BREAST

Anatomy and physiology

The breasts are modified sweat glands. The openings of the lactiferous ducts are on the apex of the nipple, which is erectile tissue. The nipple is in the fourth intercostal space in the mid-clavicular line, but accessory breast/nipple tissue may develop anywhere down the nipple line (axilla to groin) (Figs 11.1 and 11.2). The adult breast is divided into the nipple, the areola and four quadrants (upper outer to lower inner), with an axillary tail (of Spence) projecting from the upper outer quadrant (Fig. 11.3).

The size and shape of the breasts are influenced by age, hereditary factors, sexual maturity, phase of the menstrual cycle, parity, pregnancy, lactation and nutritional state. Fat and stroma surrounding the glandular tissue determine the size of the breast, except during lactation, when enlargement is mostly glandular. The breast responds to fluctuations in oestrogen and progesterone levels. Swelling and tenderness are common in the premenstrual phase. The glandular tissue reduces and fat increases with age, making the breasts softer and more pendulous. Lactating breasts are swollen and engorged with milk, and are best examined after breastfeeding.

Fig. 11.1 Accessory breast tissue in the axilla.

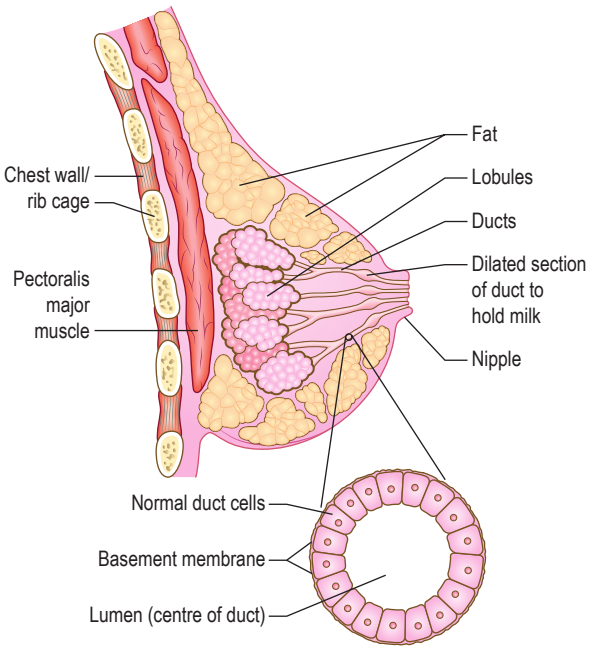


Fig. 11.2 Cross-section of the female breast.

The history

Benign and malignant conditions of the breast cause similar symptoms but benign changes are much more common. The most common presenting symptoms are a breast lump, breast pain, and skin and nipple changes. Men may present with gynaecomastia (breast swelling). Women are often worried that they have breast cancer, whatever breast symptom they have, and it is important to explore these concerns.

The history of the presenting symptoms is crucial. Find out the nature and duration of symptoms, any changes over time and any relationship to the menstrual cycle.

Ask about risk factors for breast cancer, in particular:

- previous personal history of breast cancer
- family history of breast or ovarian cancer and the age of those affected
- use of hormone replacement therapy
- previous mantle radiotherapy for Hodgkin's lymphoma.

Common presenting symptoms

Breast lump

Not all patients have symptoms. Women may present with an abnormality on screening mammography or concerns about their family history.

Ask:

- Is it a single lump or multiple lumps?
- Where is it?

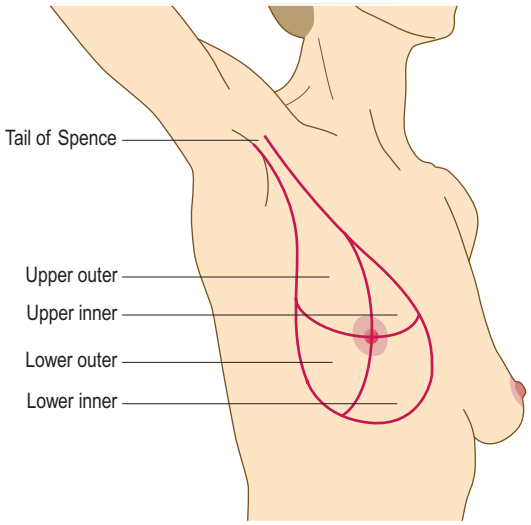


Fig. 11.3 Adult right breast.

- Is it tender?
- Is there any associated nipple discharge?
- Is there any variation in symptoms during the menstrual cycle?

Breast pain (mastalgia)

Ask if the pain varies during the menstrual cycle. Breast pain may be cyclical or non-cyclical and it is important to establish its timing and severity, and to distinguish it clearly from chest-wall pain. Cyclical mastalgia is common, worse in the latter half of the menstrual cycle and relieved by menstruation. Non-cyclical mastalgia does not vary with the menstrual cycle.

Skin changes

Women may report changes in the breast skin or these may be noted on examination. Possible skin changes include:

- Simple skin dimpling: the skin remains mobile over an underlying cancer (Fig. 11.4).
- Indrawing of the skin: the skin is fixed to the cancer.
- Lymphoedema of the breast: the skin is swollen between the hair follicles and looks like orange peel (*peau d'orange*; Fig. 11.5). The most common causes of lymphoedema are infection or tumour and it may be accompanied by redness, warmth and tenderness. Investigate any 'infection' that does not respond to one course of antibiotics to exclude an inflammatory cancer. These are rare but aggressive tumours with a poor prognosis.
- Eczema of the nipple and areola: this may be part of a generalised skin disorder. If it affects the true nipple, it may be caused by Paget's disease of the nipple (Fig. 11.6), or invasion of the epidermis by an intraductal cancer.

Nipple changes

Women may report changes to the nipple or these may be noted on examination. Changes include:

- Nipple inversion: retraction of the nipple is common and often benign. It can be the first sign of malignancy, however, in which case it is usually asymmetrical (Fig. 11.7).
- Nipple discharge: a small amount of fluid may be expressed from multiple ducts by massaging the breast. It may be clear, yellow, white or green in colour. Investigate persistent single-duct discharge or blood-stained (macroscopic or microscopic) discharge to exclude duct ectasia, periductal mastitis, intraduct papilloma or intraduct cancer.
- Galactorrhoea: this is a milky discharge from multiple ducts in both breasts, most commonly caused by one of several drugs. Rarely, it is due to hyperprolactinaemia. Galactorrhoea may persist for some time after

Fig. 11.4 Skin dimpling due to underlying malignancy.

Fig. 11.5 *Peau d'orange* of the breast.

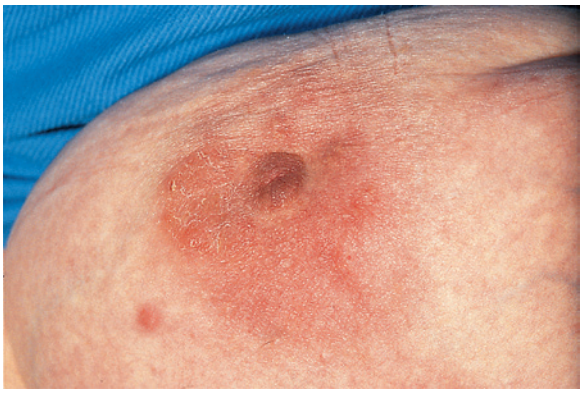


Fig. 11.6 Paget's disease of the nipple.

Fig. 11.7 Breast cancer presenting as indrawing of the nipple. Note the bloody discharge on the underclothing.

breastfeeding. It often causes hyperplasia of Montgomery's tubercles, the small rounded projections covering the areolar glands.

Gynaecomastia

Gynaecomastia is enlargement of the male breast and often occurs in pubertal boys. In chronic liver disease, gynaecomastia is caused by high levels of circulating oestrogens, which are not metabolised by the liver. Many drugs can cause breast enlargement (Box 11.1 and Fig. 11.8).

11.1 Causes of gynaecomastia

Drugs

- Cannabis
- Methadone
- Oestrogens and other hormone-manipulating drugs used in treatment of prostate cancer
- Spironolactone
- Digoxin

Decreased androgen production

- Klinefelter's syndrome

Increased oestrogen levels

- Chronic liver disease
- Thyrotoxicosis
- Some adrenal tumours

Fig. 11.8 Drug-induced gynaecomastia caused by cimetidine.

The physical examination

Always offer a chaperone and record that person's name; if the patient declines, note this. Male doctors should always have a chaperone. Ask the patient to undress to the waist and sit upright on a well-illuminated chair or on the side of a bed.

Examination sequence

- Ask the patient to rest her hands on her thighs to relax the pectoral muscles (Fig. 11.9A).
- Face the patient and look at the breasts for:
  - asymmetry
  - local swelling
  - skin changes
  - nipple changes.
- Ask the patient to press her hands firmly on her hips to contract the pectoral muscles and inspect again (Fig. 11.9B).
- Ask her to raise her arms above her head and then lean forward to expose the whole breast and exacerbate skin dimpling (Fig. 11.9C,D).
- Ask her to lie with her head on one pillow and her hand under her head on the side to be examined (Fig. 11.10).
- Hold your hand flat to her skin and palpate the breast tissue. Using two hands is often helpful. Breasts are often tender so pressing too firmly can be very uncomfortable.
- View the breast as a clock face. Examine each 'hour of the clock' from the outside towards the nipple, including under the nipple (Fig. 11.11). Examine all the breast tissue, comparing the texture of one breast with the other. The breast extends from the clavicle to the upper abdomen and from the midline to the anterior border of latissimus dorsi (posterior axillary fold). Define the characteristics of any mass (see Box 3.8).
- Elevate the breast with your hand to uncover dimpling overlying a tumour that may not be obvious on inspection.
- Is the mass fixed underneath? With the patient's hands on her hips, hold the mass between your thumb and forefinger. Ask her to contract and relax the pectoral muscles alternately by pushing into her hips. As the

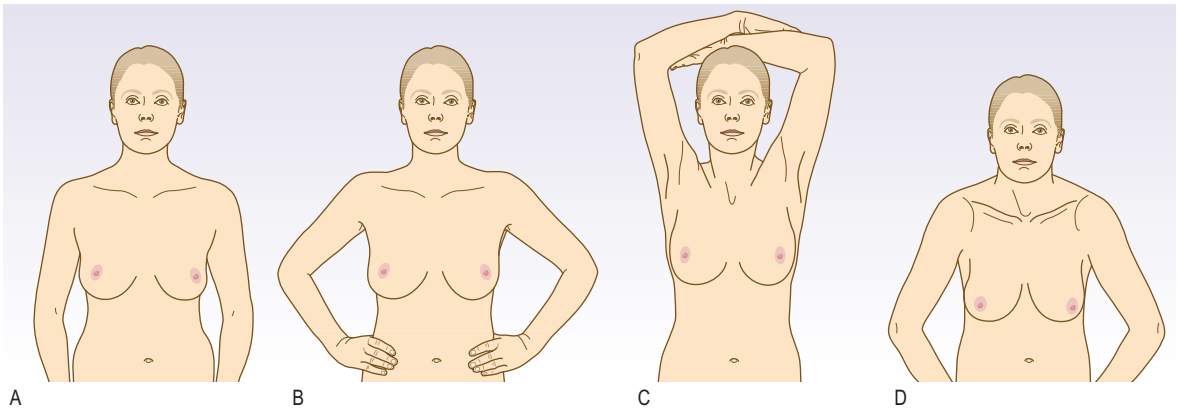


Fig. 11.9 Positions for inspecting the breasts. A Hands resting on the thighs. B Hands pressed on to the hips. C Arms above the head. D Leaning forward with the breasts pendulous.

pectoral muscle contracts, note whether the mass moves with it and if it is separate when the muscle is relaxed. Fixation suggests malignancy.
- Examine the axillary tail between your finger and thumb.
- Palpate the nipple by holding it gently between your index finger and thumb. Try to express any discharge. Massage the breast towards the nipple to uncover any discharge, noting the colour and consistency, and the number and position of the affected ducts. Test any discharge for blood using urine-testing sticks.
- Palpate the regional lymph nodes, including the supraclavicular group. Ask the patient to sit facing you, and support the full weight of her arm at the wrist with your opposite hand. Move the flat of your other hand high into the axilla and upwards over the chest to the apex. This can be uncomfortable, so warn patients beforehand and check for any discomfort. Compress the contents of the axilla against the chest wall. Assess any palpable masses for:
  - size
  - consistency
  - fixation.
- Examine the supraclavicular fossa, looking for any visual abnormality. Palpate the neck from behind and systematically review all cervical lymphatic chains (see Figs 3.27 and 9.22).

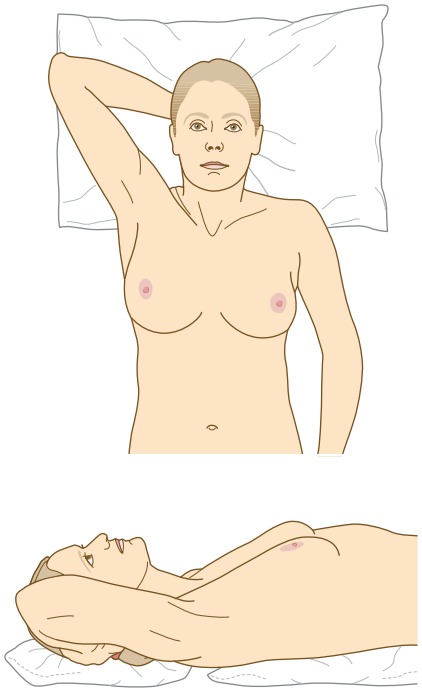


Fig. 11.10 **Position for examination of the right breast.**

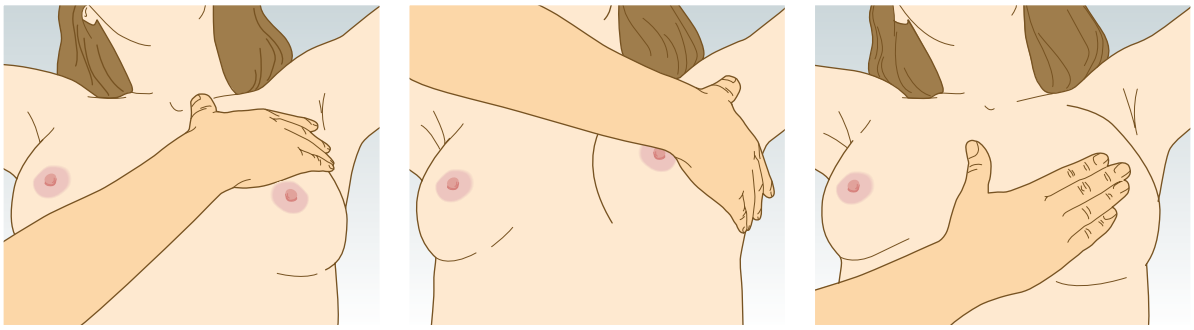
Cancers cause solid irregular masses. They are usually, but not always, painless, firm and hard, in contrast with the surrounding breast tissue. The cancer may extend directly into the overlying skin, pectoral fascia or pectoral muscle, causing the lump to feel fixed, or metastasise via regional lymph nodes or the systemic circulation.

In the UK, breast cancer affects 1 in 9 women. The incidence increases with age, but any mass is potentially malignant until proven otherwise. Cancer of the male breast is uncommon and may have a genetic basis. In contrast, fibroadenomas are smooth, mobile, discrete and rubbery lumps that are common in women under 35 years of age. These are benign overgrowths of the terminal duct lobules.

Fibrocystic changes are rubbery, bilateral and benign, and most prominent premenstrually, but investigate any new focal change in young women that persists after menstruation. These changes and irregular nodularity of the breast are common, especially in the upper outer quadrant in young women.

Breast cysts are smooth, fluid-filled sacs, most common in women aged 35–55 years. They are soft and fluctuant when the sac pressure is low but hard and painful if the pressure is high. Cysts may occur in clusters. A large majority are benign, but investigate any cyst where there is a residual mass following aspiration or which recurs after aspiration.

Breast abscesses occur as one of two types:
- Lactational abscesses in women who are breastfeeding. These are usually peripheral in the breast.
- Non-lactational abscesses, which occur as an extension of periductal mastitis, under the areola, often with nipple inversion. They usually affect young female smokers. Occasionally, a non-lactating abscess may discharge spontaneously through a fistula, classically at the edge of the areola (Fig. 11.12).



A B C

Fig. 11.11 **Clinical examination of the breast.** Palpating clockwise to cover all of the breast.

11.2 Investigation of breast lumps

Investigation	Indication/comment
Ultrasound	Lump
Mammography	Should not be used in women under 40 unless there is a strong suspicion of cancer
Magnetic resonance imaging	Dense breasts, ruptured implant, *BRCA1/2* mutation
Fine-needle aspiration	Should not be used to diagnose primary cancer but still useful for assessing lymph nodes
Core biopsy	To differentiate invasive or in situ cancer
Large-core vacuum-assisted core biopsy	Useful for large areas of diffuse change
Open surgical biopsy	Used as a last resort when multiple core biopsies have not provided a definite diagnosis

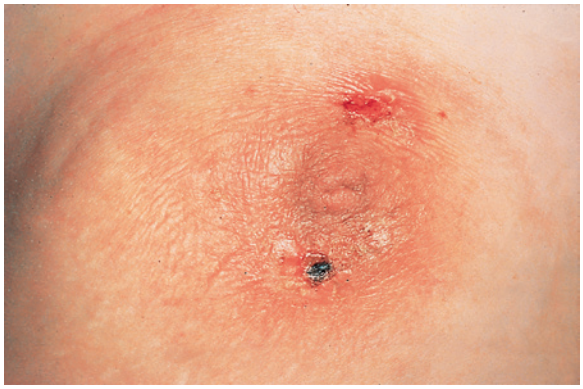


Fig. 11.12 Mammary duct fistula.

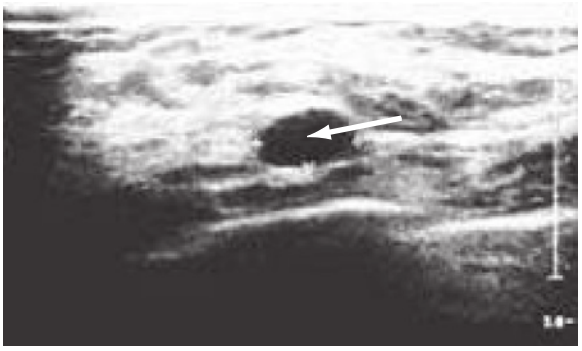


Fig. 11.13 Ultrasound of a breast cyst. A characteristic smooth-walled, hypoechoic lesion *(arrow)*.

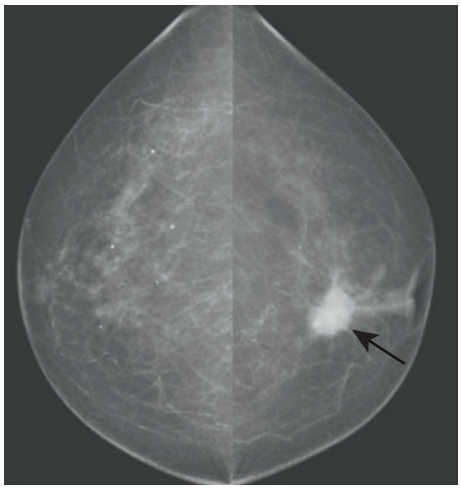


Fig. 11.14 Digital mammogram. A spiculate opacity characteristic of a cancer *(arrow)*.

Investigations

Accurate diagnosis of breast lesions depends on clinical assessment, backed up by mammography and/or breast ultrasound and pathological diagnosis; this should ideally be done by core biopsy, although fine-needle aspiration cytology can also be helpful in assessing axillary lymph nodes ('triple assessment') (Box 11.2 and Figs 11.13–11.14). Up to 5% of malignant lesions require excision biopsy for the diagnosis to be made. MRI is useful for investigating possible implant rupture or the extent of cancer in a mammographically dense breast, and for screening those with *BRCA1* or *BRCA2* gene mutations. In the UK, there are specific guidelines for the appropriate referral of patients with breast symptoms to specialist units.

FEMALE REPRODUCTIVE SYSTEM

Anatomy and physiology

The female reproductive organs are situated within the bony pelvis (Fig. 11.15). They cannot normally be felt on abdominal palpation. A vaginal examination is required for their routine assessment.

The vulva (Fig. 11.16) consists of fat pads, called labia majora, covered with hair. The labia minora are hairless skin flaps at each side of the vulval vestibule, which contains the urethral opening and the vaginal orifice. The clitoris is situated anteriorly where the labia minora meet and is usually obscured by the prepuce. Posteriorly the labia meet at the fourchette, and the perineum is the fibromuscular region posteriorly that separates it from the anus.

The vagina is a rugged tube 10–15 cm in length. There is an irregular mucosal ring two centimetres into the vagina that represents the remnants of the hymen (see Fig. 11.16). Bulging into the top of the vagina is the grape-sized fibrous uterine cervix, with the external cervical os on its surface (Fig. 11.17). The fornices are the areas of the top of the vagina next to the cervix (Fig. 11.18).

The uterus is a muscular pear-shaped structure, about the size of a large plum, situated in the midline and usually tilted