Welcome to the
2022
MAMMOGRAPHY POSITIOINING ACADEMY!

The Importance of Standardization in Mammography Positioning

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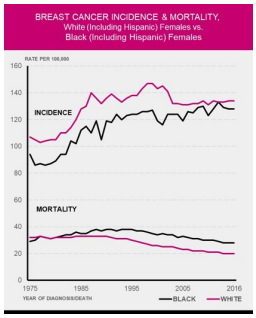


Now is the time to make a collaborative effort to establish, improve and maintain quality in mammography positioning.

QUALITY

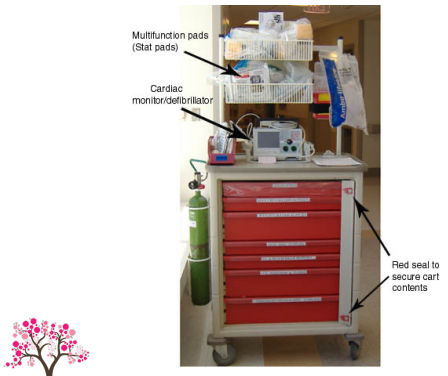
ALL industries have established standardized methods performance of tasks to:

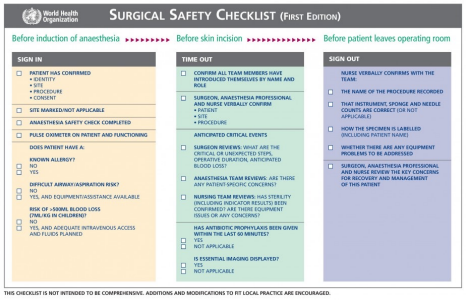
- Establish and maintain quality
- Reduce errors
- Increase consumer satisfaction
- Increase profit
- Reduce possibility of litigation

400,000 deaths per year due to medical errors….and how many mistakes were made??

How do we reduce medical errors?

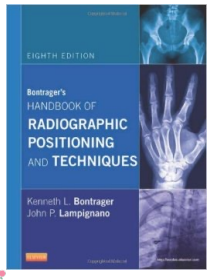
- Standardization
- Consistency
- Reproducibility

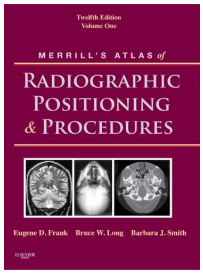




Standardized Technologist Training For General Radiology

Bontrager's and Merrill's



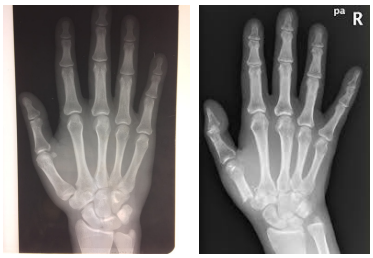


Standardization

- We all position the same way for every body part.
- We all do it in the same sequence.
- We all set up the machine before we bring the patient in.
- We all position the whole patient, not just the body part.

In General Radiology

All training is competency based and a technologist's skills will be evaluated for *positioning techniques*, as well as *clinical image evaluation*.



Consistency and Ergonomics

- **M**achine
- **P**atient
- **B**ody Part (Breast)

We Position the Whole Patient, Not Just the Body Part!

In General Radiology

we use anatomical landmarks that are visible and palpable:

- Radial head
- Humeral head
- Sternal-clavicular notch
- CL
- OML
- ASIS
- Umbilicus

In Mammography

we *should also use* Anatomical Landmarks that are Visible and Palpable:

- Perimeter of the breast
- Humeral head
- Sternal-clavicular notch
- IMF
- PNL

All exams are done using the *same* positioning technique, in the *same* sequence.

WHY???

- Consistency
- Reproducibility
- Efficiency
- Proficiency
- Use of proper body mechanics

But in mammography… we are "all over the map."

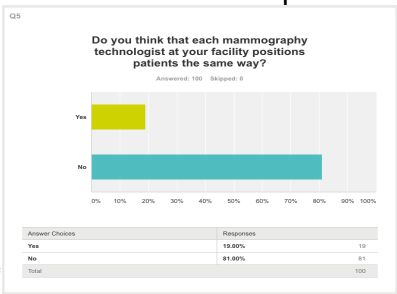
- LCC, LMLO, RMLO, RCC
- RCC, LCC, RMLO, LMLO
- RMLO, RCC, LMLO, LCC
- LCC, RCC, LMLO, RMLO
- RCC, RMLO, LMLO, LCC
- LCC, LMLO, RCC, RMLO
- LMLO, LCC, RCC, RMLO

My suggestion:

- Do CC's first.
- Then do the MLO on the side you just finished the CC on.
- Finally, do the other MLO.

Example: RCC, LCC, LMLO, RMLO

Most technologists *do not* practice a standardized method of positioning



IN MAMMOGRAPHY

- Most technologists have not been taught correlative anatomy, so they do not understand how positioning techniques effect image quality.
- Most technologists know *what* they need to see on the images, but have not been taught *how* to correct positioning problems.

IN MAMMOGRAPHY

- Most technologists have not been taught a standardized method of positioning.
- Most technologists have not been trained by a qualified trainer.

How did this happen?

- No current standardization for positioning for FFDM and DBT
- CEUs for hands-on positioning not required
- Initial 25 mammograms required but under whose supervision?

How did this happen?

- Technologists are getting most CEUs online (no actual education for positioning).
- Radiologists are passing inadequate images and/or can only give feedback regarding positioning criteria.

How did this happen?

- Updated positioning trainings are not provided by employers.
- Until recently, there was no current published data to establish parameters for positioning criteria.

How did this happen?

- No updates for positioning with FFDM or DBT (and the new equipment design requires a modification of positioning techniques used for FS).

FS/FFDM/DBT

- Increased length of the IR by up to 40%
- Increased thickness of the IR by up to 80%
- Increased width of face shield up to 50%

So the problem is:

- No standardization or follow-through
- Which means less consistency and reproducibility
- More repeats and rejects
- More accreditation failures
- Increased exposure
- MISSED BREAST CANCERS???

How can we make things better?

CONSISTENCY AND REPRODUCIBILITY

Common Work Related Injuries for Mammographers

- Wrist problems
- Shoulder problems
- Back
- Knees
- Hips

Do standardized positioning techniques work?

- Used consistently for 50+ years in Sweden
- Was taught by ACR in the 1990s
- Results published by Bassett et al in 1993 showed an improvement of 68% in image quality after ACR standardized positioning training
- Current preliminary data regarding standardized positioning techniques is impressive

Quality Improvement

AJR *American Journal of Roentgenology*

American Journal of Roentgenology, April, Vol. 210, No. 4 : pp. 807-815

Improving Performance of Mammographic Breast Positioning in an Academic Radiology Practice

Sunita Pal, Debra M. Ikeda, Robert A. Jesinger, L. Jake Mickelsen ... Show all

https://doi.org/10.2214/AJR.17.18212

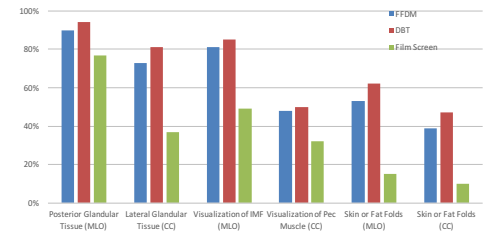
American Journal of Roentgenology, December, Vol. 209, No. 6 : pp. 1419-1425

Mammography Positioning Standards in the Digital Era: Is the Status Quo Acceptable?

Ashley I. Huppe, Kelly L. Overman, Jason B. Gatewood, Jacqueline D. Hill, Louise C. Miller, and Marc F. Inciardi

https://doi.org/10.2214/AJR.16.17522

Criteria met after Updated Standardized Positioning Training*



*AJR:209, December 2017

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Reasonable Expectations

	Positioning Criteria	FFDM	DBT	Bassett
MLO View	Visualization of Pec Muscle to PNL	86%	87%	81%
	Concave Pec	36%	28%	-
	Straight Pec	41%	46%	-
	Convex Pec	23%	26%	-
	Wide Margin at Top of Pec	95%	93%	-
	No Motion	98%	97%	99%
	Posterior Glandular Tissue Included	90%	94%	77%
	Nipple in Profile	89%	92%	88%
	Skin or fat folds	53%	62%	15%
	Upper Location	25%	27%	-
	Lower Location	35%	45%	-
	Visualization of Inframammary Fold	81%	85%	49%
	Requires More Than One View	13%	17%	-
CC View	Pec Muscle Visualized	48%	50%	32%
	No Motion	100%	98%	-
	Lateral Glandular Tissue Included	73%	81%	37%
	Nipple in Profile	83%	85%	89%
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	Visualization of Cleavage	41%	34%	-
	Requires More Than One View	5%	7%	-

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Do Standardized Positioning Techniques Work?

- Results published by Bassett et al in 1993 showed an improvement of 68% in image quality after ACR standardized positioning training*

*Yet even after this training:

only 64% of the images met ACR criteria.

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Standardized Training

Northwestern University 2012*

- After standardized training, they showed a **50%** reduction in **T**echnical **C**all **B**acks

(**TCB** for positioning, blur, etc.).

* Not published study

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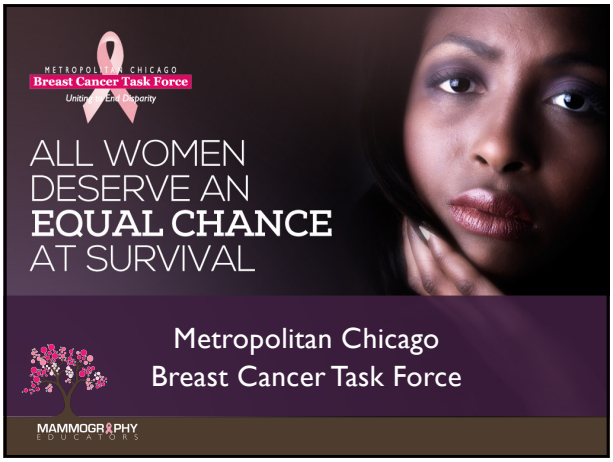

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What They Did to Affect Change:

- Developed a Train-the-Trainer* (TTT) program.
- Area technologists applied to participate in the program and were chosen by specific criteria.
- They received specialized training so that they can provide effective and proven positioning techniques to other technologists in underserved areas.
- Train-the-Trainer program successfully in place for 4 years.
- Plans for expansion to other major urban areas in US.

Program designed and presented by Louise C. Miller, RTRM

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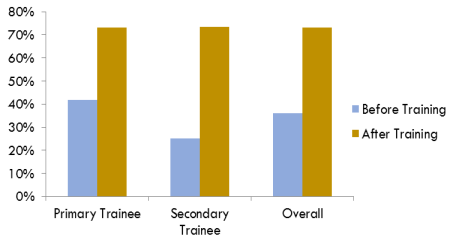
Does TTT program help improve the quality of images taken by participating mammography technologists?



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USE DATA!!

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Mammography Positioning Standards in the Digital Era: Is the Status Quo Acceptable?

Positioning criteria *following training for updated standardized positioning techniques* for FFDM and DBT far exceeds data on Bassett study.*

**Approved for publication by AJR, December 2017*

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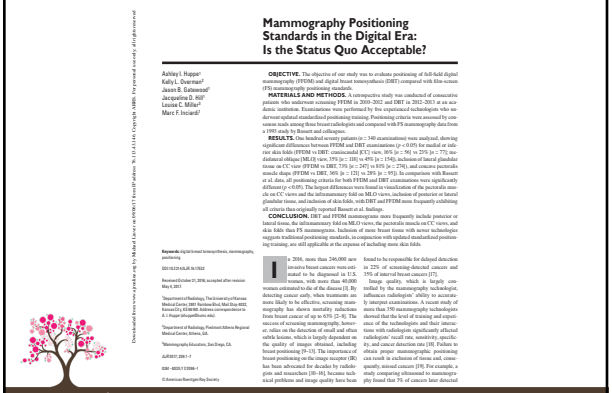

Mammography Positioning Standards in the Digital Era: Is the Status Quo Acceptable?

Ashley I. Hoppe[1]
Kelly L. Overman[2]
Jason B. Gatewood[3]
Jacqueline D. Hill[2]
Louise C. Miller[4]
Marc F. Inciardi[5]

OBJECTIVE. The objective of our study was to evaluate positioning of full-field digital mammography (FFDM) and digital breast tomosynthesis (DBT) compared with film-screen (FS) mammography positioning standards.

MATERIALS AND METHODS. A retrospective study was conducted of consecutive patients who underwent screening FFDM in 2010–2012 and DBT in 2012–2013 at an academic institution. Examinations were performed by five experienced technologists who underwent updated standardized positioning training. Positioning criteria were assessed by consensus study among three breast radiologists and compared with FS mammography data from a 1995 study by Bassett and colleagues.

RESULTS. One hundred seventy patients (*n* = 340 examinations) were analyzed, showing significant differences between FFDM and DBT examinations ($p < 0.05$) for medial or inferior skin folds (FFDM vs DBT, craniocaudal [CC] view, 36% [*n* = 56] vs 25% [*n* = 77]; mediolateral oblique [MLO] view, 35% [*n* = 110] vs 45% [*n* = 154]); inclusion of lateral glandular tissue on CC view (FFDM vs DBT, 73% [*n* = 247] vs 81% [*n* = 274]), and concave pectoralis muscle shape (FFDM vs DBT, 36% [*n* = 123] vs 28% [*n* = 95]). In comparison with Bassett et al. data, all positioning criteria for both FFDM and DBT examinations were significantly different ($p < 0.05$). The largest differences were found in visualization of the pectoralis muscle on CC views and the inframammary fold on MLO views, inclusion of posterior or lateral glandular tissue, and inclusion of skin folds, with DBT and FFDM more frequently exhibiting all criteria than originally reported Bassett et al. findings.

CONCLUSION. DBT and FFDM mammograms more frequently include posterior or lateral tissue, the inframammary fold on MLO views, the pectoralis muscle on CC views, and skin folds than FS mammograms. Inclusion of more breast tissue with newer technologies suggests traditional positioning standards, in conjunction with updated standardized positioning training, are still applicable at the expense of including more skin folds.

Keywords: digital breast tomosynthesis, mammography, positioning

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Introduction

In 2016, more than 246,000 new invasive breast cancers were estimated to be diagnosed in U.S. women, with more than 40,000 estimated to die of the disease [1]. By detecting cancer early, when treatments are more likely to be effective, screening mammography has shown mortality reductions from breast cancer of up to 65% [2–8]. The success of screening mammography, however, relies on the detection of small and often subtle lesions, which is largely dependent on the quality of images obtained, including breast positioning [9–13]. The importance of breast positioning on the image receptor (IR) has been advocated for decades by radiologists and researchers [10–16], because technical problems and image quality have been found to be responsible for delayed detection in 22% of screening-detected cancers and 35% of interval breast cancers [17].

Image quality, which is largely controlled by the mammography technologist, influences radiologists' ability to accurately interpret examinations. A recent study of more than 350 mammography technologists showed that the level of training and experience of the technologists and their interactions with radiologists significantly affected radiologists' recall rate, sensitivity, specificity, and cancer detection rate [18]. Failure to obtain proper mammographic positioning can result in exclusion of tissue and, consequently, missed cancers [19]. For example, a study comparing ultrasound to mammography found that 3% of cancers later detected

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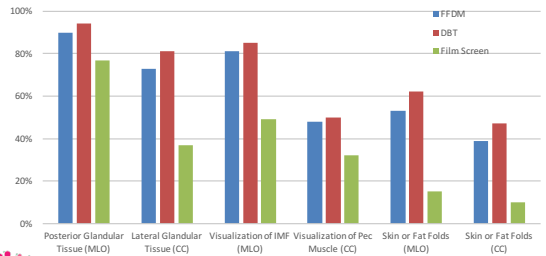
Criteria met after Standardized Training*



*AJR:209, December 2017

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*AJR:209, December 2017

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Reasonable Expectations

- Our patients have different and often challenging body habitus.
- Their breast size, shape, mobility and tenderness are hugely variable.

Reasonable Expectations

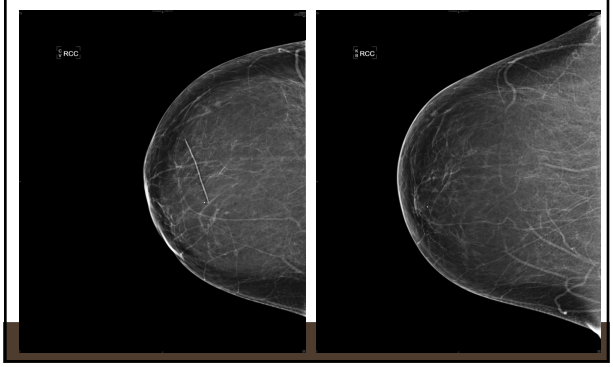
- Even the "perfect" patient, in terms of body habitus, breast mobility, etc., may provide a challenge that inhibits the technologist's ability to position and compress properly.

But we CAN improve image quality by using standardized positioning techniques that are applicable for FFDM and DBT *and* developing a strong knowledge based foundation that depends on the technologist's understanding of correlative anatomy.

Does It Work?

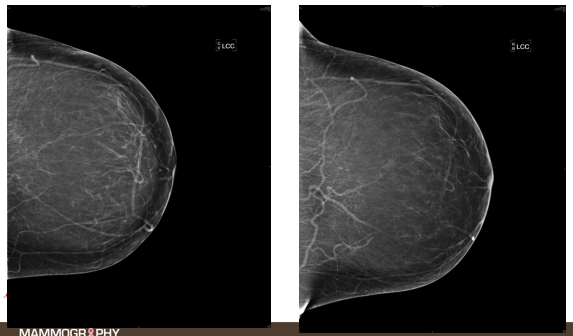
BEFORE **STANDARIZED POSITIONING** **AFTER**

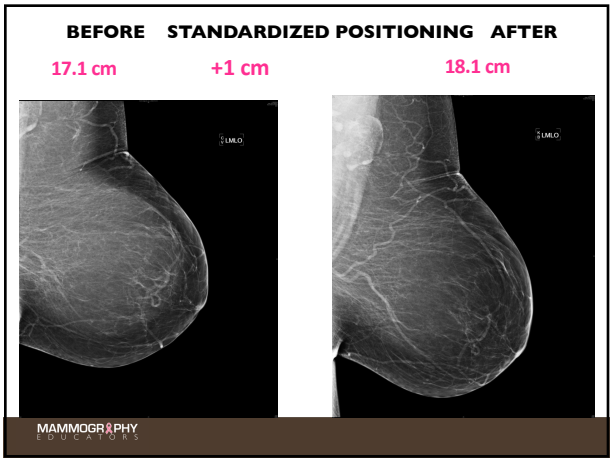
13.1 cm +3.0 cm 16.6 cm

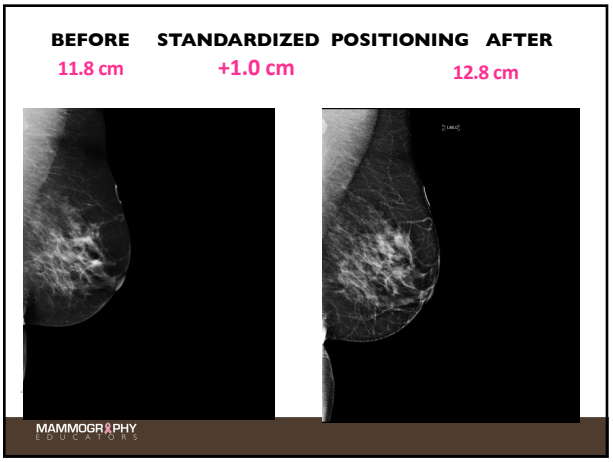


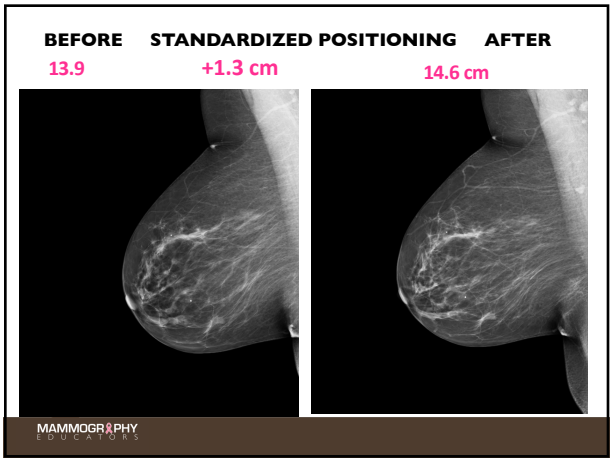
BEFORE **STANDARDIZED POSITIONG** **AFTER**

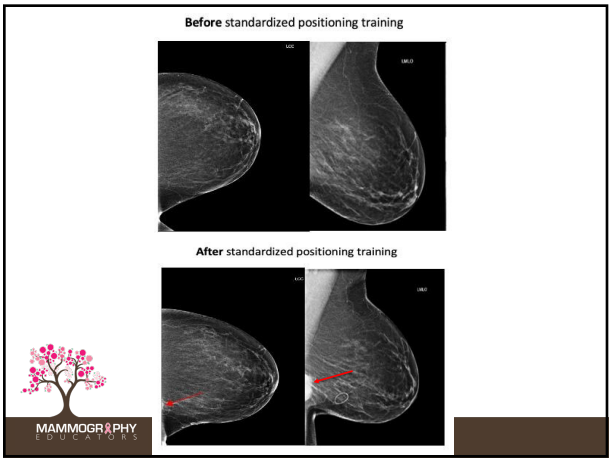
14.8 cm +2.0 cm 16.8 cm

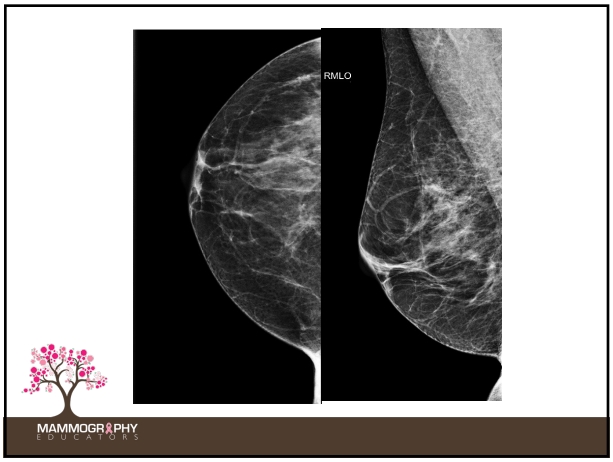


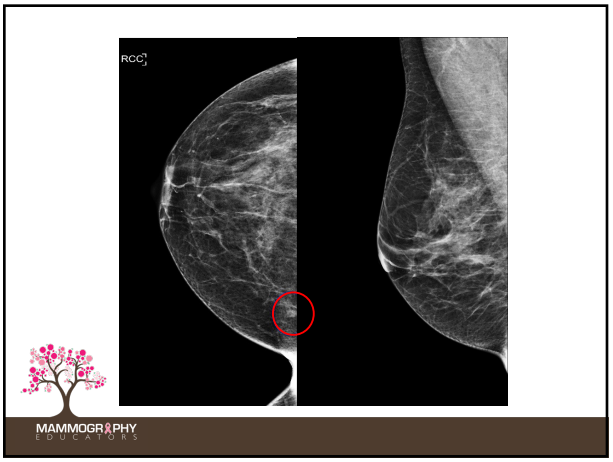


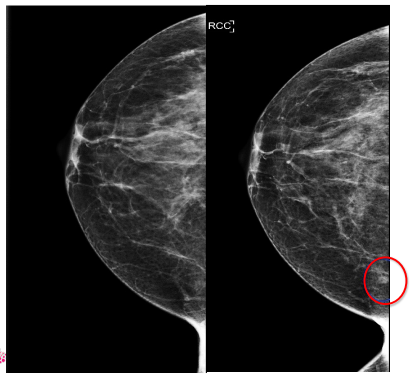












We need

- Accurate methods for determining the actual number of images taken
- Accurate methods for analyzing positioning standards
- The ability to provide corrective action plans for *improving* positioning errors
- The establishment of standardized positioning techniques that are efficient, consistent and ergonomically sound

It is OUR responsibility to make sure that ALL women receive the highest quality mammogram achievable.

BACK TO THE BASICS

MAMMOGRAPHY SHOULD BE TAUGHT ACCORDING TO SCIENTIFIC PRINCIPLE, **NOT ANECDOTE!**

Mammography and Science

ANATOMY
PHYSIOLOGY
PHYSICS

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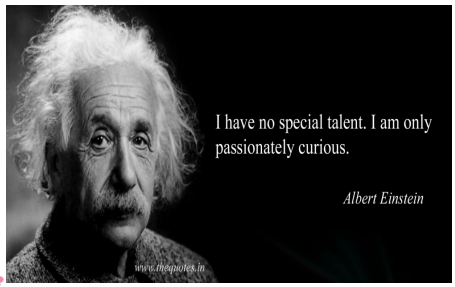


Physics…

- Newton's Third Law: For every action there is a reaction
- Law of gravity

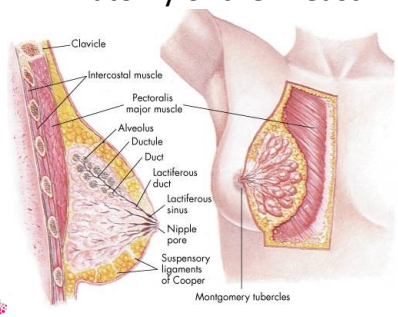
ANATOMY AND PHYSIOLOGY AS THEY RELATE TO MAMMOGRAPHY POSITIONING USING GENERAL RADIOLOGY PRINCIPLES

Goals for General Radiology Positioning

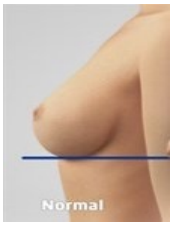
- Bring the body part back to it's true anatomical position OR the position that will best visualize that that body part
- Use palpable and visible anatomical landmarks for positioning and clinical image evaluation
- Use consistent and reproducible methods

Bring the breast back to it's natural anatomical position *(with the nipple as close to perpendicular to the chest wall as possible,)* on both screening views, to maximize visualization of breast tissue and to avoid superimposition of structures.

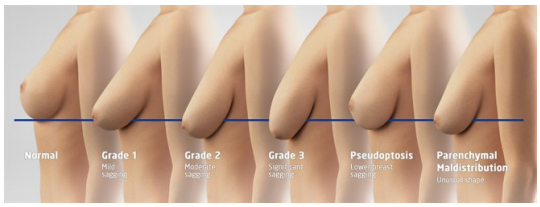
Anatomy of the Breast



Normal or natural position of the breast is when the nipple is perpendicular to the chest wall

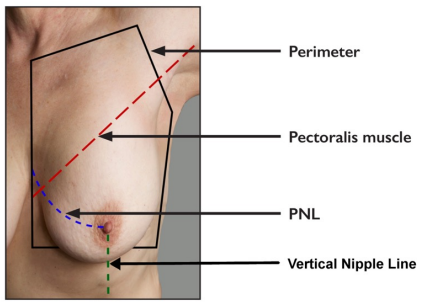


When positioning for mammography we need to bring the breast back to it's 'normal' position



In order to accomplish this and include the maximum amount of breast tissue, we must consider the anatomical landmarks that will be used for positioning and clinical image analysis.

- Perimeter
- Pectoralis muscle
- PNL
- VNL



Perimeter of the Breast

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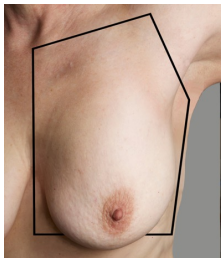
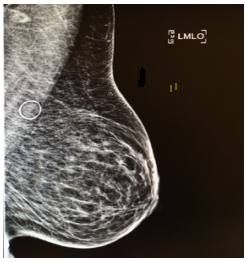
Perimeter used for Positioning and Clinical Image Analysis





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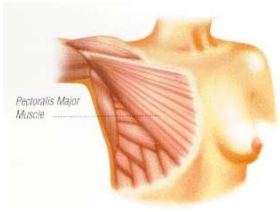
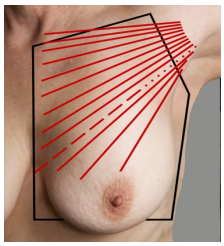
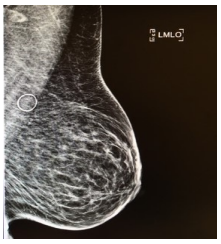
Pectoralis Major Muscle



MAMMOGRAPHY EDUCATORS

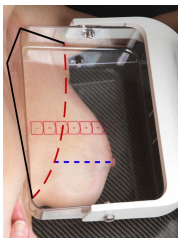
Pectoralis Used for Positioning and Clinical Image Analysis

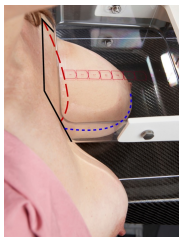




MAMMOGRAPHY EDUCATORS

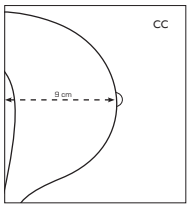
PNL used for positioning:
Elevate the breast so that the PNL is as close as possible to perpendicular to the chest wall

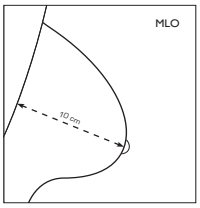




MAMMOGRAPHY EDUCATORS

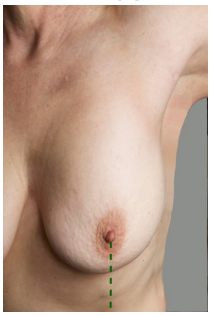
PNL used for clinical image analysis:
PNL measurement of CC should be within 1cm of the PNL measurement on the MLO





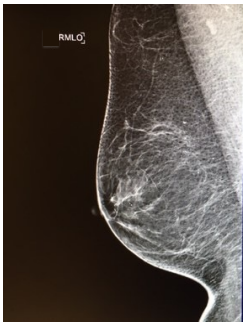
MAMMOGRAPHY EDUCATORS

Vertical Nipple Line



THE MLO

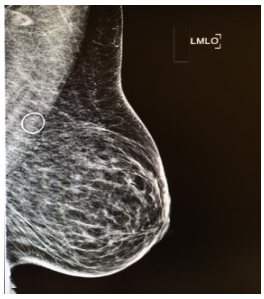
- Inclusion of all breast tissue within perimeter
- Pectoral muscle fully visualized
- Tissue well separated
- Tissue visualized back to retromammary fat space
- IMF

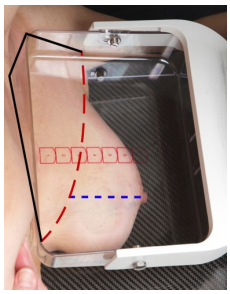


MLO: Visualization of the Pectoral Muscle

- The pectoralis muscle is really not part of the breast. However, it serves as an important anatomical landmark for positioning and image evaluation.

- Visualized down to the PNL
- Wide margin at the axilla
- Convex/straight
- Radiolucent

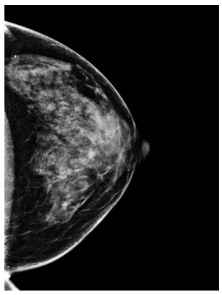




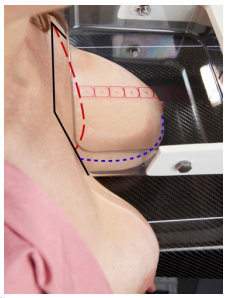
The absence or presence of these characteristics will tell you exactly what you did right…or did wrong when positioning, and therefore, whether you included or excluded breast tissue!!

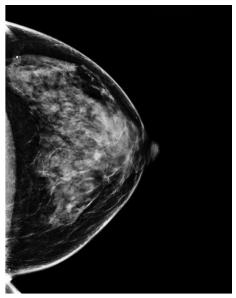
THE CC

- Include maximum amount of breast tissue in the axial/ transverse plane
- Visualization of medial breast tissue (cleavage) if possible
- Visualization of pectoralis muscle on approximately 40-50% of all CCs



MAMMOGRAPHY EDUCATORS





MAMMOGRAPHY EDUCATORS

So….I know what you're thinking

"She didn't see that patient I did yesterday!"

MAMMOGRAPHY EDUCATORS

MAMMOGRAPHY EDUCATORS

MAMMOGRAPHY EDUCATORS

MAMMOGRAPHY EDUCATORS

Well, how do you deal with different or challenging body habitus in general radiology??

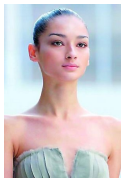


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IMAGE EVALUATION AND POSITIONING PROBLEM SOLVING

Louise C. Miller, R.T.(R)(M)(ARRT), CRT, FSBI, FNCBC
Education Director
Mammography Educators
San Diego, CA

MAMMOGRAPHY EDUCATORS

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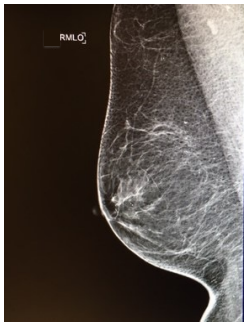

MAMMOGRAPHY EDUCATORS

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MAMMOGRAPHY EDUCATORS

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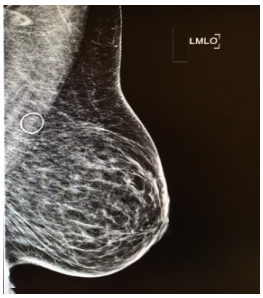

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Remember there are only two margins for error

1. It's the way the machine is set up (i.e. height, angle, compression paddle size, etc.)
2. It's the way the patient is "set up":
   both feet, hips and shoulders forward

MAMMOGRAPHY EDUCATORS

LENGTH OF THE MUSCLE

Should be visualized down to the level of the PNL

PATIENT: Length of muscle is related to the position of the patient.

The patient must be turned into the machine with both feet, hips and shoulders as far forward as possible, as not to impede progress of the compression paddle.

Angle for the MLO

- Angle to the free margin of the pectoralis muscle
- Keep angulation consistent
- Steeper angle for patients with longer thoraxes and small breasts
- Lesser angles for shorter thoraxes and larger breasts

Recommended Angulation for MLO

- Depends on body habitus
- Maintain consistency from year to year

I am going to say something that is shocking!!

Keep angles consistent

- 40 for shorter, heavier patients with large breasts
- 45 for average patients
- 50 for tall, thinner patients with smaller breasts

Keep angles consistent

- Use variations at 5 degree increments:

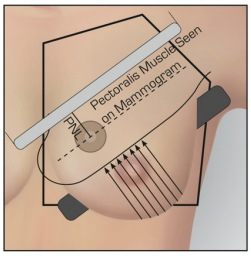
  No more 47, 42, 48, 53 etc.

Keep angles consistent

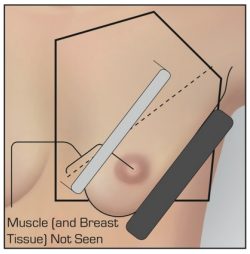
I am **not** saying NEVER use 35 or 55, but try to keep it consistent, so comparison is easier from year to year.

A MLO angled at 56 degrees one year will look markedly different than a MLO angled at 42 degrees the next year.

Proper degree of angulation

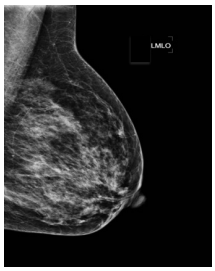


Angle too steep

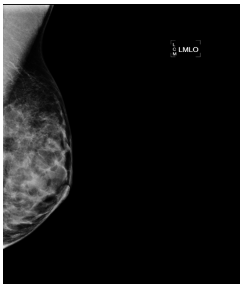


Proper degree of angulation

Angle too steep



Is it the angle or the patient?



WIDTH OF THE MUSCLE

There should be a wide margin of the pectoralis muscle at the top of the image (in the axilla).

EQUIPMENT: Width of the muscle is related to placement of the IR in the axilla

The back corner of the IR should be Placed just anterior to the latissimus dorsi.

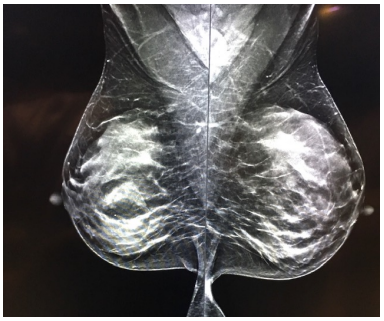
PATIENT: Width of the muscle is related to the position of the patient.

The patient must be turned into the machine with both feet, hips, and shoulder as far forward as possible, with the shoulder down, relaxed and pulled forward.

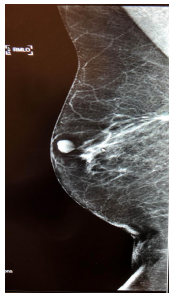
Is it the placement of the IR in the axilla or the patient?

Width of the muscle

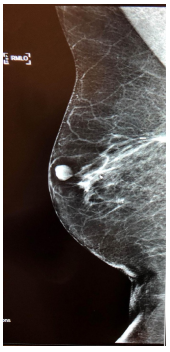
Visualization of the lat dorsi



Pt has hx of lumpectomy RUOQ

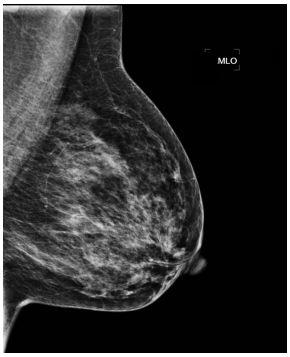


Normal placement of the IR just anterior to the latissimus dorsi



SHAPE AND OPACITY OF THE MUSCLE

The muscle should be convex or straight



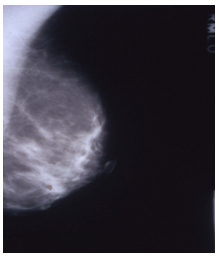
EQUIPMENT: The shape and opacity of the muscle is related to the height of the IR

The top of the IR should be positioned at height of the sternoclavicular joint, or half way between the top of the shoulder and the axilla crease.

PATIENT: The shape and opacity of the muscle is related to relaxation of the pectoralis muscle

Patient's shoulder, arm and hand must be relaxed.

Is it the height of the IR or the patient?



Reasonable Expectations

Positioning Criteria	FFDM	DBT	Bassett
Visualization of Pec Muscle to PNL	86%	87%	81%
Concave Pec	36%	28%	-
Straight Pec	41%	46%	-
Convex Pec	23%	26%	-

*AJR:209, December 2017

Problems with the MLO

- No visualization of the IMF
- Folds in the IMF
- Breast drooping

VISUALIZATION OF THE IMF

Equipment challenges:

Change of the angle will not compensate for the increased length and the width of IR for FFDM and DBT (compared to the bucky)

Change should be made in the patient position

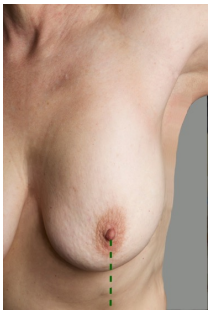
No IMF

IMF

The position of the patient related to the bottom, front corner of the IR is critical:

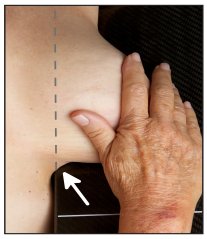
- Patient must be facing forward with both feet.
- The lower front corner of the IR should be directly below the patient's nipple (on VNL) or halfway between her ASIS and umbilicus.
- This requires the patient taking a "side step" towards you.

Inferior Nipple Line

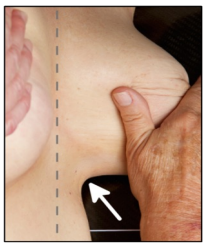


Improper / Proper

Improper
Edge of IR in front of IMF

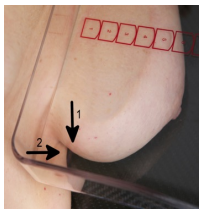


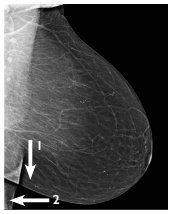
Proper
Edge of IR behind IMF



Top edge of IR indicated by vertical dotted line

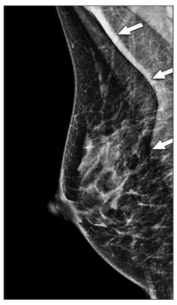
Folds in the IMF

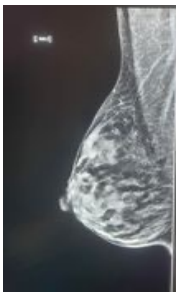


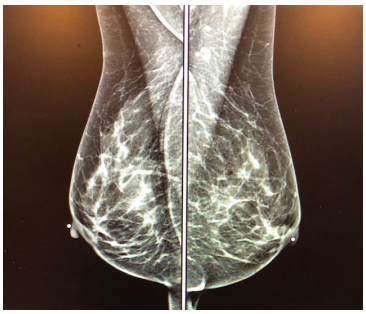


1. Horizontal fold is in the medial breast
2. Vertical fold is in the lateral breast

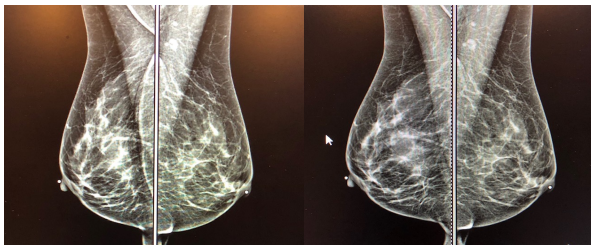
Skin and Fat Folds

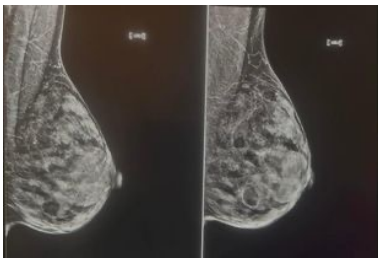






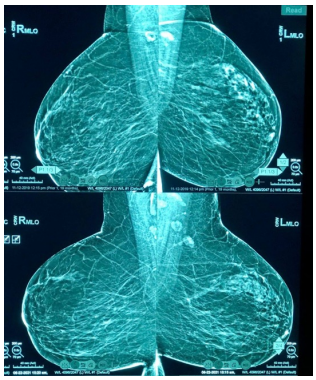
Your hand slides down the lateral side of the breast





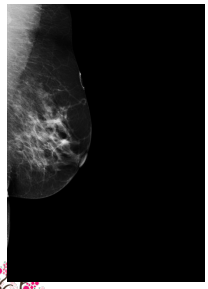
Position Of The Breast

- Breast held in up and out position to bring the breast back to it's'normal' position (nipple perpendicular to the chest wall)
- Maintained by adequate compression



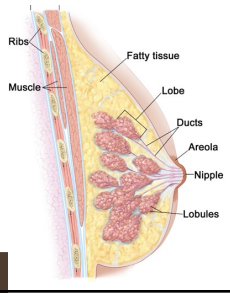
BEFORE **MILLER METHOD** **AFTER**

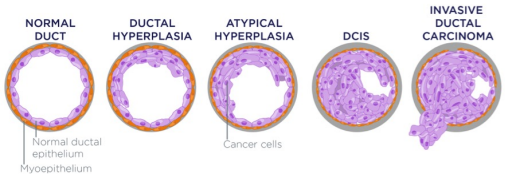
11.8 cm +1.0 cm 12.8 cm



Glandular Breast Tissue

Ducts, lobes, lobules





Breast sagging

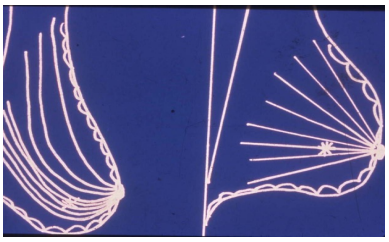


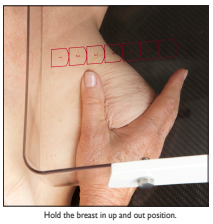
Image Courtesy Stephen Feig, MD

Maintain the breast in the up and out position*

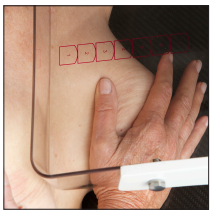
- Keep the nipple as close as possible to perpendicular to the chest wall.
- Don't let go of the breast until compression **is complete.**

*This will help eliminate the "sagging breast."

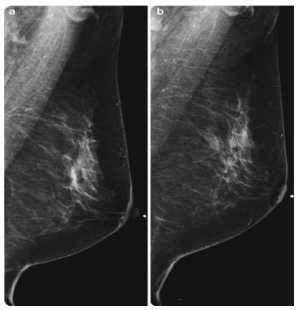
Solution for "sagging" breast



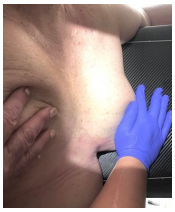
Hold the breast in up and out position.



Compress.



Have the patient lift and flatten her opposite breast – never "pull" back.



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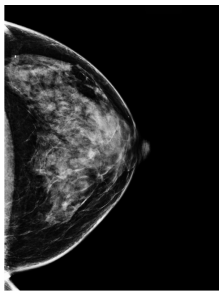
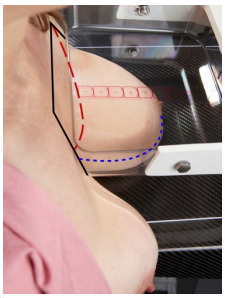
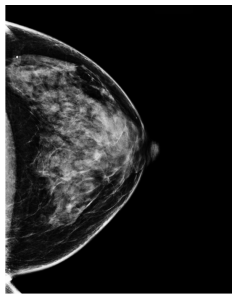






Is it the Equipment or the Patient?

- **The Equipment**:
  - IR too high or too low
  - Compression paddle size
- **The Patient**:
  - Facing towards the machine with both feet, hips and shoulders forward

Due to lack of anatomical landmarks, positioning techniques are extremely important!!

Stand on the medial side

- So you can see if medial breast tissue is included
- To facilitate the performance of the exam
- To keep the patient "pushed" forward
- To maintain eye contact

5 Things

1. Elevate the breast to the correct height
2. Pull the breast on with both hands
3. Anchor the breast
4. Push the patient in with your elbow/arm
5. "Crawl" up on the chest wall to include more pec muscle

1. Elevate the breast/IMF and adjust the height of the IR

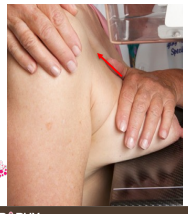
2. Pull the breast onto the IR with both hands

3. Anchor the Breast

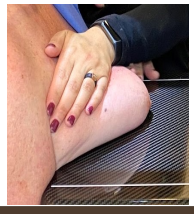
4. Place your elbow and forearm at the mid-thoracic region of her spine and gently "Push" her forward

5. Use the edge of your thumb to "climb up" the chest wall to pull superior breast tissue forward and apply compression while continuing to "push" the patient forward.

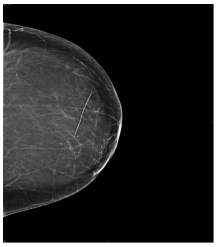
Before



After

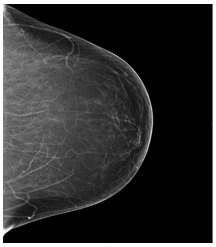


1 handed "plop"

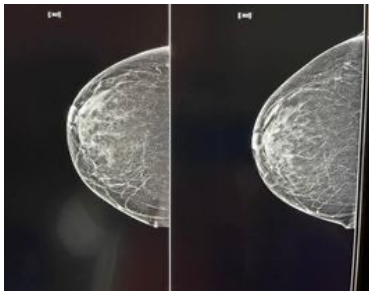


12.5 CM

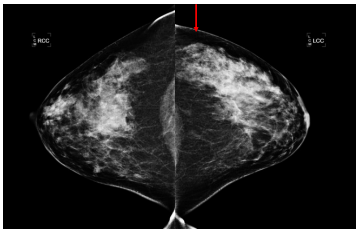
2 handed pull



14.8 CM



Failure to include lateral posterior breast tissue or ???

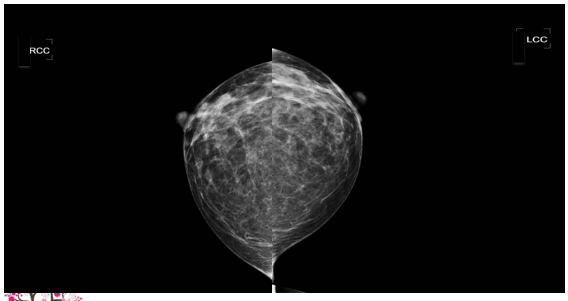


NIPPLE IN PROFILE
NIPPLE CENTERED

Nipple centered

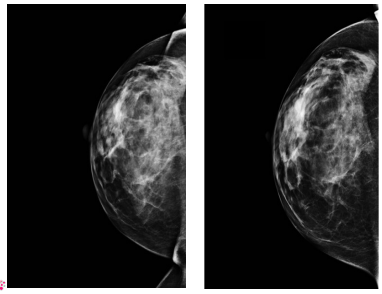
- Nipple should be centered on the CC view, if possible, and without sacrificing breast tissue.
- Nipple may not be centered due to prominent medial or lateral fullness of the breast, which should be noted on the history sheet.

Patient with Prominent Medial Fullness



- Breast tissue should never be sacrificed in order to center the nipple or show the nipple in profile.
- An additional view should be added and labeled appropriately.
- Notation should be made on history sheet.

COMPRESSION



Solutions – Compression

Criteria: Breast should be compressed until taut or less than painful. Glandular tissue should be well separated.

- Technologist must compress the breast until "taut" or less than painful.
- Technologist must work with the patient to achieve adequate compression.

FOCUS ON

- Consistency
- Reproducibility
- Efficiency
- Proficiency
- Ergonomic principles

The Proper User of Additional Views and Implants

Louise C. Miller, R.T.(R)(M)(ARRT), CRT, FSBI, FNCBC
Director of Education
Mammography Educators
San Diego, CA

Additional Views

- XCCL
- CV
- Lateral Views
- Tangential
- Implants

I do not teach

- LMO
- SIO
- FB – will demonstrate
- AT – will demonstrate

Just a review… but why do we do additional views?

- To show a specific component of the anatomy not seen on standard views
- To provide localization of an area of concern medial/lateral or superior/inferior to the nipple

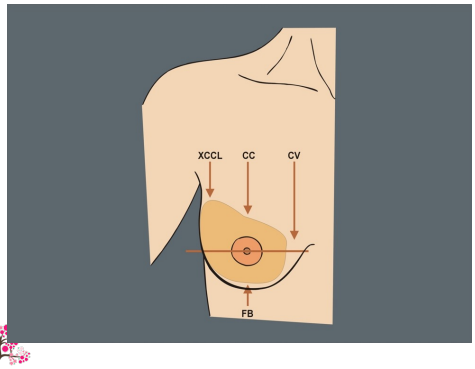
OR……

- To show an area of concern in better detail
- To counteract superimposition of structures
- To triangulate a lesion

Most commonly used additional views are done to show a specific component of the anatomy not seen on standard views

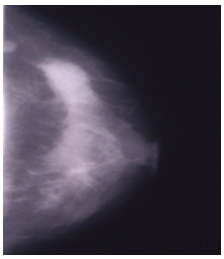
Ask and Answer:

- Which part of the breast do I want to visualize?
- In which projection?
- Which view will accomplish this?



XCCL

- For visualization of lateral breast tissue in a CC projection



An XCCL is a variation of the CC

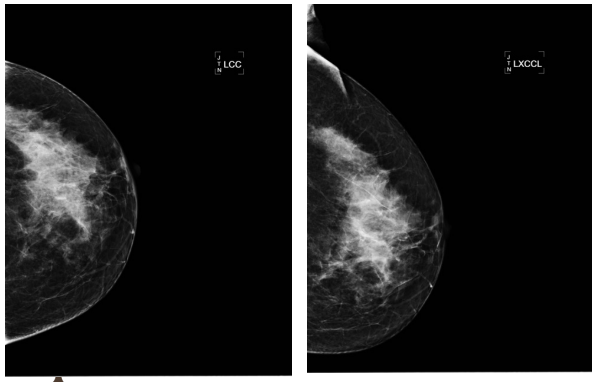
- Should not be angled – Use 0 degrees
- Patient should not be angled, or leaning back
- Visualization of pectoralis muscle may occasionally be seen but is not a requirement and not preferred as it may indicate the tube or patient is “angled”.

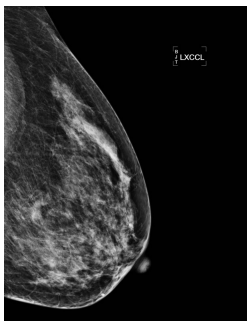
Use of the XCCL in Screening

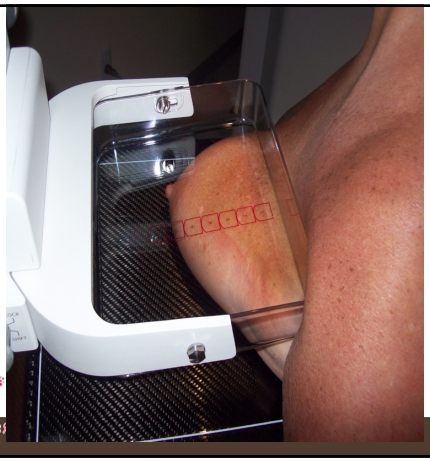
- Used on a baseline mammogram when lateral, posterior breast tissue is not visualized on the CC.
- On subsequent screening an XCCL is not necessary if, on the MLO, you have visualized glandular breast tissue back to the retromammary fat space.

Use of the XCCL in Screening

- The only published available data on the use of the XCCL in screening (Cardenosa, 1994) states that it is needed in less thatn 10% of all screening exams.
- Currently, expert breast imaging radiologists in the US, report that the XCCL is used/needed on less than 3% of all screening exams.

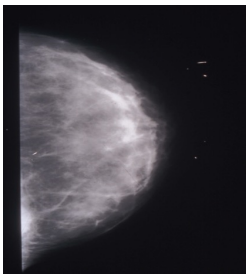


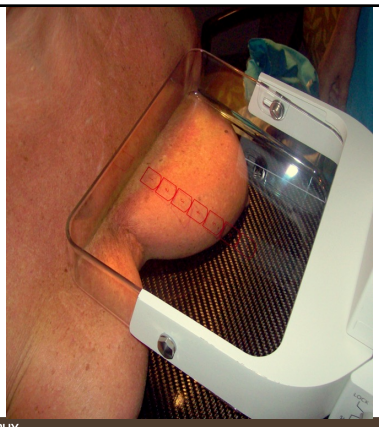




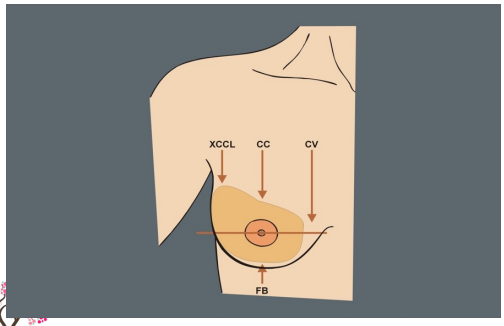

CV

- For visualization of medial breast tissue in a CC projection

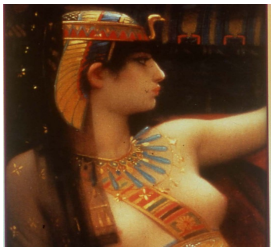




Medial or lateral orientation to the nipple:

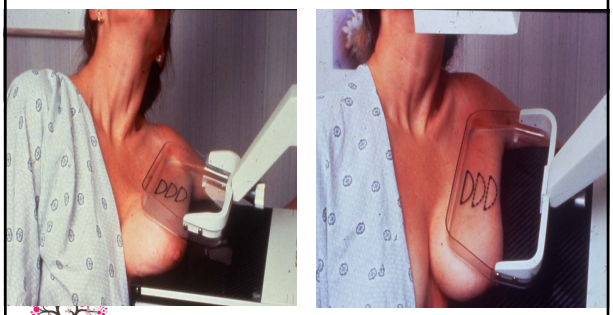


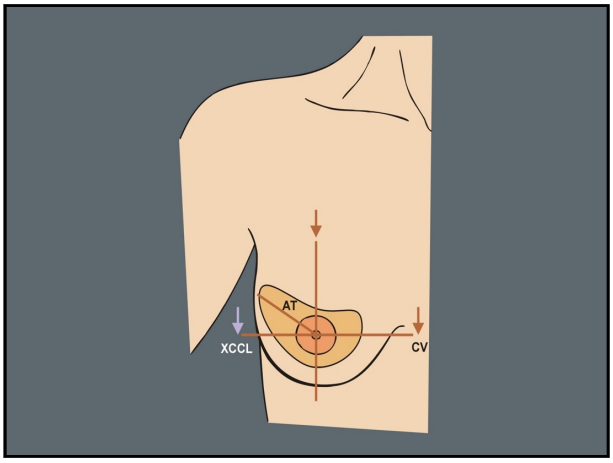
So, when do we do a Cleo???



Well, that depends. What are you trying to accomplish?

What is the Cleopatra view?





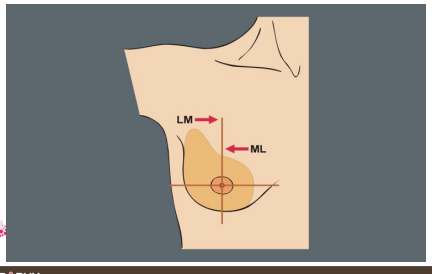
AT

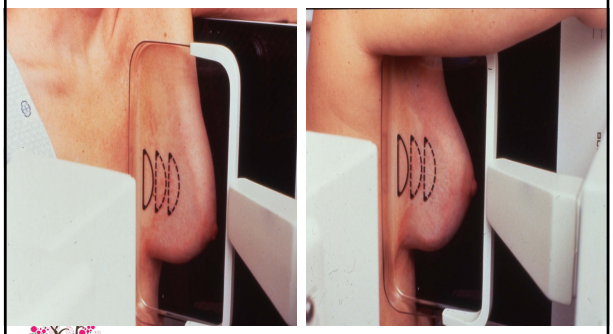
- The AT View is used only for focal compression of the axillary tail and will not give you lateral or medial
- NOR superior or inferior orientation to the nipple:

It is never used to localize a lesion

Superior or inferior orientation to the nipple:

LM or ML





The use of the Lateral

- Shows effects of gravity on air fluid levels (Milk of Calcium)
- Used as a "tie breaker" view (to overcome superimposition of structure)
- Visualizes the breast in the sagital plane (demonstrates an area of concern superior or inferior to the nipple)

Why do the LM?

- When you did the MLO you showed the lateral breast in better detail. The LM shows the medial breast in better detail.
- The LM takes advantage of the lateral mobile border of the breast and thus facilitates positioning

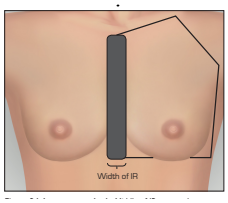
Why do the LM?

- The hardest part of the breast to image (and the area most often missed on the MLO) is the posterior medial breast. If done properly (off-setting the IR into the contralateral breast) you will be able to get deeper against the chest wall.

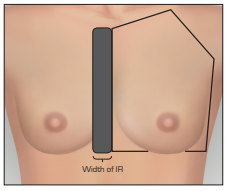
Why do the LM?

- There is no issue of the contralateral breast impeding the path of the compressi paddle

Improperly positioned LM with breasts separated so middle of the IR is centered on midsternal line thus excluding deep medial breast tissue on the side you are imaging.

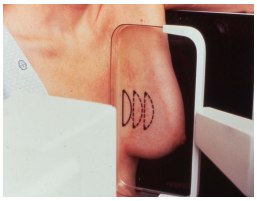


Properly positioned LM with breasts separated so *top edge of the IR* is centered on midsternal line and the width of the IR pressing against the contralateral breast.



ML – Mediolateral

Opposite breast must be pulled back to allow the compression paddle to pass and may therefore eliminate visualization of deep medial breast tissue

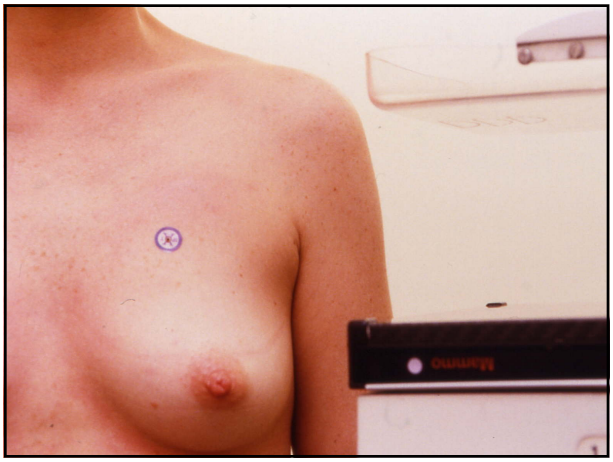


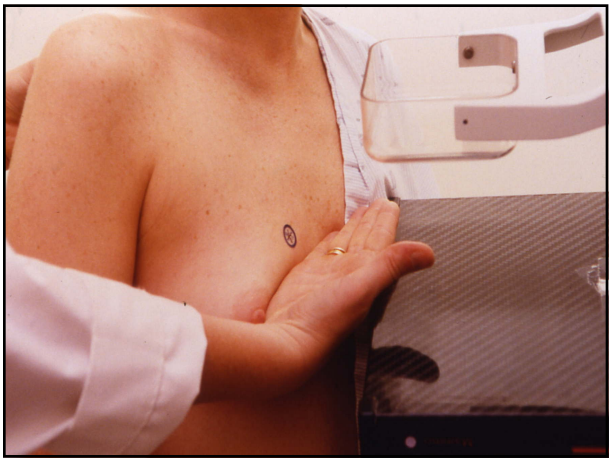
Additional views for clarification of areas of concern

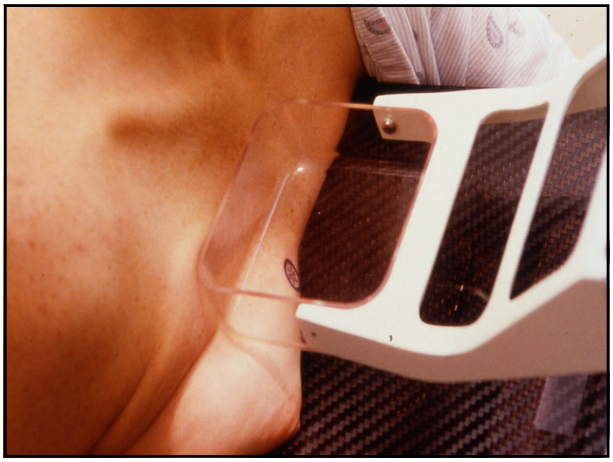
- **TAN**
- **Spot Compression**
- **Spot Compression with MAG**

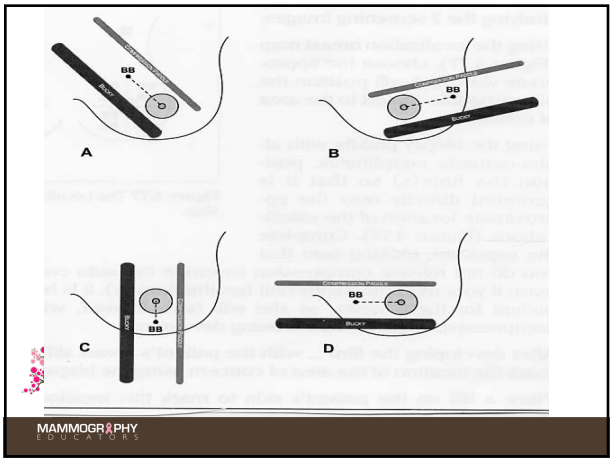
TANGENTIAL VIEWS

- **To prove the existence of dermal calcifications**
- **Enhanced visualization of palpable masses that may otherwise be superimposed on glandular breast tissue**

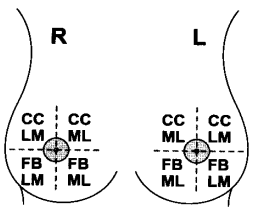




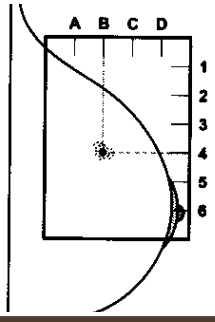




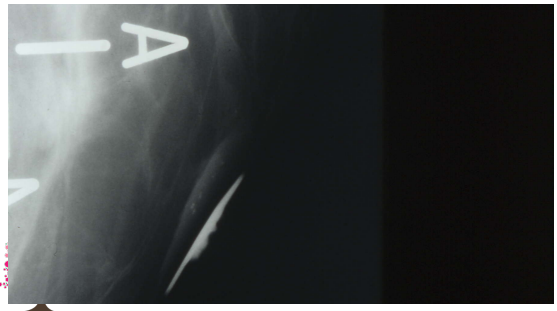
Tangential views for the verification of skin calcifications



Tangential views for the verification of skin calcifications



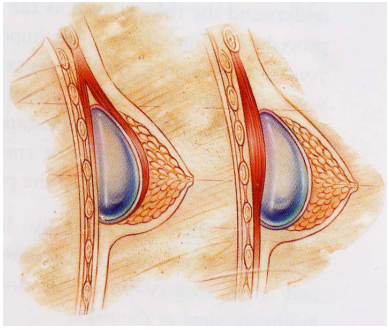
Tangential views for the verification of skin calcifications



Imaging Augmented Breasts

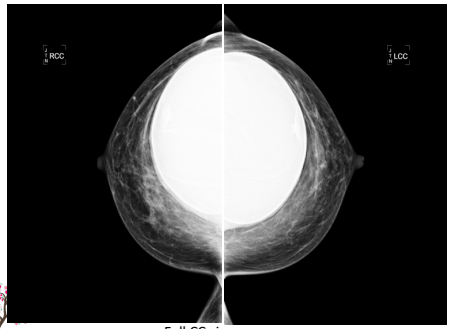
- As suggested by the ACR, 4 views of each breast should be performed to include
  - Standard and Implant Displaced views
  - Assessment of the Implant includes:
    - Location: subglandular or subpectoral
    - Type: Silicone, Saline or Mixed
    - Contour: Evaluate for rupture, weakening & possible complications such as rupture/capsular formation

Imaging Augmented Breasts



Sub-pectoral and Sub-glandular placement

Imaging the Augmented Breast

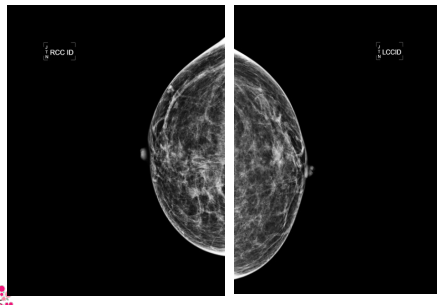


Full CC views

Imaging the Augmented Breast

Full MLO views subpectoral implants

Imaging the Augmented Breast



CC Implant Displaced Views

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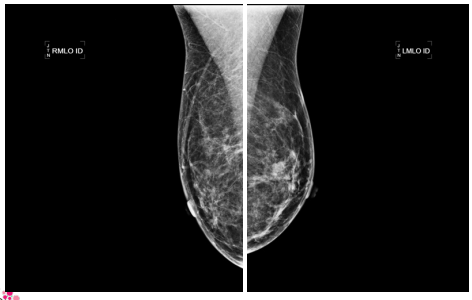
Imaging the Augmented Breast



MLO displaced views-labeling critical!

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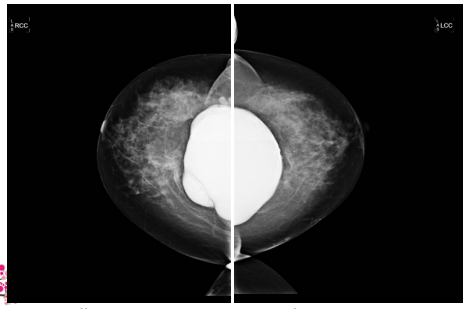
Imaging the Augmented Breast

Subglandular placement



Full CC views- note contour distortion

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Imaging the Augmented Breast

Subglandular placement

Full MLO views

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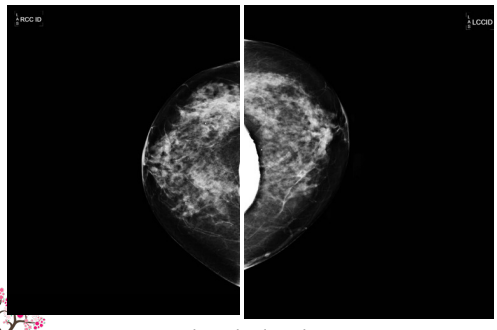
Imaging the Augmented Breast



CC Implant-displaced views

MAMMOGRAPHY EDUCATORS 227

Imaging the Augmented Breast

MLO Implant-displaced views

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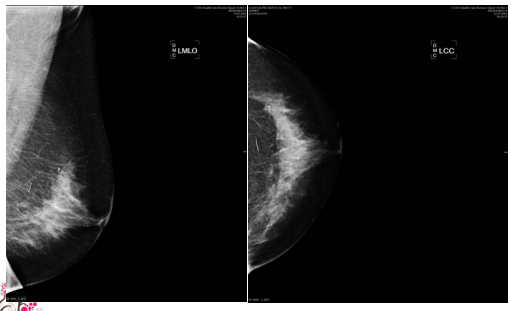
Miscellaneous Findings



LMLO & CC with retained needle fragment

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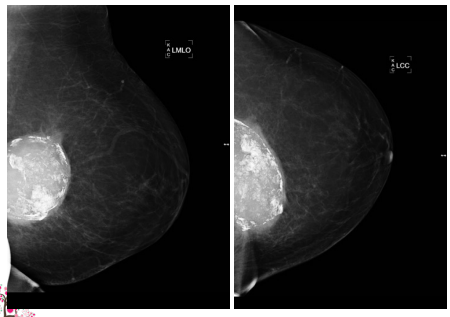
Miscellaneous Findings



Post implant removal with calcified capsule

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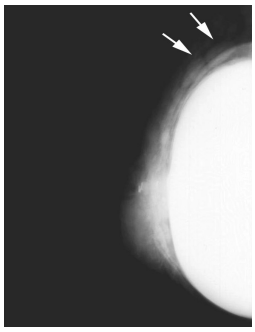
Miscellaneous Findings



Implant with free silicone in capsule (arrows)

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Suggestion for Implants

- Use only minimal compression on the full Implant views to prevent motion unsharpness
- Sit the patient down for the ID views
- Stand behind the patient
- Pull forward rather than push back
- Use “half” paddle

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MAMMOGRAPHY EDUCATORS

LCCID

MAMMOGRAPHY EDUCATORS

LMLOID

Encapsulated implants

- Develop a policy and procedure for patients with extremely encapsulated implants and/or for those with very small amount of natural breast tissue.
- Recognize that it is virtually impossible to do implant displacement views on these patients.

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DO THE BEST YOU CAN!

MISSION AND MOTIVATION

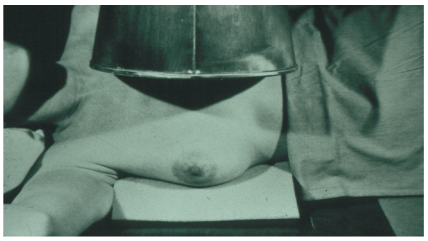
The Critical Role of the Mammographer

Louise C. Miller, R.T.(R)(M)(ARRT), CRT, FSBI, FNCBC
Director of Education
Mammography Educators
San Diego, CA

What's changed?

- Card board cassette to Xerography
- Xerography to FS
- FS to FFDM
- FFDM to DBT

Cardboard cassettes



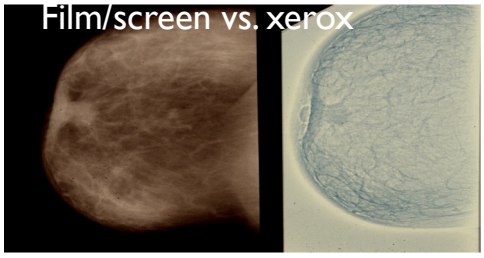
Xerography

Xerography

Pat Troyer, X-ray Technologist, shows a completed mammograph and the Xeroradiography equipment at Bess Kaiser Hospital which has helped detect cancer early in hundreds of women over the past three years. A balloon (or sometimes a clear plastic plate) compresses the breast and spreads the tissue to produce a clear picture of the interior.

Xeroradiography produces a highly detailed picture on plastic coated paper. A physician specialist (Radiologist) can interpret the picture without the use of the special viewing apparatus usually needed to read X-rays. This view of both breasts shows mammary dysplasia—a non-malignant condition of the breast. If

Film/screen vs. xerox



Full Field Digital Mammography

Digital Breast Tomosynthesis

- This technology has been tested since the 1990s
- Invented by Dr. Daniel Kopans at Harvard Medical School/Massachusetts General Hospital
- Approved by the FDA in 2011

FS - FFDM - DBT

- Increased width in Face Shield
- Increased thickness and length of IR compared to the bucky

With change comes challenge *and* opportunity

CHANGE IS NOT EASY, BUT…

- IT IS CHALLENGING
- IT IS SOMETHING DIFFERENT
- IT CAN BE FUN!!

How you approach change will directly affect success!

BE POSITIVE!!

AND STAY CALM……

STAY FOCUSED ON WHAT IS IMPORTANT

Motivation and Mission

Patients and Perspective

Motivation

- How do we motivate others
- How do we keep ourselves motivated

Mission

- Our aspirations as individuals
- Our aspirations as a group

Patients

Why we do what we do

Perspective

How we look at things

DISTORTED PERSPECTIVE

BURN OUT AND STRESS

IN TIMES OF STRESS

- Remember your mentor or someone you have mentored
- Remember the patient who thanked you for being kind
- Remember something that was personal and positive related to your work

This is personal!

Each and every patient belongs to someone.

Take the time to see them as such.

Remembering this will help us focus on the commitment we have made as health CARE professionals

ARE YOU TOO BUSY?

What about your commitment to your work?

Why are you doing this in the first place?

Committed to a Cause

- Gives us a sense of competence about ourselves and others
- Helps us focus our energy
- Is a positive outlet for our energy
- Creates a positive identification
- Connects us with our Spiritual self

When we are committed

- Emotional support
- Empathy
- Engage with our self and others
- Utilize our inner resources to guide us

Committed to a Cause

- Gives us a sense of competence about ourselves and others
- Helps us focus our energy
- Is a positive outlet for our energy
- Creates a positive identification

Committed to a Cause

- We benefit emotionally
- Create interdependence
- Add to our mental well being

COMMITTED TO COMPASSION

HAVING PRIDE IN WHAT YOU DO

PRIDE

Acknowledging all that you have…and all that you have accomplished *with* humility….but *without* arrogance

INDIVIDUAL AND COLLECTIVE PRIDE

Experiences in which we can say

"I….we….did this well"

Being of service to one another, one colleague, one patient, one life at a time, one moment at a time is essentially what the role of the breast health professional is all about….

BEING PROUD OF WHAT YOU DO…AND YOUR SPECIAL ROLE AS A LINK IN THE CHAIN OF LIFE

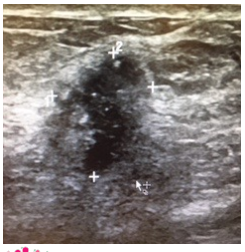
Pride we can feel when we are

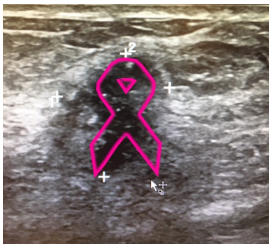
- Kind
- Compassionate
- Mentoring
- Teaching
- Motivating
- Sharing
- Healing
- Helping

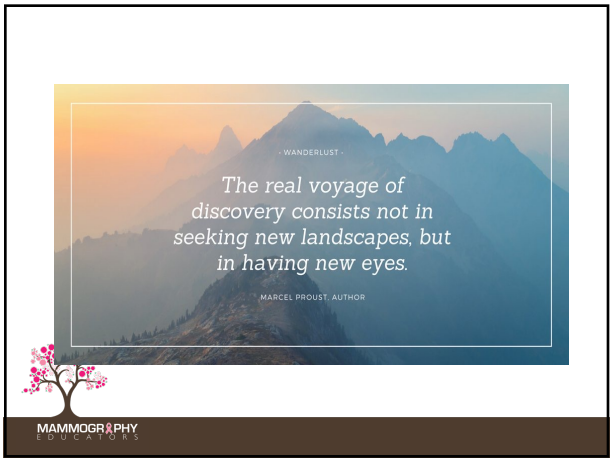
Making a difference

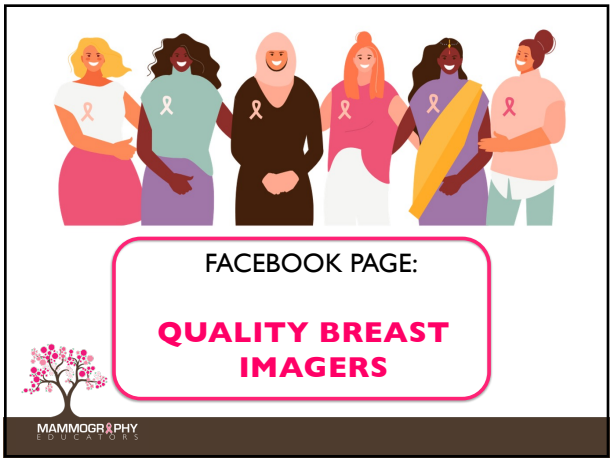
This is personal!

- Each and every patient belongs to someone.
- Take the time to see them as such.
- The quality of their exam depends on YOU.









Thank you!

For questions or more information, contact us at:

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