

*Update on
Stereotactic Breast
Biopsy*

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Why Percutaneous Biopsy rather than Surgical Biopsy?

- Minimally invasive
 - Reduced morbidity
 - Limited post-procedure disability
 - Improved cosmesis
 - Reduced costs
 - Equivalent accuracy
-

History of Stereotactic Biopsy

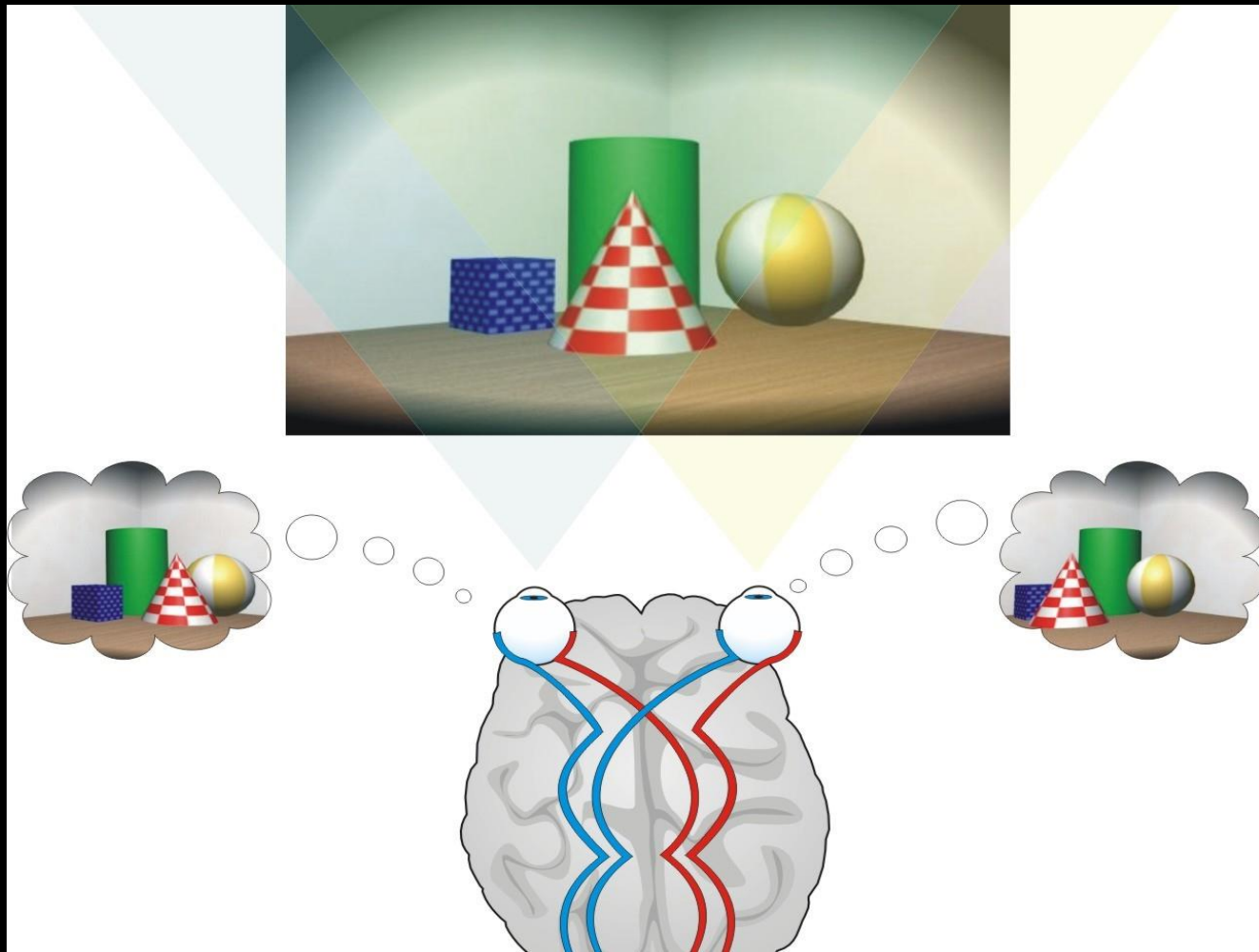
- 1979 Stereotaxic biopsy was introduced in Sweden using FNA (prone table)
 - 1982 Lindgren in Sweden introduced core needle biopsy using an automated gun
 - 1990 Parker adapted an automated needle-gun system for stereotaxic biopsy
 - STNB has developed into an important tool for early cancer diagnosis
-

Principles of Stereotactic Biopsy

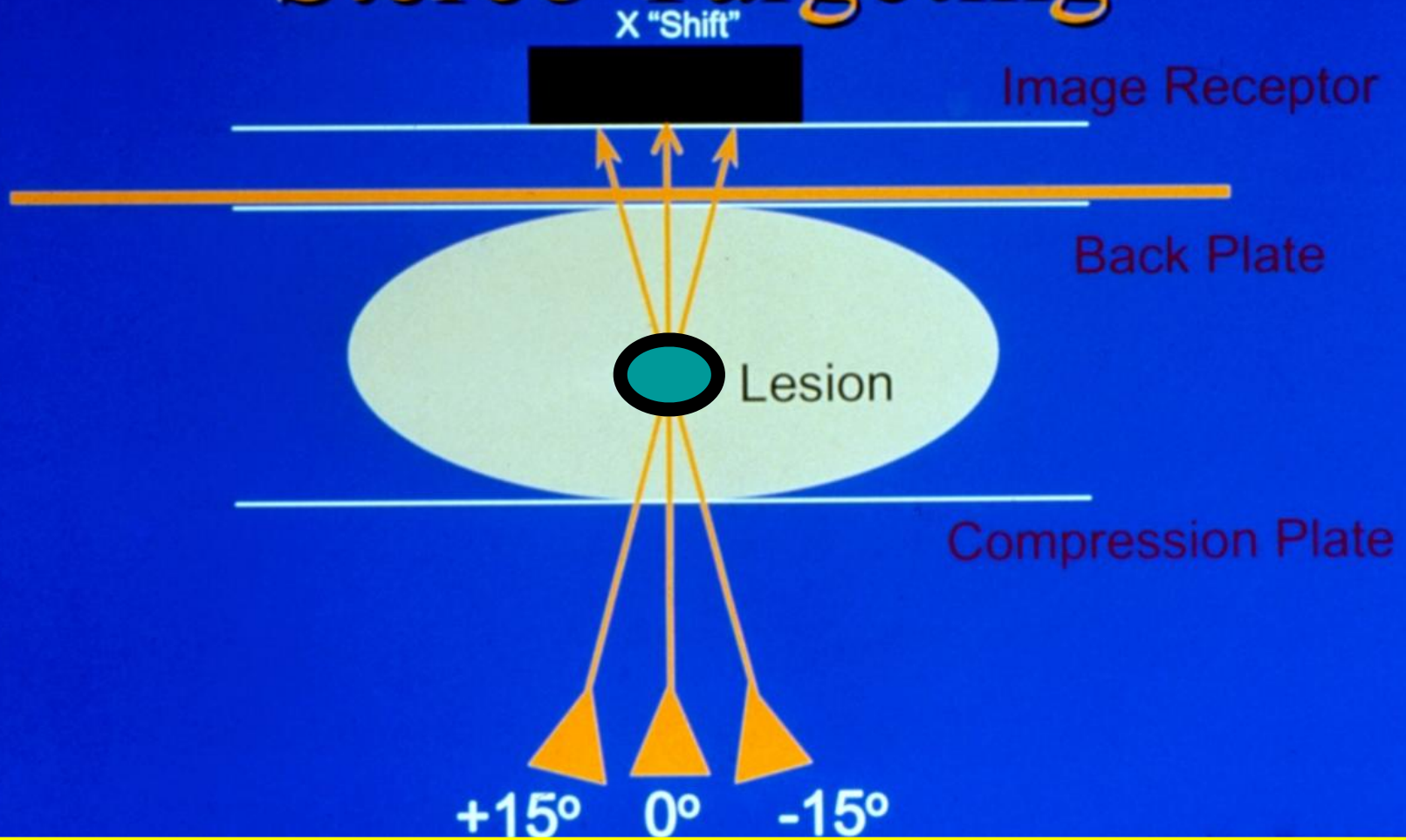
- Used clinically since the early 1980's for diagnosis of non-palpable mammographically- detected suspicious lesions
 - Core needle biopsy under X-ray guidance
 - The position (X-Y location and depth) of lesion is determined with use of a pair of **stereo images**
 - Biopsy needle is guided to the target semi-automatically, based on the coordinates obtained from the stereo machine
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Principles of Stereotactic Biopsy

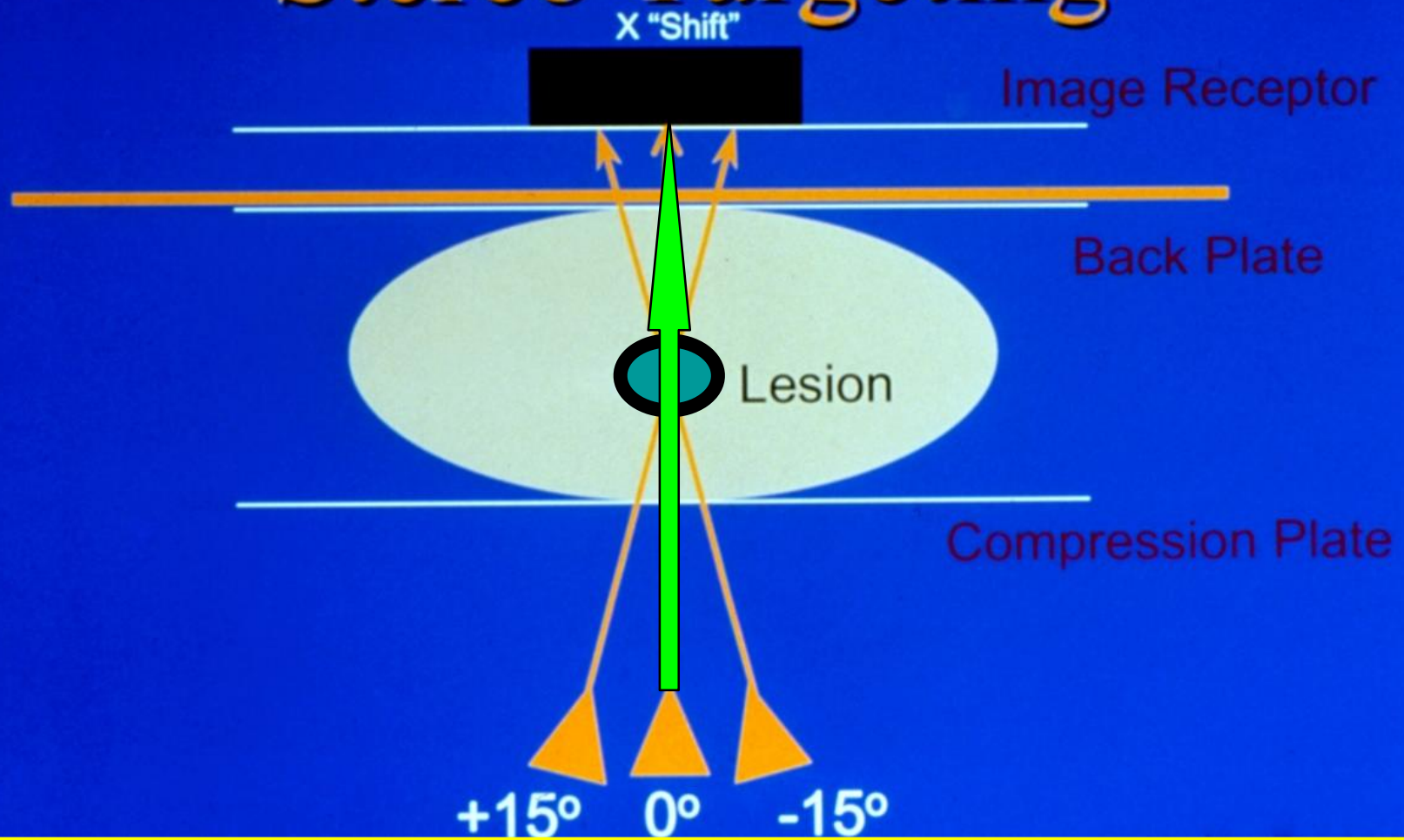
Stereo
View



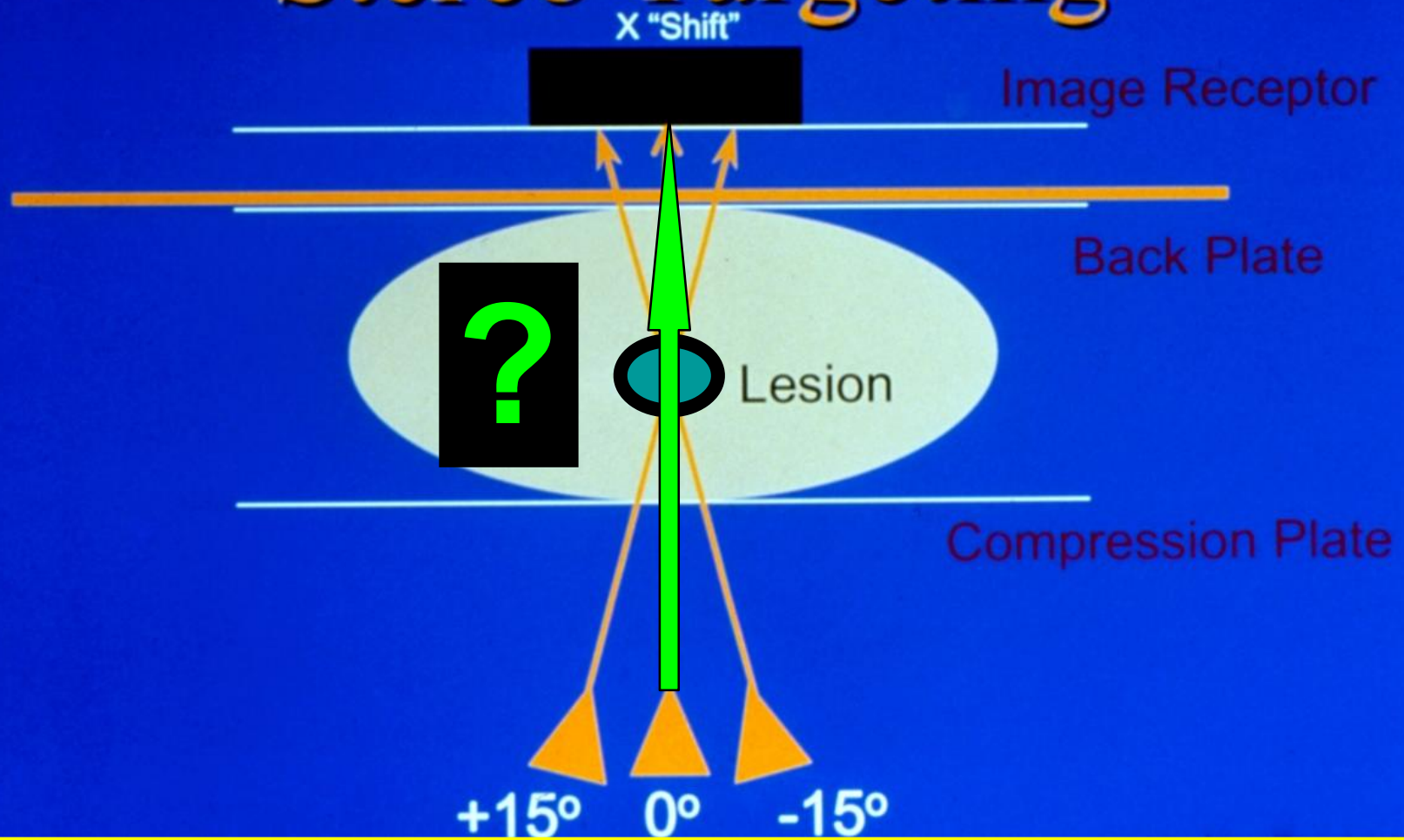
Stereo Targeting



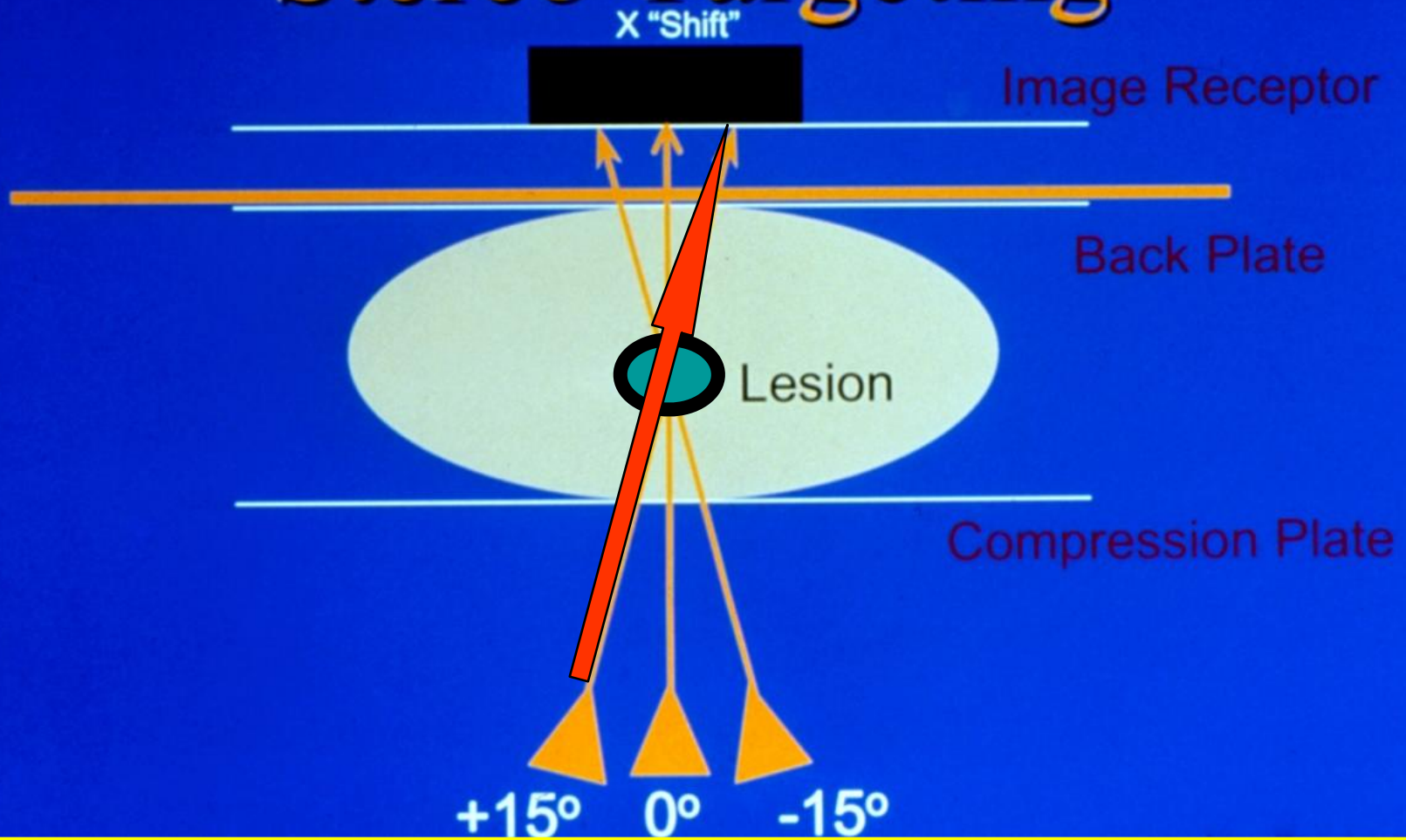
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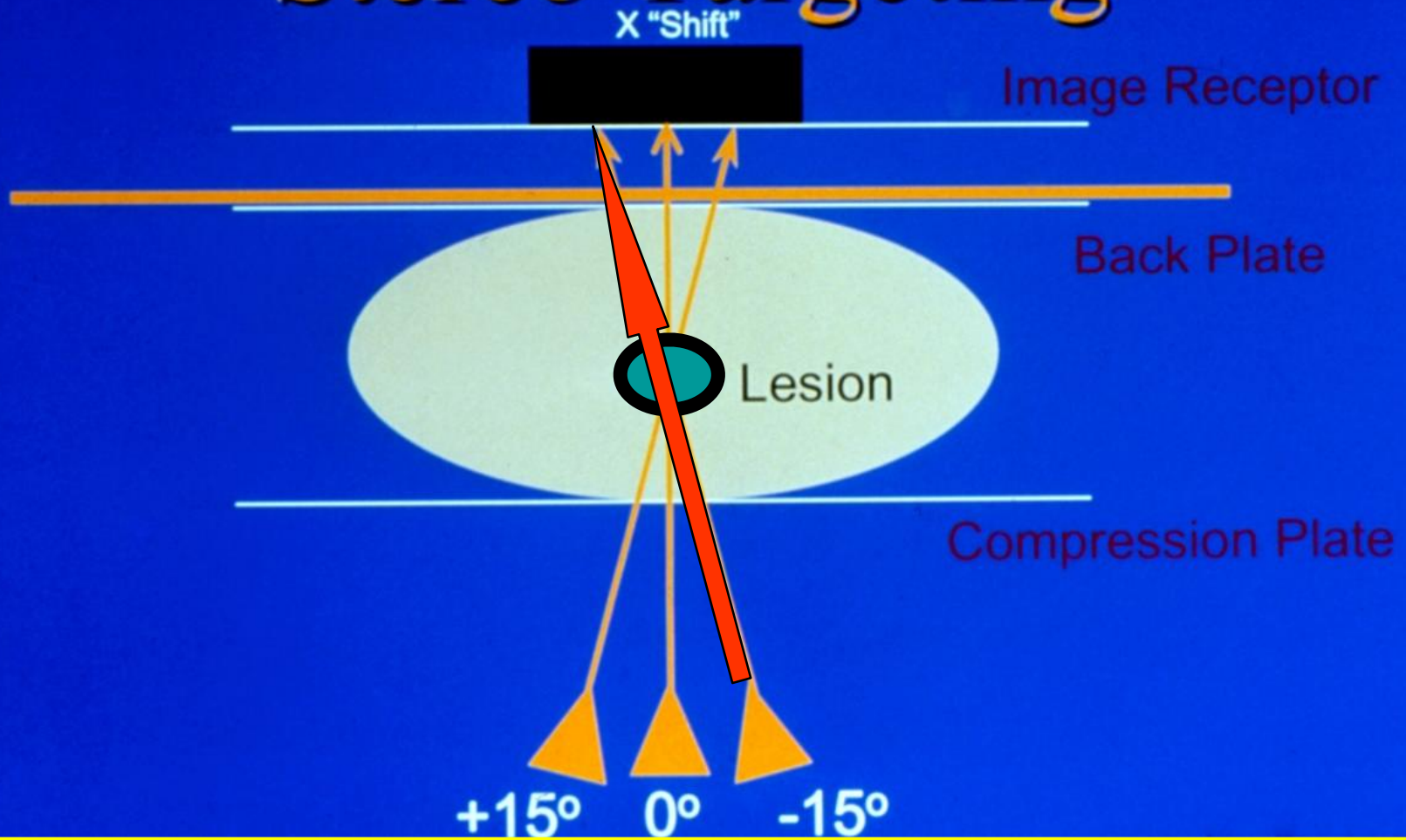
Stereo Targeting



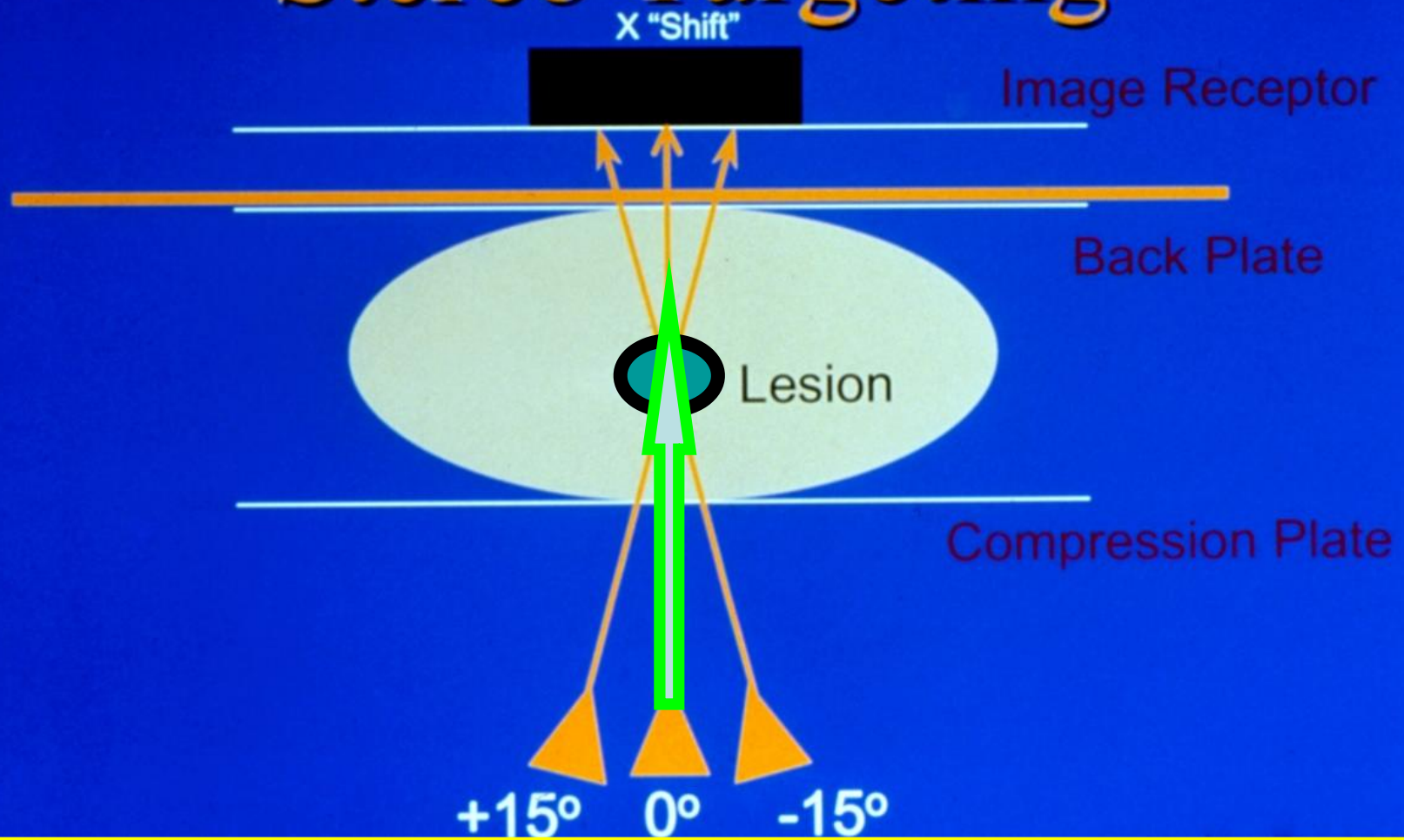
Stereo Targeting



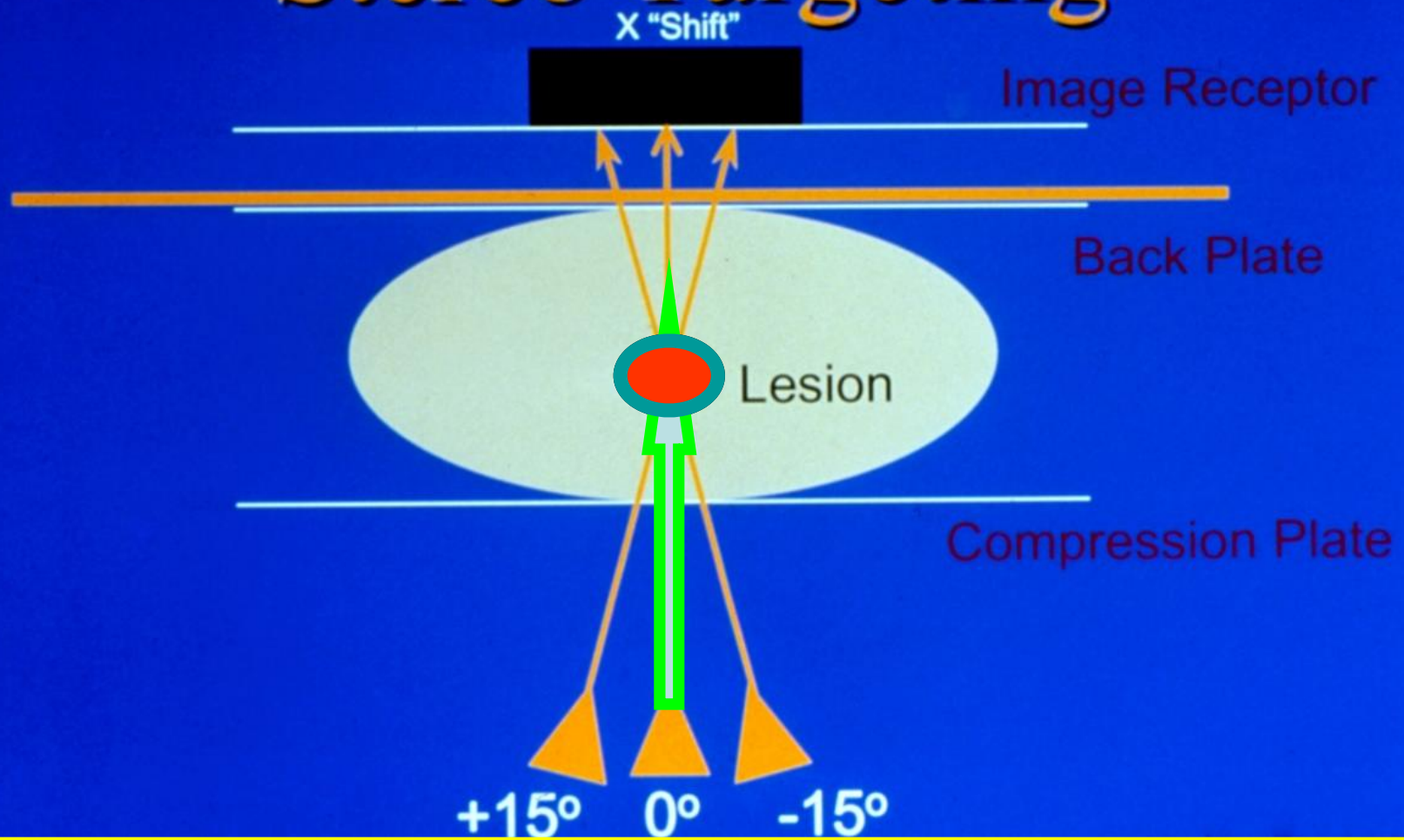
Stereo Targeting



Stereo Targeting



Stereo Targeting

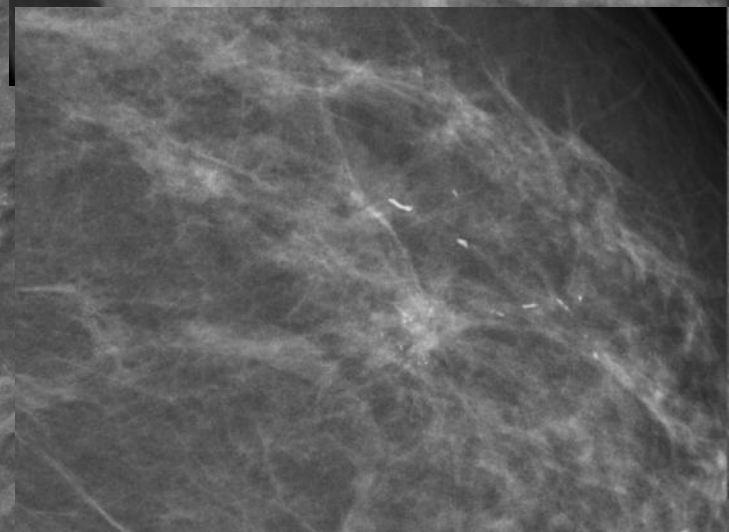
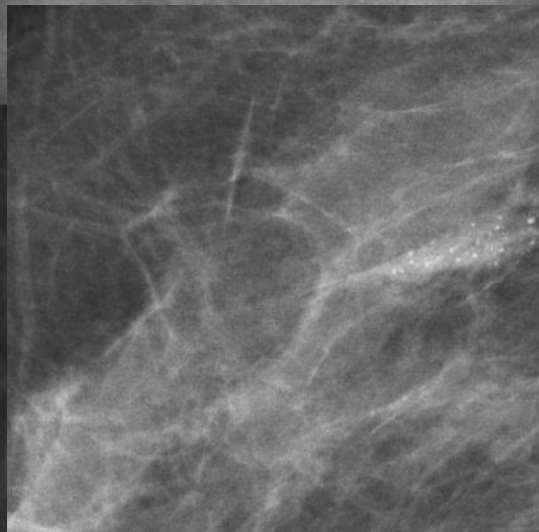
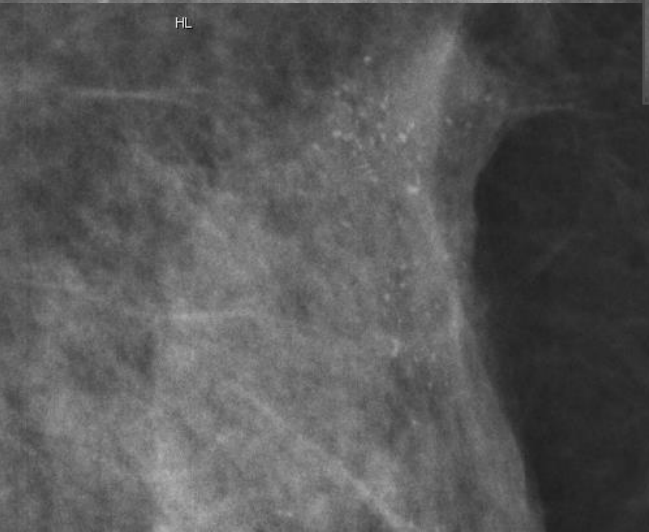
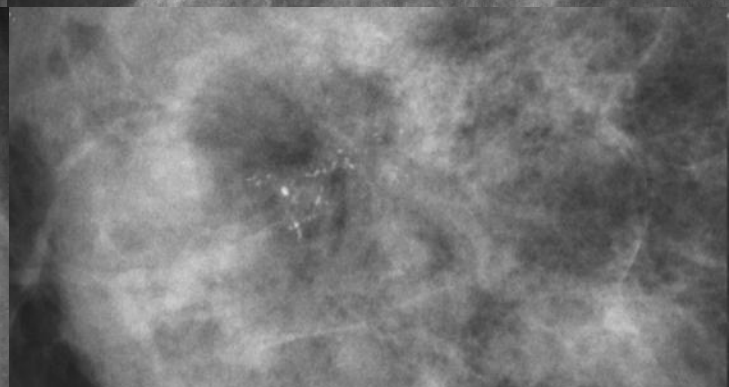
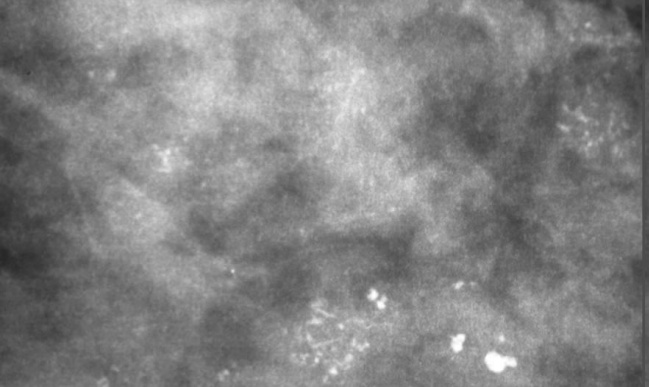
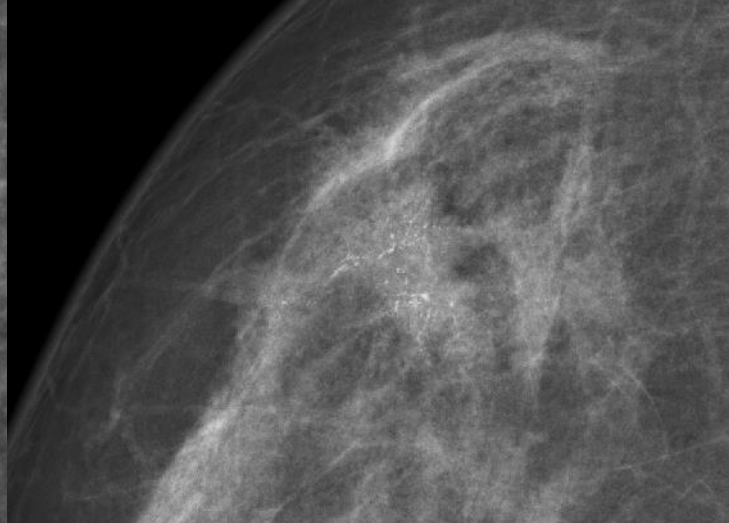
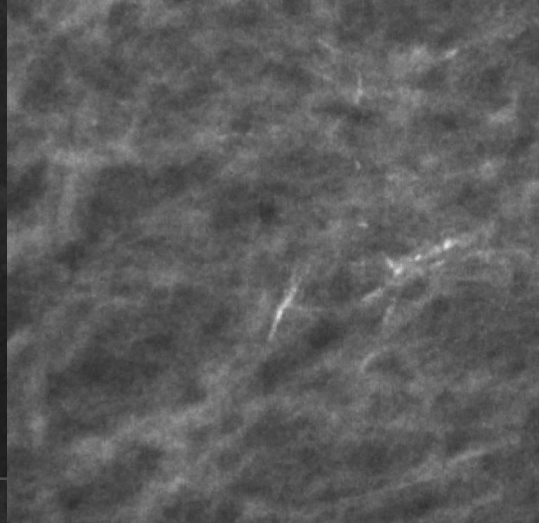
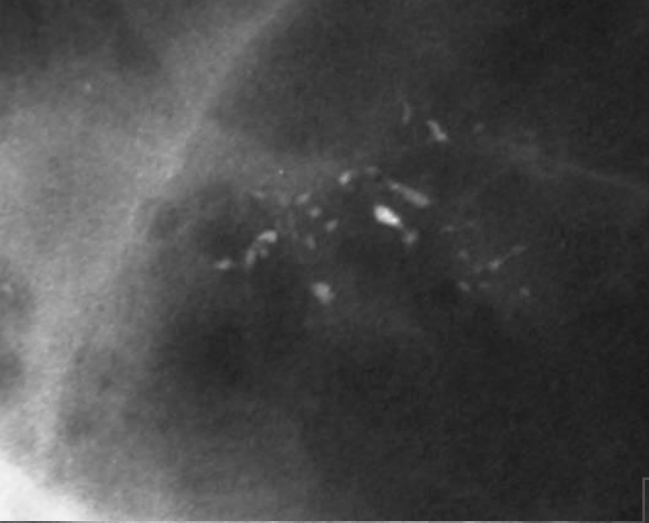


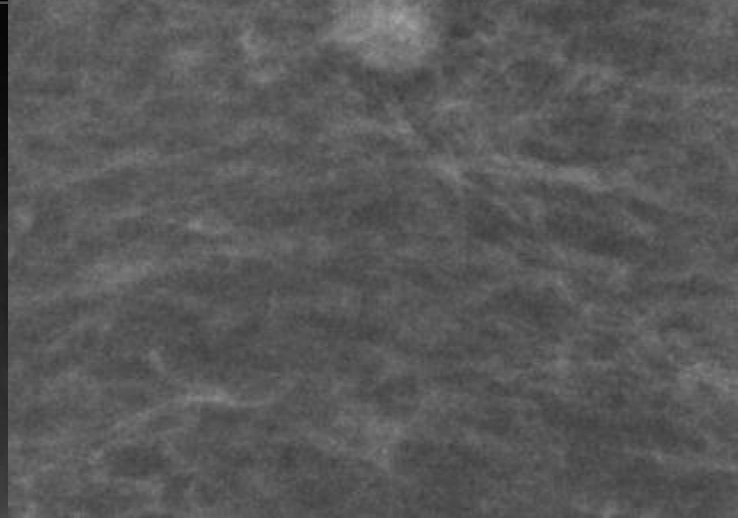
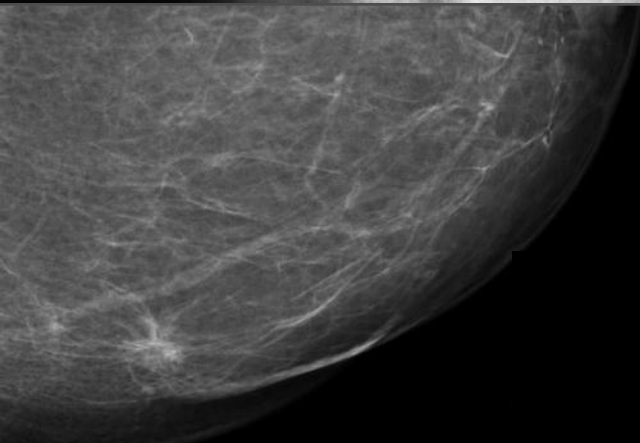
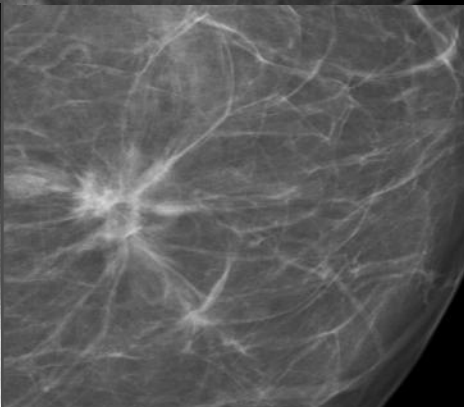
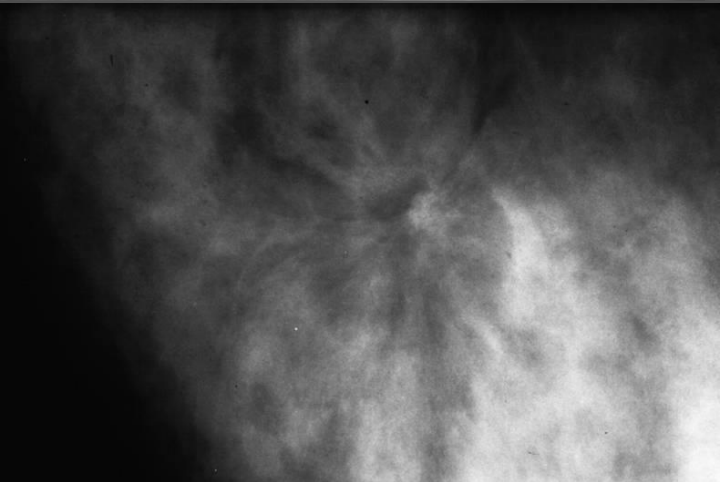
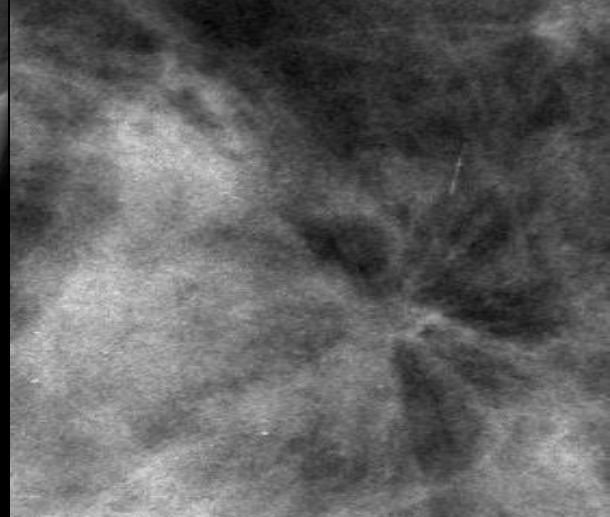
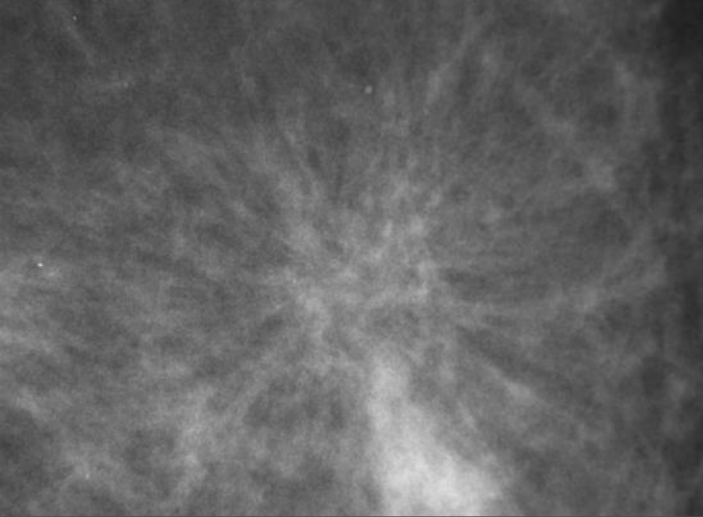
Principles of Stereotactic Biopsy

- Lesions must be visible on mammogram
- Most biopsies are done under ultrasound guidance

Except:

- Most Calcifications
 - Mass not visible on ultrasound
 - Subtle Architectural distortions
 - Subtle Asymmetric densities
-

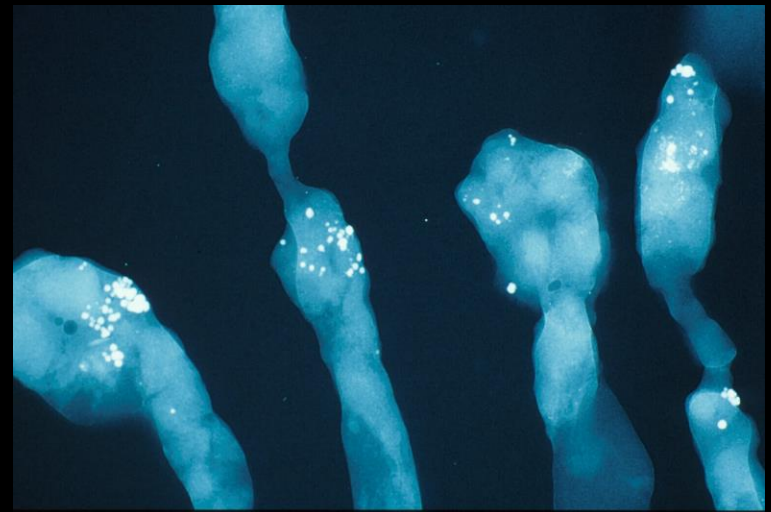




Stereotactic-guided Breast Biopsy

Equipment

- Add-on upright analog
- Add-on upright digital
- Prone table - Core Biopsy
- **Prone table – VAB**
- Needle type (CB v **VAB**)



Upright Add-On vs Prone Table

Upright Unit

- Cheaper / versatile

- Awkward access

- Fainting if upright, but can be performed recumbent

Prone Unit

- Expensive / biopsy only

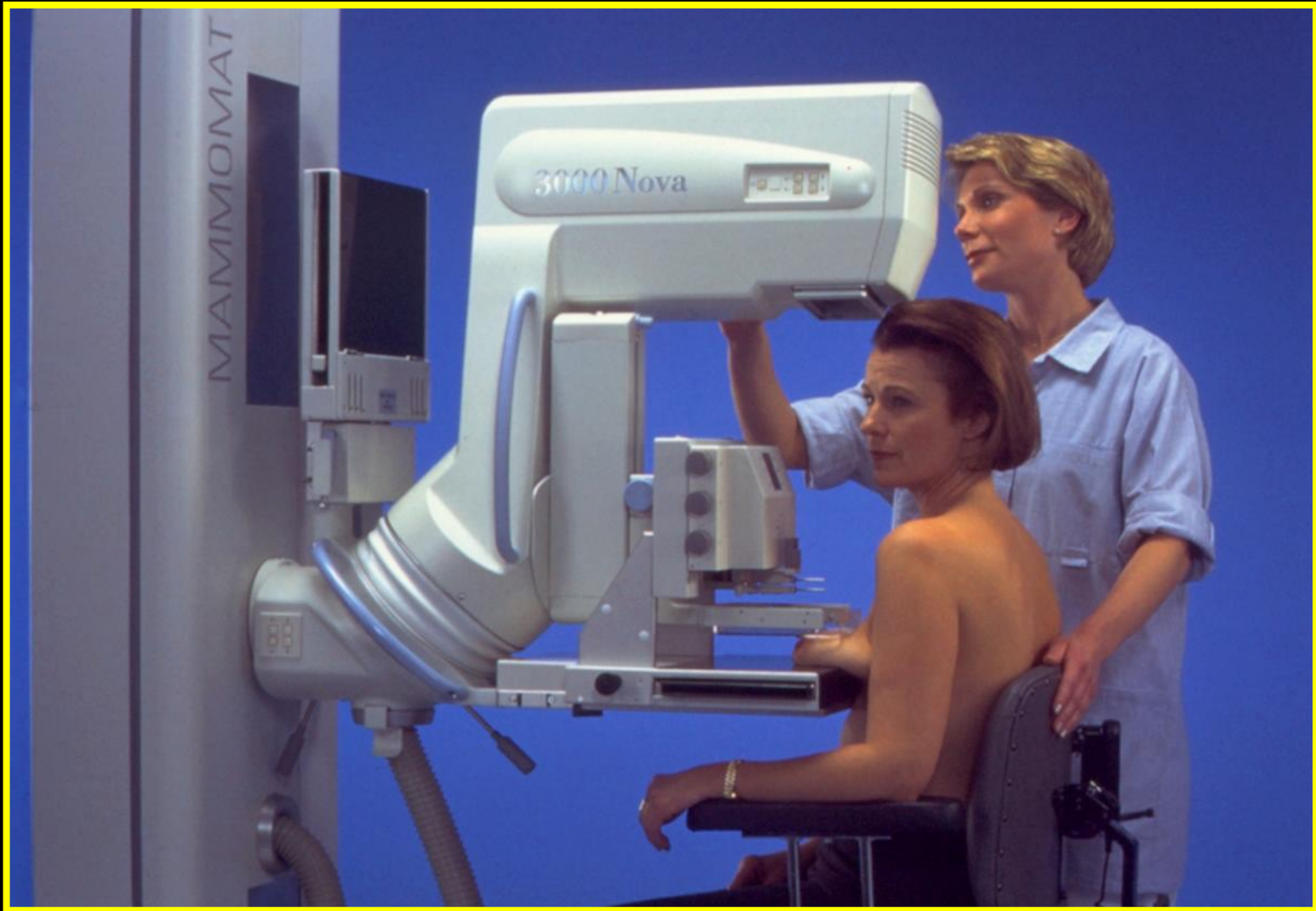
- Better accessibility lesion (gravity posterior lesions)

- Better accessibility radiologist

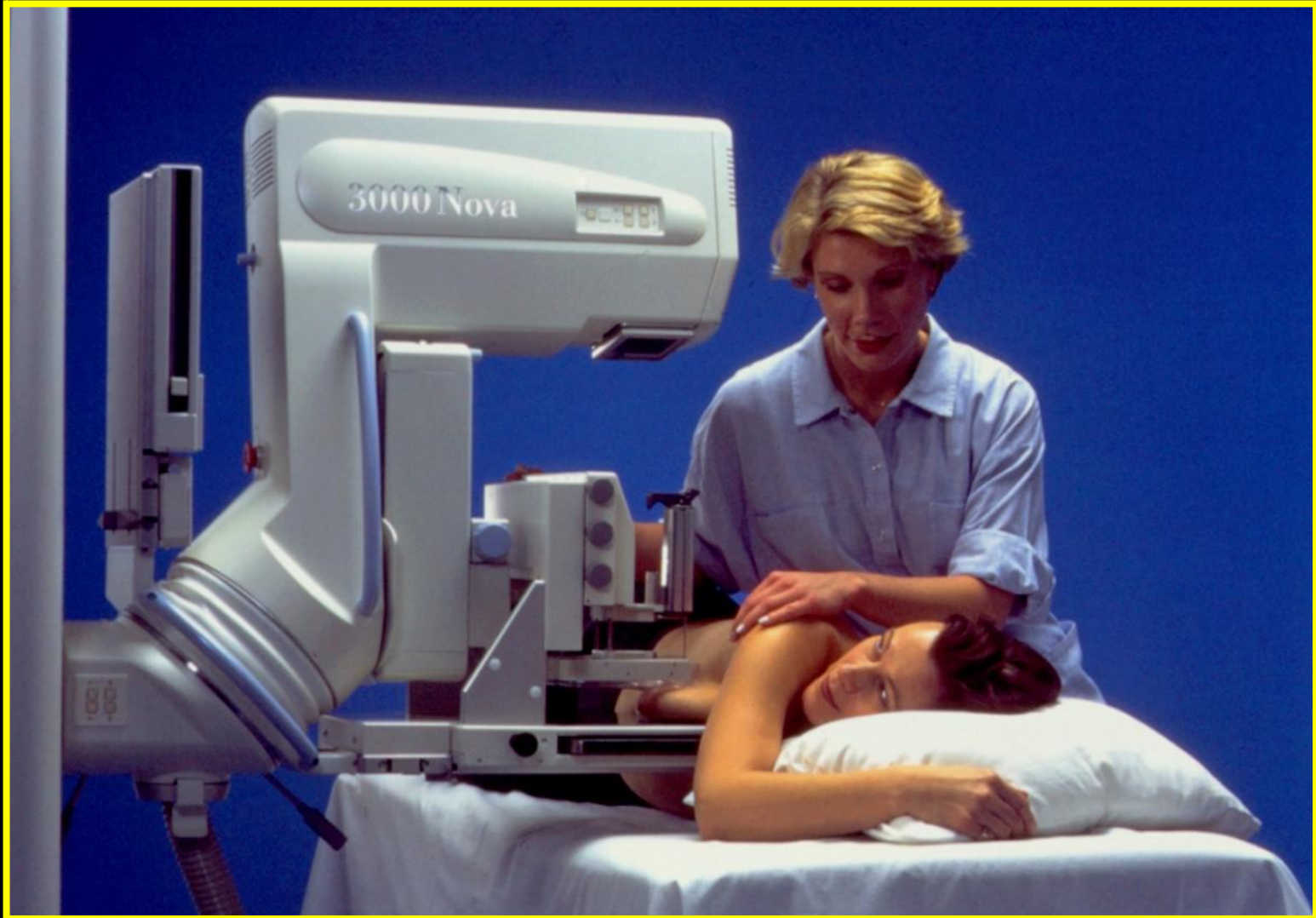
- Patient comfort

- Less patient movement

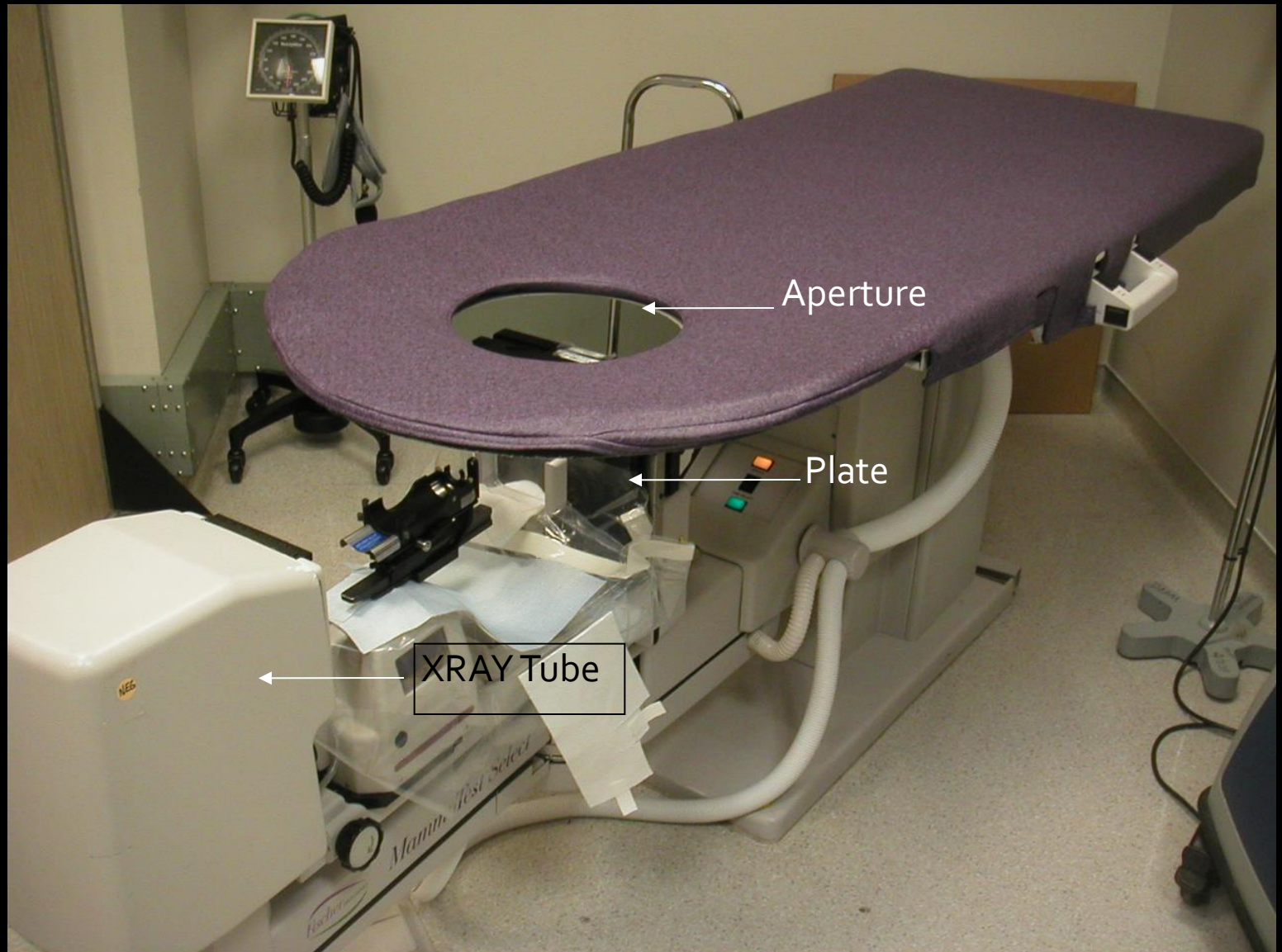
ADD-ON UNIT WITH PT. UPRIGHT



ADD-ON UNIT WITH PT. RECUMBENT



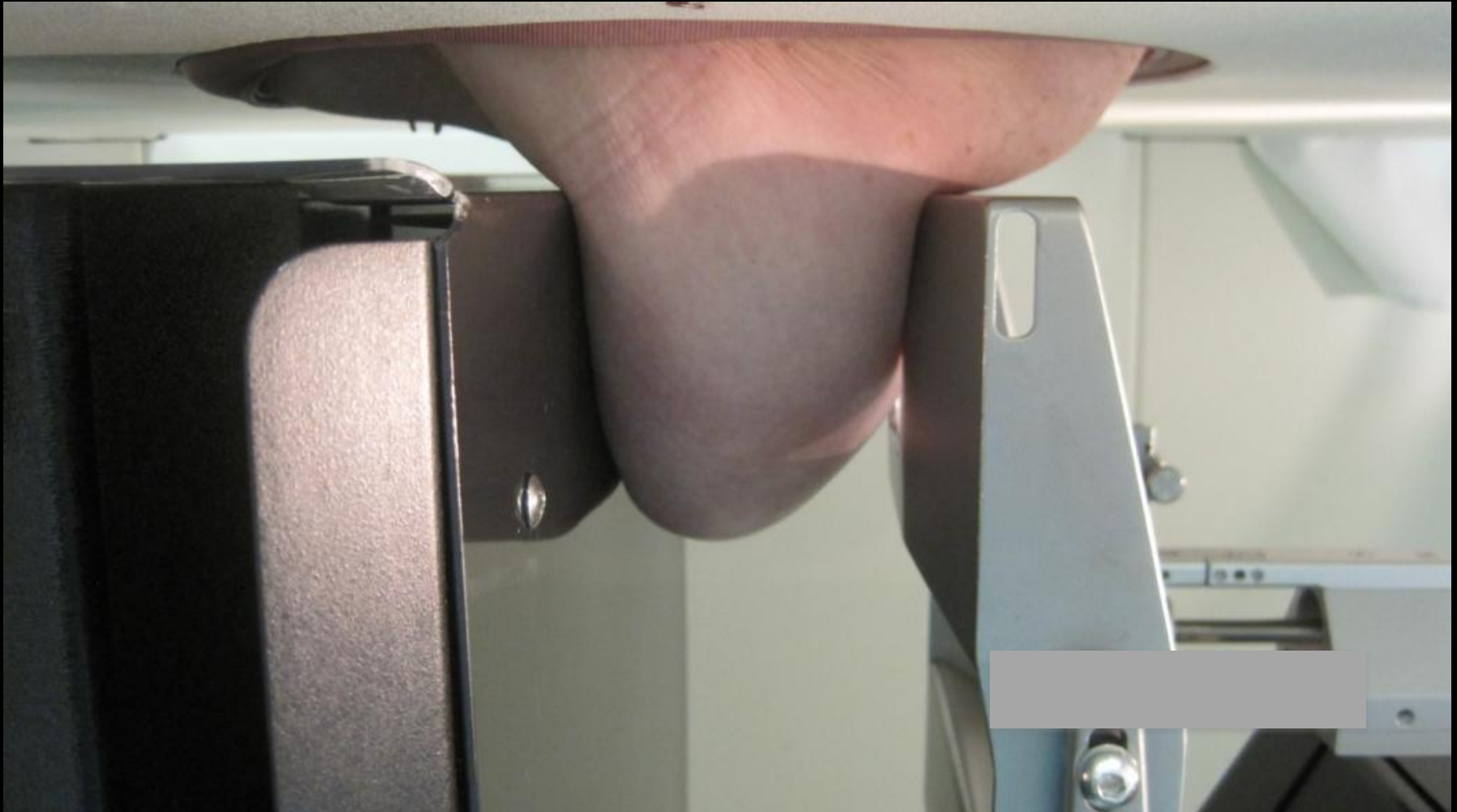
Prone Table 1992







Symmetrical Breast Compression



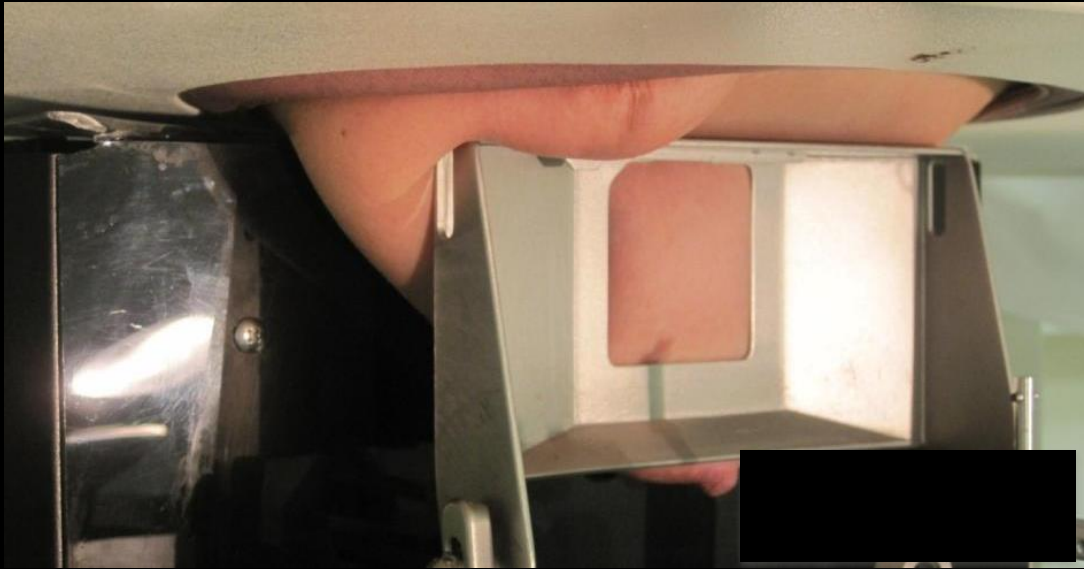
Courtesy Luis Pina Insausti MD

Positioning Important!!

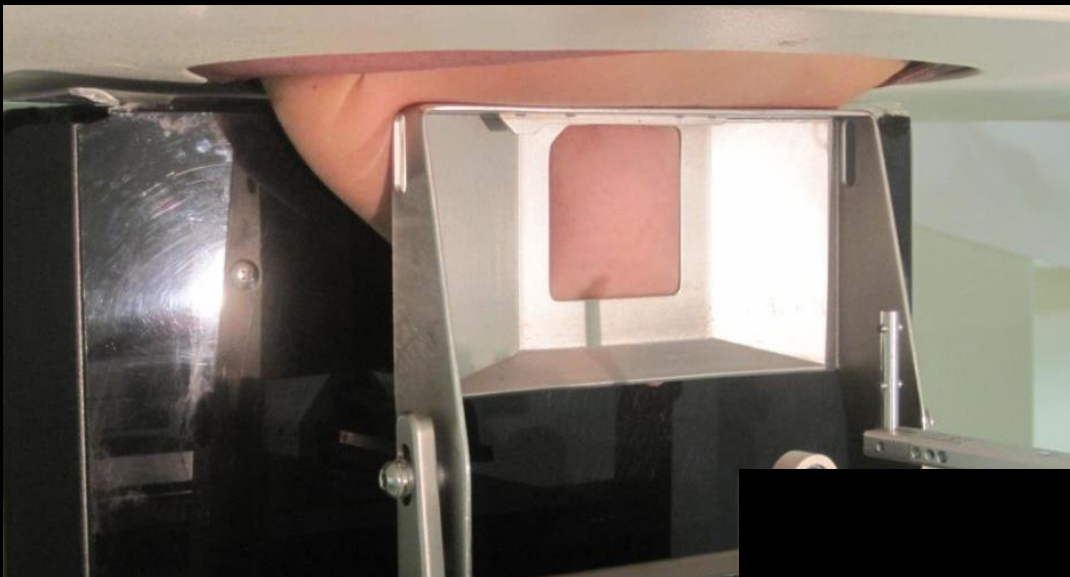


Pectoral
Muscle
Relaxation:
Arm by side

Positioning Important!!



Beware overlapping
Tissue: may obscure
Reference markers



Difficult Lesion Access



Arm and
breast through
the aperture

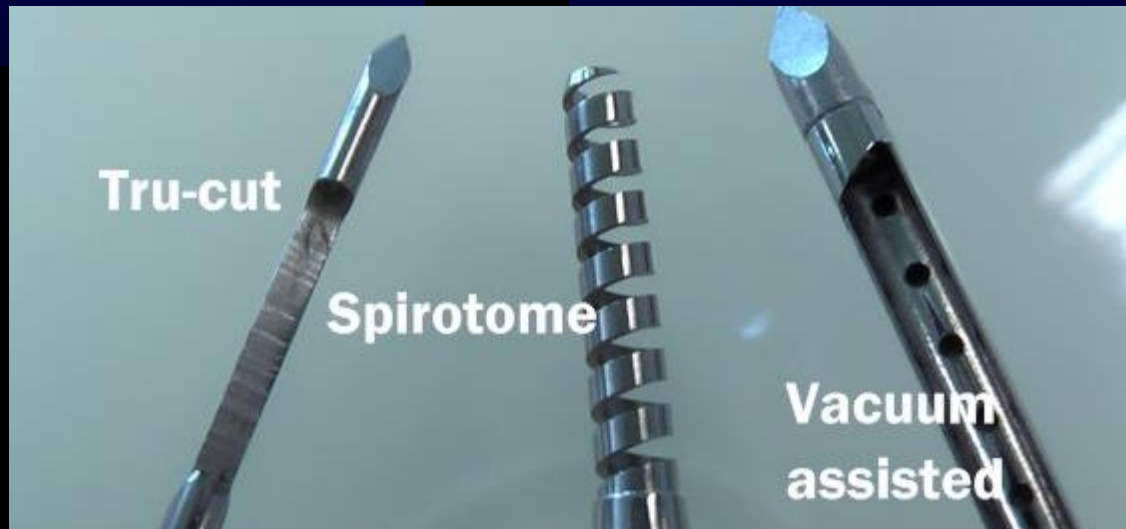
Tissue Acquisition Devices



Tissue Acquisition

*Core Biopsy
(CB)
(12-14 G)*

*Large- Core Needle
Biopsy (L- CNB)
(8-11 G)*



Weight of Single Specimen

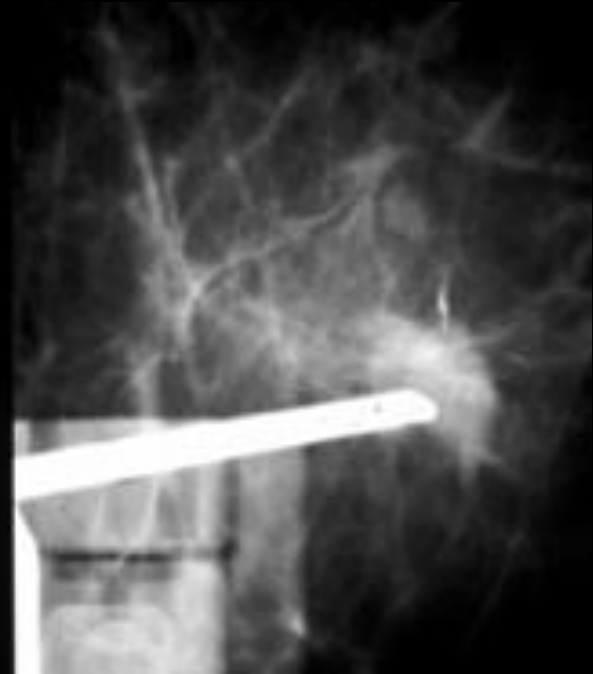
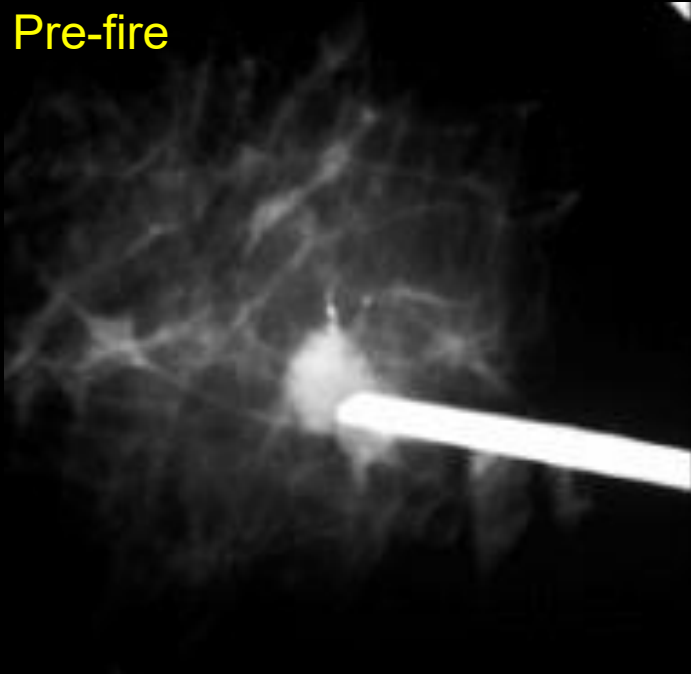
Gauge	Type	mg
14	Spring-loaded	16
14	Hand-held	35
11	Mammotome	100
9	Suros	150
8	Mammotome	300
11	Artemis minitome	1000
15	Noeothermia	3000

Local Anesthesia



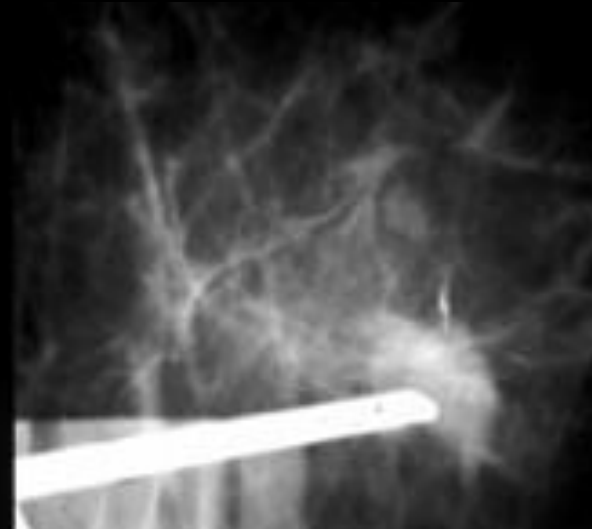
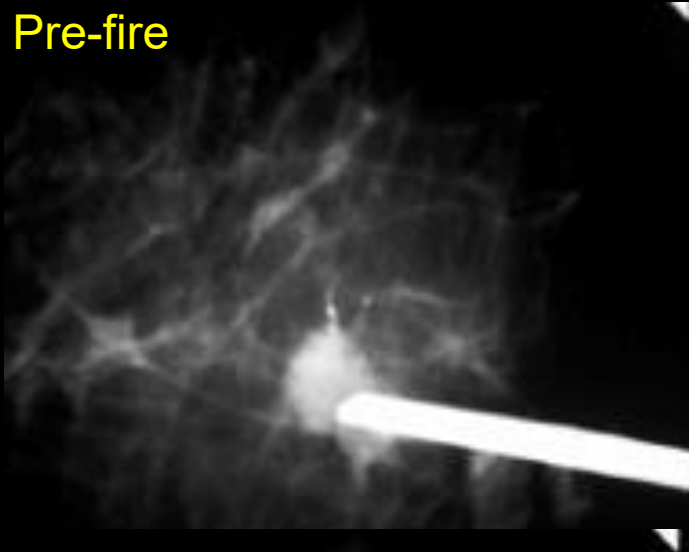
Stereotactic Guidance: 14G Needle

Pre-fire

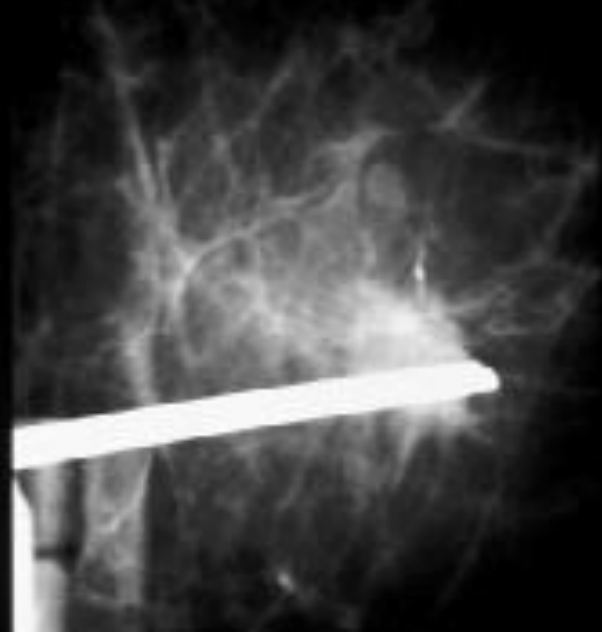


Stereotactic Guidance: 14G Needle

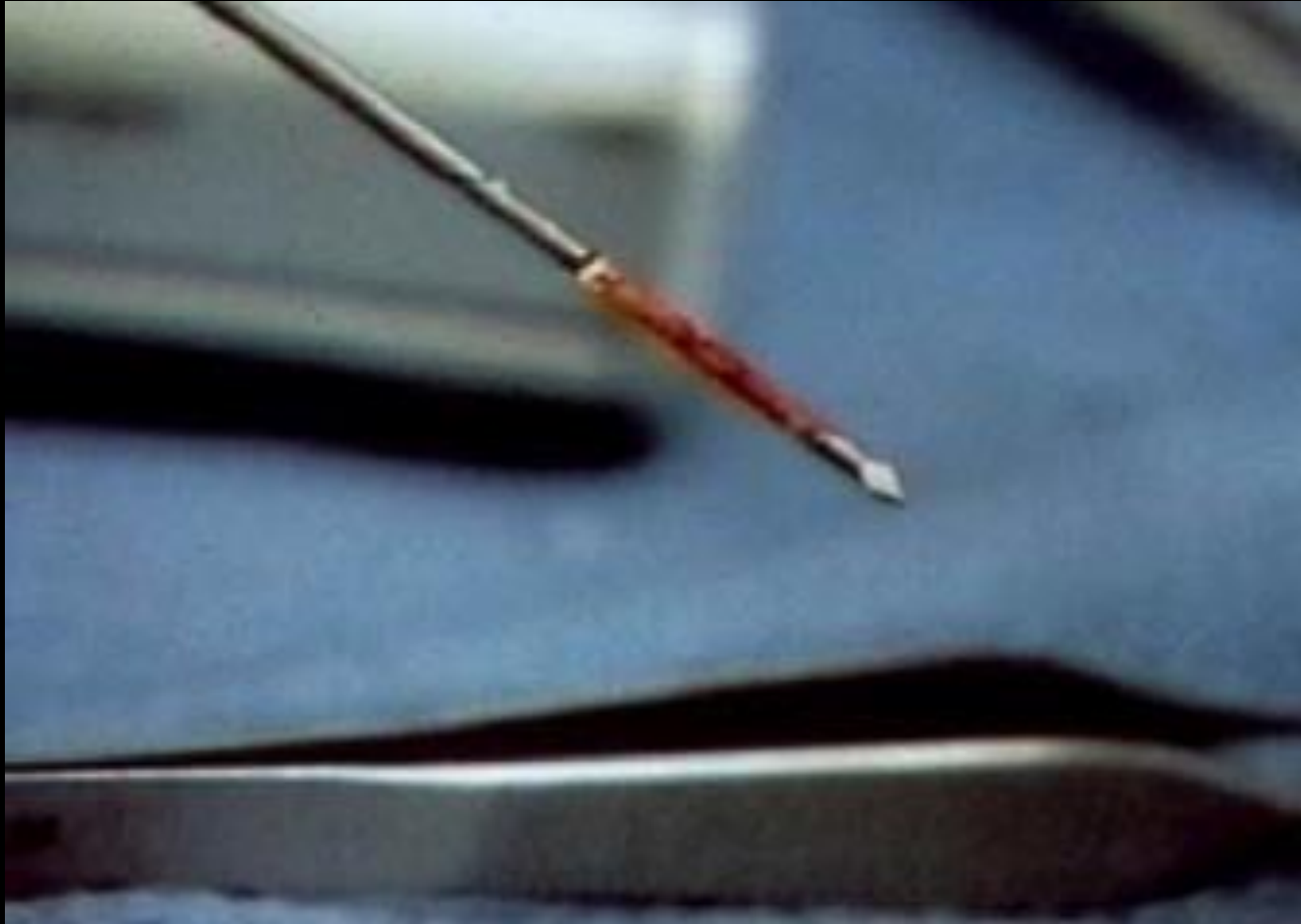
Pre-fire



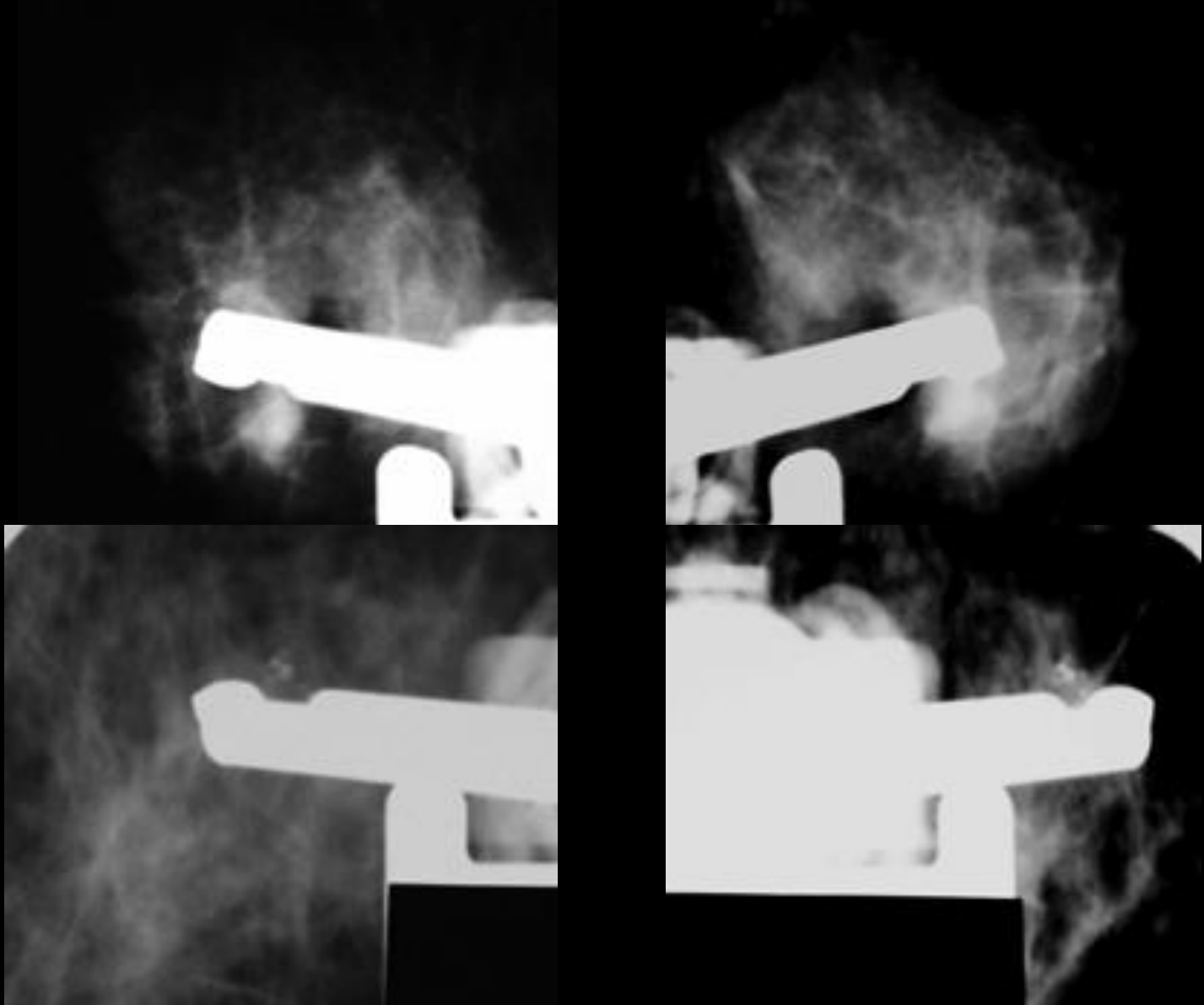
Post-fire



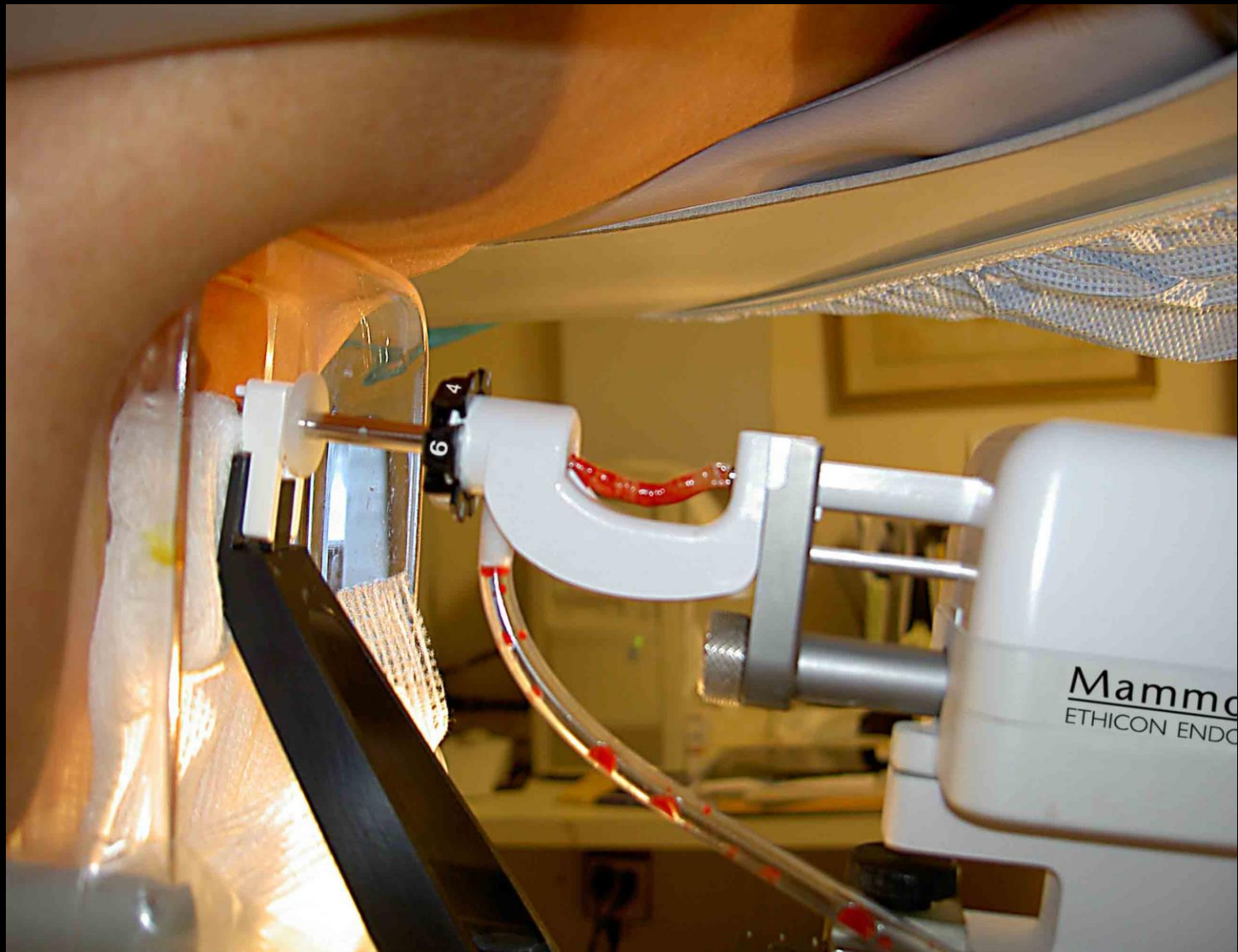
14 Gauge Tru-cut Core Sample



Vacuum System



Vacuum Core



Vacuum device Tissue Retrieval

Foot on the paddle for vacuum

*Turn needle clockwise or anti-clockwise
for cores*

Obtain 8-12 cores

*Release the foot
and start lavage*



Tissue Samples

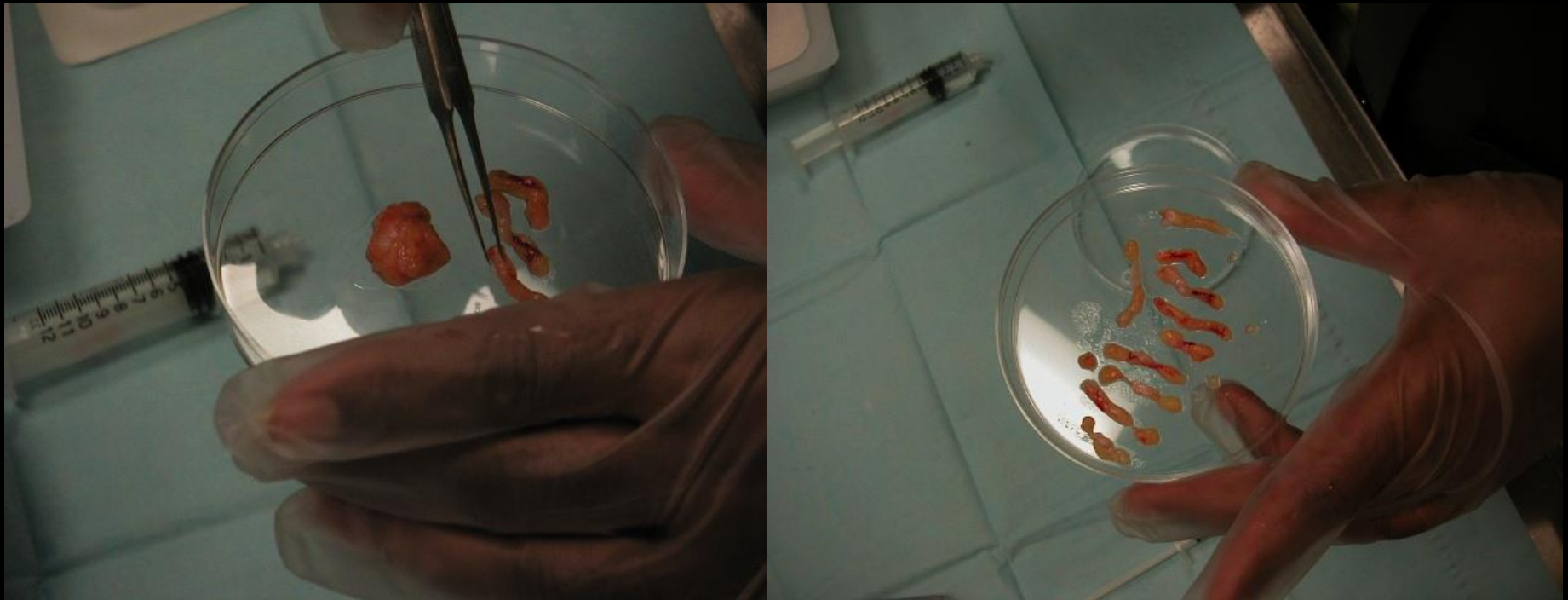
Separate the cores

Put cores in a container

Radiograph the cores

Separate the cores with calcium from those without

Label and put in separate formalin containers



Obtain Specimen Radiograph



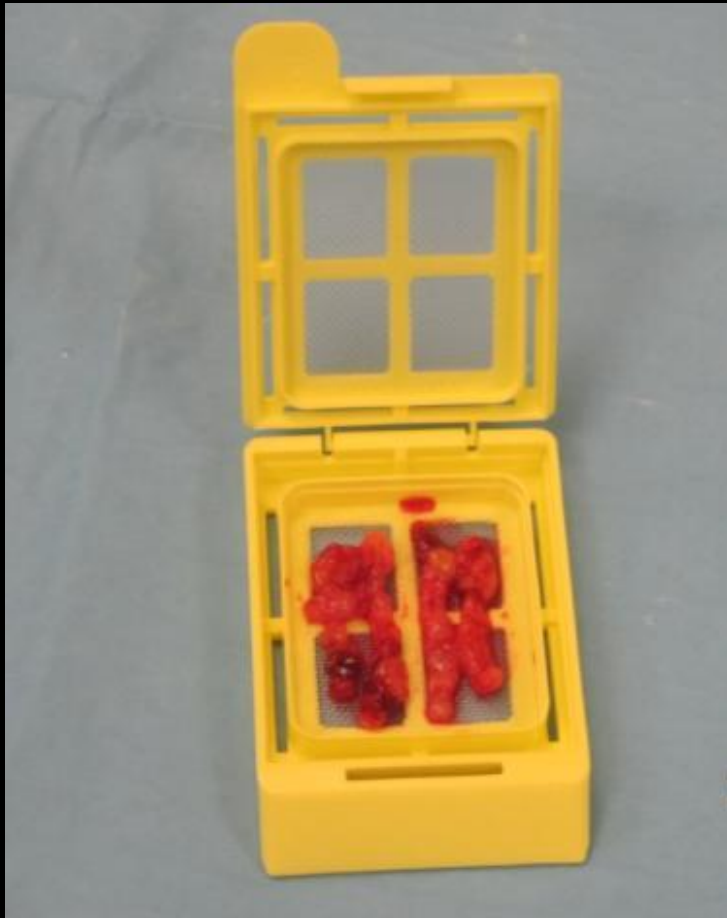
Obtain Specimen Radiograph



Obtain Specimen Radiograph



Obtain Specimen Radiograph

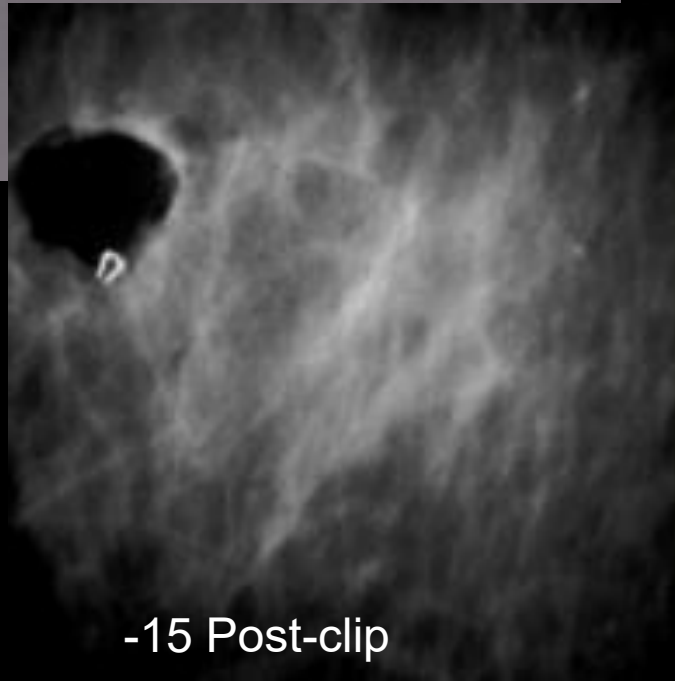


Clip placement done in all Patients

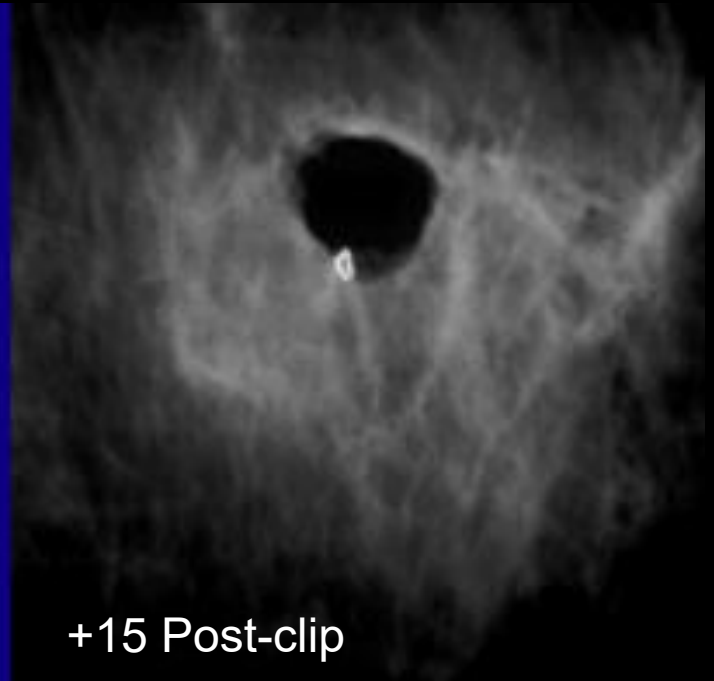


Document Clip Placement

Ethicon Micromark Applicator with Clip



-15 Post-clip

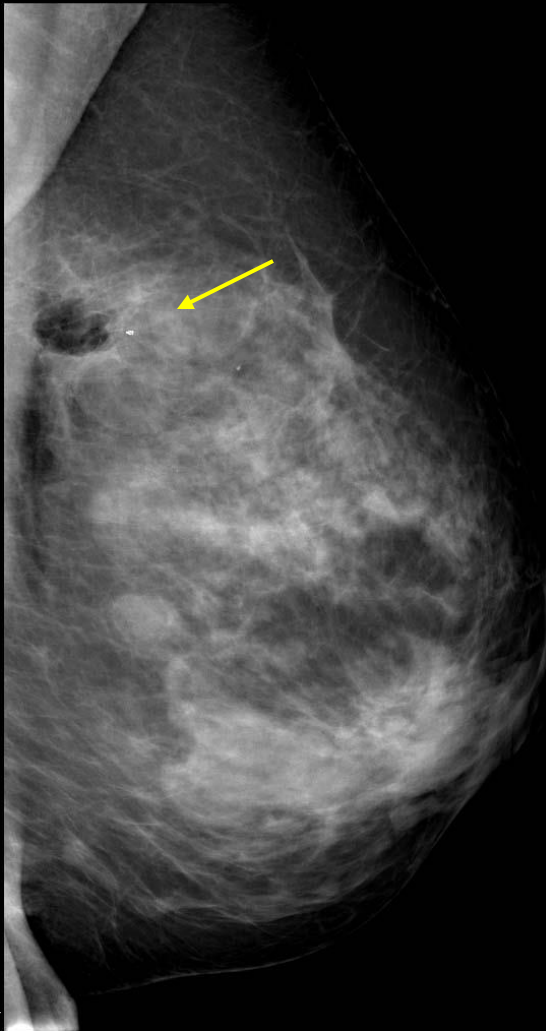


+15 Post-clip

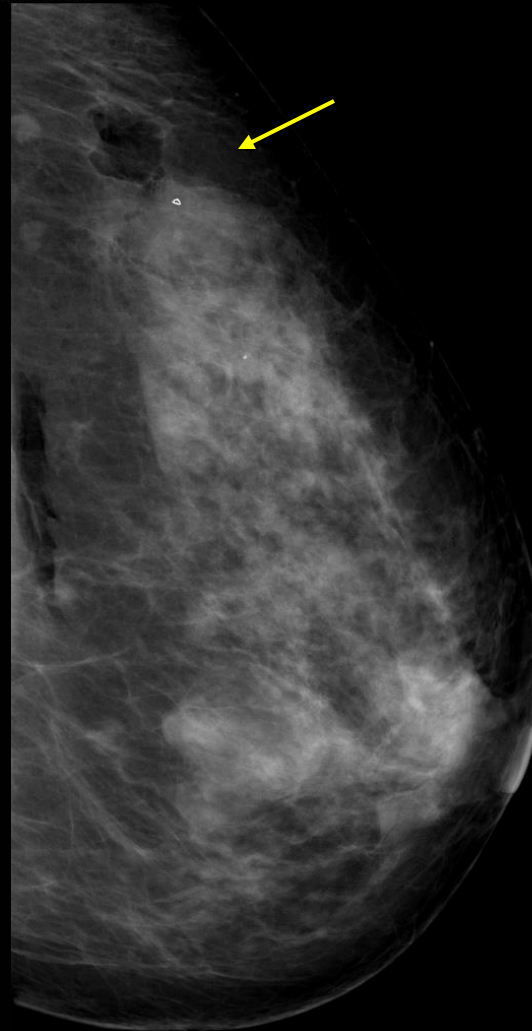
Post-Procedure ML and CC Mammogram

Lt. CC

Lt. ML



1.51:0.016R 1. Ratio: 12:2

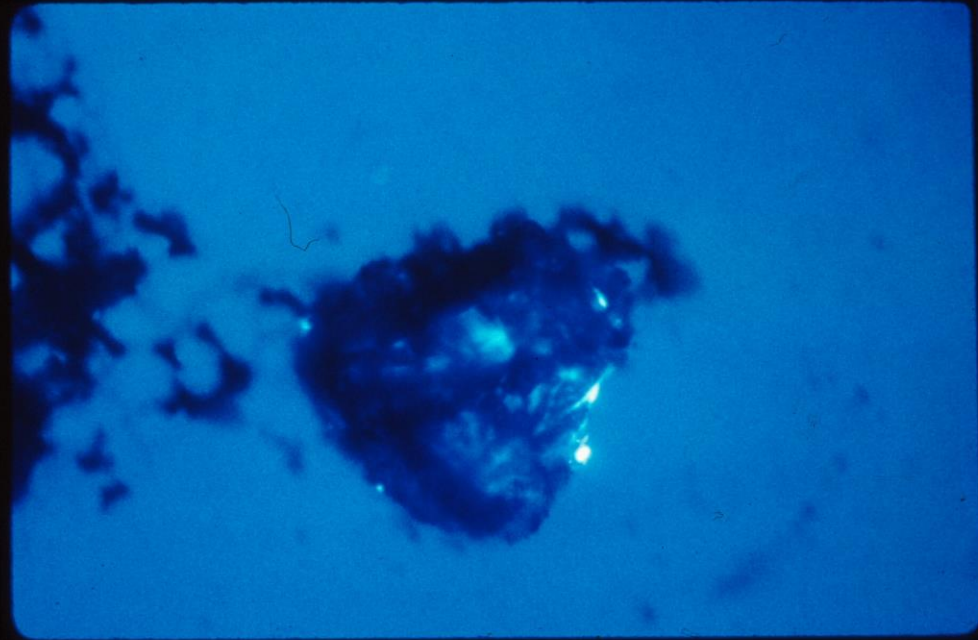


What if there are no Calcifications in the Pathology Report?

Paraffin block radiograph



Polarized light microscope

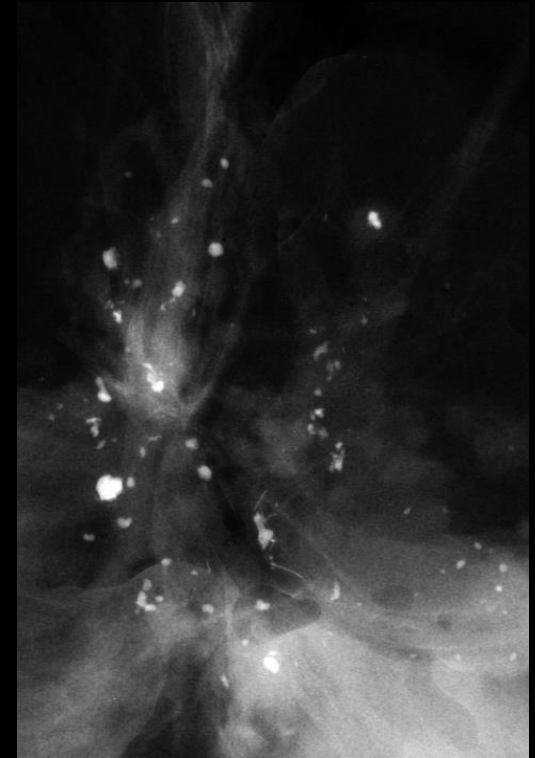


Review Post-Procedure Instructions

- No strenuous activity
 - Keep pressure dressing until the next morning
 - Avoid any anti-platelet, anti-coagulant, or anti-thrombin for atleast 3 days (no aspirin or Advil, Tylenol is O.K.)
 - *Inform patient as to method of communication of the pathology results!!*
-

Contraindications for Stereo Biopsy

- Very thin breast < 1.5 cm on compression
- Patient weight > 250 lbs (table)
- Superficial lesion
- Lesion close to chest wall
- Patient cannot lie prone or still (table)
- Severe kyphosis (table)



Success Rate of Stereo Biopsy

- **Core Biopsy:** 14G (1236 pts: 14 studies)
 - 14% “inadequate”
 - 8% False negative rate
- **VAB 11G:** (4781 pts: 11 studies)
 - 1% “inadequate”
 - 0.67% False negative rate: 20/5935 pts in 6 studies

Jackman R et. al. Radiology 2006

Stereotactic Core Biopsy

Absolute Pathology Requirements

- Excellent histopathology
- Excellent mammographic/pathologic Correlation
- Eyes with brain attached

M Lagios MD

Technical Issues Affecting Pathologic Diagnosis

- **Sample**

- Needle gauge
- Number of cores

Image correlation
and concordance

- **Tissue preparation**

- Orientation in Cassette
- Number of levels, spacing

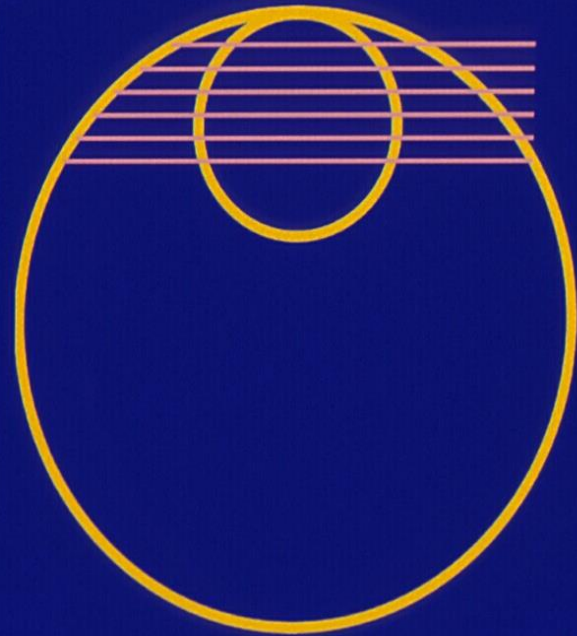
- **Diagnostic criteria**

- Inclusion of NG 2-3, Necrosis
-

How Much Tissue Remains Unsampled in Routine Practice?



How Much Tissue Remains Unsampled?



Ans: 6 Small step-levels sample
- 70% of 14G CNB
- 20% of 11G Vacuum Bx

Image-detected Breast Cancer Consensus 2001

The pathologist's ability to establish an accurate diagnosis of an *image-detected* abnormality is compromised when imaging studies are unavailable to the pathologists



*Thank
you!*