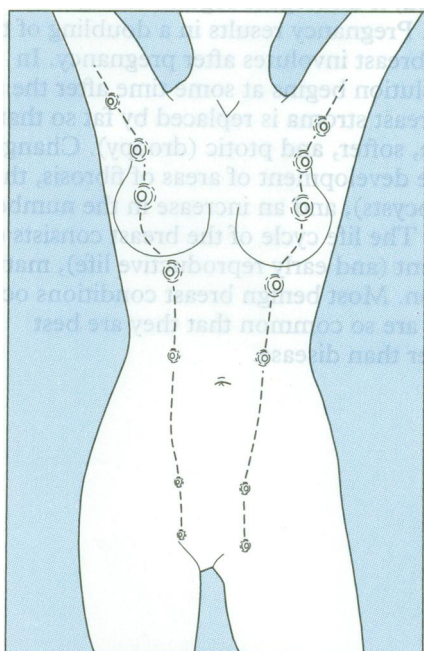


CONGENITAL PROBLEMS AND ABERRATIONS OF NORMAL BREAST DEVELOPMENT AND INVOLUTION

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Congenital abnormalities



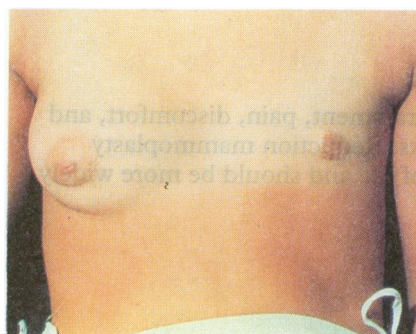
Usual sites of accessory nipples and breasts along milk lines.

Extra nipples and breasts

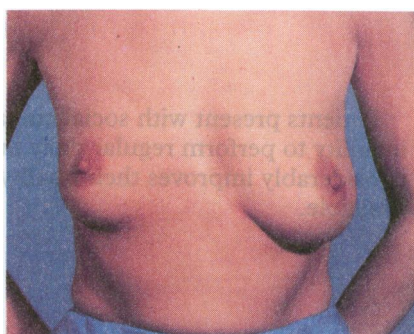
Between 1% and 5% of men and women have supernumerary or accessory nipples or, less frequently, supernumerary or accessory breasts. These usually develop along the milk line: the most common site for accessory nipples is just below the normal breast, and the most common site for accessory breast tissue is the lower axilla. Accessory breasts below the umbilicus are extremely rare. Extra breasts or nipples rarely require treatment unless unsightly, although they are subject to the same diseases as normal breasts and nipples.



Patients with an accessory nipple (left) and bilateral accessory breasts (right).



Left breast hypoplasia.

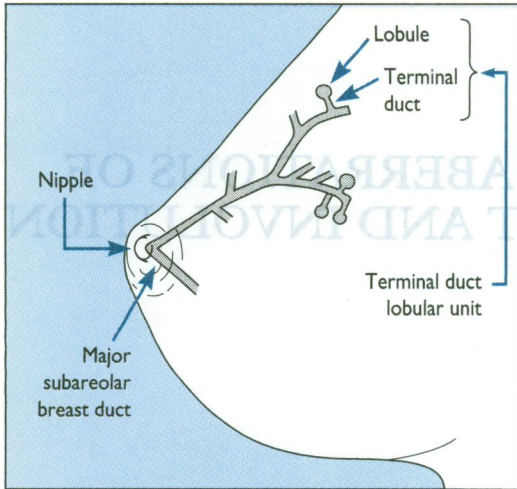


Breast asymmetry.

Absence or hypoplasia of the breast

One breast can be absent or hypoplastic, usually in association with defects in pectoral muscle. Some degree of breast asymmetry is usual, and the left breast is more commonly larger than is the right. True breast asymmetry can be treated by augmentation of the smaller breast, reduction or elevation of the larger breast, or a combination of procedures.

Breast development and involution



Anatomy of breast showing terminal duct lobular units and branching system of ducts.

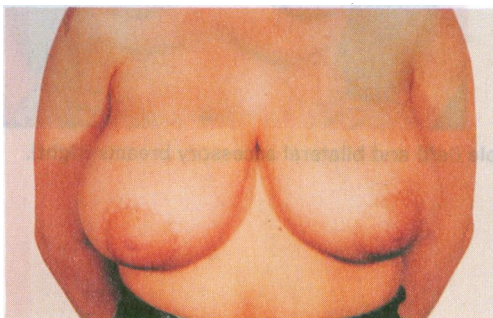
The breast is identical in boys and girls until puberty. Growth begins at about the age of 10 and may initially be asymmetrical: a unilateral breast lump in a 9-10 year old girl is invariably developing breast, and biopsy specimens should not be taken from girls of this age as they can damage the breast bud. The functional unit of the breast is the terminal duct lobular unit or lobule, which drains via a branching duct system to the nipple. The duct system does not run in a truly radial manner, and the breast is not separated into easily defined segments. The lobules and ducts—the glandular tissue—are supported by fibrous tissue—the stroma. Most benign breast conditions and almost all breast cancers arise within the terminal duct lobular unit.

Aberrations of normal breast development and involution

Age (years)	Normal process	Aberration
<25	Breast development Stromal	Juvenile hypertrophy Fibroadenoma
25-40	Lobular Cyclical activity	Cyclical mastalgia Cyclical nodularity (diffuse or focal)
35-55	Involution Lobular Stromal	Macrocysts Sclerosing lesions
	Ductal	Duct ectasia

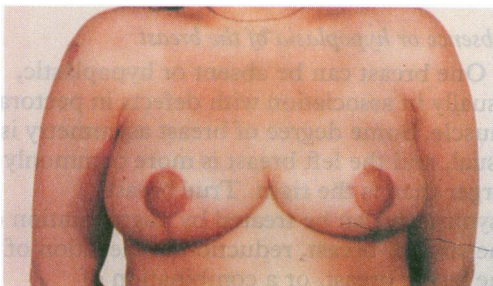
After the breast has developed, it undergoes regular changes in relation to the menstrual cycle. Pregnancy results in a doubling of the breast weight at term, and the breast involutes after pregnancy. In nulliparous women breast involution begins at some time after the age of 30. During involution the breast stroma is replaced by fat so that the breast becomes less radiodense, softer, and ptotic (droopy). Changes in the glandular tissue include the development of areas of fibrosis, the formation of small cysts (microcysts), and an increase in the number of glandular elements (adenosis). The life cycle of the breast consists of three main periods: development (and early reproductive life), mature reproductive life, and involution. Most benign breast conditions occur during one specific period and are so common that they are best considered as aberrations rather than disease.

Aberrations of breast development



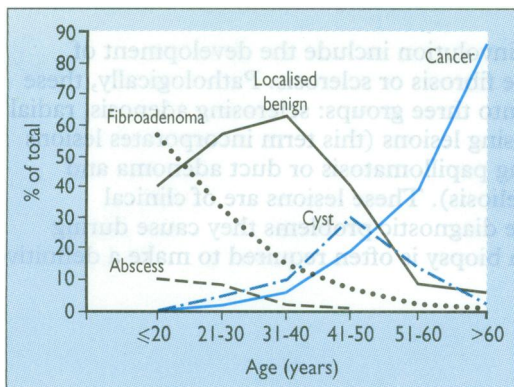
Juvenile or virginal hypertrophy

Prepubertal breast enlargement is common and only requires investigation if it is associated with other signs of sexual maturation. Uncontrolled overgrowth of breast tissue can occur in adolescent girls whose breasts develop normally during puberty but then continue to grow, often quite rapidly. No endocrine abnormality can be detected in these girls.



Patient with juvenile hypertrophy (top) and after surgery (bottom).

Patients present with social embarrassment, pain, discomfort, and inability to perform regular daily tasks. Reduction mammoplasty considerably improves their quality of life and should be more widely available.



Changing frequencies of different discrete breast lumps with age.



Juvenile fibroadenoma of right breast.

Fibroadenoma

Although classified in most textbooks as benign neoplasms, fibroadenomas are best considered as aberrations of normal development: they develop from a whole lobule and not from a single cell, they are very common, and they are under the same hormonal control as the remainder of the breast tissue. They account for about 13% of all palpable symptomatic breast masses, but in women aged 20 or less they account for almost 60% of such masses. There are four separate types of fibroadenoma: common fibroadenoma, giant fibroadenoma, juvenile fibroadenoma, and phyllodes tumours. There is no universally accepted definition of what constitutes a giant fibroadenoma, but most consider that it should measure over 5 cm in diameter. Juvenile fibroadenomas occur in adolescent girls and sometimes undergo rapid growth but are managed in the same way as the common fibroadenoma. Phyllodes tumours are distinct pathological entities and cannot always be clinically differentiated from fibroadenomas.

A definitive diagnosis of fibroadenoma can be made by a combination of clinical examination, ultrasonography, and fine needle aspiration cytology. They have characteristic mammographic features in older patients when they calcify, and a few patients have multiple fibroadenomas. Current evidence of the natural history of fibroadenomas suggests that less than 5% of them increase in size and about one quarter get smaller or completely disappear.

Management—Fibroadenomas over 4 cm in diameter should be excised. In women aged under 40 fibroadenomas diagnosed by clinical examination, ultrasonography, and fine needle aspiration cytology do not need excision unless this is requested by the patient. In women aged over 40 a selective policy of excision should be used to ensure that breast cancers are not missed.

Aberrations in early reproductive period

Final diagnosis in patients with palpable breast mass

Localised benign*	38%
Carcinoma	26%
Cysts	15%
Fibroadenoma	13%
Periductal mastitis	1%
Duct ectasia	1%
Abscess	1%
Others	5%

*Localised areas of nodularity that histologically show no clinically significant abnormality or aberrations of normal involution

Pain and nodularity

Cyclical pain and nodularity are so common that they can be regarded as physiological and not pathological. Pain which is severe or prolonged is regarded as an aberration. Focal breast nodularity is the most common cause of a breast lump and is seen in women of all ages. When excised most of these areas of nodularity show either no pathological abnormality or aberrations of the normal involutinal process such as focal areas of fibrosis or sclerosis. The preferred pathological term is benign breast change, and terms such as fibroadenosis, fibrocystic disease, and mastitis should no longer be used by clinicians or pathologists.

Aberrations of involution



Mammogram of discrete breast lesion with surrounding halo characteristic of breast cyst.

Cystic disease

This term should be restricted to the clearly defined group of women with a palpable breast cyst. Cystic disease affects 7% of women in Western countries, and cysts constitute 15% of all discrete breast masses. Cysts are distended and involuted lobules and are seen most frequently in perimenopausal women. Most present as a smooth discrete breast lump that can be painful and is sometimes visible. Cysts have characteristic halos on mammography and are readily diagnosed by ultrasonography. The diagnosis is established by needle aspiration, and providing the fluid is not bloodstained it should not be sent for cytology. After aspiration the breast should be re-examined to check that the palpable mass has disappeared. Any residual mass requires full assessment by mammography and fine needle aspiration cytology as 1-3% of patients with cysts have carcinomas; few of these are associated with a cyst. Patients with multiple cysts have a slightly increased risk of developing breast cancer, but the magnitude of this risk is not considered of clinical significance.

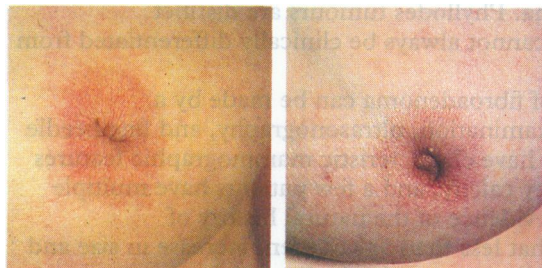
The mammographic appearance of sclerosing lesions mimics that of cancer, causing diagnostic problems during breast screening

Sclerosis

Aberrations of stromal involution include the development of localised areas of excessive fibrosis or sclerosis. Pathologically, these lesions can be separated into three groups: sclerosing adenosis, radial scars, and complex sclerosing lesions (this term incorporates lesions previously called sclerosing papillomatosis or duct adenoma and includes infiltrating epitheliosis). These lesions are of clinical importance because of the diagnostic problems they cause during breast screening. Excision biopsy is often required to make a definitive diagnosis.

Duct ectasia

The major subareolar ducts dilate and shorten during involution, and, by the age of 70, 40% of women have substantial duct dilatation or duct ectasia. Some women with excessive dilatation and shortening present with nipple discharge, nipple retraction, or a palpable mass that may be hard or doughy. The discharge is usually cheesy, and the nipple retraction is classically slit-like. Surgery is indicated if the discharge is troublesome or the patient wishes the nipple to be everted.



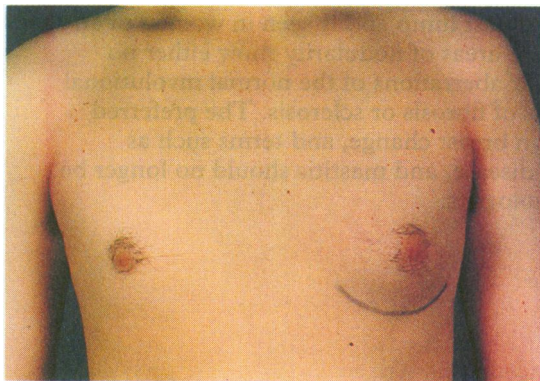
Slit-like nipple retraction due to duct ectasia (left) and nipple retraction due to breast cancer (right).

Atypical hyperplasia is the only benign breast condition associated with a significantly increased risk of subsequent breast cancer

Epithelial hyperplasia

Epithelial hyperplasia is an increase in the number of cells lining the terminal duct lobular unit. This was previously called epitheliosis or papillomatosis, but these terms are now obsolete. The degree of hyperplasia can be graded as mild, moderate, or florid. If the hyperplastic cells also show cellular atypia the condition is called atypical hyperplasia. The absolute risk of breast cancer developing in a woman with atypical hyperplasia who does not have a first degree relative with breast cancer is 8% at 10 years: for a woman with a first degree relative with breast cancer, the risk is 20-25% at 15 years.

Gynaecomastia



Patient with left sided gynaecomastia. Black line indicates lower limit of dissection.

Causes of gynaecomastia

Puberty	25%
Idiopathic (senescent)	25%
Drugs (cimetidine, digoxin, spironolactone, androgens, or antioestrogens)	10-20%
Cirrhosis or malnutrition	8%
Primary hypogonadism	8%
Testicular tumours	3%
Secondary hypogonadism	2%
Hyperthyroidism	1.5%
Renal disease	1%

Gynaecomastia (the growth of breast tissue in males to any extent in all ages) is entirely benign and usually reversible. It commonly occurs in puberty and old age. It is seen in 30-60% of boys aged 10-16 years and usually requires no treatment as 80% resolve spontaneously within two years. Embarrassment or persistent enlargement are indications for surgical referral.

Senescent gynaecomastia commonly affects men aged between 50 and 80, and in most it does not appear to be associated with any endocrine abnormality. A careful history and examination will often reveal the cause. A history of recent progressive breast enlargement without pain or tenderness and without an easily identifiable cause is an indication for investigation. Mammography can differentiate between breast enlargement due to fat and gynaecomastia and is of value if malignancy is suspected. Fine needle aspiration cytology should be performed if there is clinical or mammographic suspicion of breast cancer. Only if no clear cause is apparent should blood hormone concentrations be measured.

In drug related gynaecomastia withdrawal of the drug or change to an alternative treatment should be considered. Gynaecomastia is seen increasingly in body builders who take anabolic steroids; some have learnt that by taking tamoxifen they can combat this. Danazol produces symptomatic improvement in some patients with gynaecomastia.

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The ABC of Breast Diseases has been edited by J Michael Dixon.