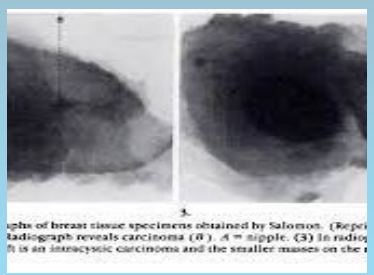
SCREENING MAMMO: BACK TO BASICS

Nikki Kezar RT(R)(M)
Piper Breast Center- Coon Rapids

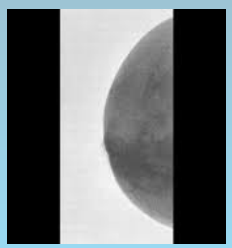
1

HISTORY OF MAMMOGRAPHY

NOVEMBER 8TH, 1895- WILLIAM ROENTGEN DISCOVERED X-RAYS



1913- ALBERT SALOMON IMAGED BREAST SPECIMENS TO HELP IDENTIFY BREAST PATHOLOGY



1927-OTTO KLEINSCHMIDT PUBLISHED THE FIRST KNOWN IMAGE OF BREAST TISSUE ON A LIVING PATIENT

2

HISTORY OF MAMMOGRAPHY

- 1930- Stafford Warren takes first mammogram in the U.S. and develops the stereoscopic technique

- 1950's- Raul Leborgne invented the compression technique.

3

HISTORY OF MAMMOGRAPHY

- 1952- Dr. Roach and Dr. Hilliboe highlighted medical potential of xeroradiography.

- 1960's- Charles Gros designed first x-ray device exclusively for mammograms.

4

HISTORY OF MAMMOGRAPHY

- 1963- Philip Strax and Samuel Shapiro helped contribute to the routine use of mammograms for screenings.
- 1972- Screen-Film mammography was introduced.

- 2000- Digital mammography was approved by the FDA.
- 2011- Digital Breast Tomosynthesis was approved by the FDA.

5

PATIENT PREP

- Remove all articles of clothing from the waist up.
- Remove deodorants, lotions and perfumes.
- Place gown on opening in the front.
- Store belongings in a safe location.

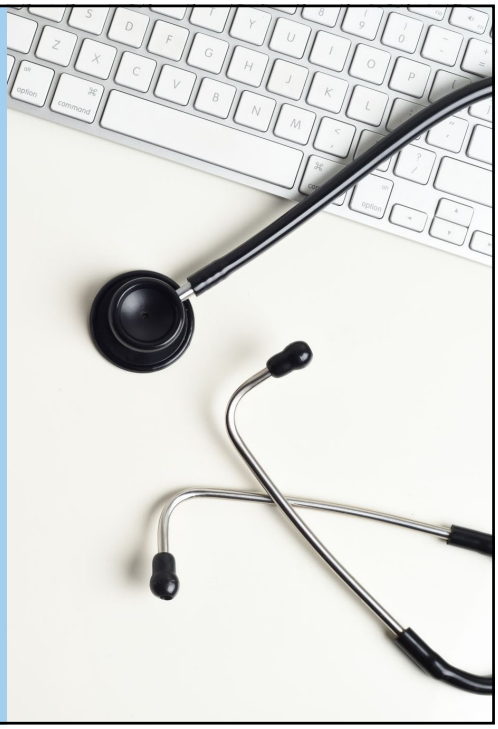
6

MEDICAL HISTORY

- Any new breast concerns?
- Any surgeries or biopsies to breasts or chest?
- Currently taking any hormones?
- Family history of breast or ovarian cancer?
- Recent vaccinations?
- If there is a past history of lumpectomy/mastectomy:

I. Any radiation or chemotherapy?

II. Hormone blockers?



7

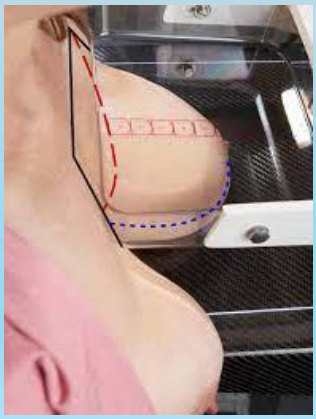
CRANIAL-CAUDAL (CC)

- Technologist should be standing on medial side of breast being imaged.
- Patient should stand with feet/hips/shoulders facing machine.
- Arms by their side.
- Shoulders relaxed.
- Patient should turn their head to face technologist.
- Elevate breast so the PNL is perpendicular to chest wall.
- Adjust IR so the top is at the height of the IMF.
- Using both hands gently but firmly, pull the breast forward, away from the chest wall and onto IR

8

CRANIAL-CAUDAL (CC)

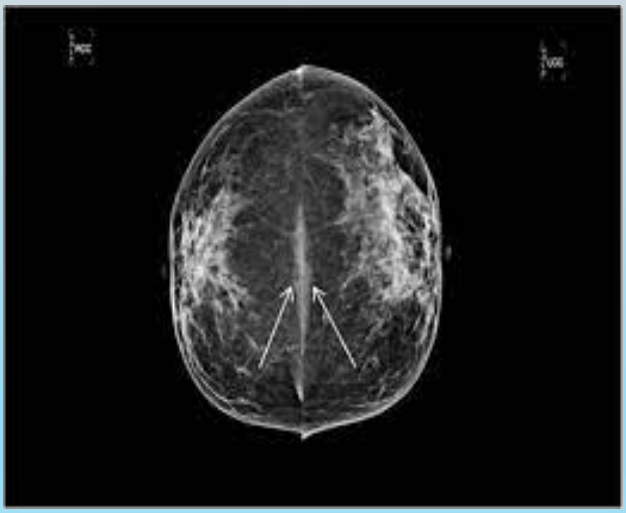
- Anchor the breast with the base of thumb against the chest wall. DO NOT remove this hand until compression is being applied.
- Lift the opposite breast over the corner of the IR.
- Technologist should bring arm up and around the patient's back with their arm resting at the base of patient's neck.
- Help guide the patient forward, into the machine.
- Apply compression.
- Eliminate skin folds.
- Have patient stop breathing.



9

IMAGE CRITIQUE (CC)

- All breast tissue is visualized. YOU MUST VISUALIZE MEDIAL TISSUE.
- Retroglandular fat is visualized.
- Visualization of pectoral muscle on approximately 40% of cases.
- Nipple is centered and in profile.
- Visualization of cleavage.
- The PNL measurements between the CC and the MLO should not exceed 1cm.
- No motion on image.



10

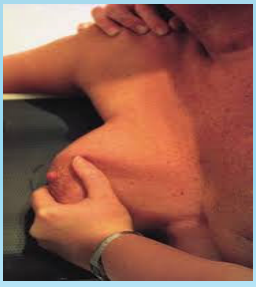
MEDIOLATERAL OBLIQUE (MLO)

- Rotate the gantry to place the pectoral muscle parallel to the IR.
- Adjust the height of the image receptor so the top is level with the height of the sternoclavicular joint.
- Patient should stand with feet and hips facing machine.
- Have patient reach their arm up and around the top of the IR and lean towards their shoulder.
- Standing on the medial side of the patient reach around the front of the patient and place your hand on the lateral aspect of the breast at the angle of the pectoral muscle, make sure all breast tissue is in front of the IR.

11

MEDIOLATERAL OBLIQUE (MLO)

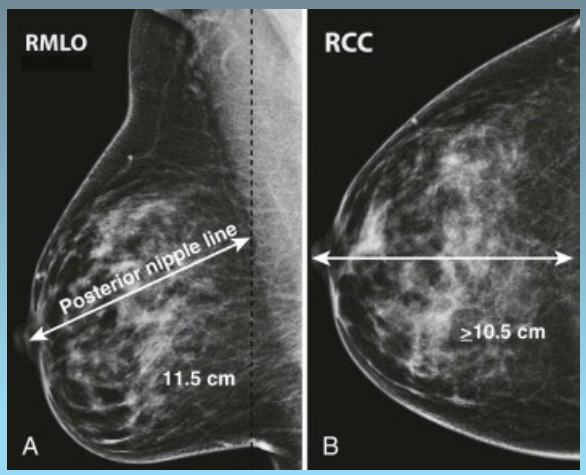
- Have patient relax their arm and place the corner of the IR in to the axilla.
- Bend their arm at a 90 degree angle to their body.
- With one hand on each side of the breast being imaged lift all the breast tissue up and out, away from the thorax.
- Slide your inferior hand out towards the nipple and place it on the medial side of the breast holding it in the up and out position.
- Have patient hold opposite breast up and out.
- Check the IMF for any air gaps.
- Apply compression.
- Have patient stop breathing.



12

IMAGE CRITIQUE (MLO)

- Visualization of all breast tissue.
- The breast is UP and OUT (no camel nose)
- Visualization of retromammary fat.
- IMF is visualized and free of folds.
- Nipple is in profile.
- Visualization of pectoral muscle from axilla down to the level of the PNL
- Convex or straight muscle.
- The PNL measurements between the CC and the MLO should not exceed 1cm.
- No motion on image.



13

CORRECTIVE ACTION (CC)

The PNL is short when compared to the MLO (exclusion of posterior breast tissue)

- IMF is elevated properly
- The breast is fully pulled in to the machine
- Patient pulled back
- Bring patients head forward
- Compression paddle is adjacent to the rib cage

Inadequate lateral breast tissue (exclusion of lateral tissue)

- Pull the lateral breast tissue forward while compression is being applied
- Perform XCCL

14

CORRECTIVE ACTION (CC)

Inadequate medial breast tissue (exclusion of medial tissue)

- Patient's ribs are resting against the IR
- Opposite breast is draped over the edge of IR
- Compression paddle is adjacent to rib cage
- Perform cleavage view

Motion (poor visualization of breast structures)

- Proper compression applied
- Appropriate breathing technique

15

CORRECTIVE ACTION (MLO)

Muscle not visualized down to PNL, usually missing IMF (Medial and inferior tissue excluded)

- Check degree of angulation
- Breast must be mobilized medially until the nipple is parallel to the free muscle margin
- Patient feet/hips/shoulder facing machine
- Compression paddle must be adjacent to sternum and ribs

Muscle is concave (Breast tissue may be excluded by failing to mobilize the breast properly)

- Patient's shoulder, arm and elbow is relaxed
- IR is too high

16

CORRECTIVE ACTION (MLO)

Anterior breast drooping (possible superimposition and poor visualization of inferior and anterior breast tissue)

- Ensure breast is supported up and out during compression
- Position nipple and PNL as close to perpendicular to the best wall as possible
- Pull hand out towards the nipple
- If breast shape, prominent axillary tissue or pec muscle inhibits inadequate compression do anterior compression view

Inadequate visualization of IMF (exclusion of posterior and inferior breast tissue)

- Feet/hips/shoulders facing forward
- Bottom edge of IR is lateral/behind the IMF
- Angulation of machine may be too steep
- Compression paddle adjacent to the sternum and over the IMF
- Breast in up and out position

17

CORRECTIVE ACTION (MLO)

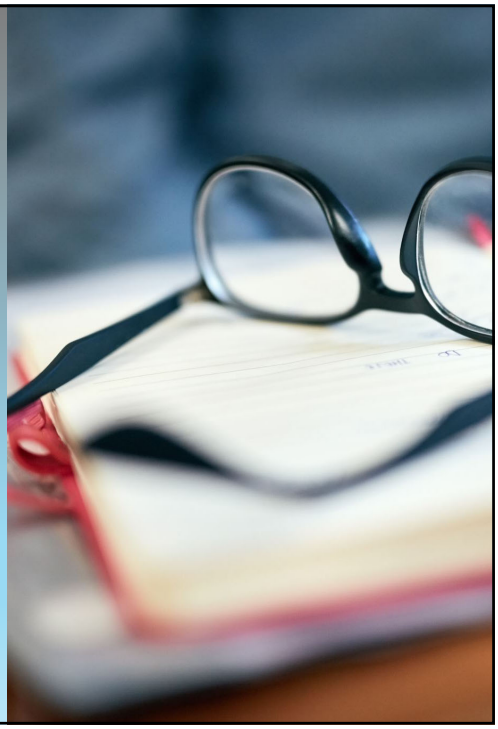
Excessive skin and fat folds (Inadequate visualization of breast tissue)

- Smooth out skin in axilla and fat folds prior to compression. Pull down on abdominal tissue to verify the IMF is open

18

REFERENCES:

- Mammographyeducation.com
- Radcomm.net
- Nationalbreastcancer.org
- Eradimaging.com
- Radiopaedia.org
- nih.gov
- mdpi.com



19