

# Approaching a Breast Mass

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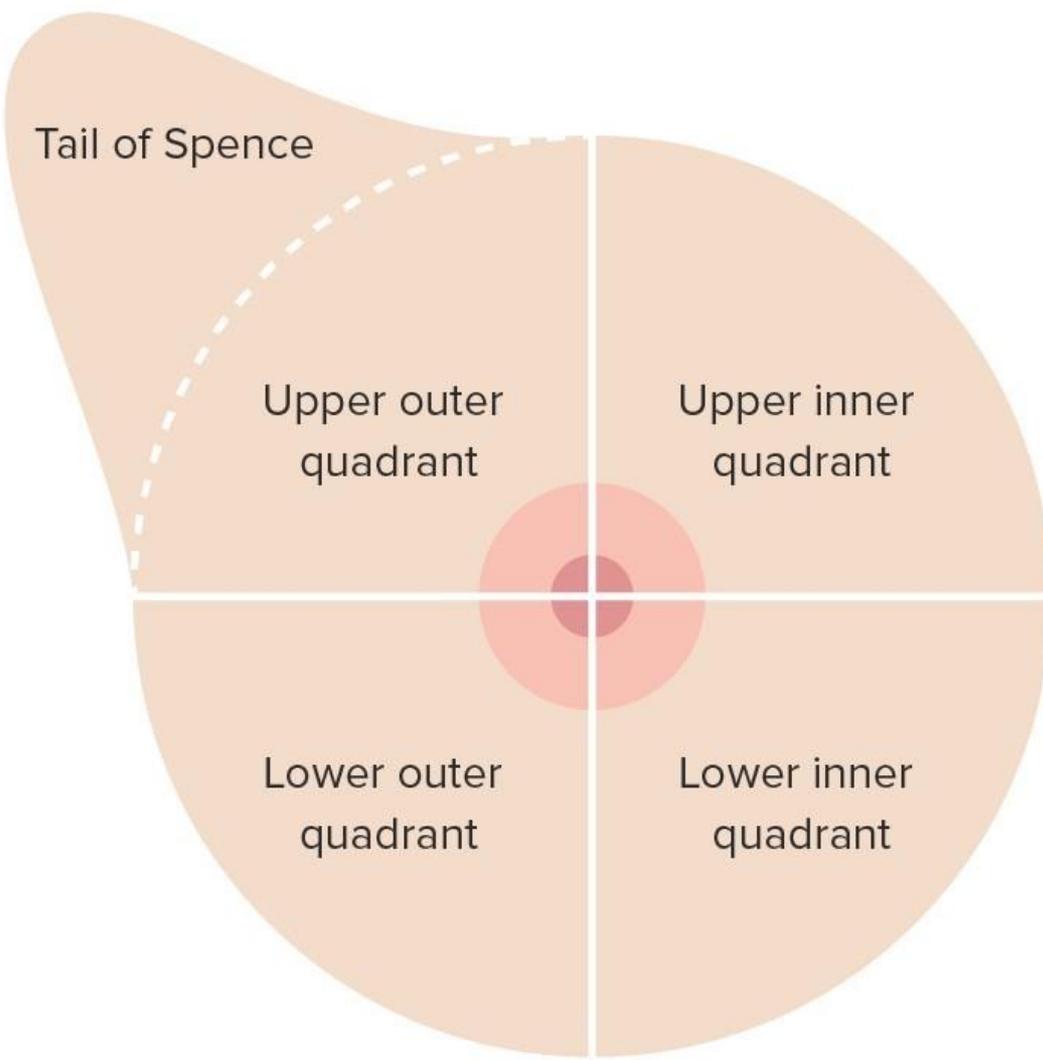
# Introduction



- Anatomy of the Breast

## Breast

paired structures lying in the superficial fascia of the anterior thoracic wall in men and women alike, although it normally enlarges after puberty in women, and abnormally in men (gynecomastia)



## Quadrants of the Breast

- Upper-Outer (UOQ)
- Upper-Inner (UIQ)
- Lower-Outer (LOQ)
- Lower-Inner (LIQ)

- **Vertically: rib 2 - rib 6 (midclavicular line)**
- **Horizontally: lateral sternal border - mid-axillary line**
- **Centrally: Areola (not to be confused with the nipple), a circular pigmented area surrounding the nipple (protruded) at the 4th intercostal space**
- **Montgomery's Tubercles: sebaceous glands that enlarge during pregnancy for lubrication**

# Axillary and circular body



## Axillary Body:

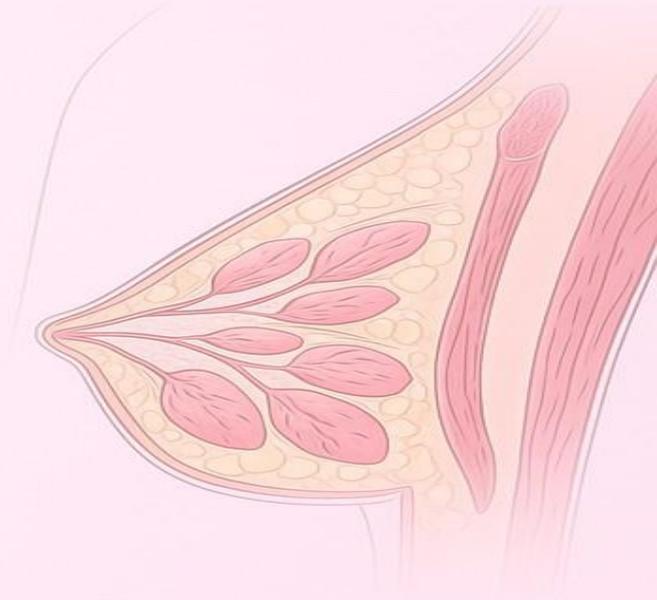
more commonly known as tail  
of Spence present in 2-6% of  
the population

accessory breast tissue that pierces  
the pectoral fascia in the axillary  
area

It is the **ONLY** breast tissue lying deep  
to the deep fascia.

# Let's dig a little deeper!

- 1) retro-mammary space containing loose areolar connective tissue
- 2) deep fascia
- 3) pectoralis major, serratus anterior, external oblique muscle



# Parenchyma

**Mammary Gland (lined with epithelial cells)**

**Lobes (15-20)**

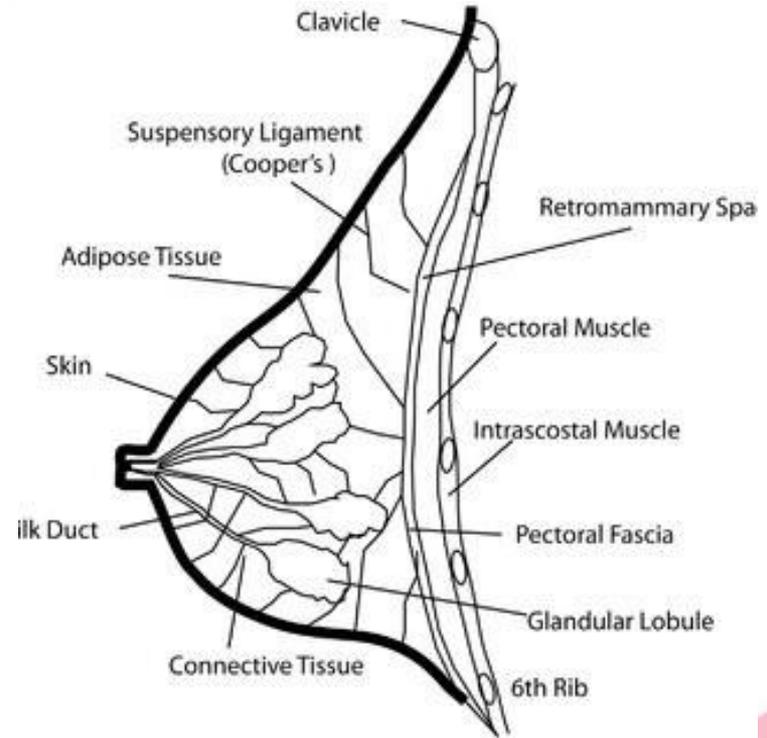
**Lobules**

**Alveoli**

**Lactiferous Duct**

**Lactiferous Sinus**

**Nipple**

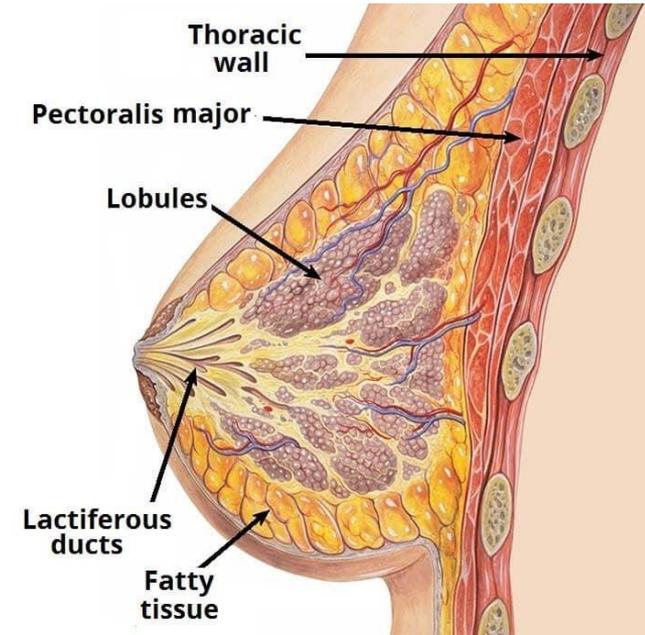


# Stroma

- **Fibrous Component:**
- **Cooper's ligaments**

( suspensory ligaments of cooper ) maintain breast shape , separate secretory lobules , secure breast to skin and underlying pectoral fascia (associated with pectoralis major)

- **Collagen**
- **Elastin**
- **Adipose Tissue**



# Blood Supply

## Axillary Artery

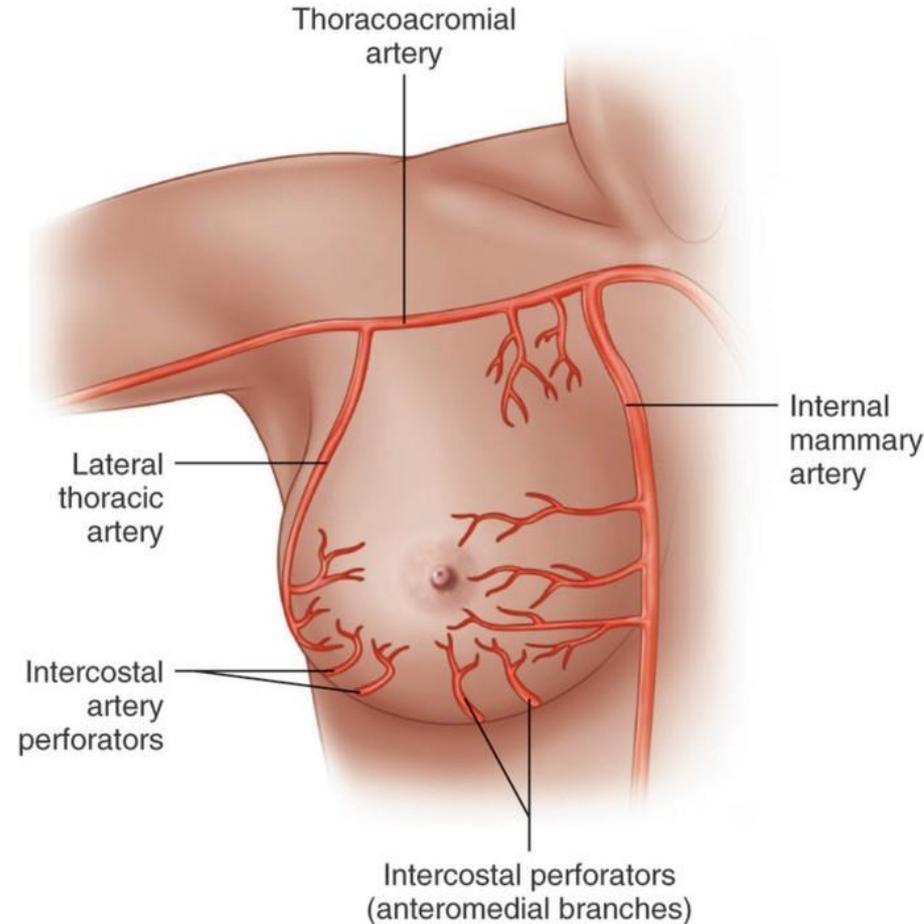
- Superior Thoracic Artery
- Thoracoacromial Artery
- Lateral Thoracic Artery

## Internal Mammary Artery (medially)

- 2nd, 3rd, 4th intercostal branches

## Intercostal Artery

- lateral branch of posterior intercostal

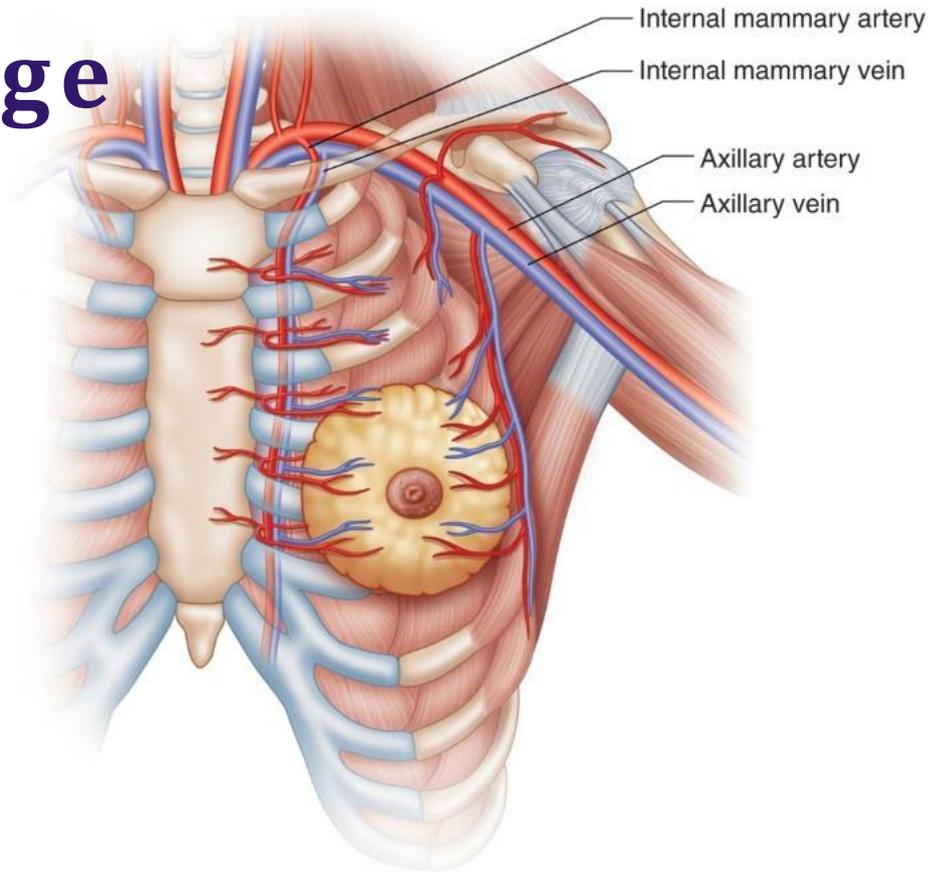


# Venous Drainage

Internal Mammary  
Vein

Axillary Vein

Intercostal Vein



# Lymphatic Drainage

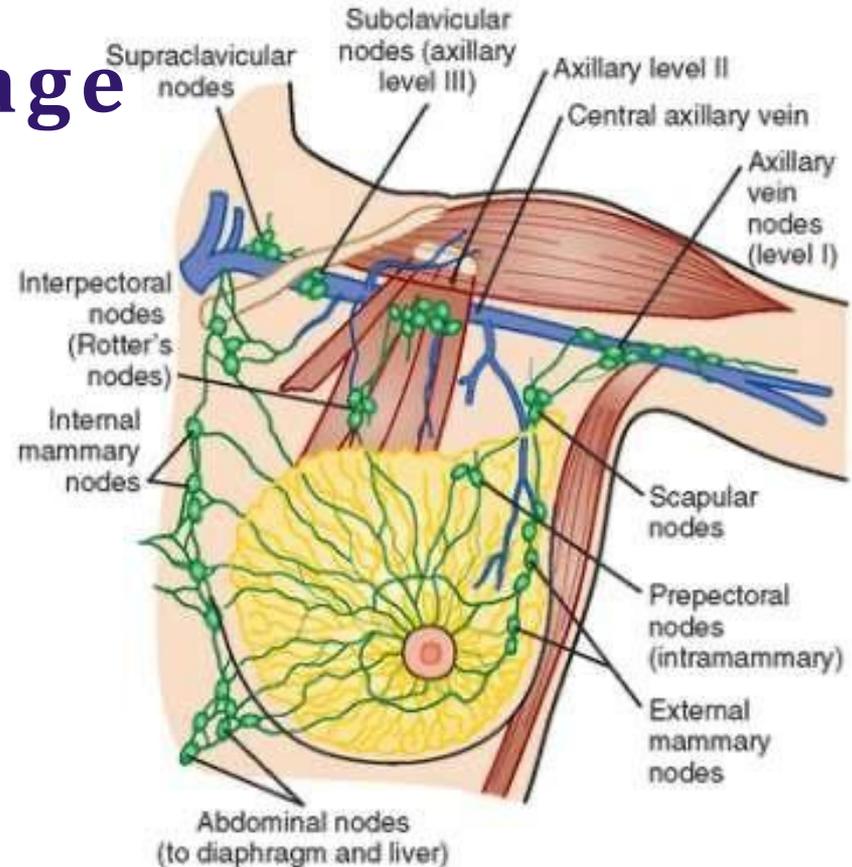
## Axillary Lymph Nodes (75%)

- anterior (pectoral) axillary lymph nodes
- posterior (scapular) axillary lymph nodes
- lateral axillary lymph nodes
- central axillary lymph nodes
- apical axillary lymph nodes

## Internal Mammary Lymph

## Nodes Supraclavicular

## Lymph Nodes



# Triple Assessment



## Clinical

History  
Examination



## Imaging

Ultrasonography  
Mammography



## Pathology

Fine Needle Aspiration  
Cytology  
Core Biopsy

# History

- Over 85% of breast masses are BENIGN!



# Patient Medical History

**Age**

**Onset/  
Duration**

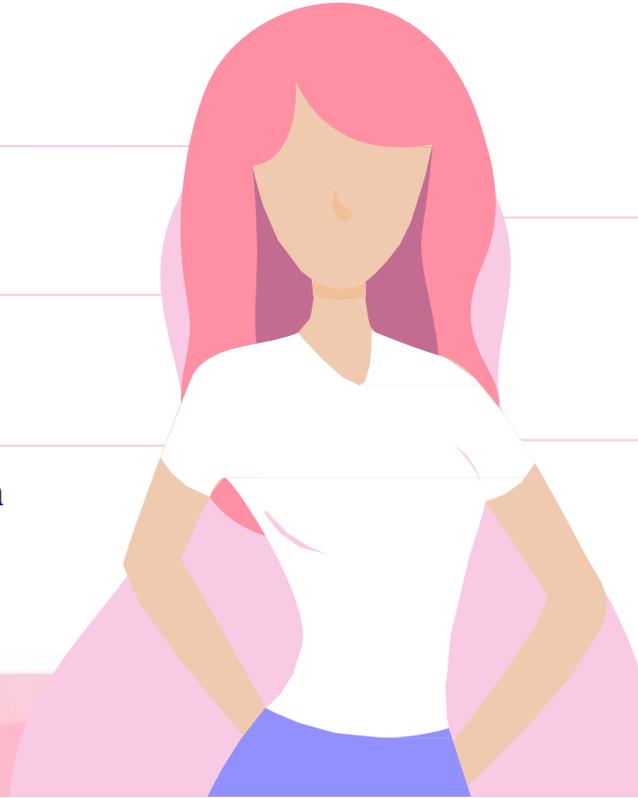
**Location**

**Unilateral/  
Bilateral**

**Progression**

**Pain**

**Association with  
Cycle**



We must ask about any associated symptoms, like:  
Nipple retraction , ulceration or discharge  
If present,

Is it unilateral ,spontaneous or  
a response to her menstrual  
period ?

The amount and whether it is :

**Bright red blood:**

duct papilloma / duct carcinoma

**Purulent:** abscess.

**Milky:** galactocele / Galactorrhoea.

**Serous:** Fibrocystic disease.

**Cheesy :** duct ectasia

## **Past medical & surgical history :**

- Previous breast lumps or cancer.
- Previous breast surgery or biopsy.
- History of radiation to the chest area before age 30.
- Previous gynecological surgeries or diseases like ovarian cancer or excess estrogen exposure.
- Previous breast trauma.



## **Family history :**

Breast or ovarian cancer in a 1st-degree relative, and in which age?  
BRCA1 or BRCA2 genes in family  
(play role in 5-10% of cases)

## **Drug history :**

Oral contraceptives  
Hormonal  
replacement therapy

## **Social history :**

Smoking and alcohol  
are significant risk  
factors for breast  
cancer

# Systemic review



Menstrual history :  
Menarche , menopause, hot flushes or any  
changes to menstrual cycle.

Fever



Lung abscess

Unintentional weight loss

Bony pain

Shortness of breath



Symptoms of  
advanced cancer



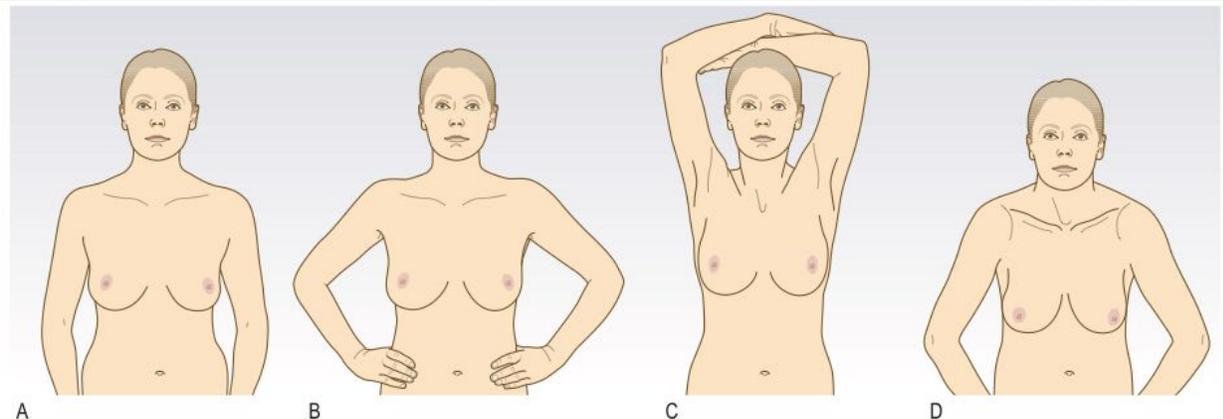
Examination

**Exposure** : the patient should be exposed above the waist

## **Inspection:**

Inspection positions :

- 1- setting erect with both arms by the side
- 2- setting erect with both arms raised above the head
- 3- bending forward with arms on hip



**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.

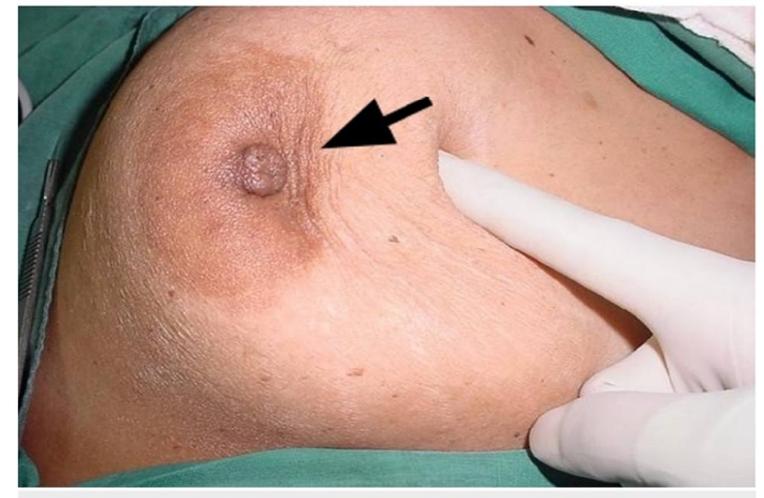
## The breast is inspected for :

- Shape and symmetry
- Lumps
- Skin tethering
- skin changes over the area of the mass and the areola.
- Nipple inversion (retraction), and nipple discharge (red flags include bloody discharge and spontaneous unilateral discharge).
- Inspect the arm for lymphedema.

### Shape and symmetry



### Skin tethering

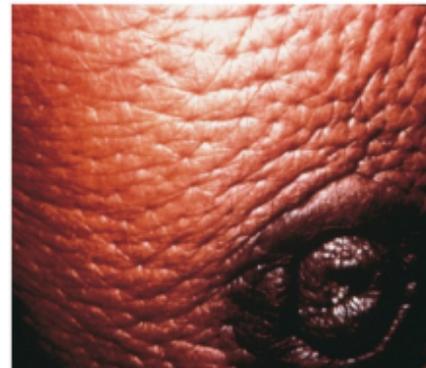


## Skin changes



Figure 53.9 Ulcerated carcinoma of the right breast

## Peau d'orange



## Nipple discharge



Figure 53.10 Recent nipple retraction. (a) Slit-like retraction of duct ectasia with mammary duct fistula. (b) Circumferential retraction with underlying carcinoma.

# Palpation

- Lie the patient flat
- Get the level with the patient
- Palpate with the palmer surface of the fingers, then palpate with the finger tips
- One hand palpates the breast for any abnormalities while the other one sustains and stabilizes the breast
- , the most effective strategy based on available evidence is the “lawnmower”

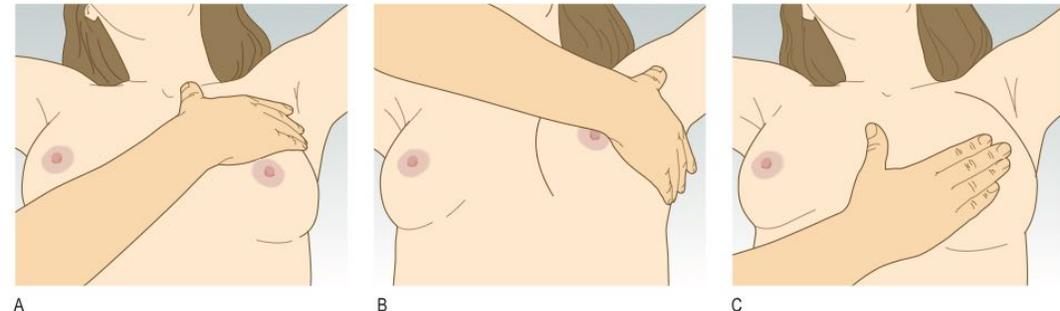
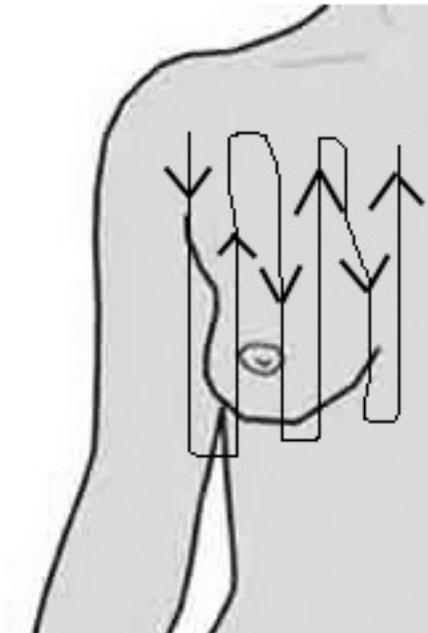
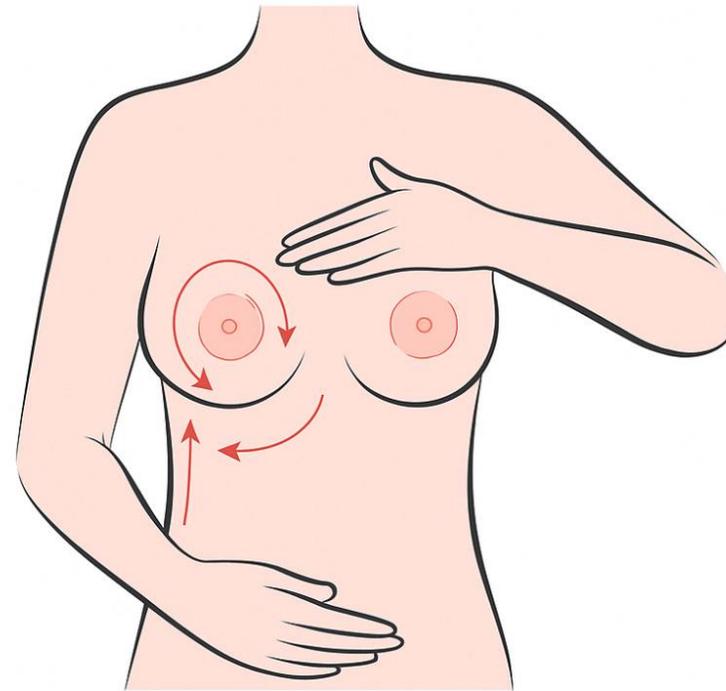


Fig. 11.11 Clinical examination of the breast. Palpating clockwise to cover all of the breast.

lawnmower



## 1. Circular method



- Start with normal breast
- Palpate in turn each quadrant of the breast by palm of the finger to find any lump
- Then palpate between the fingers and the thumb to note the consistency of breast tissue
- Palpate axillary tail
- Palpate the tissue beneath the areola
- Remember to press the nipple against the chest wall to elicit any discharges if not spontaneously present



## CONT....



- Note the temperature and tenderness
- Once the lump is identified with flat hands , palpate it between fingers and the thumb to identify :
  - Size and shape of the lump
  - Surface – smooth/irregular
  - Edge – well/ill-defined
  - Consistency – soft, firm, hard or cystic (fluctuation and transillumination)
  - Fixed to surrounding structures (skin, breast tissue, pectoral muscle, chest wall)
- Lymph nodes palpation (central , apical, pectoral, subscapular, brachial, infraclavicular, supraclavicular)

Initial Evaluation: Interpretation of findings

Certain findings are of particular concern: (red flags)●

Mass fixed to the skin or chest wall-➤

Stony hard, irregular and/or painless-➤



## CONT....

Painful, tender, rubbery masses in women who have a history of similar findings and who are of reproductive age suggests *fibrocystic changes*.

Red flag findings suggest *cancer*. However, the characteristics of benign and malignant lesions, including: presence or absence of risk factors, overlap considerably.

For this reason and because failure to recognize cancer has serious consequences, most patients require testing to more conclusively exclude breast cancer



# Invistegation

# Mammography

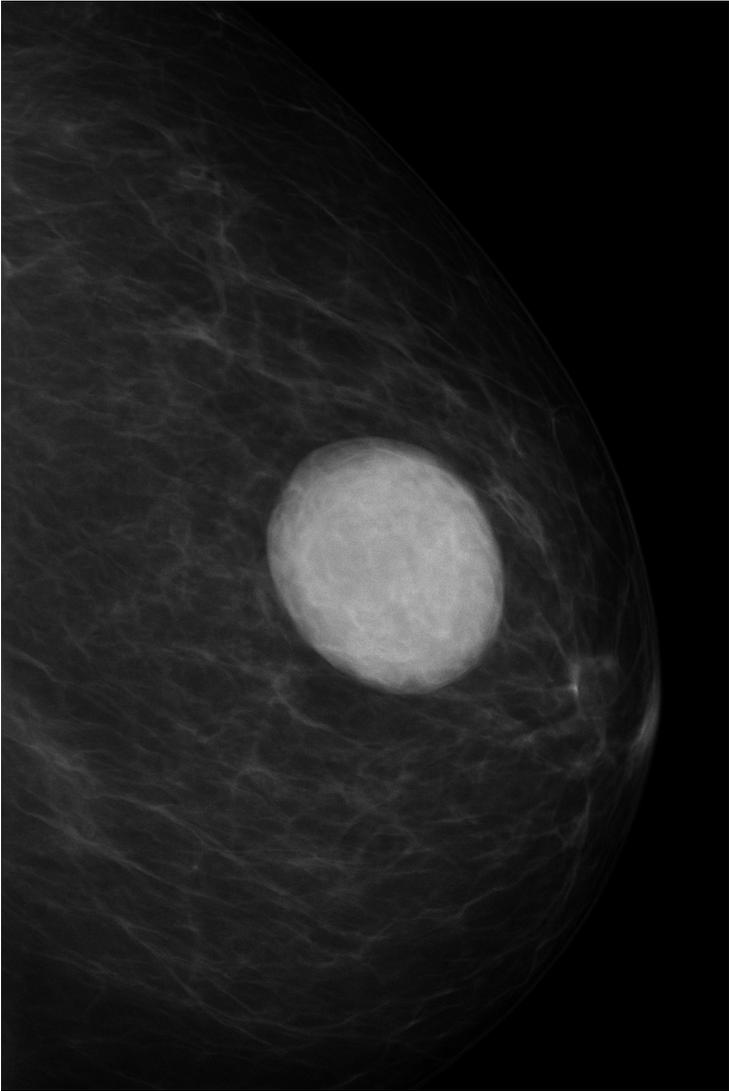
In women **over 40** mammography is usually performed (because women under 40; their dense breast tissue gives false positive results).

With mammography, benign lumps are usually very well defined and may have a surrounding halo

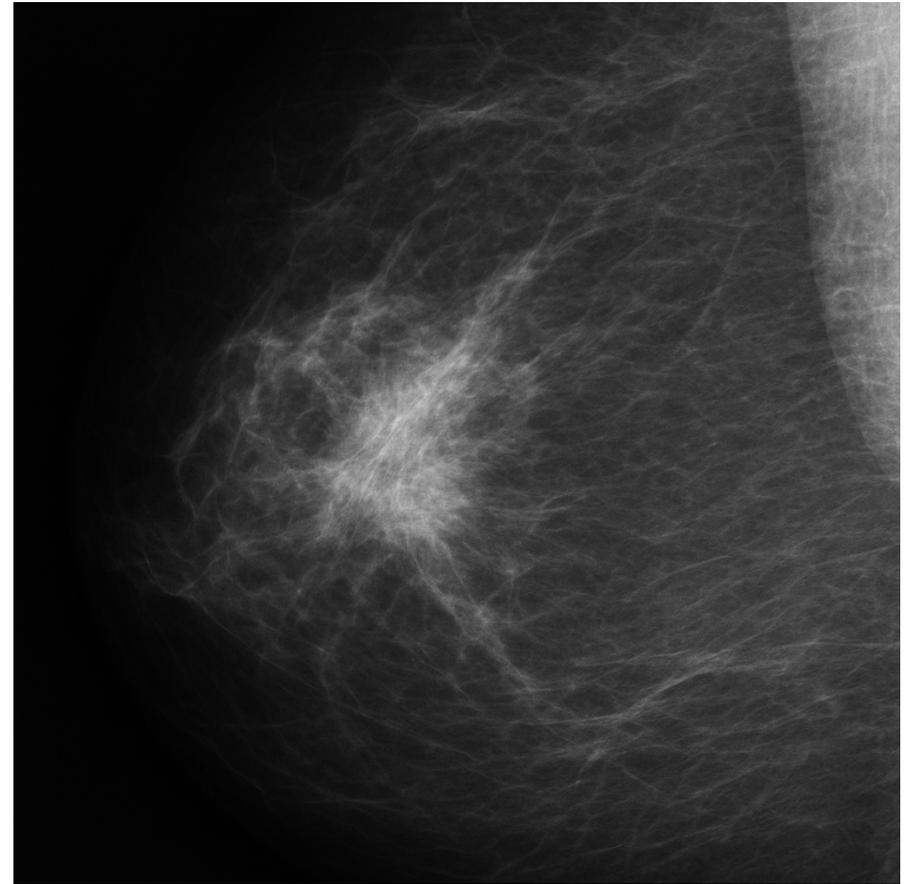
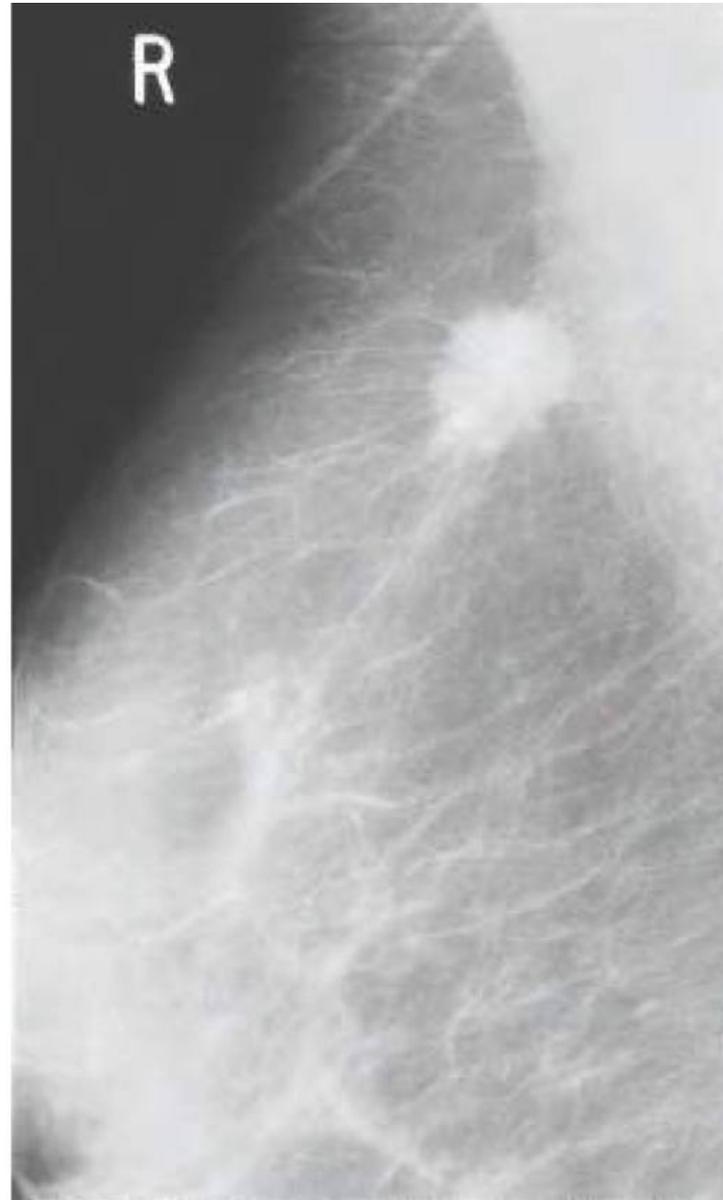
whereas breast cancers are commonly associated with speculation, architectural distortion (spiky dense irregular mass) or malignant microcalcification



benign lumps



malignant



# Ultrasound

In women **under 40** years of age ultrasound is the preferred

Ultrasound is particularly useful in assessing whether a lump is solid or Cystic

With ultrasound , benign lumps are usually Oval or round in shape with circumscribed margin and horizontal orientation

Where as malignant leasion appear hypoechoicwith ill defined border

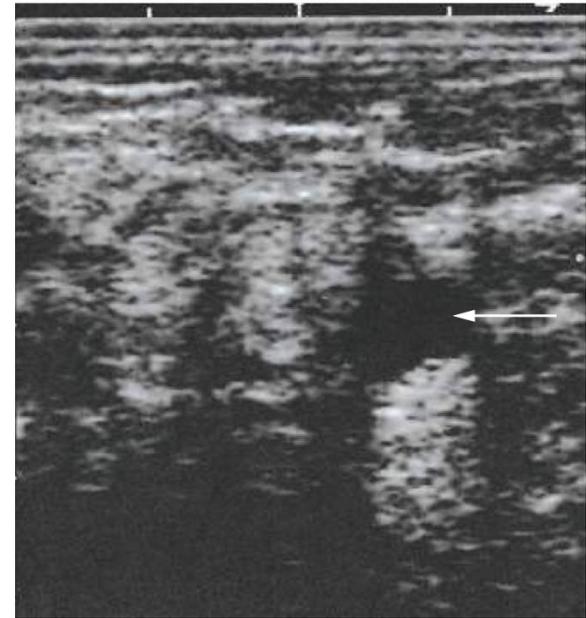


Figure 53.3 Ultrasound of the breast showing a cyst (arrow).

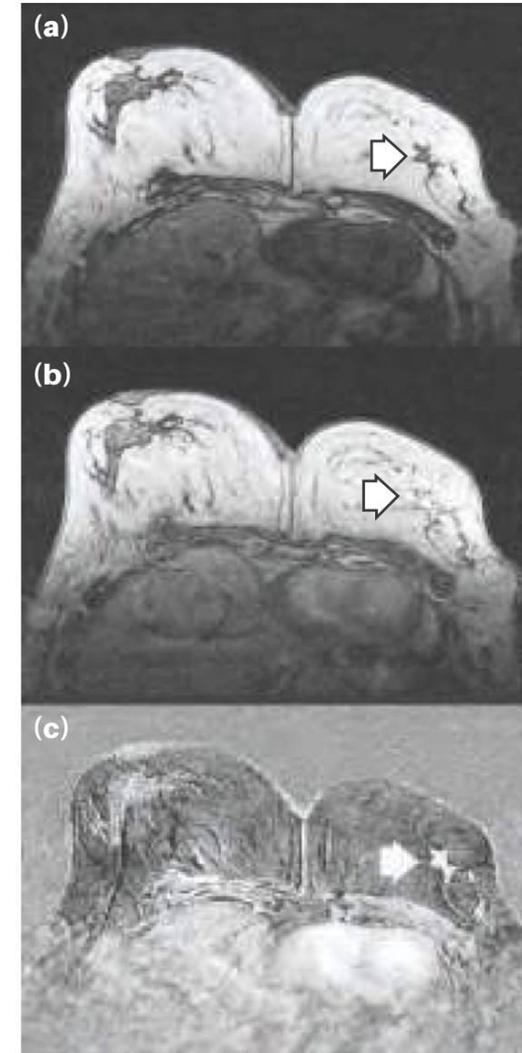


Figure 53.4 Ultrasound of the breast showing a carcinoma (arrow).

# MRI

Magnetic resonance imaging of the breast is useful in number of sitting :

- 1- As screening tool in high risk women (because of family history)
- 2- To distinguish scar from recurrence in women who have had breast conservation therapy for cancer
- 3- To assess multifocality and multicentricity in lobular cancer





## The Breast Imaging Reporting and Data System (BI-RADS)

**Is a numerical scale ranging between 0 and 6 that is used in mammogram, breast ultrasound, and breast magnetic resonance imaging (MRI) reports. It is a standardized way to report your risk of breast cancer based on your diagnostic tests...**

## BI- RADS ASSESSMENT CATEGORIES

	Category	Recommended Action	Likelihood of Cancer
0	Incomplete	Need additional views / imaging to further evaluate	N/A
1	Negative	Continue routine annual screening	Essentially 0%
2	Probably benign	Continue routine annual screening	Essentially 0%
3	Benign	Short interval follow-up suggested (6 months)	<2% probability of malignancy
4	Suspicious for malignancy	Biopsy should be considered	* 4A: low suspicion for malignancy (2-9%) * 4B: moderate suspicion for malignancy (10-49%) * 4C: high suspicion for malignancy (50-94%)
5	Highly suggestive of malignancy	Biopsy required	Proven malignancy
6	Known biopsy-proven malignancy	Confirmed biopsy and treatment planning	>95% probability of malignancy

# **Pathological Assessment**

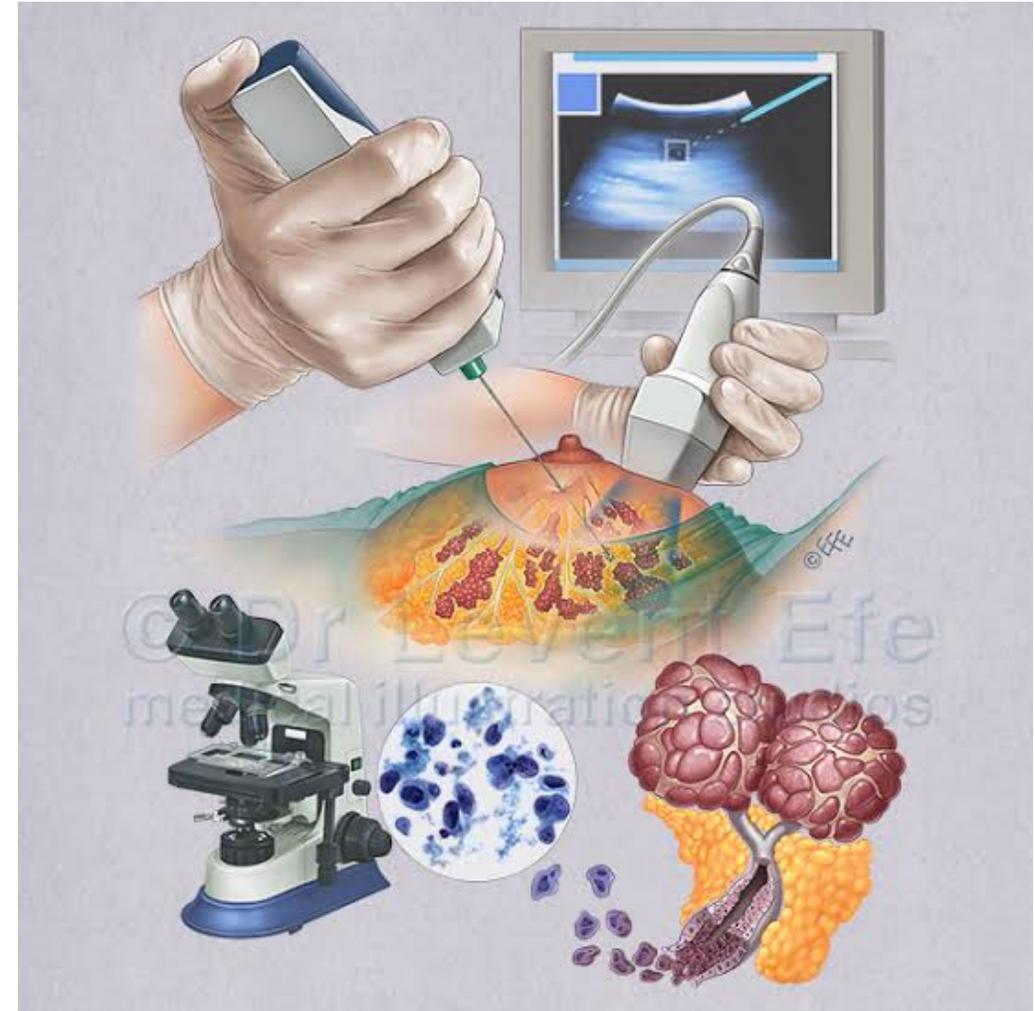
# Fine-needle aspiration (FNA)

allows cells to be taken from the lump.  
A fine needle attached to a syringe is inserted into the lump and cells are withdrawn by making several passes through the lump with negative pressure

A major advantage of this technique is that it allows drainage of a cyst (if fluid is present, then the diagnosis is invariably benign).

Once cells are withdrawn from a breast lump they can be sent for cytology assessment.

FNA has a 5% false negative mostly due to sampling error



# Biopsy

When cytology is inadequate the next step in diagnosis is core cut (true cut) biopsy.

This is a minimally invasive procedure where, under local anaesthesia, a sliver of breast tissue is obtained from the breast lump.

This carries some advantages over FNA cytology in that a histological assessment of tumor grade (when a lump is malignant) and invasiveness can be made and estrogen receptor status can also be assessed.



# Other Investigations

Investigation	Purpose
Chest X-ray	Screening for lung/bone metastases
Tumor Markers (CEA, CA15-3, CA27-29)	Follow-up, detect recurrence
Abdominal CT	Detect liver/abdominal metastases
Chest CT	Detect pulmonary metastases
MRI	Assess tumor extent, multifocal/multicentric disease
Serum Calcium	Detect bone metastases / hypercalcemia

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# Benign breast masses



# Fibroadenomas

# Fibroadenomas



**Fibroadenomas** : The most common, benign (non-cancerous) breast tumors made up of both glandular and stromal (connective) tissue.

- Most common in women in their reproductive age.
- Estrogen sensitive.

## **Clinical features:**

- Mostly solid.
- Highly mobile mass.
- Well-defined.
- Firm.
- May be painful during the menstrual cycle.

## **Diagnosis:**

-Ultrasound: well-defined mass.

-Mammogram: well-defined mass that may have popcorn-like calcification.

If imaging is inconclusive: fine-needle aspiration showing fibrous and glandular tissue.

## **Management:**

Regular check-ups.



# Phyllodes tumor

# 2-Phyllodes tumor

**Phyllodes tumors:** Fibroepithelial tumors composed of epithelial and stromal component , and most common in women in their 40s .

- Most phyllodes tumors are benign and only 25% are malignant.
- Histologically similar to that of fibroadenoma.

## **Clinical features:**

- Painless, rapidly growing mass, mobile well circumscribed.
- Average size 4–7 cm.
- Stretching and shiny skin
- Dilated visible veins

## **Diagnosis:**

If a phyllodes tumor is suspected (based on clinical or imaging findings) → core needle biopsy.

## **Treatment:**

Small→ Wide excision (1-2 margins).

Lumpectomy shouldn't be done as it can cause recurrence.

Giant→ More wider excision.

Malignant→ Simple mastectomy may be necessary





# **Intraductal papilloma**

# 3- Intraductal papilloma

**Intraductal papilloma:** Benign epithelial tumor within breast ducts (solitary or multiple).

## **Clinical features:**

Features are related to size and location

- Central papilloma is usually a large, subareolar located lesion.
- Peripheral papilloma is usually multiple small lesions located on external areas of the breast.

## **Solitary papilloma**

- Most common cause of bloody nipple discharge.
- Single, large, central lesion.
- Palpable breast tumor close to or behind the nipple.

## **Multiple papilloma**

- Usually asymptomatic but may cause nipple discharge in rare cases.
- Peripheral lesions; smaller than solitary papilloma

## **Treatment**

Excision through circumareolar incision.

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# Approach to suspected breast cancer

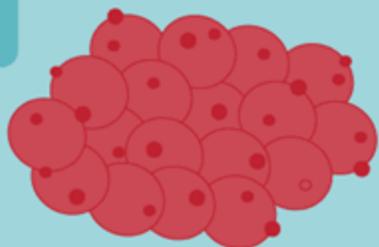
- Involves **clinical assessment, radiographic imaging**, and, if necessary, **biopsy**
- In the case of a confirmed breast cancer diagnosis, **imaging of both breasts, receptor and tumor marker testing**, and **staging of the mass** should be performed



# Staging

# TNM System for Staging Breast Cancer

**T**



## Tumor size

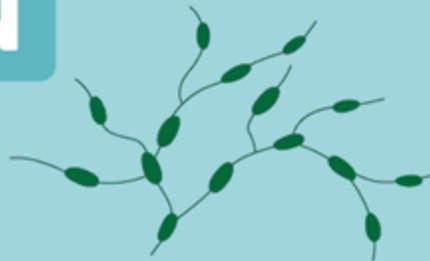
**T-1:** 0-2 centimeters

**T-2:** 2-5 centimeters

**T-3:** >5 centimeters

**T-4:** Tumor has broken through skin or attached to chest wall

**N**



## Lymph Node Status

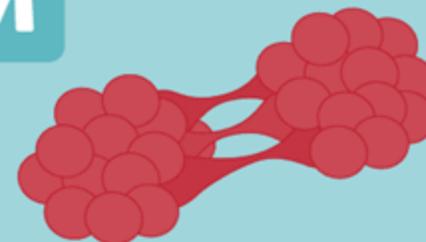
**N-0:** Surgeon can't feel any nodes

**N-1:** Surgeon can feel swollen nodes

**N-2:** Nodes feel swollen and lumpy

**N-3:** Swollen nodes located near collarbone

**M**



## Metastasis

**M-0:** Tested nodes are cancer-free

**M-1:** Tested nodes show cancer cells or micrometastasis

# Manchester clinical staging

Stage I → **Tumor confined to breast**. Any skin involvement covers an area less than the size of the tumor.

Stage II → **Tumor confined to breast**. **Palpable/mobile axillary nodes**.

Stage III → Tumor **extends beyond the breast tissue** because of skin **fixation in an area greater than** the size of the tumor OR because of **ulceration/ Tumor fixity underlying fascia**.

Stage IV → **Fixed axillary nodes, supraclavicular** nodal involvement, **satellite nodules or distant metastases**.





# **Receptor status**

# Receptor status

Determined by **immunohistochemistry (IHC) or fluorescence in situ hybridisation (FISH)**.

## Estrogen receptor (ER):

- » **70% of invasive breast cancers are ER positive.**
- » ER positive cancer cells **depend on estrogen for growth.**
- » Targeted by drugs that **interfere with estrogen activity.**

## \* Progesterone receptors (PR):

- ❖ PR status influences likelihood of **recurrence.**

## \* Human epidermal growth factor receptor 2 (HER2/neu):

- ✓ **HER2 positivity** (determined by protein overexpression or gene amplification) is found **in 15% of early stage invasive** breast cancers.
- ✓ **Associated with poor prognosis.**
- ✓ Tumors with **high levels of these receptors** may **respond to drugs such as trastuzumab (Herceptin®).**

## \* Triple negative breast cancer:

**Tumors not expressing ER, PR or HER2/neu** are known as triple



**Management**

# Management

- **Surgery**
- **Radiation Therapy**
- **Chemotherapy**
- **Hormone Therapy**
- **Targeted Therapy**



# Surgery

- ❑ Conservative surgery
- ❑ Mastectomy



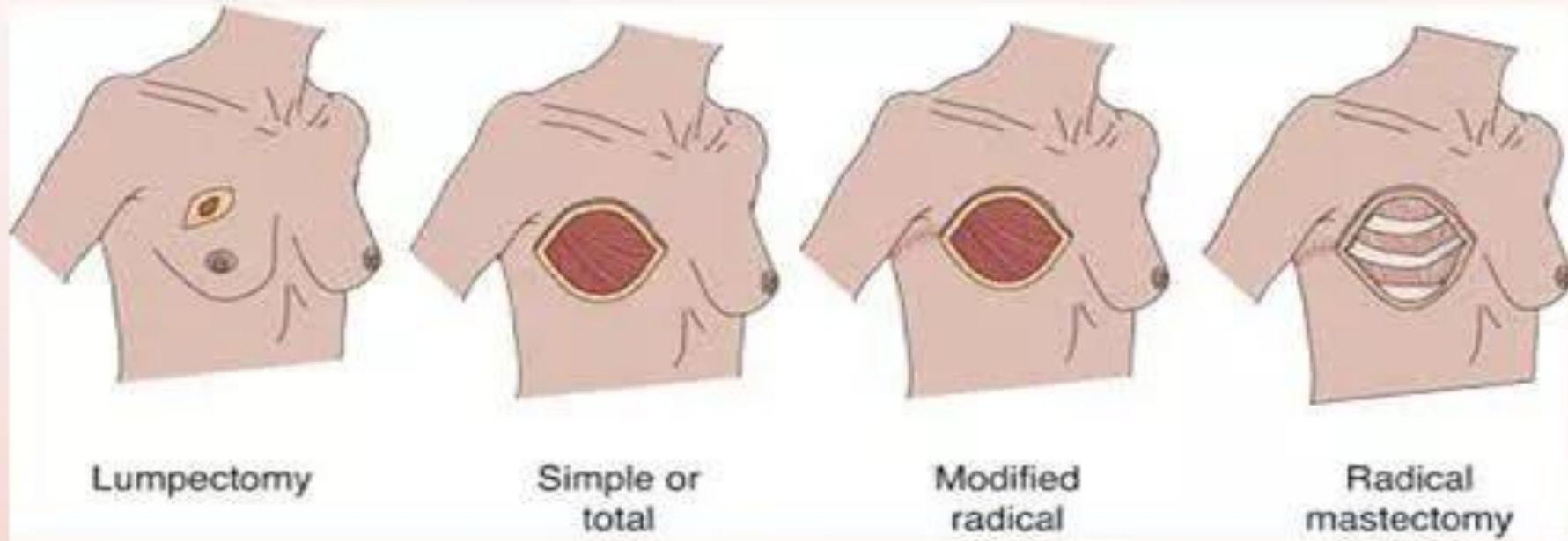
# Conservative surgery

Surgical Option	Indications	Limitations / Notes
<b>Wide Local Excision (WLE)</b>	<ul style="list-style-type: none"><li>Selected patients with Stage I or II breast cancer (<a href="#">NCCN Guidelines</a>)</li></ul>	<ul style="list-style-type: none"><li>Not suitable for widespread disease or small breasts</li><li>Extent of disease may require MRI, especially for invasive lobular carcinoma or dense breasts</li></ul>
<b>Quadrantectomy</b>	<ul style="list-style-type: none"><li>Removes entire quadrant of the breast</li><li>Primarily for T2 tumors</li></ul>	<ul style="list-style-type: none"><li>Significant deformity possible if defect is not reconstructed</li></ul>

# Mastectomy

Type of Mastectomy	Extent of Surgery
<b>Simple (Total) Mastectomy</b>	Removal of the entire breast only
<b>Radical Mastectomy</b>	Removal of the breast, underlying chest wall muscles (pectoralis major and minor), and axillary lymph nodes
<b>Modified Radical Mastectomy (MRM)</b>	Removal of the breast and axillary lymph nodes; chest muscles are preserved

# Types of Mastectomy Procedures



# Radiation Therapy

## Radiotherapy is indicated for:

- ❖ Large tumor >5 cm
- ❖ After breast conserving surgery
- ❖ Lymph node involvement
- ❖ Age <35 years

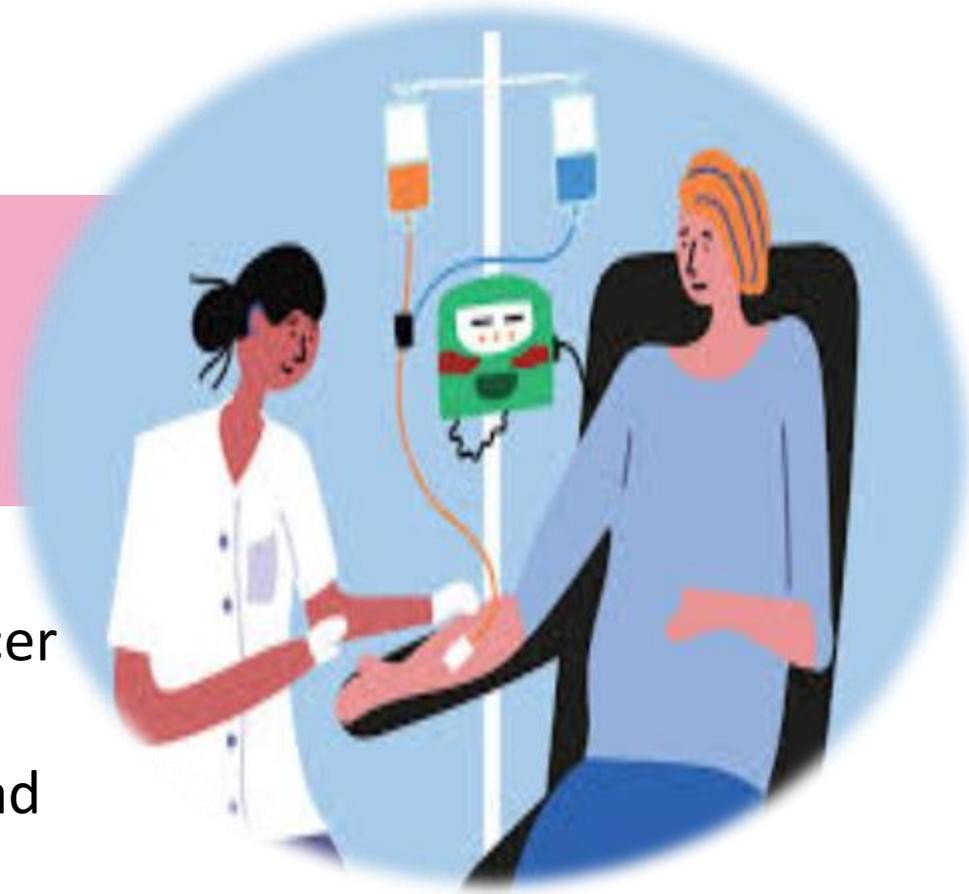


# Chemotherapy

## Indications:

Chemotherapy is typically considered in breast cancer patients with the following features:

- **Lymph node–positive disease** – cancer has spread to axillary lymph nodes.
- **Large primary tumor** – usually tumors >2–3 cm.
- **High-grade tumors** – Grade 3 tumors with aggressive histology.
- **Receptor status** – Estrogen receptor (ER) negative or HER2-positive tumors.



# Timing of Chemotherapy

## ➤ **Neoadjuvant chemotherapy**

- Administered **before surgery**.

- Goal: reduce tumor size to allow **breast-conserving surgery** or improve resectability.

## ➤ **Adjuvant chemotherapy**

- Given **after surgery**.

- Goal: eliminate microscopic residual disease and **prolong disease-free survival**, especially in **pre-menopausal women with ER-negative tumors**.

# Hormone Therapy

Tamoxifen has been the most widely used 'hormonal' treatment in breast cancer. It acts as an estrogen receptor antagonist, decreasing **recurrence** rates in ER+ cancers.



# Targeted Therapy

Trastuzumab was originally approved for treating HER2/-positive breast cancer in patients with metastatic disease.



# Prognosis

The most important prognostic factor in breast cancer is whether or not they have **metastasized to the axillary nodes**.

-A sentinel node biopsy is used to assess axillary lymph nodes

## Sentinel node biopsy

-Standard of care in the management of the axilla in patients with clinically node-negative disease.

- **In** patients in whom there is no tumor involvement of the sentinel node, further axillary dissection can be avoided.



**"Early Detection  
Saves Lives. It Did  
In My Case."**



