SNS COLLEGE OF ALLIED HEALTH SCIENCES

SNS Kalvi Nagar, Coimbatore - 35

Affiliated to Dr.MGR Medical University, Chennai

DEPARTMENT OF RADIOGRAPHY AND IMAGING TECHNOLOGY

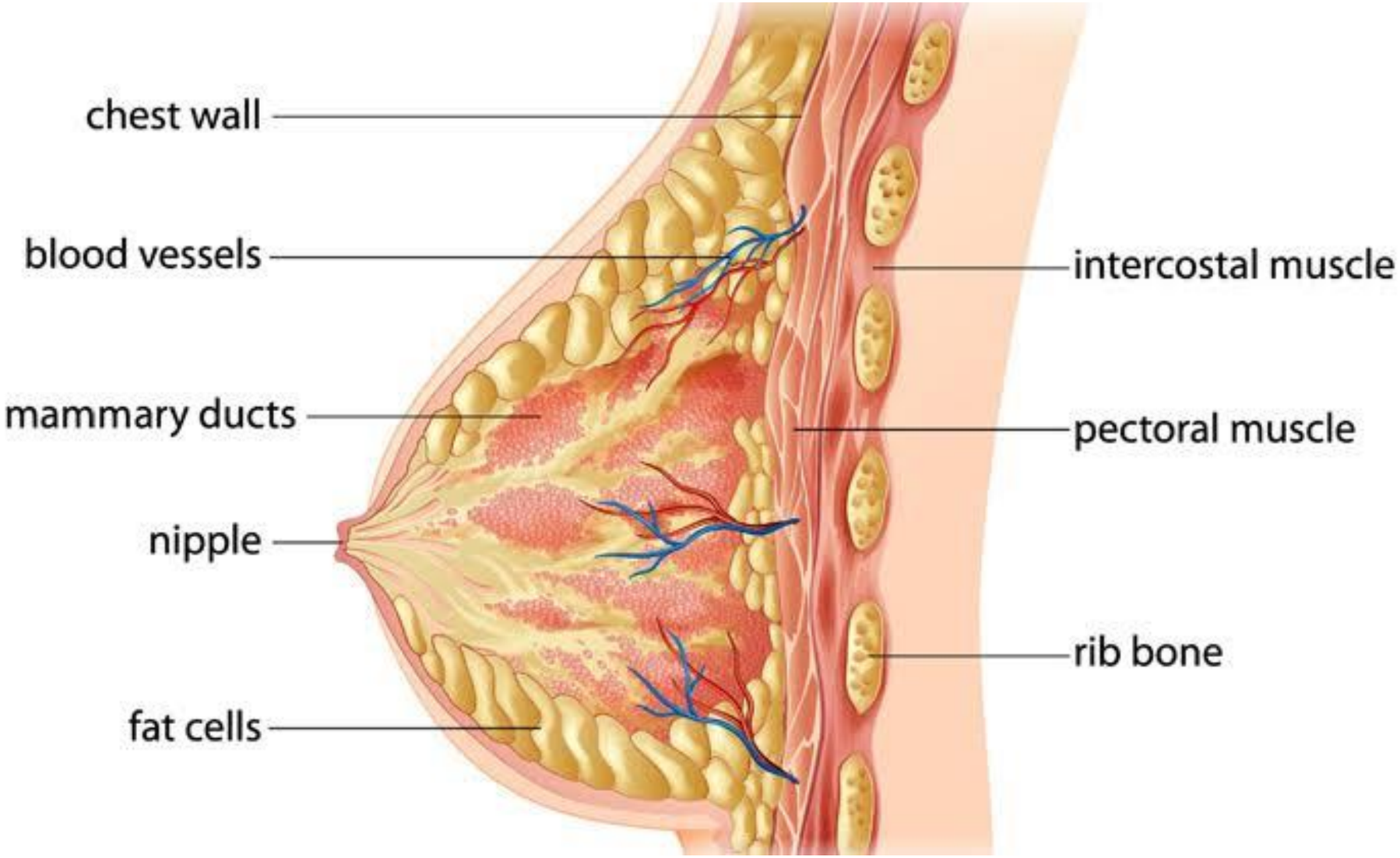
I YEAR

TOPIC : MAMMOGRAPHY

MAMMOGRAPHY

- Mammography is a radiographic examination of breast.
- It helps to detect breast cancer early and reduces the mortality rate for women of age >40 .
- Breast cancer is the leading cancer in women and in India, one in 22 women may have the chance of getting breast cancer in her life time.

ANATOMY OF BREAST



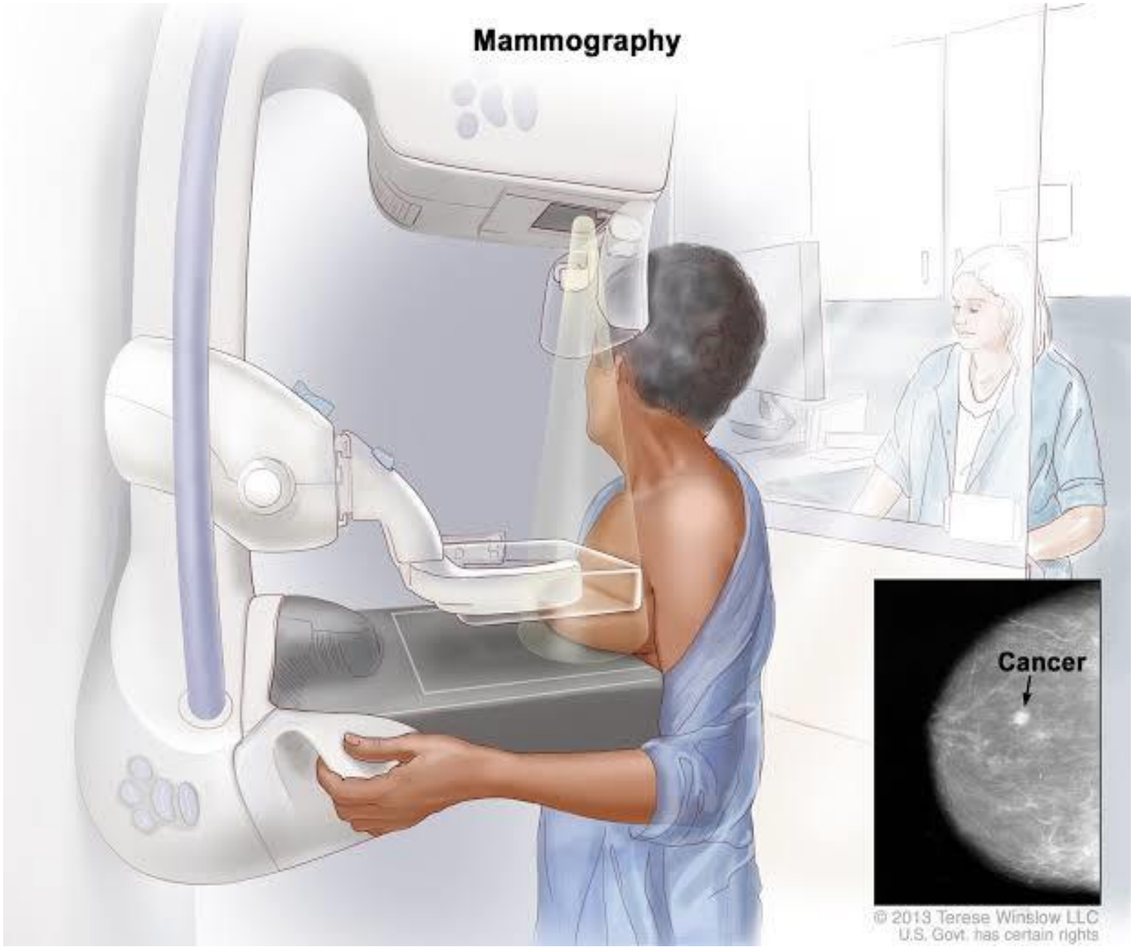
TYPES OF MAMMOGRAM

SCREENING MAMMOGRAM

- It is performed in asymptomatic patient.

DIAGNOSTIC MAMMOGRAM

- It is performed on high risk patients or patients with symptoms.



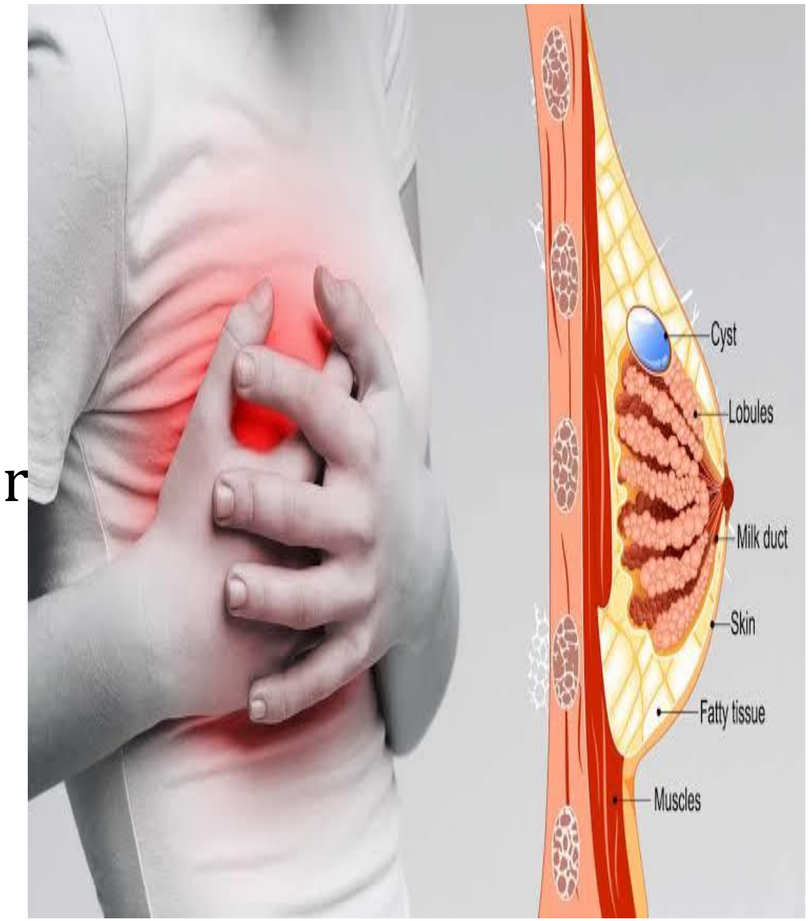
INDICATION & CONTRAINDICATION

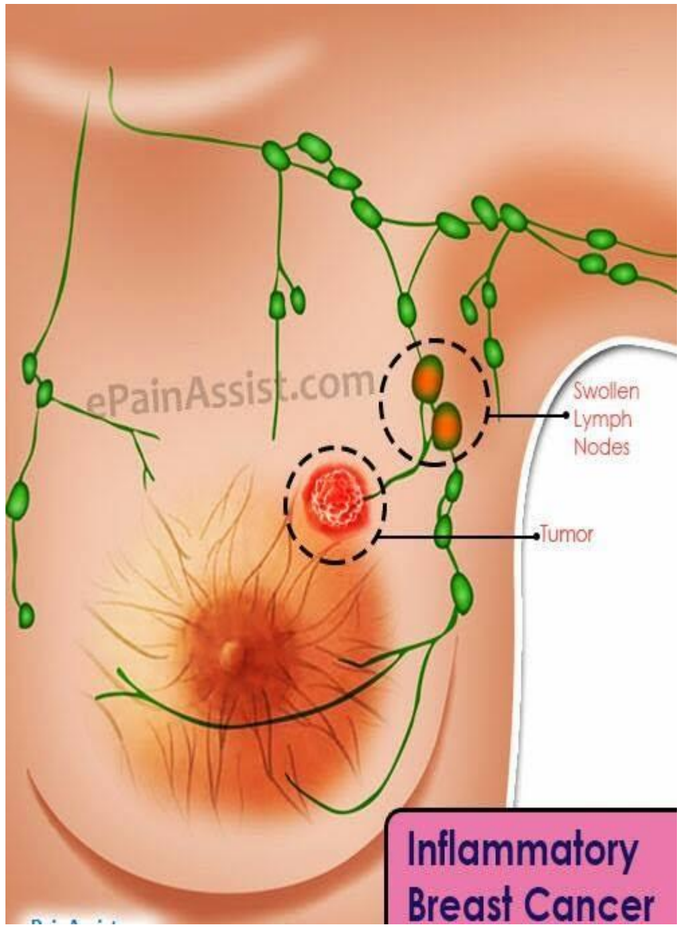
INDICATION

- Pain
- Swelling
- Nipple discharge
- Calcification
- Benign or malignant tumor
- Lymphnode enlargement

CONTRAINDICATION

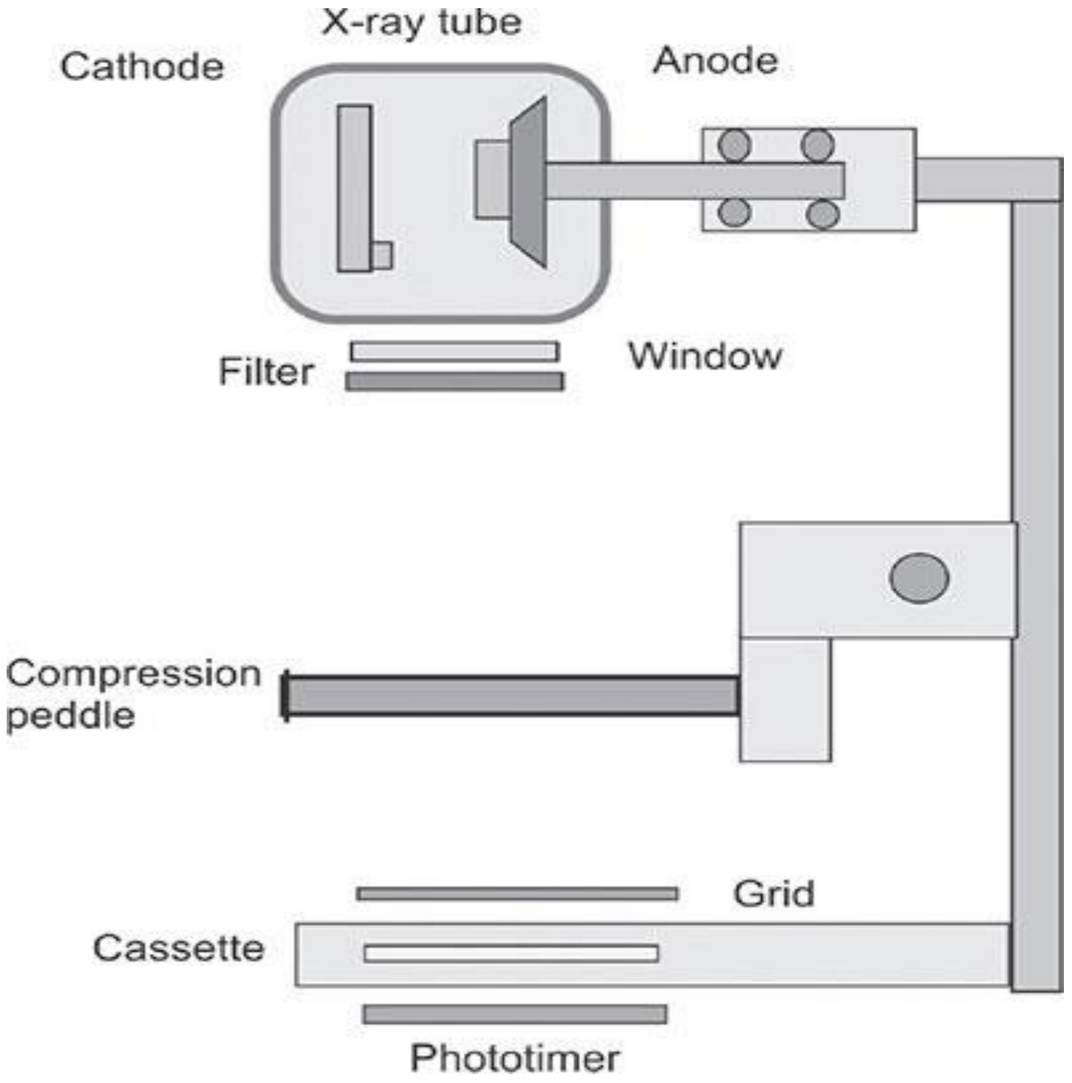
- Inflammation
- Breast implant
- Severe nipple discharge
- Large palpable mass





MAMMOGRAPHY EQUIPMENT

- High frequency generator
- Molybdenum target
- Filament
- Filter
- Grid
- Compression device
- Automatic Exposure Control



MAMMOGRAPHY EQUIPMENT

GENERATOR

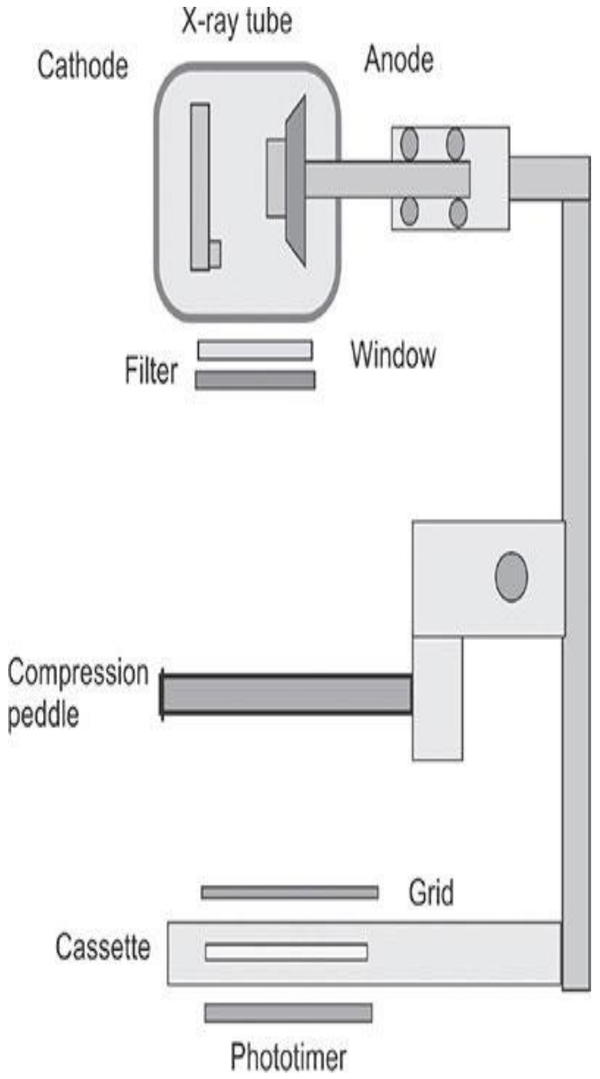
- High frequency generator is used on a single phase.
- They are smaller in size with good reproducibility and capable of providing tube current up to 600mAs.

TARGET

- Molybdenum and Rhodium.

FILAMENT

- Positioned within a focusing cup with 2 focal spot sizes namely 0.4 mm and 0.1 mm.
- Filament types are either double wound filament or flat ribbon filament or circular filaments.



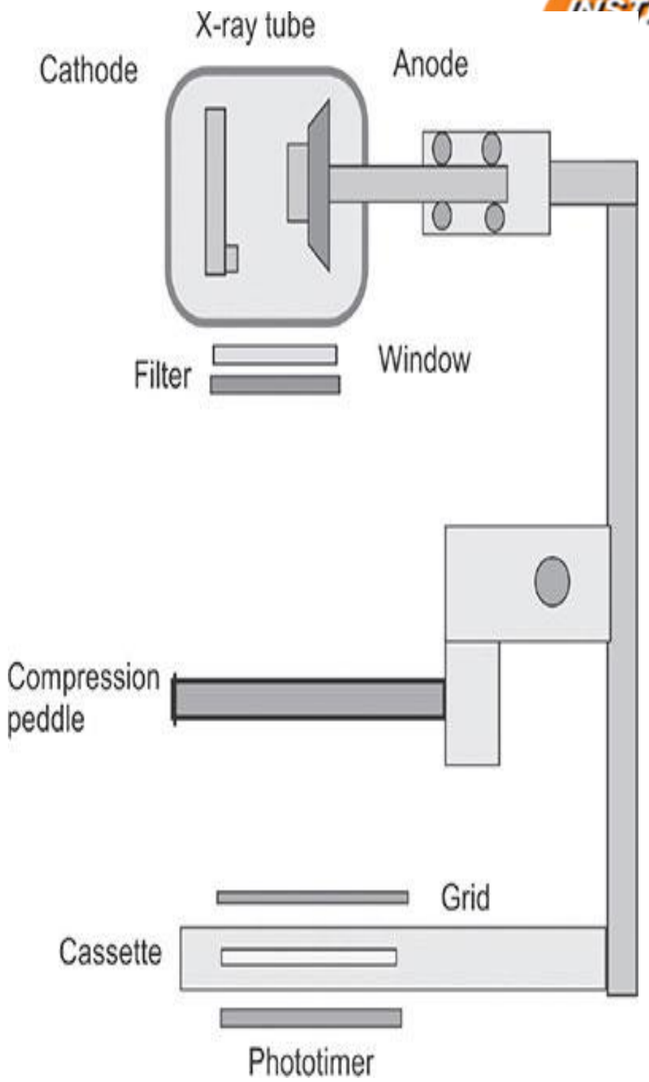
MAMMOGRAPHY EQUIPMENT

FILTERS

- Thin beryllium window or borosilicate glass window is used to reduce inherent filtration.
- In addition, filters are used to remove unwanted high energy bremsstrahlung X-rays.

GRID

- Scattered radiation is an important factor that reduces contrast in mammography.
- Scatter can be reduced by grid, or air technique with breast compression.



MAMMOGRAPHY EQUIPMENT

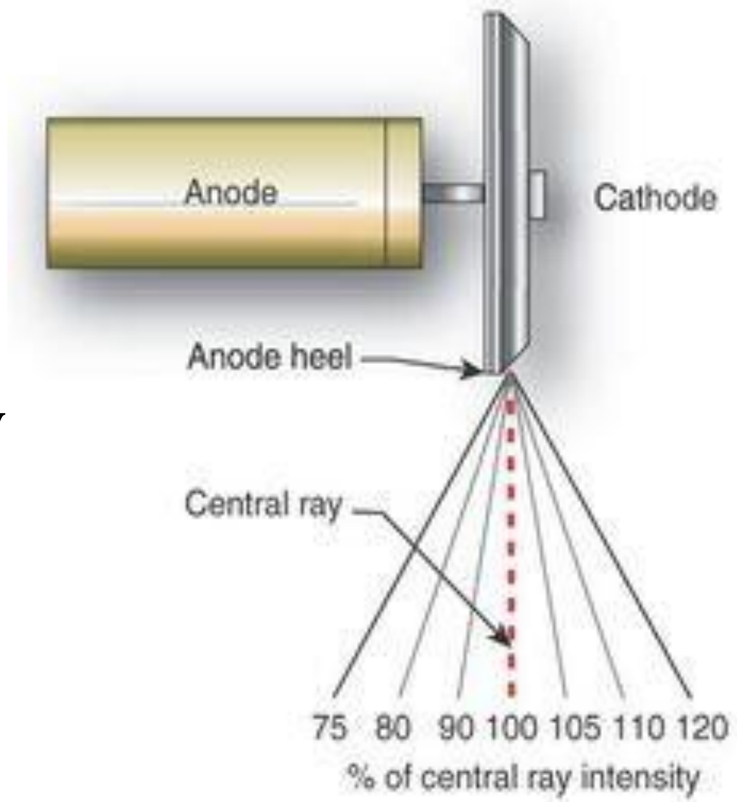
HEEL EFFECT

- Heel effect causes the X-ray intensity is always higher at the cathode side.
- Position chest wall towards the cathode side and nipple towards the anode side.

COMPRESSION PEDDLE

➢Breast compression is required in all mammography examination, to get good quality images.

➢It ensures that tissue near the chest wall is not underexposed and tissue near the nipple is not over exposed.



MAMMOGRAPHY EQUIPMENT

BREAST COMPRESSION HAS FOLLOWING ADVANTAGES-

- It reduces the overlapping of anatomy,spread out the tissue,reduces the thickness of breast

- Since compressed breast is thinner,scatter radiation is reduced and contrast resolution is improved

- Compression brings the breast closer to the receptor,minimizes magnification and reduces focal spot blurring with lesser radiation dose to the breast.

- It also immobilizes the breast,minimizes motion related blur and reduces exposure time.

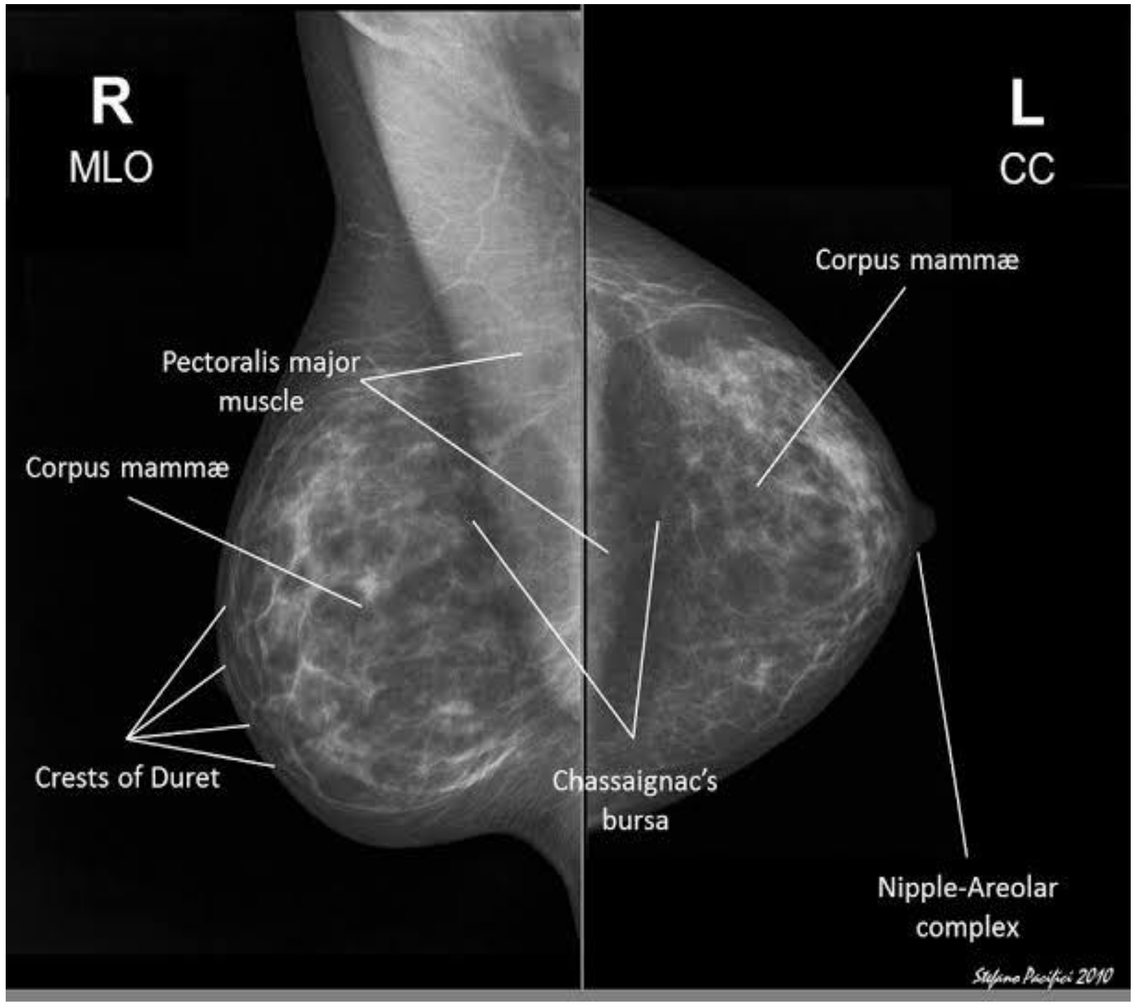
VIEWS OF MAMMOGRAM

STANDARD VIEWS

- Cranio caudal view
- Medio lateral oblique view

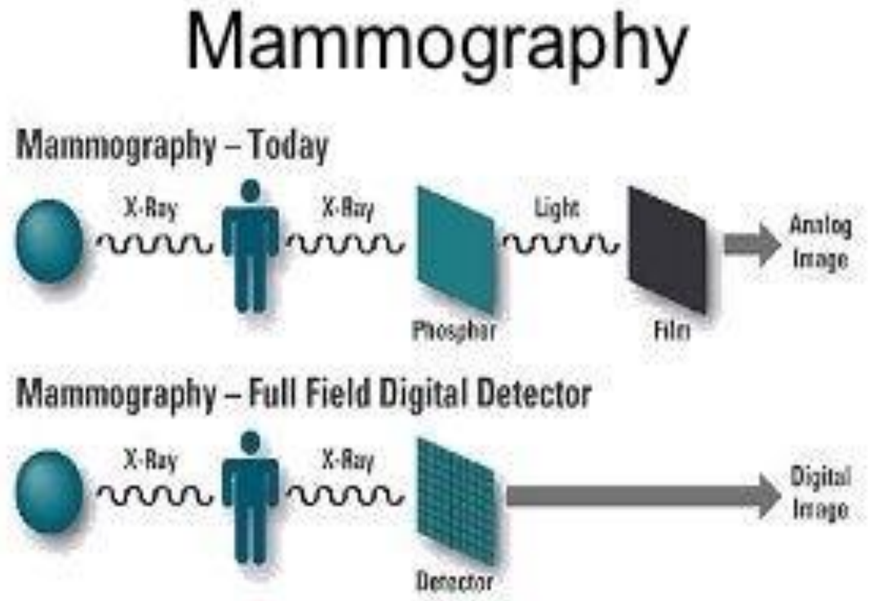
ADDITIONAL VIEWS

- True lateral view
- Lateral medial oblique view
- Paddle compression view
- Magnification view
- Tangential view



SCREEN FILM SYSTEM

- Mammography is used with screen film and digital detectors today.
- The cassette,screens and films are specially made for mammography.
- Single emulsion film with single back screen is used.
- The cassette is made up of carbon fiber to have low attenuation.
- Gadolinium Oxysulfide activated with terbium is used as screen phosphor.



In digital mammography screen-film system has been replaced by Detectors to give the digital images

DIGITAL MAMMOGRAM

- Instead of Screen film system , detectors can be used for mammogram.

- Images can be captured directly or indirect

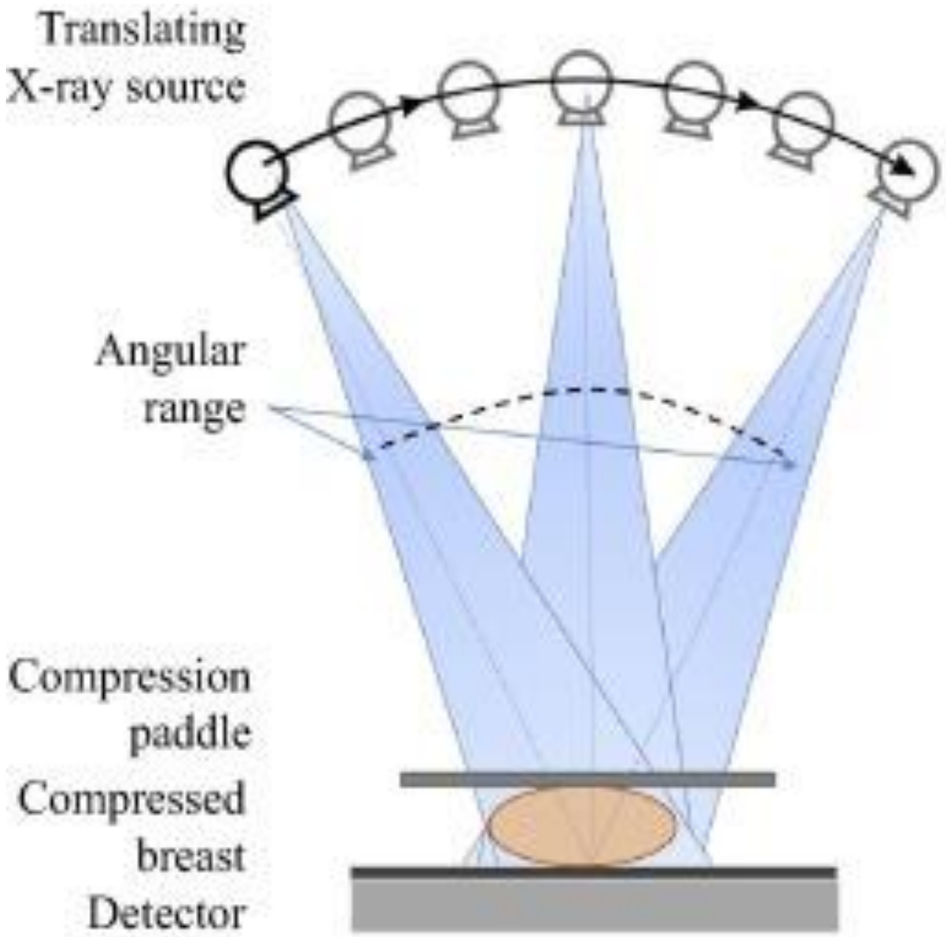
- In direct digital mammogram, X-rays falls directly on the photo-conductor Amorphous Selenium, converts X-rays into digital signal.

- In indirect digital mammogram, X-rays falls in an scintillator(cesium Iodide : Thallium)which emits light , this light is then detected by photo diode (Amorphous Silicon)and converted into digital signal.

RECENT ADVANCES

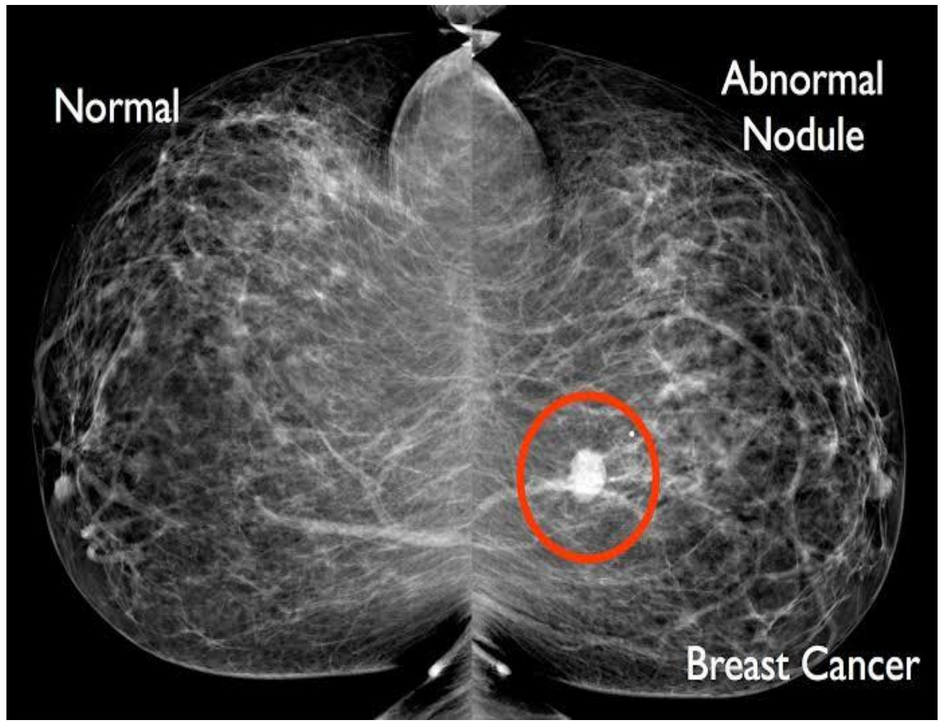
DIGITAL BREAST TOMOSYNTHESIS

- It gives 3D picture of the breast using X-rays.
- It takes multiple X-ray images of breast from many angles.
- The breast is positioned similar to the normal mammogram but with little compression.
- X-ray tube moves isocentrically in an arc around breast and takes about 15 images

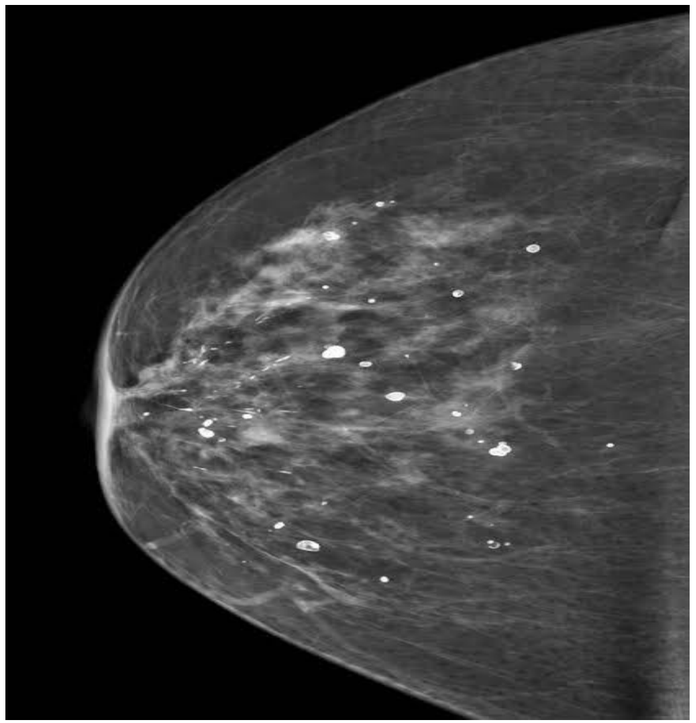


CASE SCENARIO

ABNORMAL NODULE



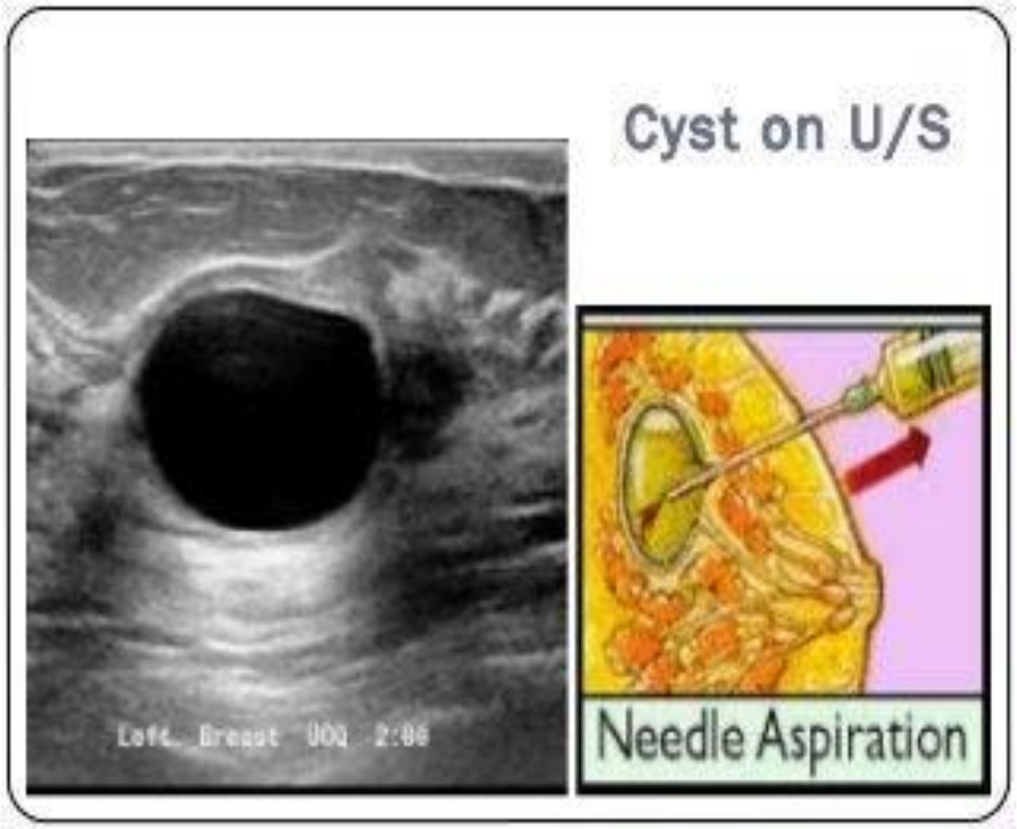
MICROCALCIFICATION



OTHER MODALITIES FOR BREAST IMAGING

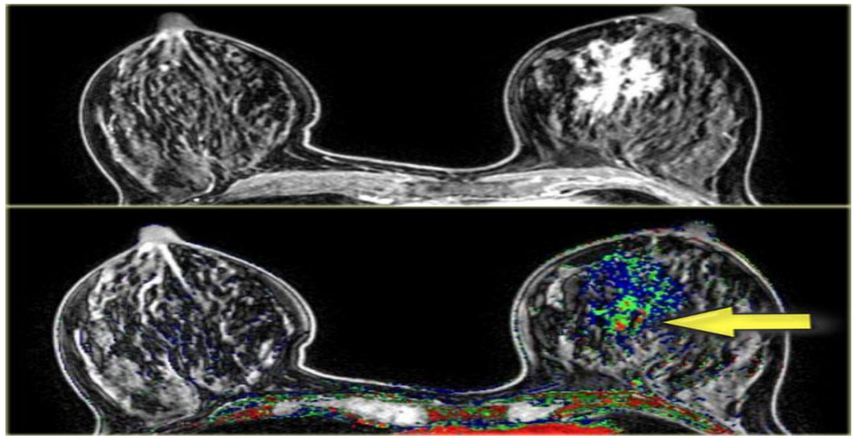
BREAST ULTRASOUND

- It is an imaging test that uses soundwaves to look at the breast tissue.
- Breast ultrasound aids the assessment of abnormalities which is detected by mammography.
- Determine vascularity characteristics of lesions may be cyst filled with fluid or solid tumor.
- Better evaluation of location and dimensions of lesions.



MRI MAMMOGRAM

- It is the most sensitive method to detect the breast cancer.
- Coils are designed such a way that the patient lies in prone position with breast dependent within the coil.



BI-RADS

BI-RADS(BREAST IMAGING REPORTING AND DATABASE SYSTEM)

BIRADS criteria for reporting are as follows :

BI-RADS 0	Incomplete
BI-RADS 1	Negative
BI-RADS 2	Benign findings
BI-RADS 3	Suspicious benign
BI-RADS 4	Suspicious abnormality
BI-RADS 5	Known case of malignancy
BI-RADS 6	Known case of biopsy with proven malignancy

ADVANTAGES AND DISADVANTAGES OF MAMMOGRAM

ADVANTAGES:

- Early detection of breast cancer.
- Avoids unnecessary biopsies.
- Reduce tissue superimposition.
- Contrast enhancement of lesions.
- High depth and contrast resolution.

DISADVANTAGES:

- Motion artifacts are more likely to occur because of

Slightly long exposure time.

THANK YOU