

Breast Cancer Overview

Part 1



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Breast Cancer overview



Objectives:

Students should be able to:

- Assess and realize the significance of risk factors.
- Take relevant focused history.
- Perform standardized breast clinical examination.
- Understanding and practicing triple assessment concept.



Breast Cancer Overview



- **Lecture outlines:**
- Introduction:
- Relevant anatomy and physiology.
- Cancer facts.
- Focused history taking.
- Standardized Examination
- Breast imaging.
- Cytological and histological Examination
- Metastatic workup



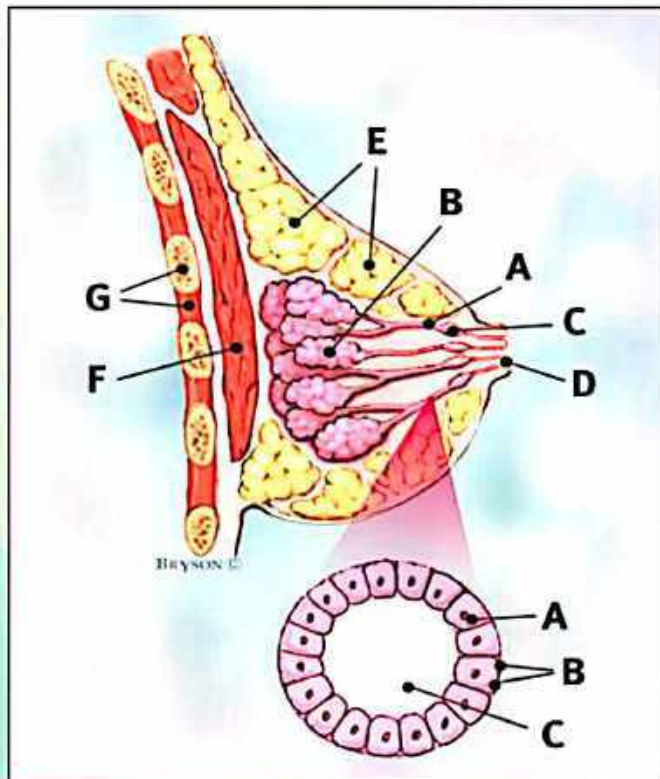
Why Are We Concerned ?



- Body image and wellbeing.
- Positive psychological balance.



Relevant Anatomy & Physiology



Breast profile: *Modified sweat gland*

- A ducts
- B lobules
- C dilated section of duct to hold milk / *Ampulla*
- D nipple
- E fat
- F pectoralis major muscle
- G chest wall/rib cage

Enlargement: *1 cuboid*

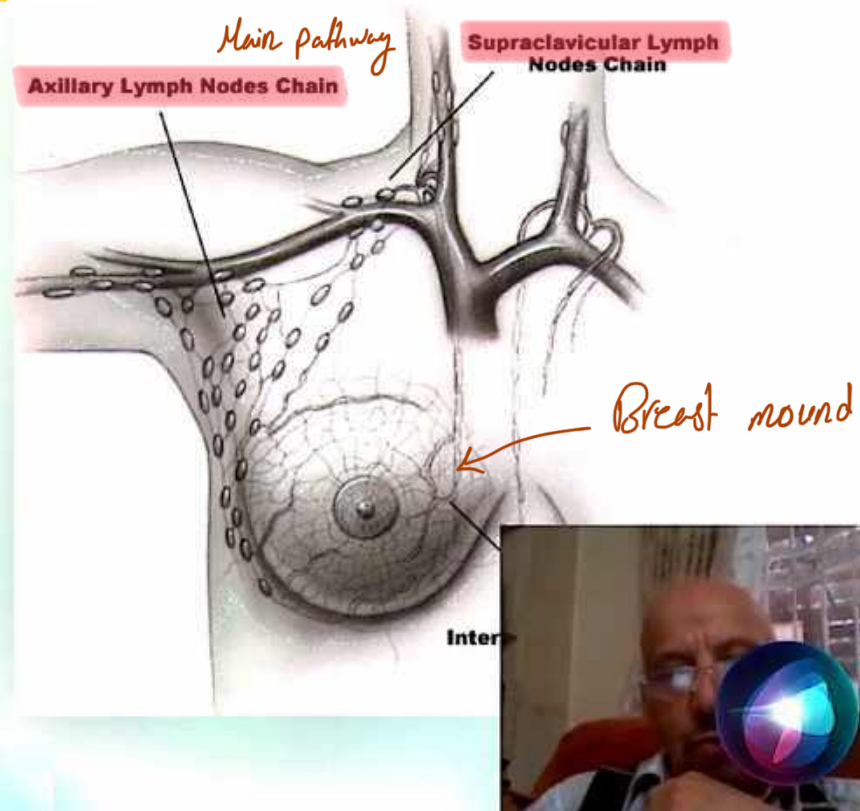
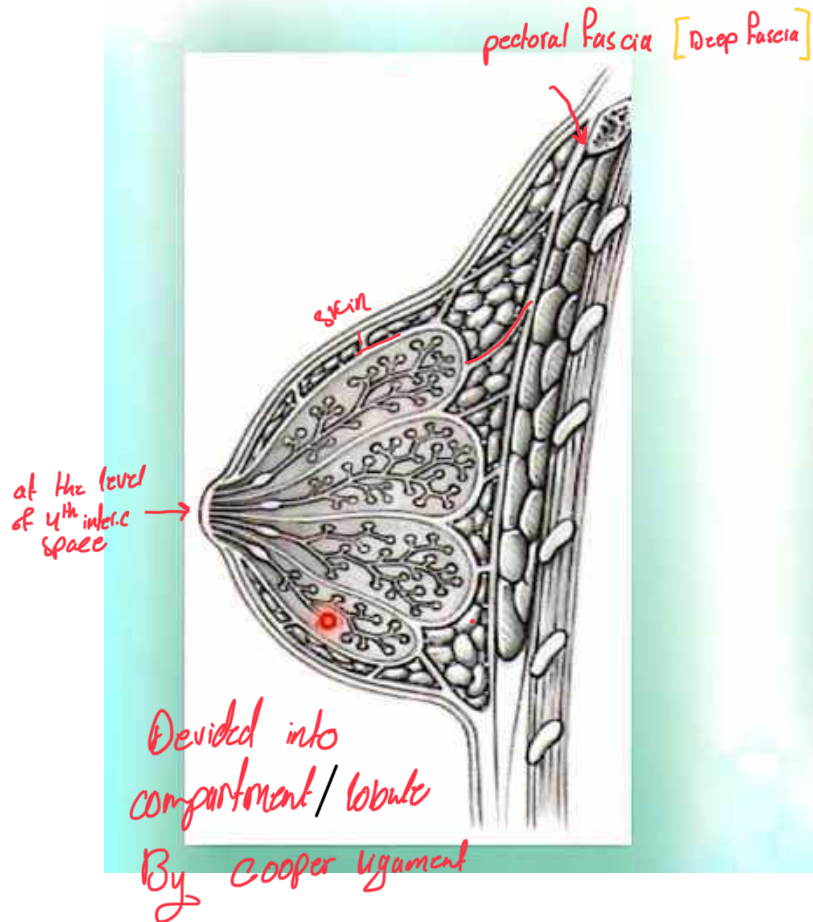
- A normal duct cells
- B basement membrane
- C lumen (center of)



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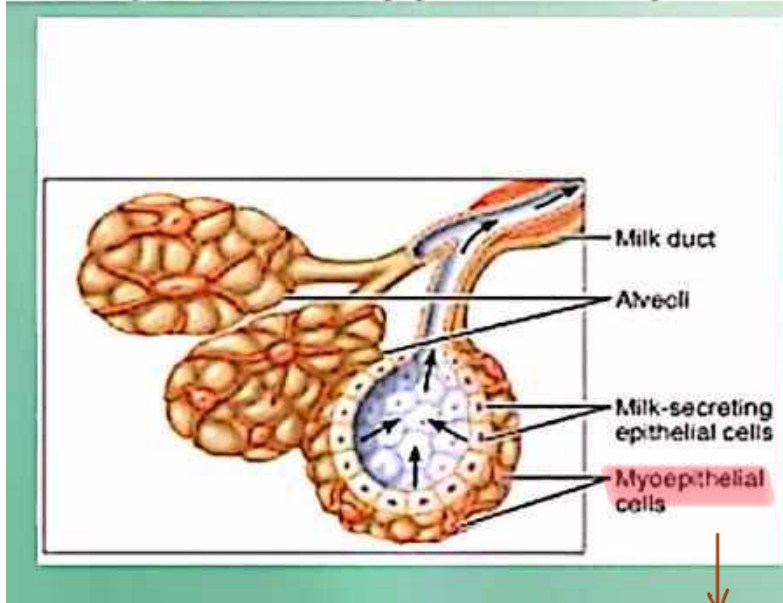
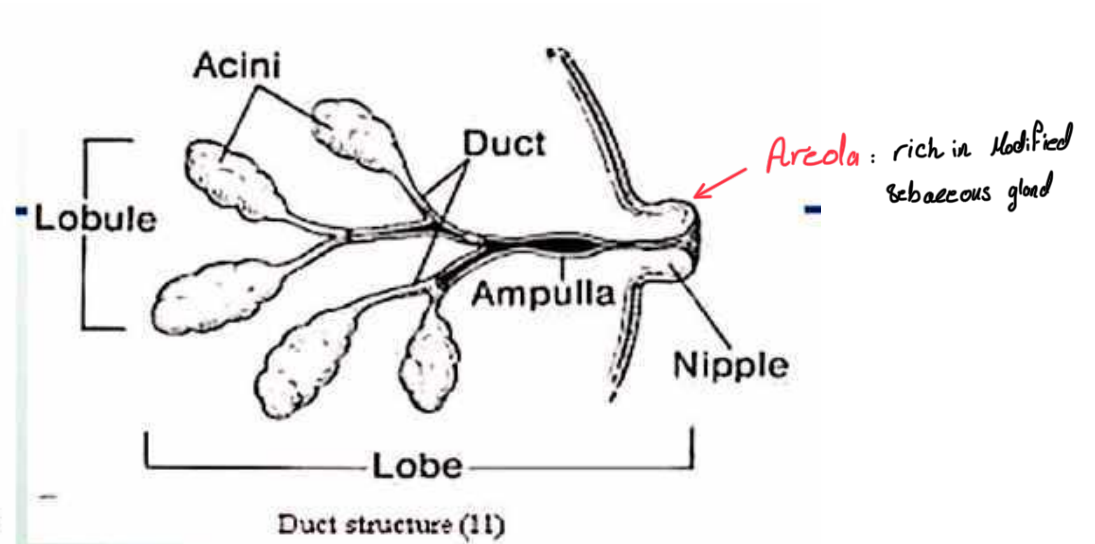
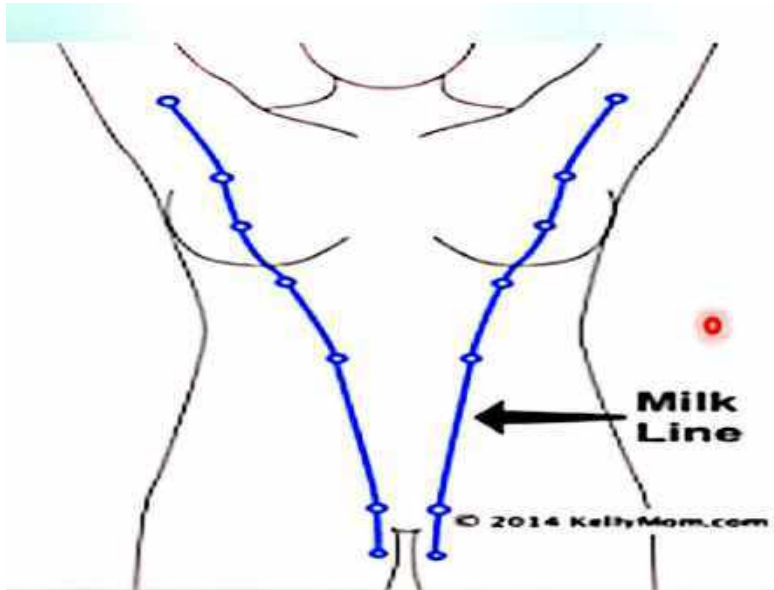
- Base of Breast From 2nd - 6th ribs
- From lateral margin of sternum to mid Axillary line

Anatomy of the Breast & Axilla



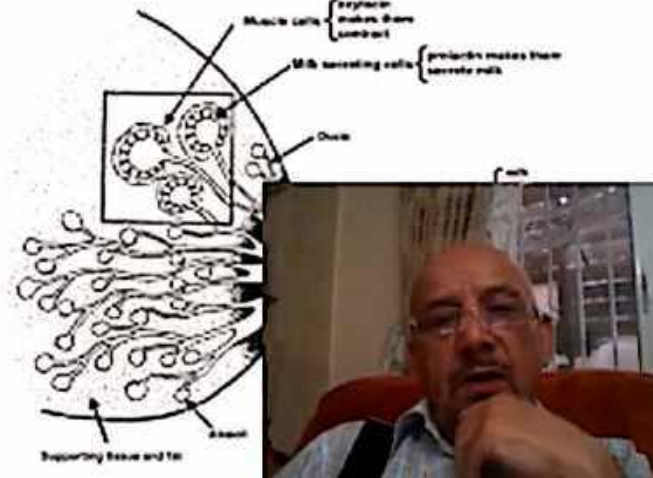
Breast

- Mammary gland: Modified sweat gland ~ are organized in 15-20 lobes
- Stroma: no capsule ⇒ Adipose tissue & Fibrous stroma [suspensory ligament / Cooper run between Dermis & Pectofascia to support Breast & separate lobes]
- Nipple-areolar complex.



↓
Squeeze to get milk out

Breast Anatomy - Structure



Triple Assessment



- ① • Clinical Evaluation
- ② • Imaging (ultrasound and/or mammography)
- ③ • Cytology or Histology
FNA

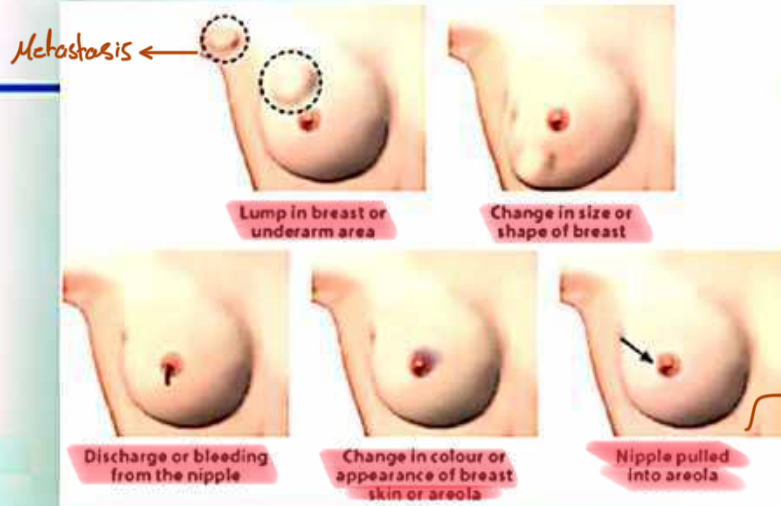
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① Clinical :

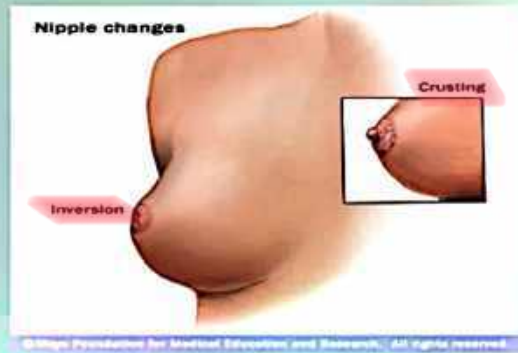
A: Symptoms

Tumors infiltrate the Breast tissue & deform, shorten the Cooper's ligaments & lead to dimpling of skin



⇒ inflammation
~ poor prognosis

Retraction of nipple ⇒ Paget



* Tumor can block lymphatics → lymphedema
→ thickening of skin
peau d'orange



Risk factors



- Age ~ 52
- Gender (100:1) : F
- White race
- Obesity .(BMI >30)
- Exogenous hormones / *Estrogen*
 - Reproductive factors.
 - **previous suspicious breast biopsy** / *surgery*
- Personal history of breast cancer
- Family history of breast cancer
 - one first-degree relative 2x → *Maternal* >> *paternal*
 - 2 first degree relatives 3x

Inherited genetic mutations

only 5-6% of all breast cancers are directly attributable to inheritance of a breast cancer susceptibility gene such as BRCA1, BRCA2, p53

Lifestyle factors

Alcohol

Smoking

Exposure to therapeutic ionizing radiation.

70% of women have no risk factors!





- Gail Model Risk of Breast Cancer
- Developed in 1994, Published in JNCI





New recommendations on breast cancer screening

The American Cancer Society has updated its guidelines for healthy women with an average risk of getting breast cancer.

Age range	Mammogram		Clinical breast exam	
	Old	New	Old	New
20-39	No	No	Every 3 years	No
40-44	Annual	Optional*	Annual	No
45-54	Annual	Annual	Annual	No
55+	Annual	Every one or two years*	Annual	No

Now: no need of it

*Based on discussion with doctor about benefits and risks of mammography.
NOTE: Screenings should continue as long as a woman has a life expectancy of 10 years and is a good candidate for breast cancer treatment.
Source: American Cancer Society



B: Standardized Breast Examination



1. inspection ⇒ change in size or shape of Breast, Areolar-nipple complex (retracted or not), distortion due to underlying mass, Dilated U.S increase the thickness or texture of skin.



→ Axillary tail
→ to see the lat. & inf. parts Breast



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⇒ contracted P. major
↓
After leaning forward
↓
See if there is any obvious
Retractions! Dimpling of skin



2. palpation

Supra. cLN & Intra. cLN



Anterior group central group
* Axilla Apical group
 Medial group
 lateral.g
 posterior.g



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* I @ supine position

examine Both; the Breast mound & Breast Area



Rolling & Dipping

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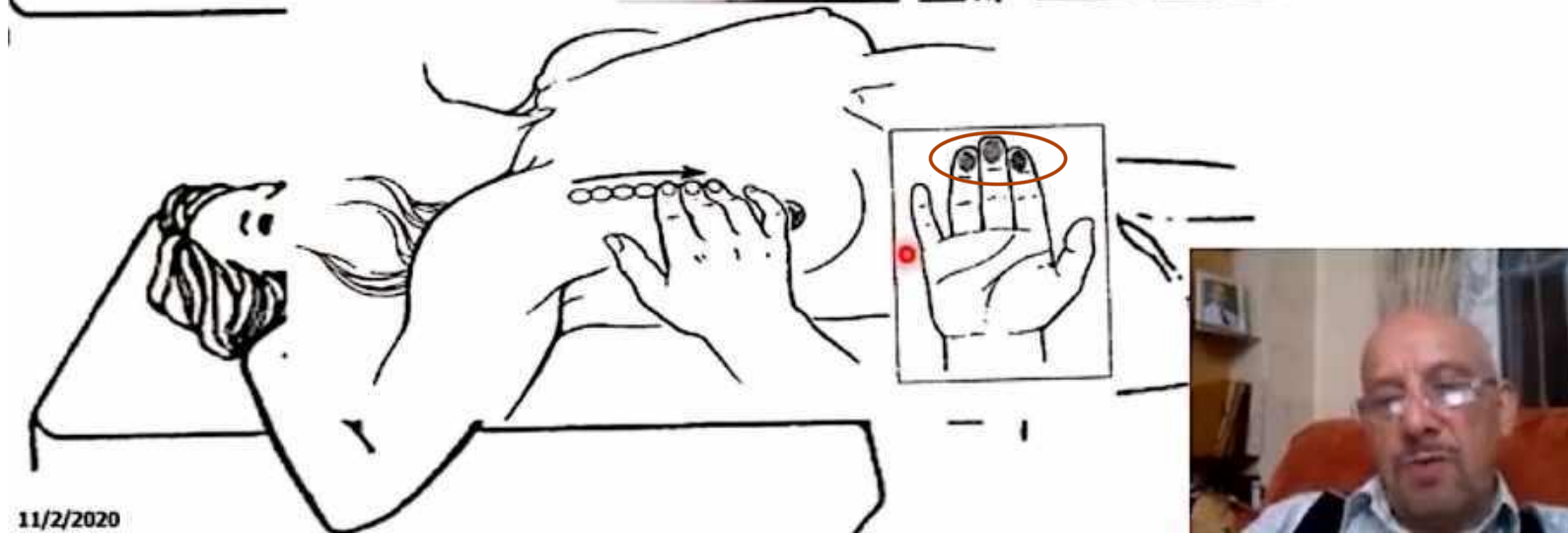
Breast Palpation Techniques - 3 ways



⇒ The proper way
⇒ Good for examine
B. mound & Area

From outer
to inner circle

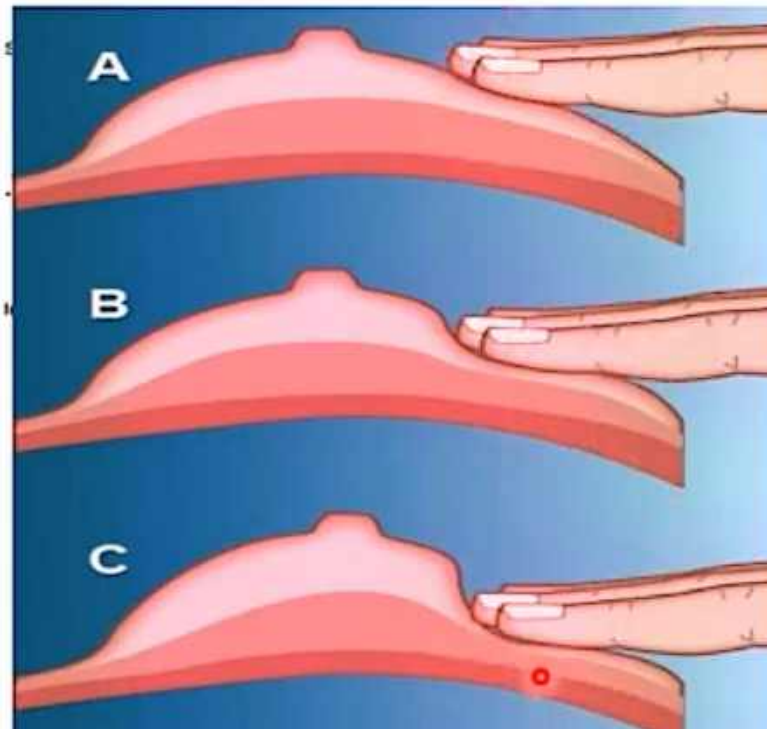




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Levels of Pressure for Palpation of Breast Tissue Shown in a Cross-sectional View of the Right Breast



superficial .p

Intermediate .p

Deep .p



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Malignant Masses



- **Hard.** *~ according to type*
- **Painless:** Malignant masses painful in only 10-15% of patients. *~ present of pain will not exclude malignancy
pain can come from
not mass itself
inflammatory carcinoma*
- **Irregular.**
- **Skin Dimpling.** *~ infiltration of central Duct*
- **Nipple Retraction.**
- **Bloody or Water Discharge.** *← in Duct papilloma → Rare*
- Possibly **fixed** to the skin or chest

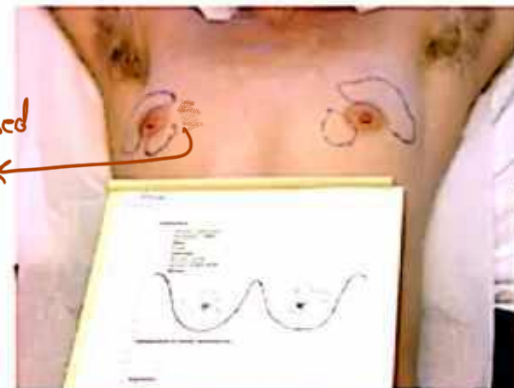


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to follow up your pt & remember Their Glandular structure → Topography



Misdiagnosed
as a mass ←



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retracted nipple



Abnormal Areolar-nipple complex

Misdiagnosed as eczema

can be dx by Biopsy





Blood discharge

retroareolar
duct papilloma
or duct
carcinoma





Retracted

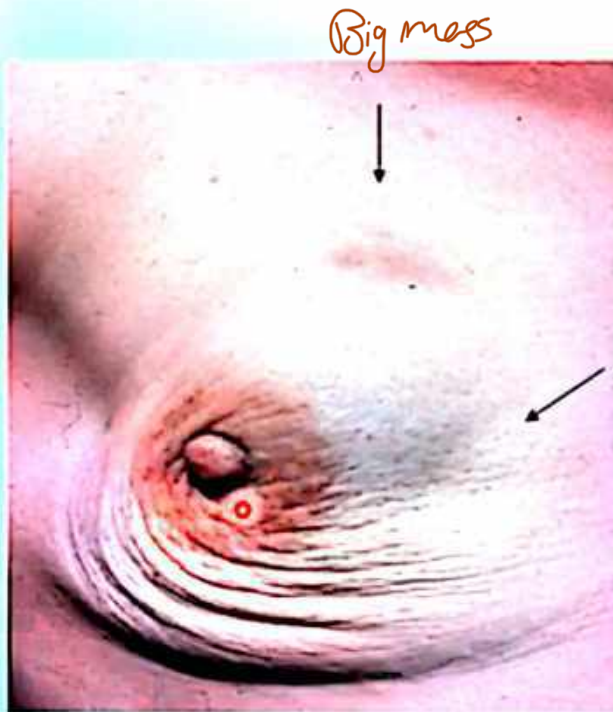


→ Advanced CA :
P. orange
→ Retraction of N.



Mass is shown ←
when she elevated
her arms

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Big mass

not well retracted

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Due to accumulation
of lymphatic
fluids

Red, hot, tender, firm



P. orange



14



Peaud'orange





Skin Ulceration

if not treated



T2,3 → T4





1. Breast Ultrasound

- Ultrasound is useful in the assessment of breast lumps
- Complements mammography and is able to differentiate **solid and cystic** lesions
- Also able **to guide fine needle aspiration and core biopsies**
- Can be used to **assess tumour size and response to therapy**
- In the diagnosis of malignancy it has a sensitivity and specificity of 75% and 97% respectively
- Cysts and solid lesions have typical appearances

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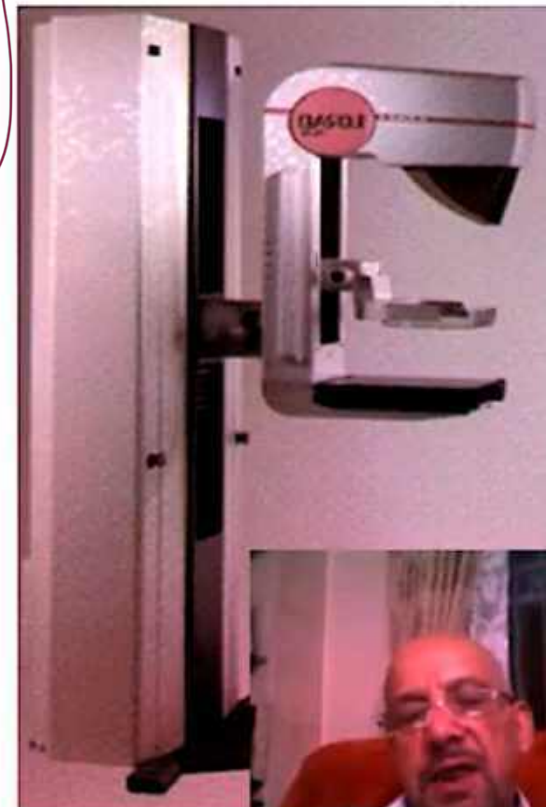


→ It's not good to use it during pre-menstrual or if the pt has sort of inflammatory process

Breast Imaging



- The breast can be imaged with mammography, ultrasound or MRI.
- 2. • Mammography is the most sensitive of breast imaging modalities. *painful!*
- Sensitivity is reduced in young women due to the presence of increased glandular tissue.
- For symptomatic patients, imaging always be performed as part of triple assessment.



• Standard for cancer screening & Dx of CA.

• give you the size & if it's Multifocal & Mammographic suspicious which increase which ↑ the clinical susp of Malignancy

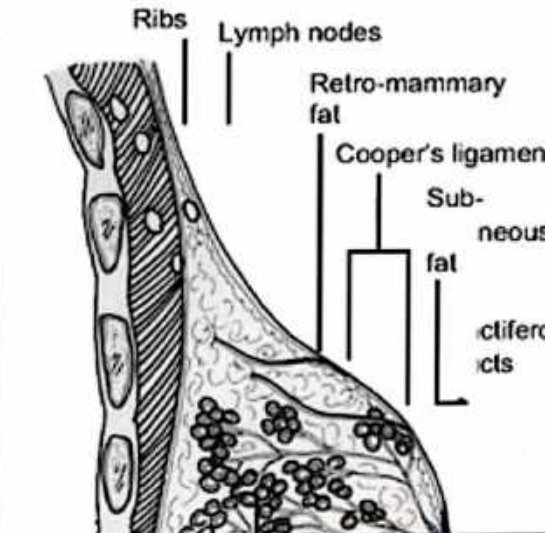
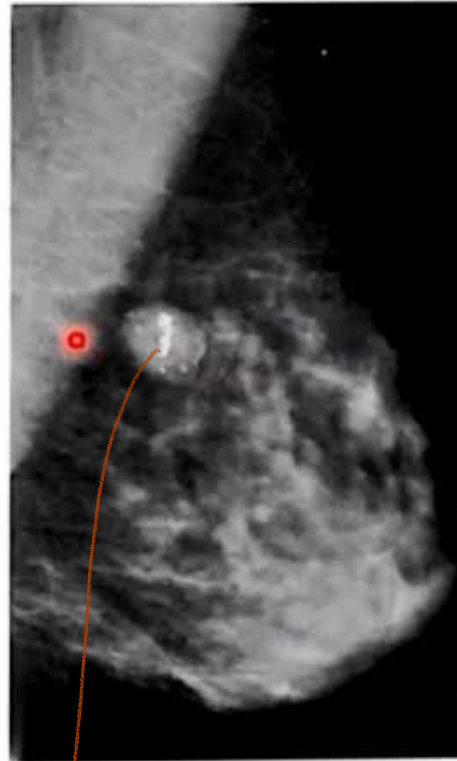
- lesions at same quadrants \Rightarrow Multi Focal
- // // diff. // \Rightarrow Multicentric



craniocordal Review



Mediolateral oblique view



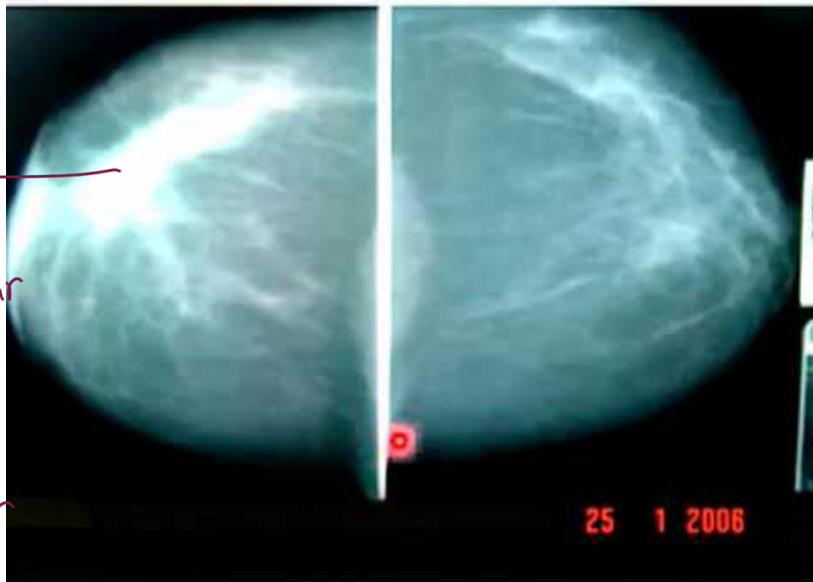
Mass with coarse calcification \Rightarrow Benign / Fibroadenoma



RT / LF

(Cranio caudal)

Mediolateral



very dense irregular mass, extend to the nipple, by comparing to other nipple, this one is thick

↳ typical appearance of malignant mass

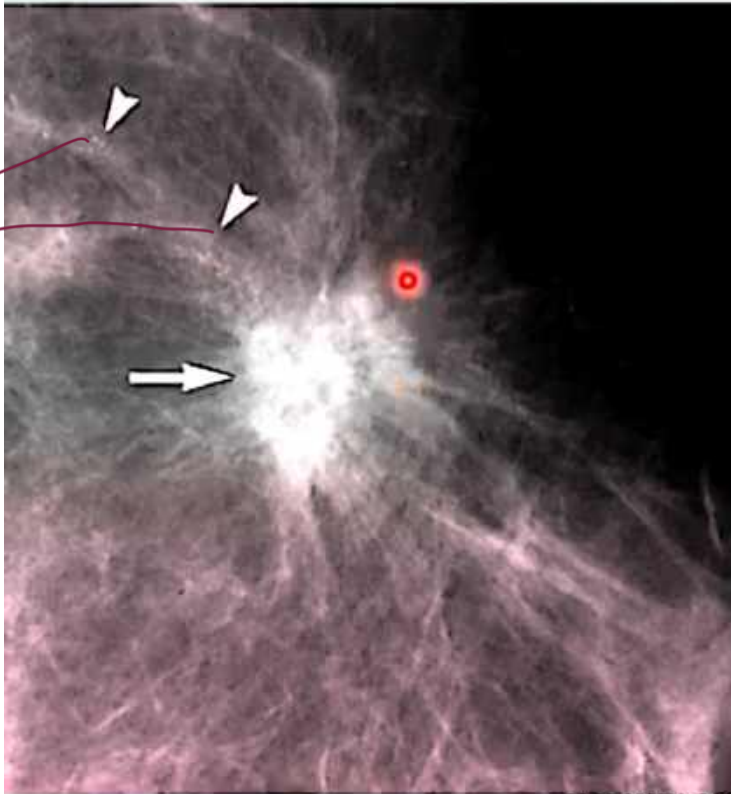
www.profjamalmelhem.net



Irregular like sunray appearance & very dense



Small dots of calcification



Multiple area of calcification

5 dots of calcification (micro)

Malignant ← Biology

Benign ←

Scanned with CamScanner



Biopsy → → Hamartoma or Adenofibroma

• No architecture distortion with Black spot



Mediolateral oblique

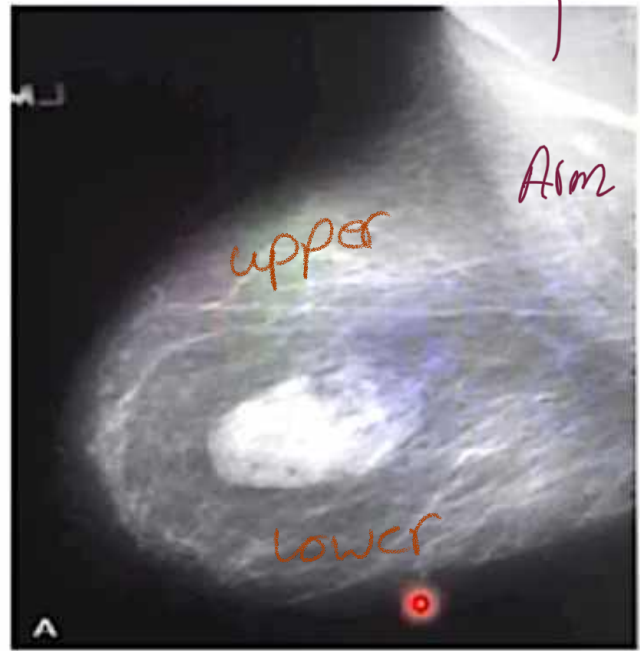


Figure 2-4. Hamartomas have a very characteristic appearance on mammography, composed of fatty and soft tissue densities surrounded by a fibrous capsule. A, The MLO view shows a "breast within a breast" appearance of hamartoma. B, The CC view. (Images courtesy of Dr. Alex S. G. Radiology, University of Michigan.)



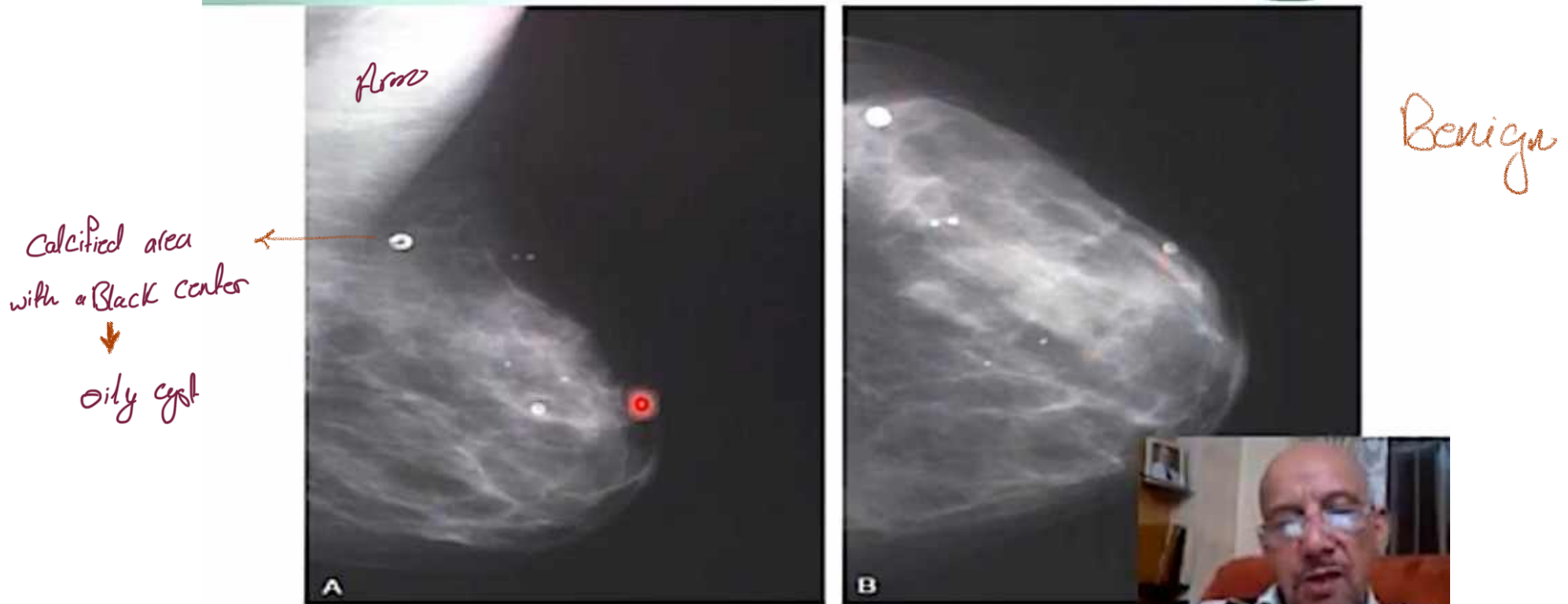


Figure 2-6. MLO and CC views of the right breast demonstrate benign calcificati cysts. (Images courtesy of Dr. Alexis Nees, Department of Radiology, University o



Radiographic views of the breast

Standard views:

- **45° Medio lateral Oblique (MLO view) / Lundgren's view**
- **Craniocaudal view (CC view)**



RCC



LCC



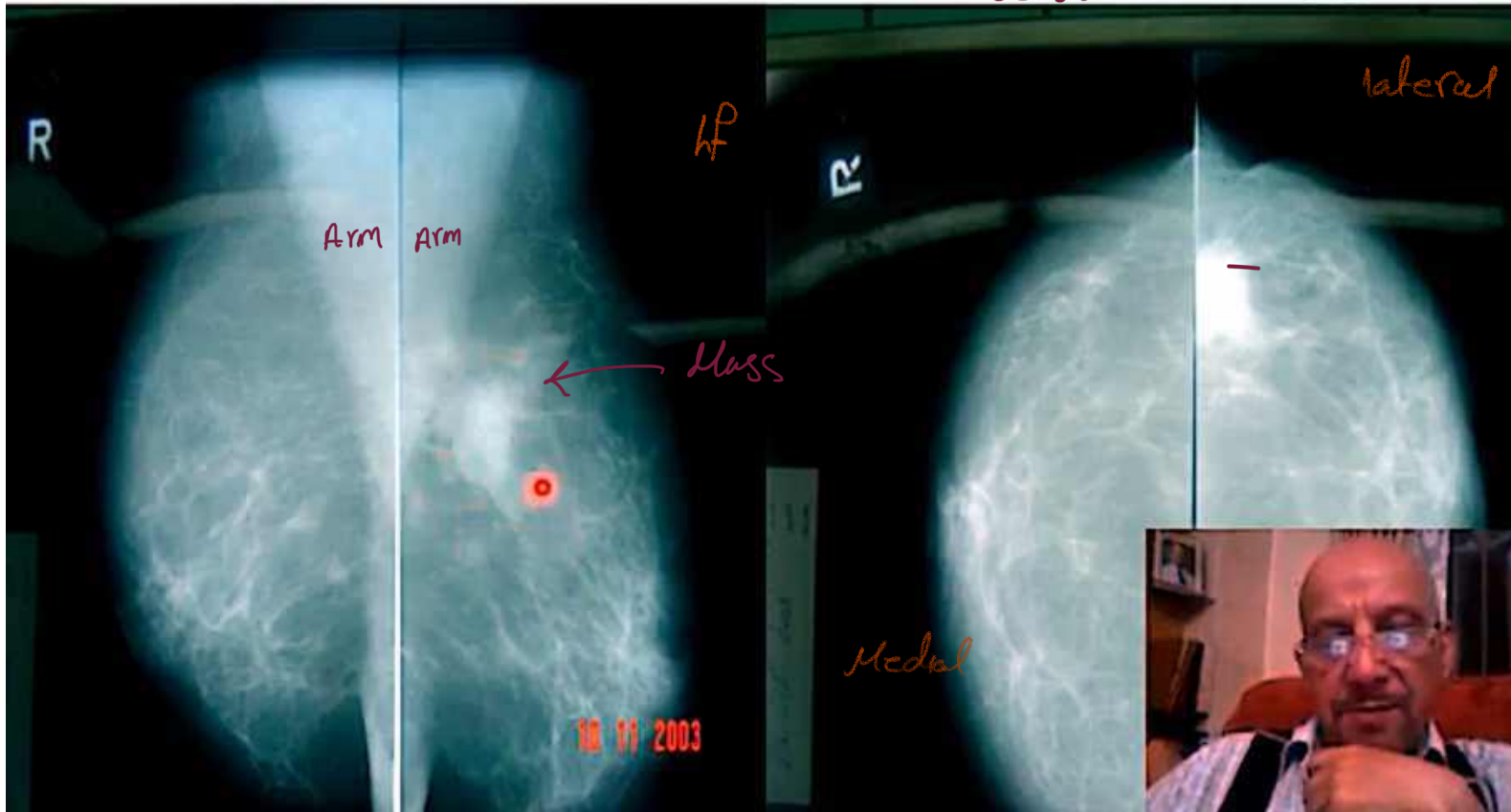
RMLO



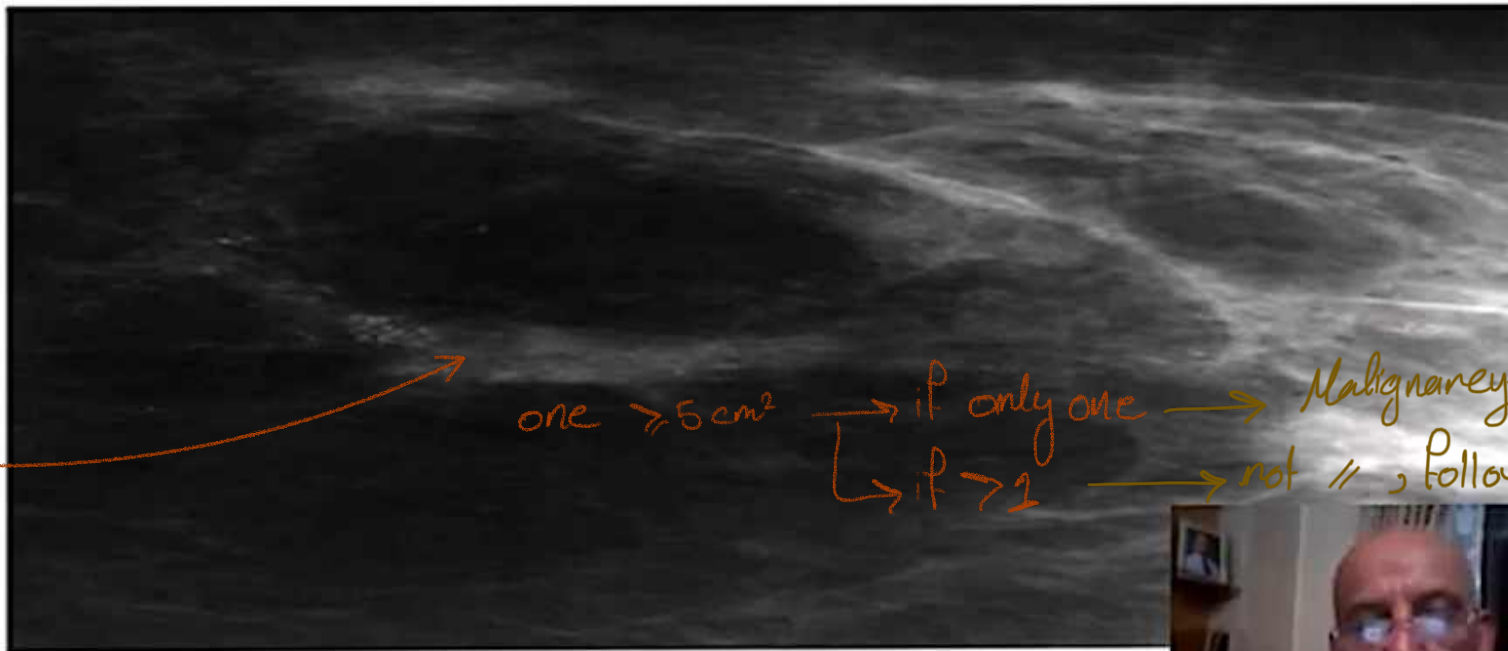
* Mammography *



craniocaudal view



Mass is located in upper outer. q. in HP Breast
Scanned with CamScanner



microcalcifications
↓
25% chance
to being
Malignancy

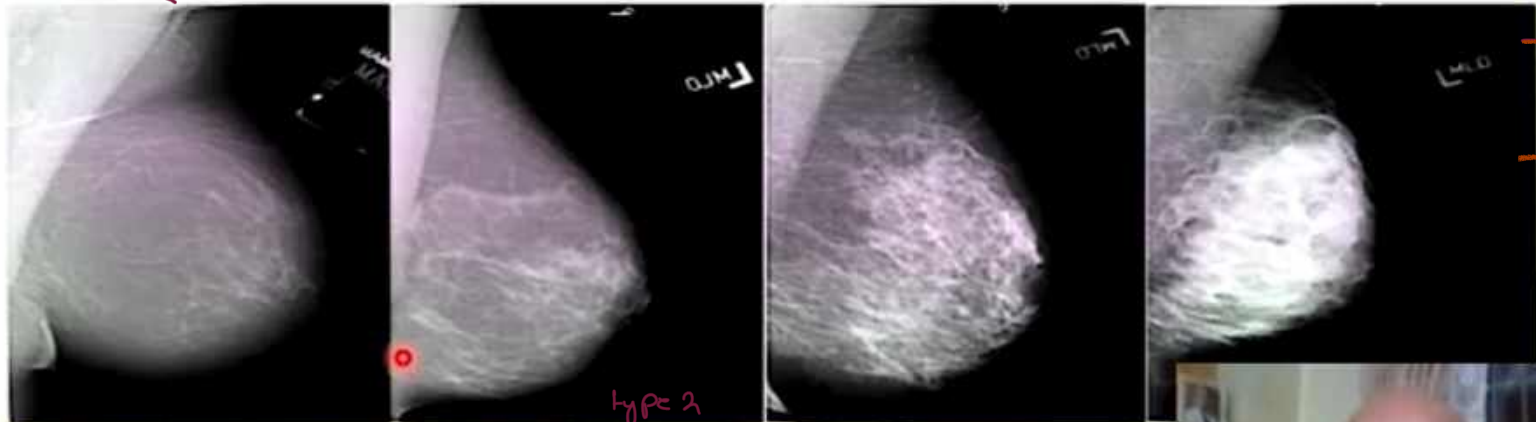
one $> 5 \text{ cm}^2$ → if only one → Malignancy
↳ if > 2 → not // , follow it up



Figure 2-7. Magnification CC view demonstrating segmentally distributed, pleomorphic calcifications. Pathology demonstrated DCIS and invasive carcinoma. (Image courtesy of Dr. A. Department of Radiology, University of M)

↳ follow up → if increase with time or not

↓ Dense by aging & lossing glandular structure
 ←



→ Normal for young lady
 → if for > 50 pt..
 . dysplastic Breast
 . need monitoring

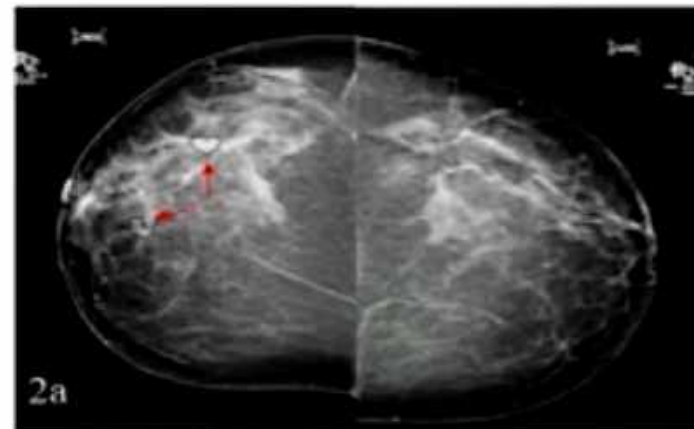
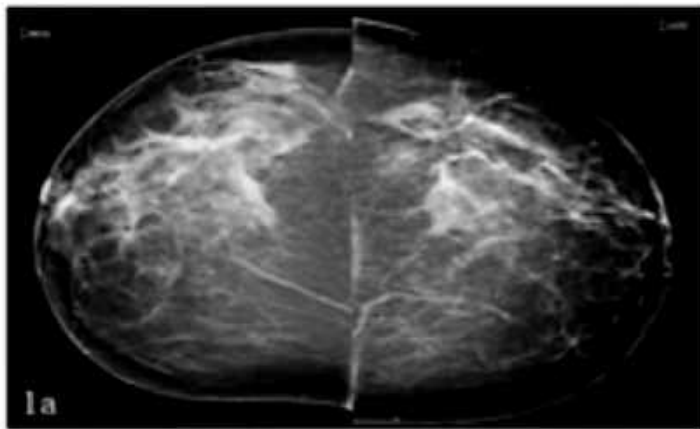
Breast composition and its mammographic appearance.*

Replace by fatty tissue

type 3 $< \frac{1}{2}$



Digital Mammography





BI-RADS mammographic assessment categories

Assessment category	Recommendation	Probability of malignancy
0: Incomplete	Need for further evaluation <i>MRI</i>	Not applicable
1: Normal	Normal interval follow-up	0 percent
2: Benign	Normal interval follow-up	0 percent
3: Probably benign <i>Fibroadenoma, gross cyst</i>	A short interval follow-up is recommended	<2 percent
4: Suspicious abnormality	A biopsy should be considered	≥2 to <95 percent (a) Low-risk (b) Intermediate-risk (c) Moderate-risk
5: Highly suggestive of malignancy <i>with signs of mammograph</i>	Biopsy or surgery should be performed	≥95 percent
6: Biopsy-proven carcinoma	Appropriate action should be taken	

BI-RADS: Breast Imaging Reporting and Data System.
 Source: Breast Imaging Reporting and Data System (BI-RADS) Atlas, 4th Edition, American College of Radiology, Reston, VA, 2003.



③ Cytology & Histology



1.

Fine Needle Aspiration Biopsy (FNAB)

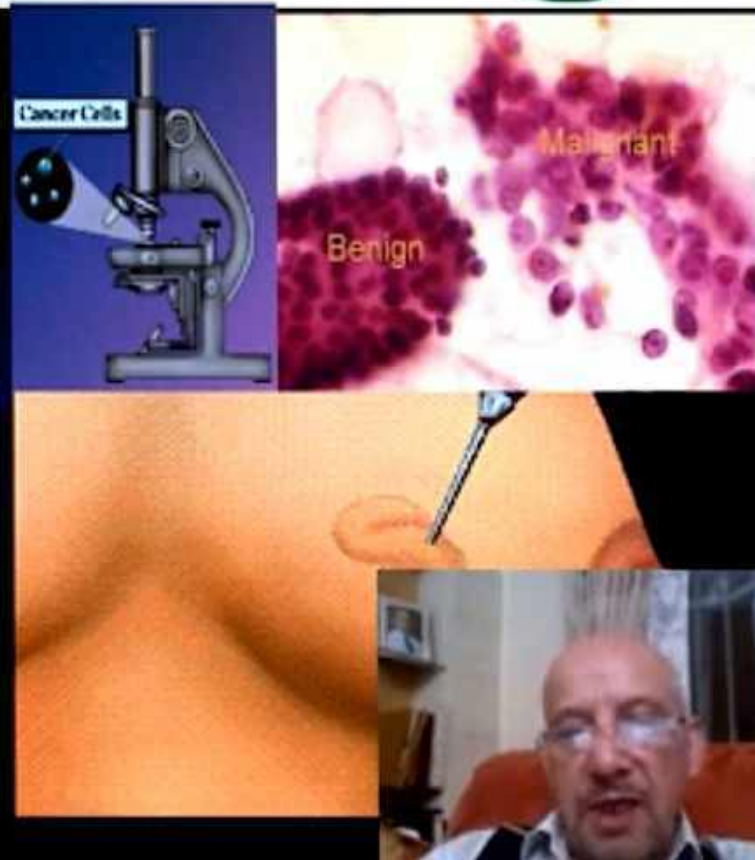
Fine needle **aspiration** biopsy is usually done in an office.

A small needle is inserted into the **tumor** and a sample of tissue is drawn up into the needle.

Material from the needle is put on a slide and examined for the presence of malignant cells.

It is a simple procedure done with **minimal discomfort**.

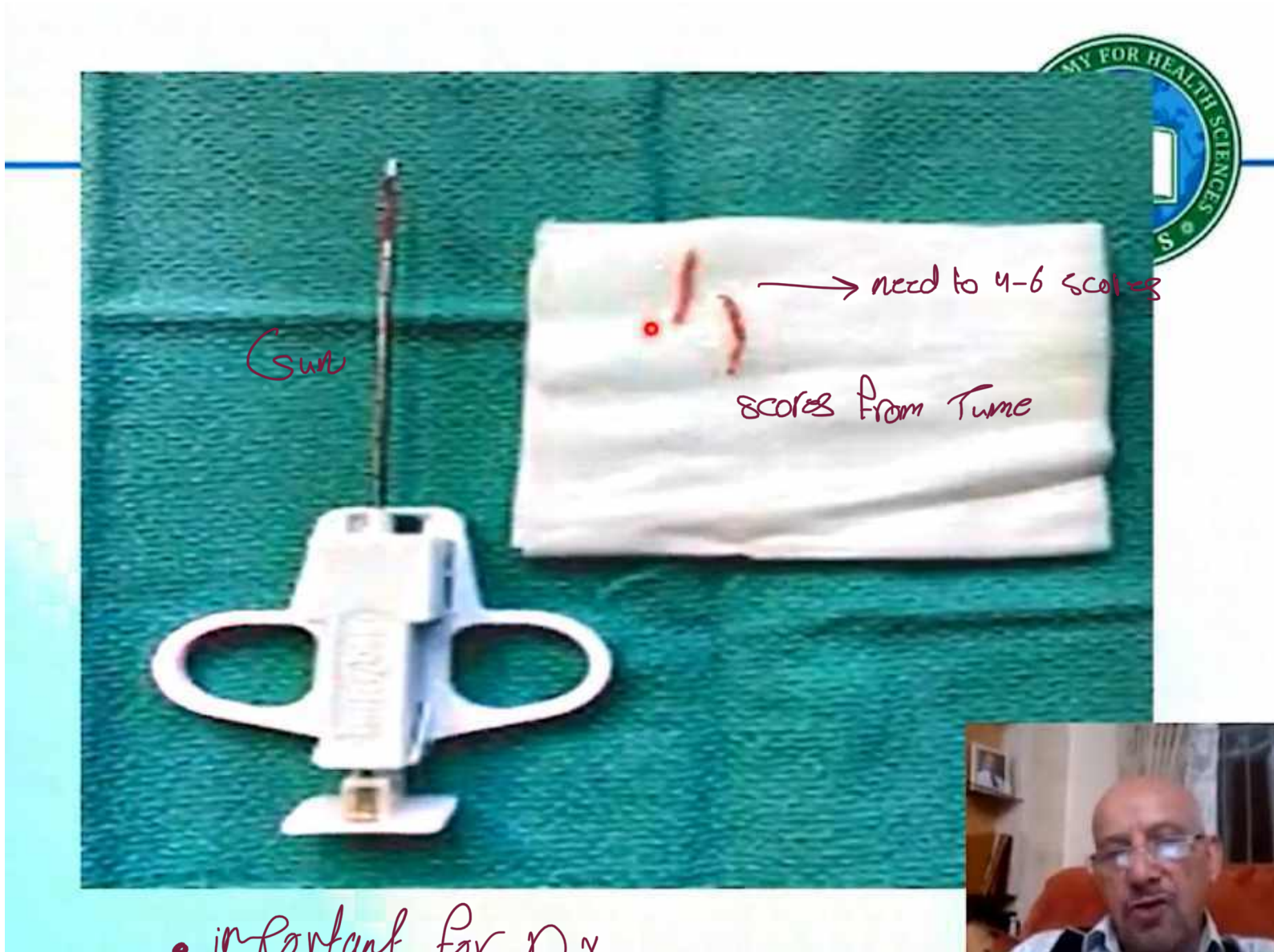
Disadvantage: May not always rule out cancer when it is negative.



✿ Not proper for Dx ✿

Core Biopsy → without U/S Guidance / with Anesthesia





- important for Dx.
- ↑ Accuracy



Biopsy



FNA

- relatively **atraumatic**
- sensitivity of %99-73
- ideal **for simple cyst** aspiration
- can't distinguish in-situ vs invasive cancer

CNB

- cutting needle
- greater trauma
- high sensitivity - 100%**
- distinguishes between invasive and in-situ**
- stereotactic with **mammography and US**



3.

Incisional biopsy

Incisional biopsy is done under local anesthesia, often with mild sedation.

It is an outpatient procedure.

Only part of the tumor is removed for diagnosis.

Incisional biopsy is usually done when the tumor is large.

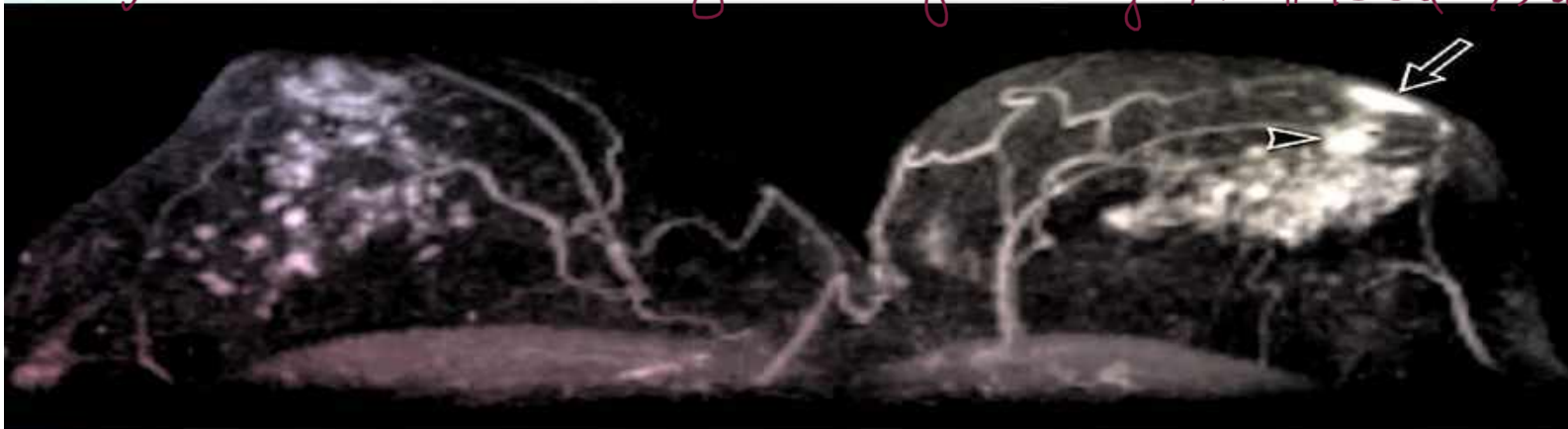
It is rarely performed except in special circumstances.



Paget's Disease of the Nipple

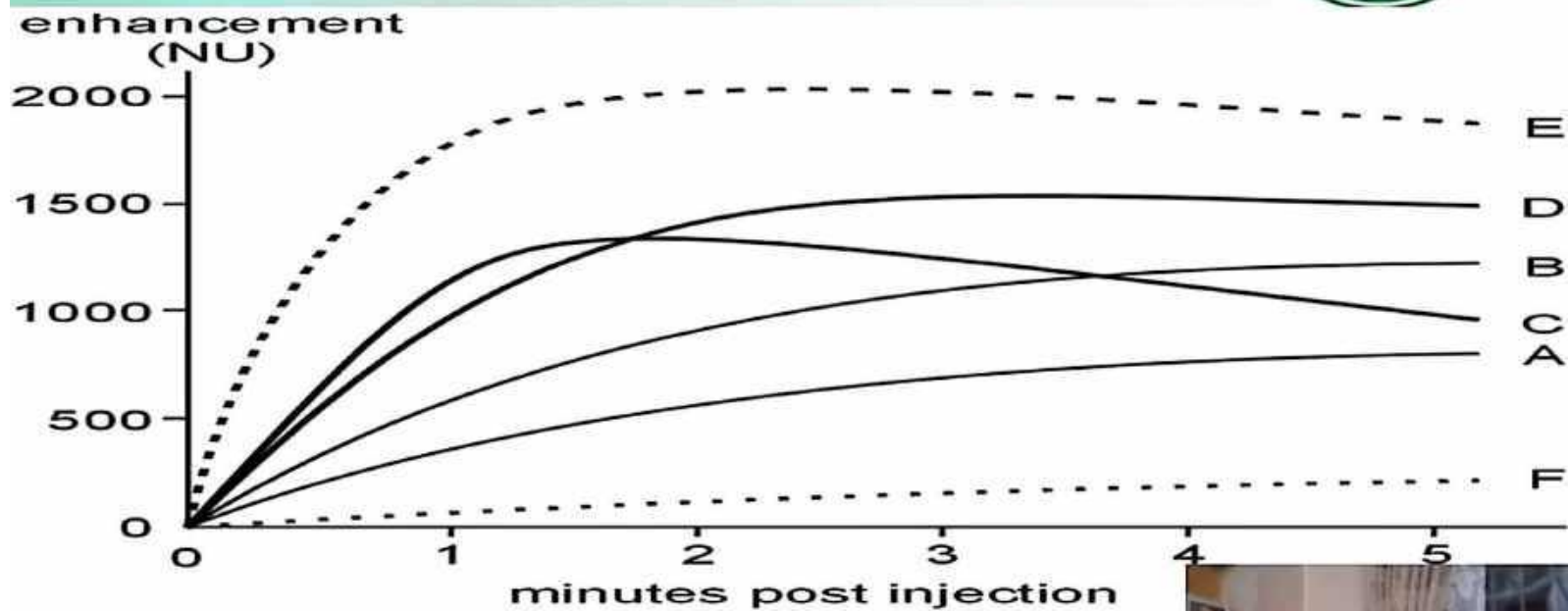


MRI → for stronger family history / Multifocal / More accurate



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MR Imaging, breast

Enhancement curves for carcinomas. About 90% of enhance according to the patterns represented by D and E. NU = normalized units

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in calcification
stereotactic Biopsy → Histopathology



Advanced Breast Biopsy Instrumentation System

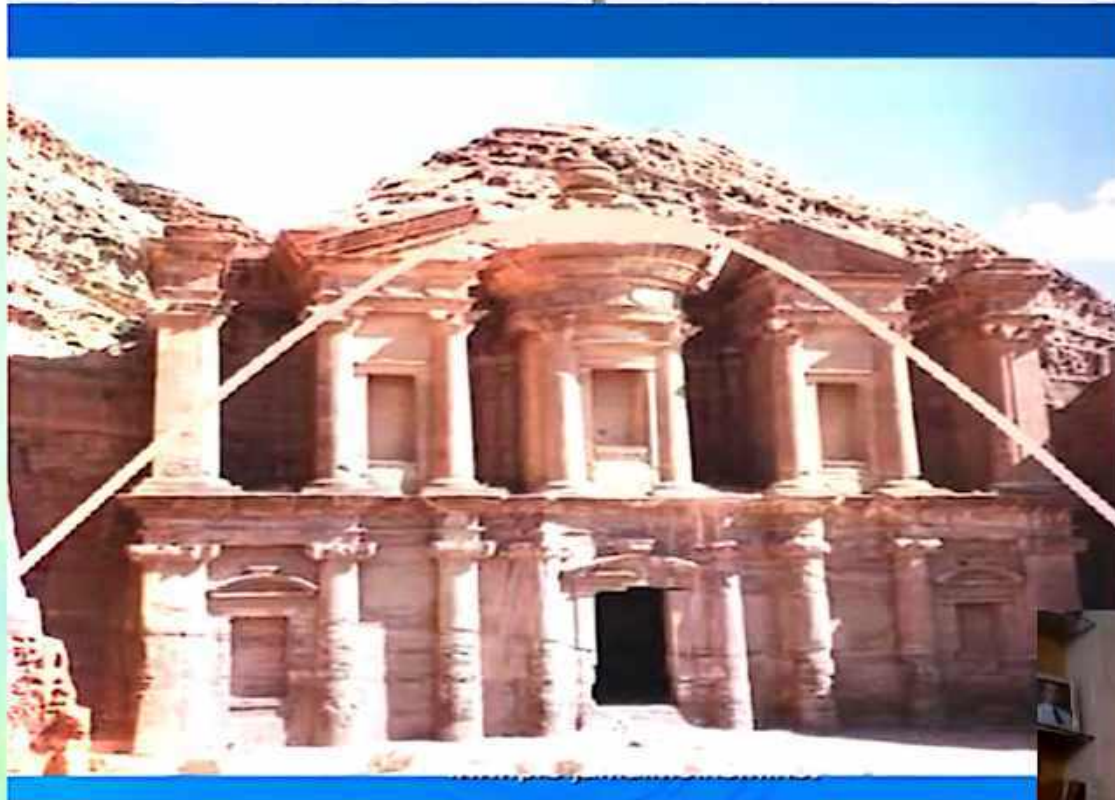
Stereotactic Image-Guided Breast Biopsy



⇒ Done for early calcifications



Thank you



Breast Cancer Overview Part 2

Staging & Surgical Management

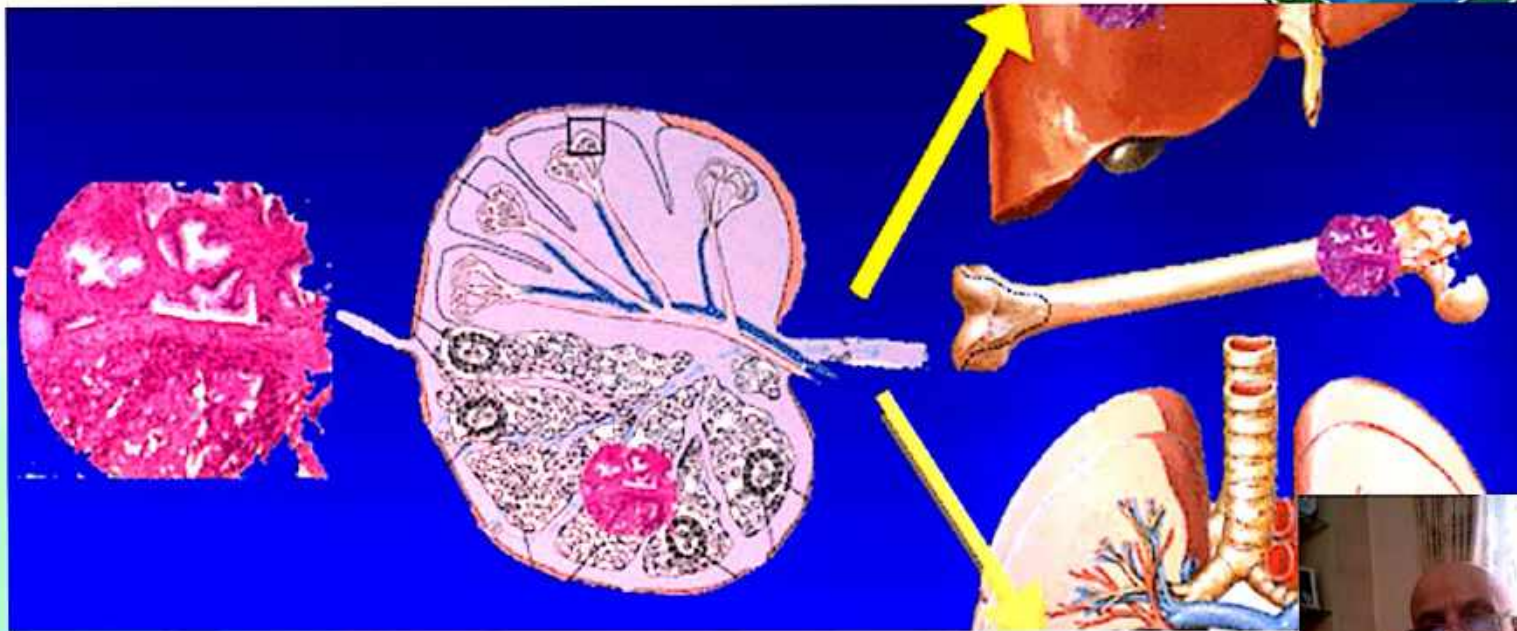


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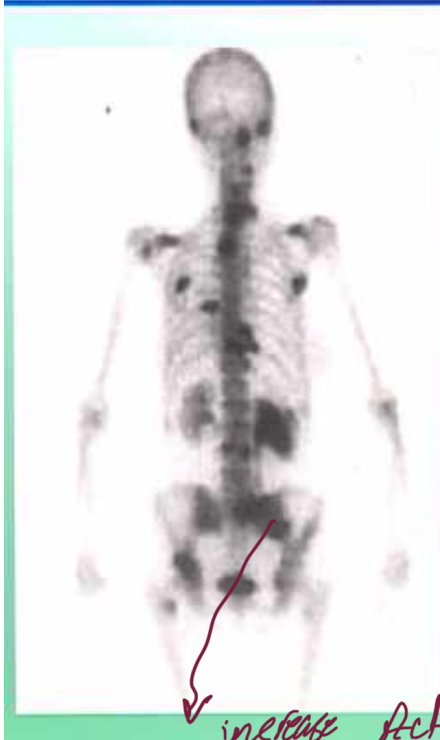
May go to Brain → Don't DO CT, unless
pt has symptoms



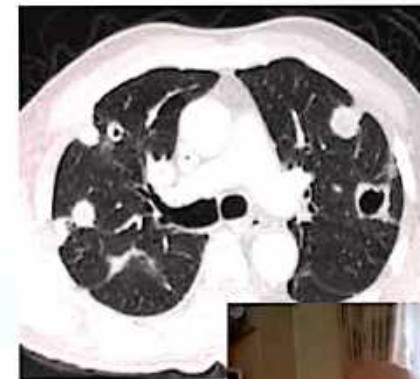
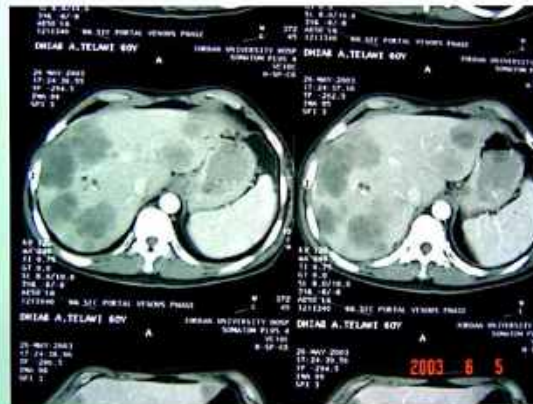
- Staging should be done after doing the proper evaluation
- Of the primary tumor in the breast and axilla by imaging and
- Biopsy. (T&N)



Bone scan



CT For chest & Abdomen



* These tests are -ve in an early stages



Bone M. infiltration
↑

- CBC count with differential and platelet count *↳ pt may develop Anemia due to*
- Chemistry and renal function studies
- Liver function tests
- Tumor markers CA 15.3

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Objectives of staging



- Provides useful prognostic information.
- Allows decisions to be made regarding adjuvant therapy.
- Allows comparison of treatment outcomes between different centers.



TNM Criteria



- **T = Primary Tumor** *by US*
 - Tis = carcinoma in situ
 - T1 = less than 2 cm in diameter
 - **T2 = between 2 and 5 cm in diameter**
 - T3 = more than 5 cm in diameter
 - T4 = any size, but extends to the skin or chest wall
- **N = Regional Lymph nodes** *By examination*
 - N0 = no regional node involvement
 - **N1 = metastasis to movable same side axillary nodes**
 - N2 = metastasis to fixed same side axillary nodes
 - N3 = metastasis to same side internal mammary nodes
- **M = Distant Metastasis**
 - **M0 = no distant metastasis**
 - M1 = distant metastasis

T2N1M0



Clinical Staging



	T	N	M	S-Year Survival
Stage 0	Tis	N0	M0	> 95%
Stage I	T1	N0	M0	Overall = 85%
Stage II				Overall = 66%
(Stage IIA)	T0	N1	M0	
	T1	N1	M0	
	T2	N0	M0	
(Stage IIB)	T2	N1	M0	
	T3	N0	M0	
Stage III				Overall = 41%
(Stage IIIA)	T0	N2	M0	
	T1	N2	M0	
	T2	N2	M0	
	T3	N1, N2	M0	
(Stage IIIB)	T4	Any N	M0	
	Any T	N3	M0	
Stage IV	Any T	Any N	M1	Overall 10%

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15



65% 14:42

Breast Cancer Staging Calculator

	Clinical			Pathological		
T	T0	Tis	T1	T2	T3	T4
N	N0	N1mi	N1	N2	N3	
M	M0			M1		
PROGNOSTIC FACTORS	G1		G2	G3		
	HER2 +		ER +	PR +		
	HER2 -		ER -	PR -		

IIIC

Anatomic Stage

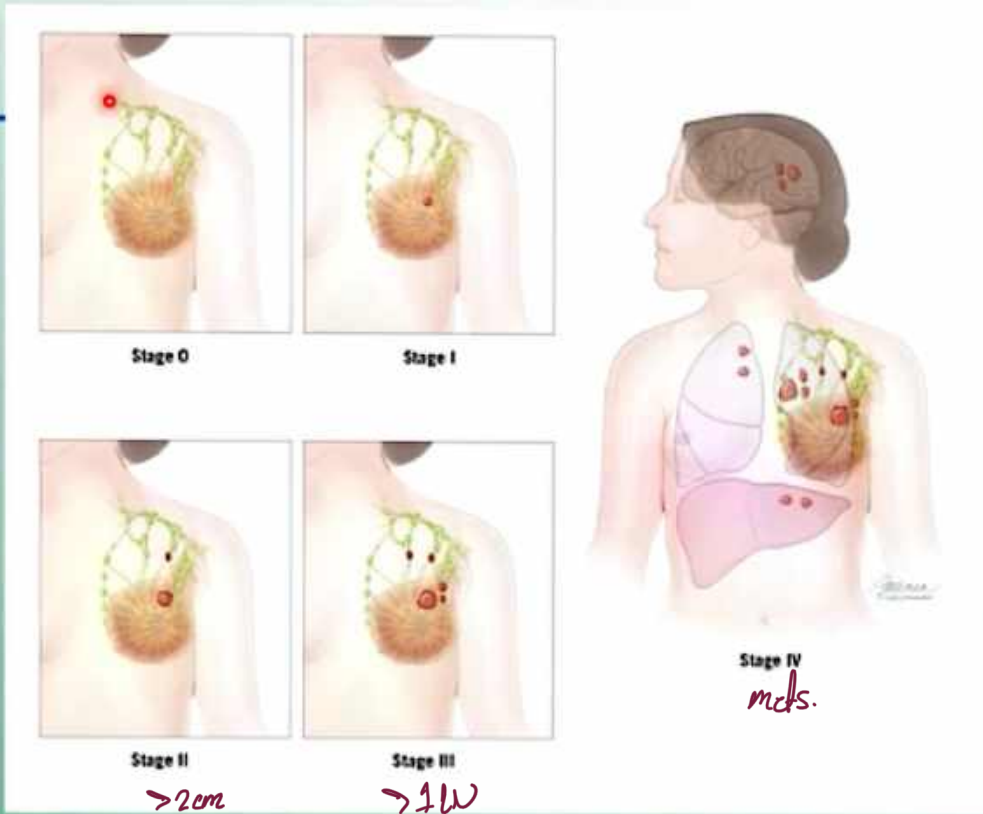
IIIA

Clinical Prognostic Stage

-2

TNM 8
CALCULATOR





- Stages for predict the prognosis of the cancer



5-year relative survival rates for breast cancer by stage

- The 5-year relative survival rate for women with **stage I** breast cancer is close to **100%**.
- For women with **stage II** breast cancer, the 5-year relative survival rate is about **85%**.
- The 5-year relative survival rate for stage III breast cancers is about **70%**. But often, women with these breast cancers can be successfully treated.
- Breast cancers that have spread to other parts of the body are more difficult to treat and tend to have a poorer outlook. Metastatic, or **stage IV** breast cancers, have a 5-year relative survival rate of about **20%**. Still, there are often many treatment options available for women with this stage of breast cancer.



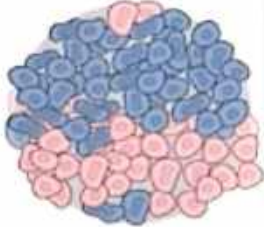
⇒ Do surgery then ck

⇒ chemotherapy



Histological Grades



Prognosis				Grade
	Grade 1	Grade 2	Grade 3	
				
	<p>Glandular/Tubular Differentiation: >75% of tumor forms glands</p> <p>Nuclear Pleomorphism: Uniform cells with small nuclei similar in size to normal breast epithelial cells</p> <p>Mitotic Count: < 7 mitoses per 10 high power fields</p>	<p>Glandular/Tubular Differentiation: 10% to 75% of tumor forms glands</p> <p>Nuclear Pleomorphism: Cells larger than normal with open vesicular nuclei, visible nucleoli, and moderate variability in size and shape</p> <p>Mitotic Count: 8-15 mitoses per 10 high power fields</p>	<p>Glandular/Tubular Differentiation: <10% of tumor forms glands</p> <p>Nuclear Pleomorphism: Cells with vesicular nuclei, prominent nucleoli, marked variation in size and shape</p> <p>Mitotic Count: > 16 mitoses per 10 high power fields</p> <p style="color: red;"><i>Poorly diff.</i></p>	

Grade I tumors have a total score of 3-5

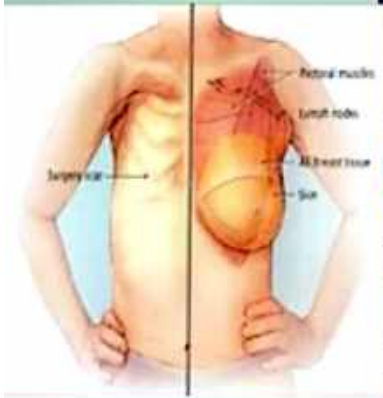
Grade II tumors have a total score of 6-7

Grade III tumors have a total score of 8-9



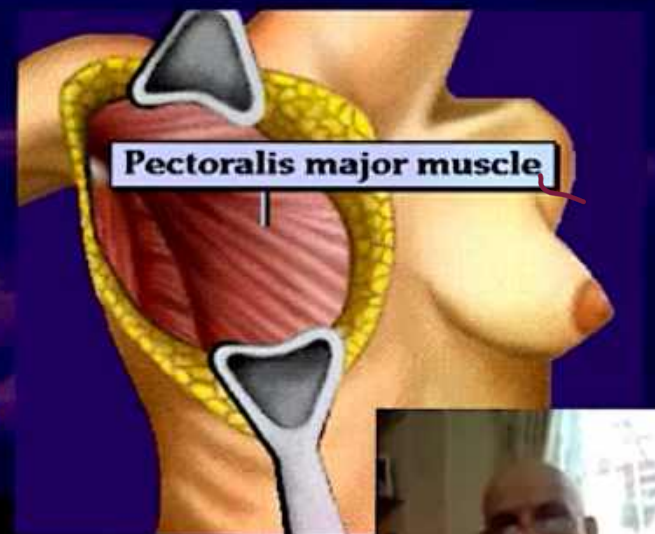
①

Radical mastectomy

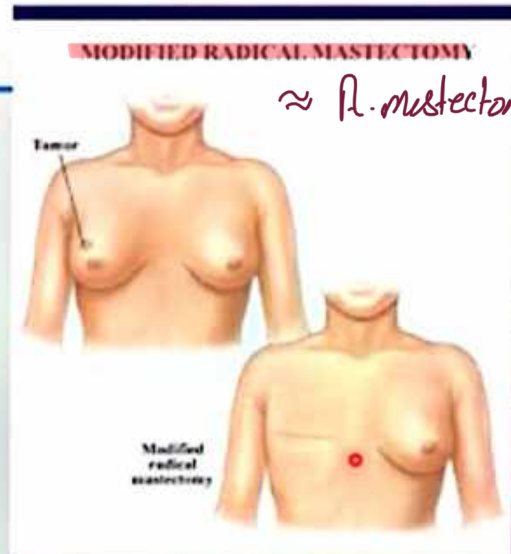


In radical mastectomy the muscles of the chest (e.g., **pectoralis major** and **pectoralis minor**) along with the breast and **lymph nodes** are all removed.

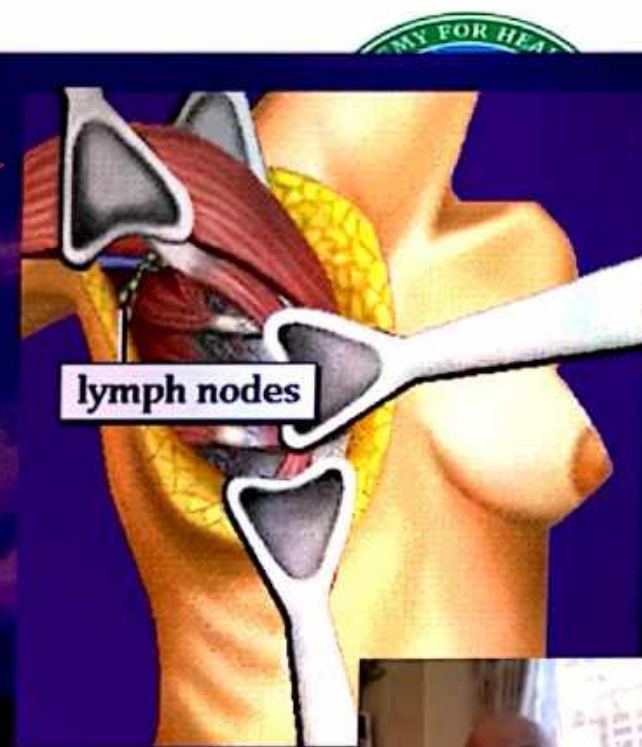
Radical mastectomy is now rarely performed. It is usually reserved for very large **cancers** that have grown into the **muscle**.



↳ loss shoulder stability

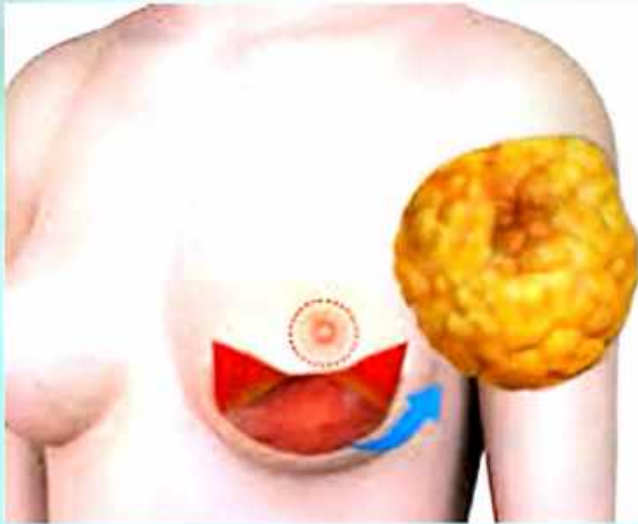


≈ R. mastectomy





Do skin sparing mastectomy



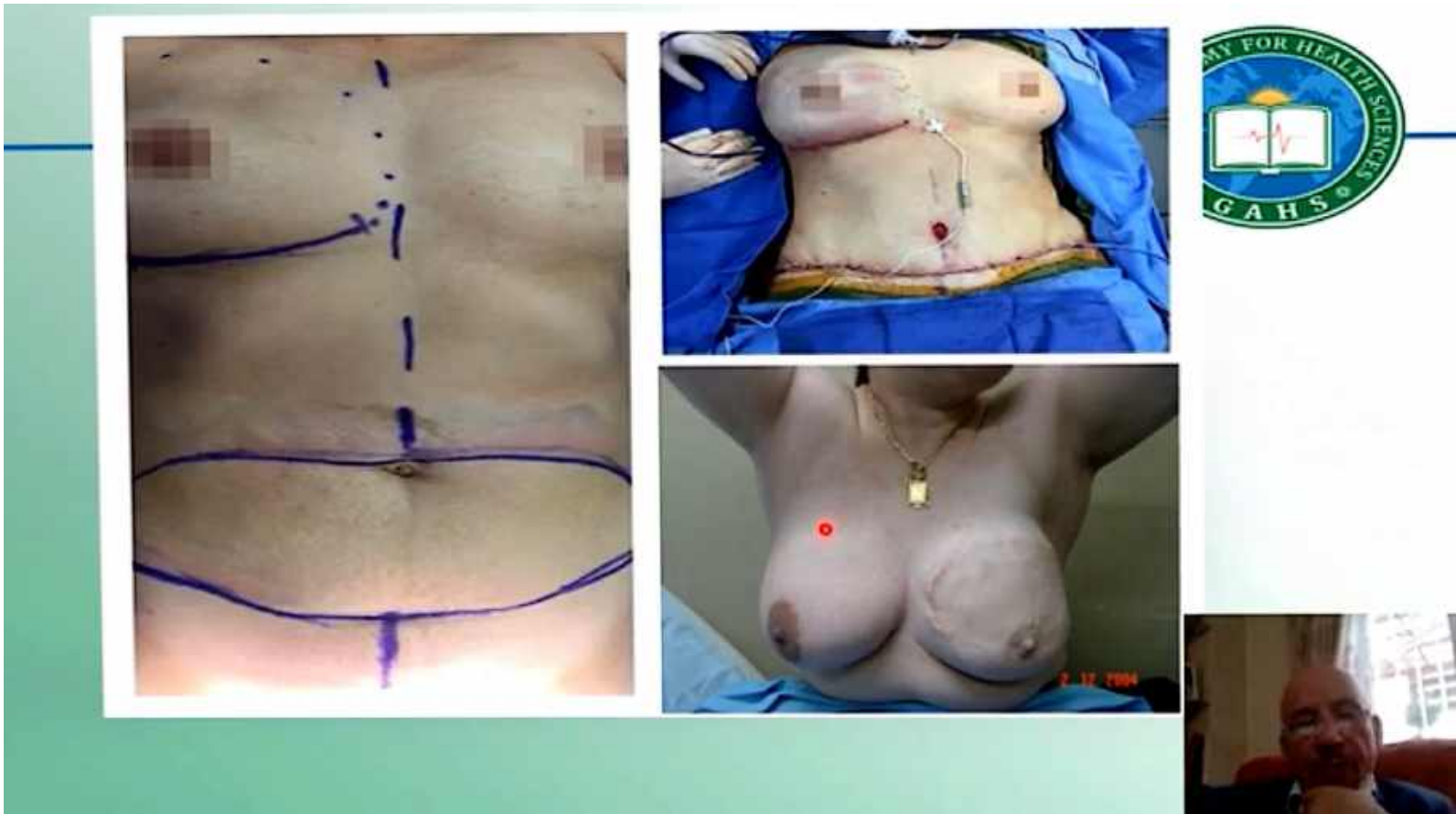
or replace it by silicone implant



③ Trans- Flap

- * Transverse Rectus
Abdominus
myocutain *
- less popular

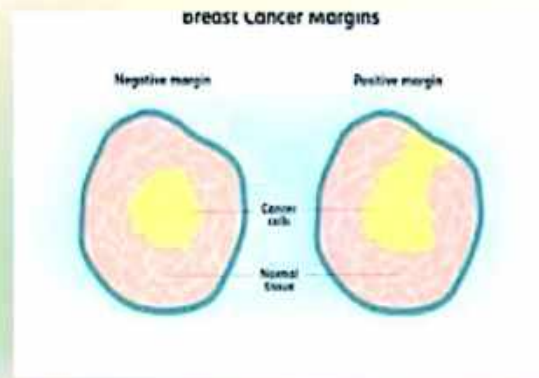




From Back → less complication
→ But we loss its function



purely ms not fat
ms will Atrophied ← with time



*wide local excision
with safety margin*



Types of Breast Conserving Operations

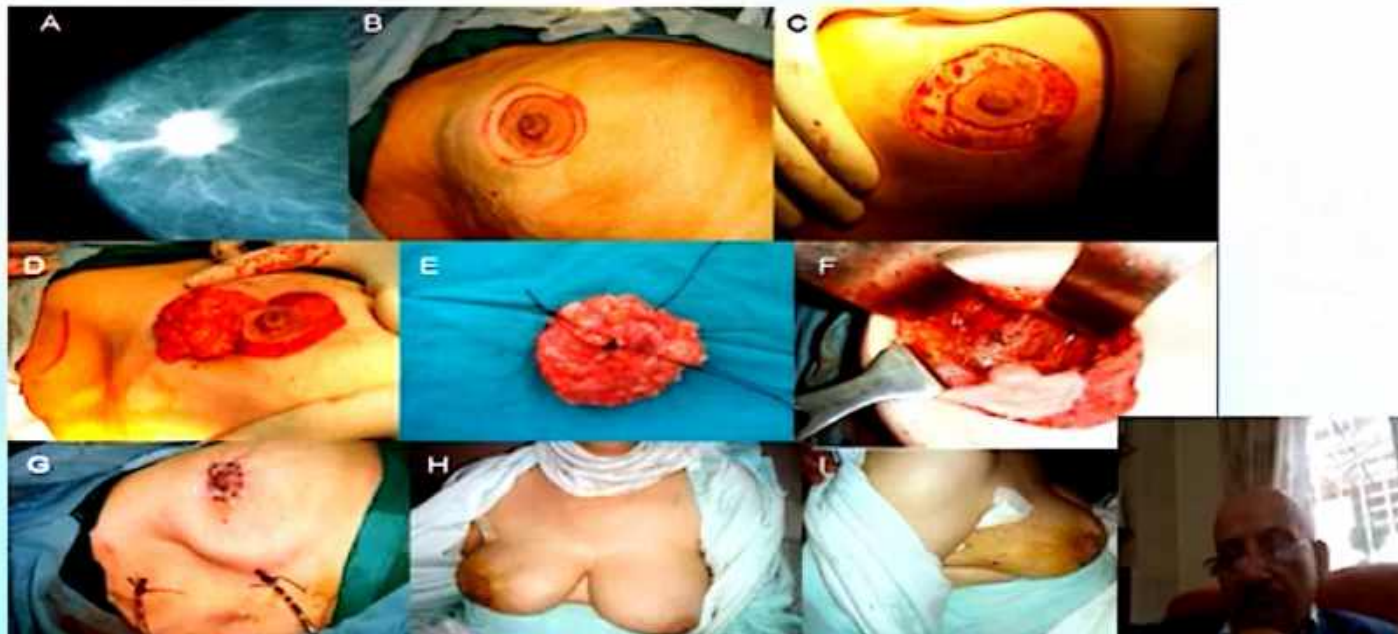


- Segmental mastectomy, quadrectomy,
Partial mastectomy

not standard / in the past



oncologic surgery

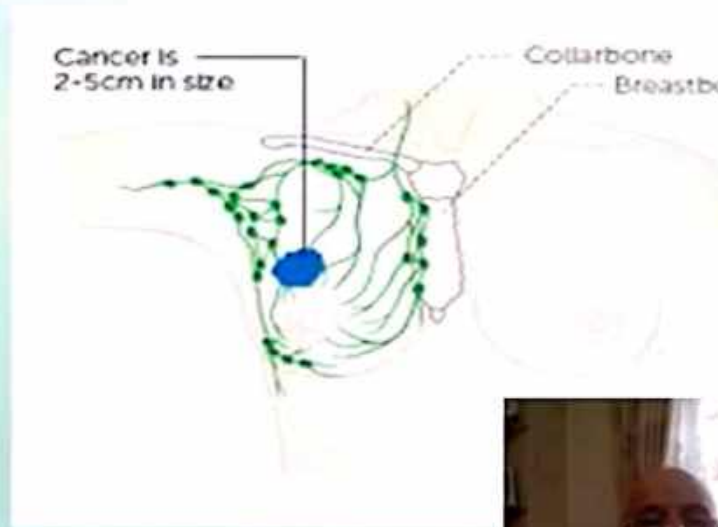
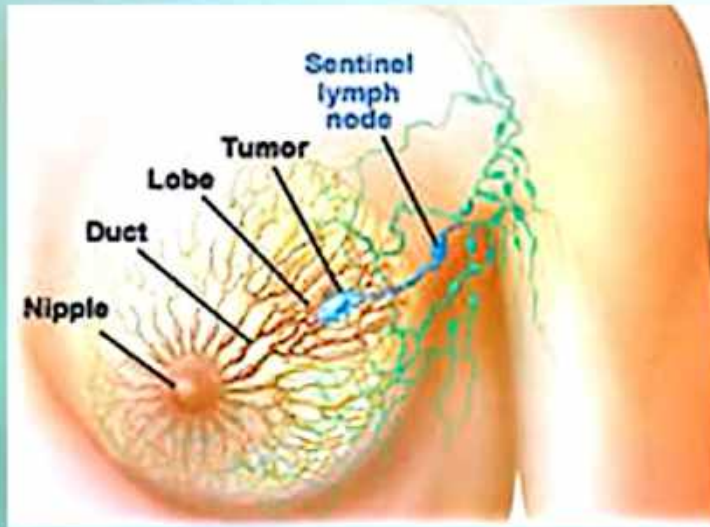


Donut Mastectomy - Infection

Local Flaps



www.profjamalmelhem.net



- Do level 2 or 3
- use \rightarrow First LN \rightarrow Ax. dissection or not



Thank You

