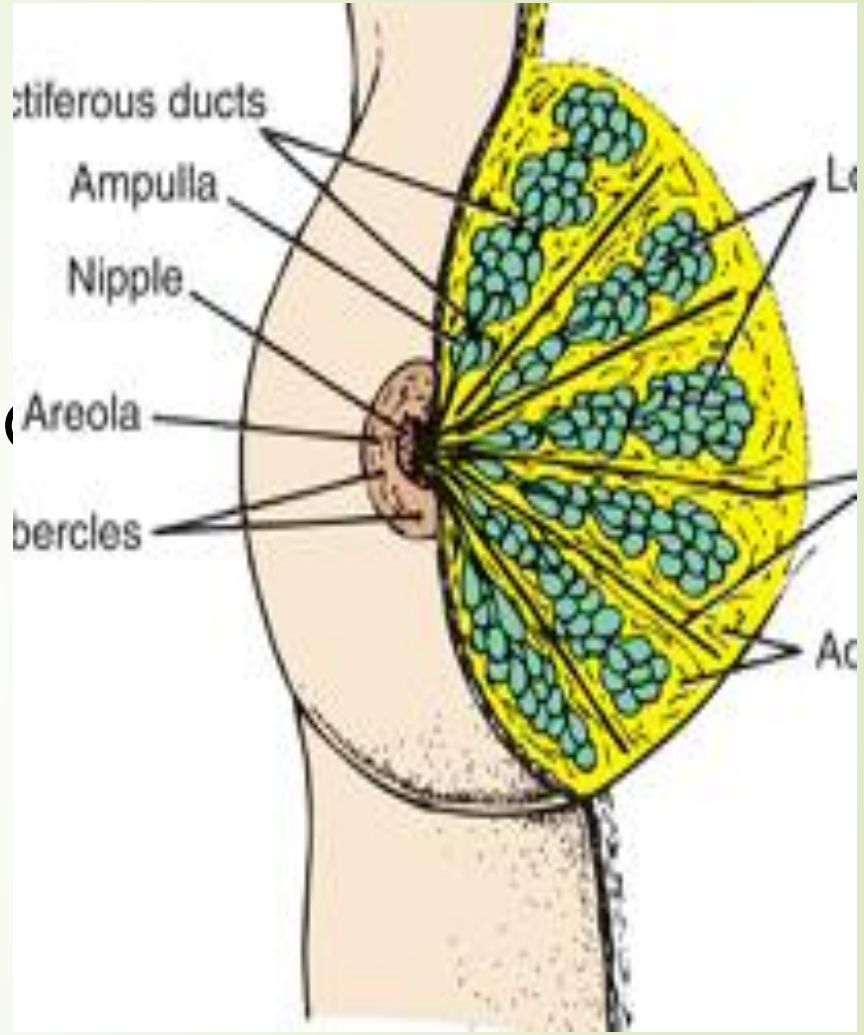


Each breast consists of 15 to 20 lobes, which radiate out from the nipple (see Fig. 3.14A). The main duct from each lobe opens separately on the summit of the nipple and possesses a dilated ampulla just before its termination. The base of the nipple is surrounded by the areola. The underlying areolar glands produce tiny tubercles on the areola. The lobes of the gland are separated by fibrous septa that serve as suspensory ligaments (see Fig. 3.14B). A space filled by loose connective tissue called the retromammary space lies deep to the breast and superficial to the underlying pectoral muscles.



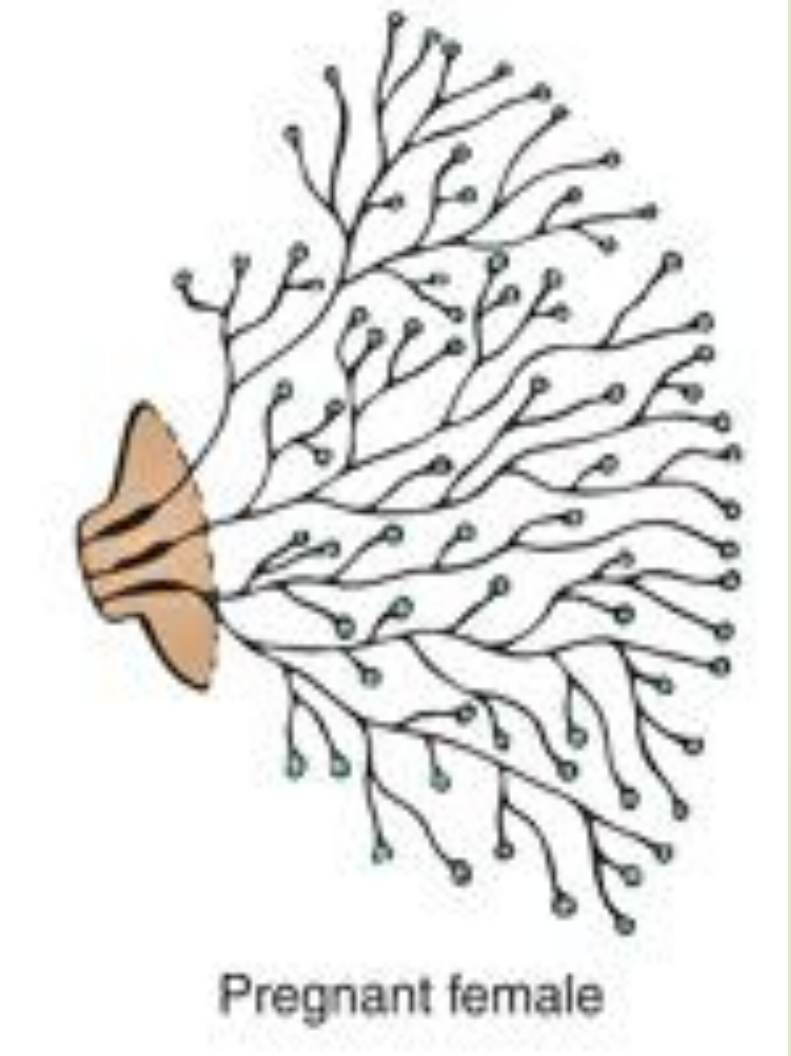
Young Women

In young women, the breasts ten
protrude forward from a circular
base.



Pregnancy

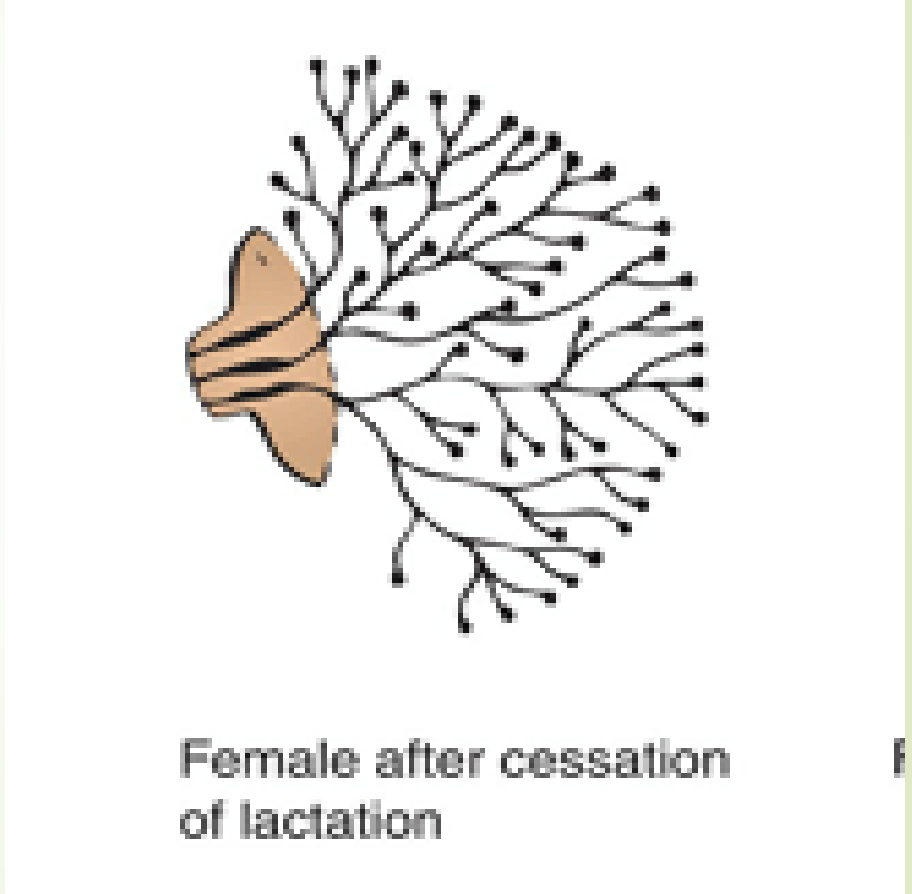
In the early months of pregnancy, the duct system rapidly increases in length and branching (Fig. 3.15). The secretory alveoli develop at the ends of the smaller ducts, and the connective tissue becomes filled with expanding and budding secretory alveoli. The vascularity of the connective tissue also increases to provide adequate nourishment for the developing gland. The nipple enlarges, and the areola becomes darker and more extensive as a result of increased deposits of melanin pigment in the epidermis. The



Late During the second half of pregnancy, the growth process slows. However, the breasts continue to enlarge, mostly because of the distention of the secretory alveoli with the fluid secretion called colostrum

Postweaning

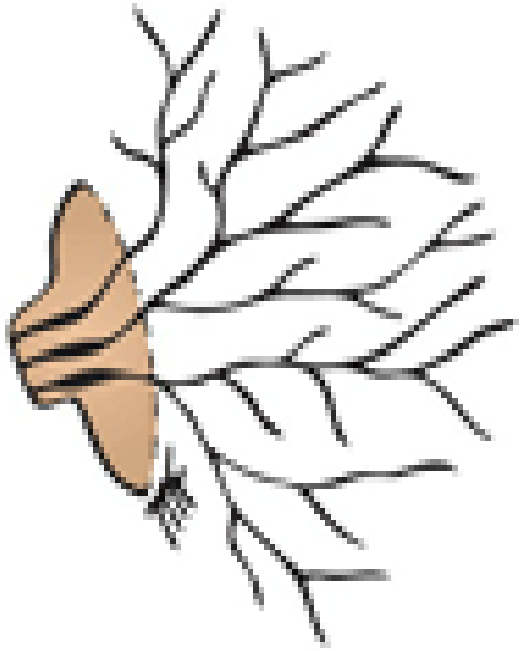
The breasts return to their inactive state once the baby has been weaned. The remaining milk is absorbed; the secretory alveoli shrink, and most of them disappear. The interlobular connective tissue thickens. The breasts and the nipples shrink and return nearly to their original size. The pigmentation of the areola fades, but the area never



Female after cessation of lactation

Postmenopause

The breast atrophies after the menopause (see Fig. 3.15). Most of the secretory alveoli disappear, leaving behind the ducts. The amount of adipose tissue may increase or decrease. The breasts tend to shrink in size and become more pendulous. The atrophy after menopause is caused by the absence of ovarian estrogens and



Female after menopause

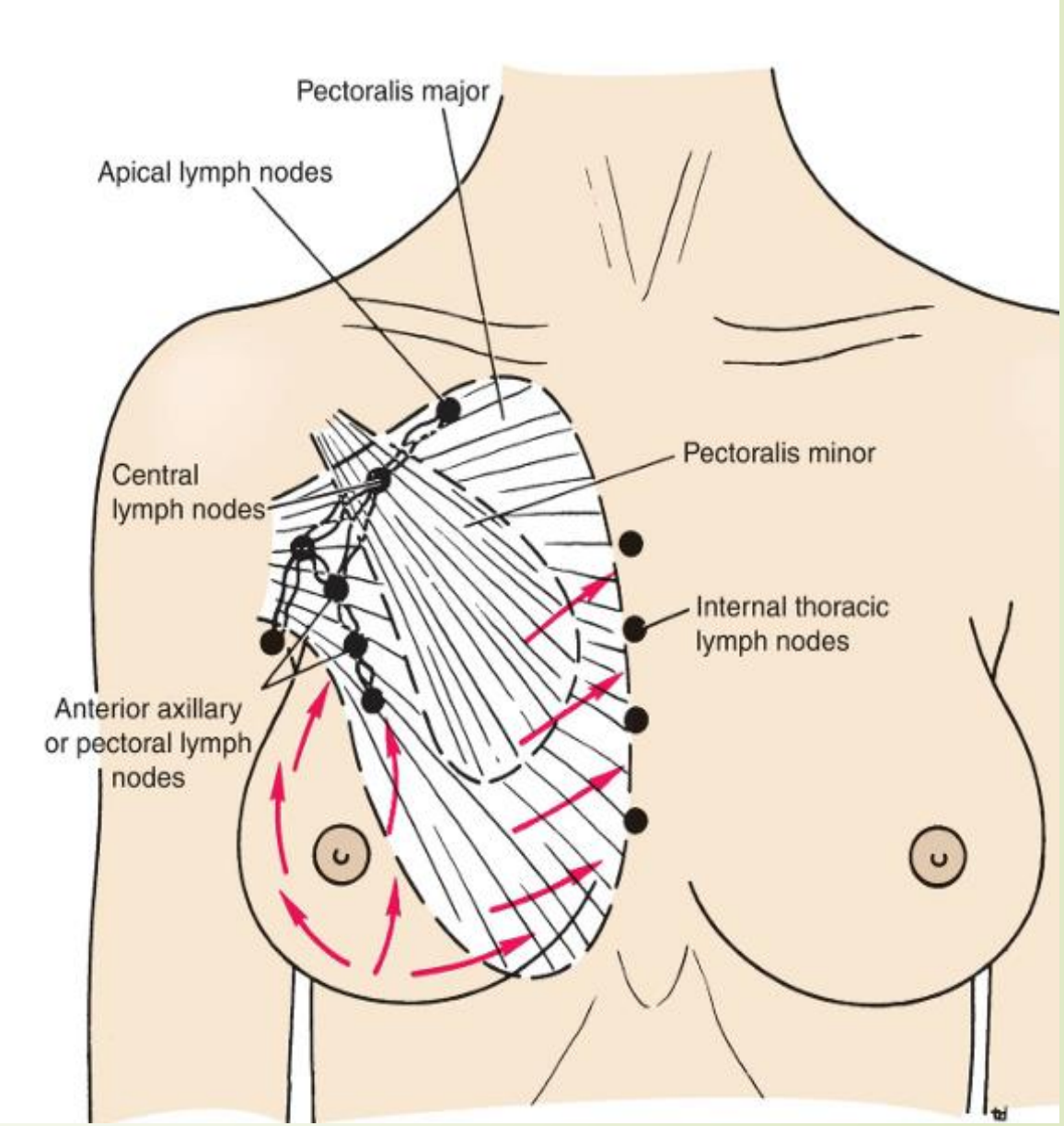
Blood Supply

The arterial supply to the breasts includes the perforating branches of the internal thoracic artery and the intercostal arteries. The axillary artery also supplies the gland via its lateral thoracic and thoracoacromial branches. The veins correspond to the arteries.

Lymph Drainage

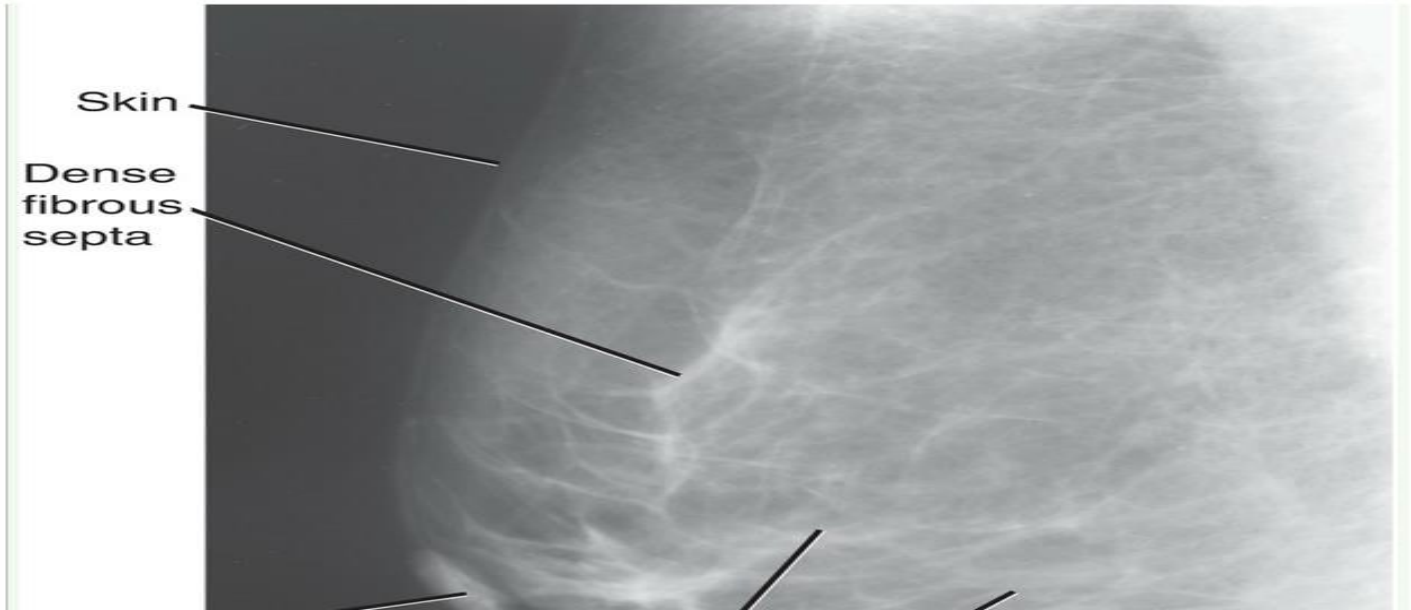
The lymph drainage of the mammary gland is of great clinical importance because of the frequent development of cancer in the gland and the subsequent dissemination of the malignant cells along the lymph vessels to the lymph nodes.

The lateral quadrants of the breast drain into the anterior axillary or pectoral group of nodes (situated just posterior to the lower border of the pectoralis major muscle). The medial quadrants drain by means of vessels that pierce the intercostal spaces and enter the internal thoracic group of nodes (situated within the thoracic cavity along the course of the internal thoracic artery). A few lymph vessels follow the posterior intercostal arteries and drain posteriorly into the posterior intercostal nodes (situated along the course of the posterior intercostal arteries); some vessels communicate with the lymph vessels of the



Breast Examination The breast is one of the common sites of cancer in women. It is also the site of different types of benign tumors and may be subject to acute inflammation and abscess formation. For these reasons, clinical personnel must be familiar with the development, structure, and lymph drainage of this organ. With the patient undressed to the waist and sitting upright, first inspect the breasts for symmetry. Some degree of asymmetry is common and is the result of unequal breast development. Any swelling should be noted. An underlying tumor, a cyst, or abscess formation can cause a swelling. Carefully examine the nipples for evidence of retraction. A carcinoma within the breast substance can cause retraction of the nipple by pulling on the lactiferous ducts. Next, ask the patient to lie down so that the breasts can be palpated against the underlying thoracic wall. Finally, ask the patient to sit up again and raise both arms above her head. With this maneuver, a carcinoma

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. Extremely low doses of x-rays are used so that the dangers are minimal, and the examination can be repeated often. Its success is based on the fact that a lesion measuring only a few millimeters in diameter can be detected long



Importance of Fibrous Septa

a The interior of the breast is divided into 15 to 20 compartments that radiate from the nipple by fibrous septa (suspensory ligaments) that extend from the deep surface of the skin. Each compartment contains a lobe of the gland. Normally, the skin feels completely mobile over the breast substance. However, a scirrhous carcinoma or a disease such as a breast abscess may apply traction to the fibrous septa that causes dimpling of the skin.

Breast Abscess

An acute infection of the mammary gland may occur during lactation. Pathogenic bacteria gain entrance to the breast tissue through a crack in the nipple. Because of the presence of the fibrous septa, the infection remains localized to one compartment or lobe to begin with. Abscesses should be drained through a radial incision to avoid spreading of the infection into neighboring compartments; a radial

Lymph Drainage and Breast Carcinoma

The lymph vessels from the medial quadrants of the breast pierce the second, third, and fourth intercostal spaces and enter the thorax to drain into the lymph nodes alongside the internal thoracic artery. The lymph vessels from the lateral quadrants of the breast drain into the anterior or pectoral group of axillary nodes. Therefore, a cancer occurring in the lateral quadrants of the breast tends to spread to the axillary nodes. Thoracic metastases are difficult or impossible to treat, but the lymph nodes of the axilla can be removed surgically

Approximately 60% of carcinomas of the breast occur in the upper lateral quadrant. The lymphatic spread of cancer to the opposite breast, to the abdominal cavity, or into the lymph nodes in the root of the neck is caused by obstruction of the normal lymphatic pathways by malignant cells or destruction of lymph vessels by surgery or radiotherapy. The cancer cells are swept along the lymph vessels and follow the lymph stream. The entrance of cancer cells into the blood vessels accounts for

In patients with localized cancer of the breast, most surgeons do a
simple mastectomy or a lumpectomy, followed by radiotherapy to the
axillary lymph nodes and/or hormone therapy. In patients with localized
cancer of the breast with early metastases in the axillary lymph nodes, most
authorities agree that radical mastectomy offers the best chance of cure. In
patien, followed by radiotherapy or hormone
therapy, is the treatment of choice. ts in whom the disease has already spread beyond these areas (e.g.,
into the thorax), simple mastectomy

Radical mastectomy is designed to remove the primary tumor and the
lymph vessels and nodes that drain the area. This means that the breast and
the associated structures containing the lymph vessels and nodes must be
removed en bloc. The excised mass is therefore made up of the following: a
large area of skin overlying the tumor and including the nipple; all the
breast tissue; the pectoralis major and associated fascia through which the
lymph vessels pass to the internal thoracic nodes; the pectoralis minor and

Male Breast Carcinoma

Carcinoma in the male breast accounts for about 1% of all carcinomas of the
breast. This fact tends to be overlooked when examining the male patient.
Because the amount of breast tissue in the male is small, the tumor can
usually be felt with the flat of the examining hand in the early stages.
However, the prognosis is relatively poor in the male, because the
carcinoma cells can rapidly metastasize into the thorax through the small
amount of intervening tissue.