PROPER POSITIONING WITH THE USE OF NIPPLE MARKERS

By Susan Sprinkle-Vincent, A.A.S., R.T. (R) (M) Mammography Program Manager and Consultant
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Mammography is the most difficult radiographic procedure to perform. Studies have shown that more breast cancers were missed when a woman was not in the correct position during her mammogram. Proper positioning is the key element to ensure the greatest amount of breast tissue is captured on the clinical image. The nipple plays a key role in determining if the breast is positioned properly. During positioning the nipple can change direction at any point and may not always be visible by the technologist. As we use our hands to mobilize, capture and secure the tissue prior to compression, often times this specific hand maneuver obscures visualization of the nipple. Using a nipple marker makes positioning easier as the marker can be felt to determine if the nipple is centered or rotated while positioning. Because we use our hands in this manner it is important to use a quality nipple marker that stays in place and does not move or come off when positioning, otherwise later we find the nipple marker on the sleeves of our scrubs, the bucks or on our shoes. A nipple marker immediately identifies the nipple location on the clinical image and is necessary on each and every patient during a mammogram. With consistent use, the marker will expedite image critique, interpretation, enhance exposures, avoid repeat films, and most importantly improve positioning. Below references the 6 essential reasons nipple markers add value in positioning and image critique.

6 Reasons Nipple Markers Add Value in Positioning and Image Critique:

1. Identifies if lateral or medial tissue is missing on the image.
2. Indicates suboptimal anterior compression and rotation of the nipple on the MLO view.
3. A landmark for the posterior nipple line measurement tool.
4. Helps to determine area for Spot Compression or Spot Compression Magnification Views.
5. Nipple markers help to determine motion.
6. Nipple markers assist us with comparing positioning from year to year or facility to facility.

Routine Nipple Marking - A valuable tool in positioning and image critique

A Universally Good Mammography Practice for Screen-film and Digital Examinations

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1. Identifies if lateral or medial tissue is missing on the image.

Supplies are not always naturally in the perfect position. If the nipple is either on the CC view or if the nipple is present lateral, this indicates we are missing some lateral tissue, refer to Exhibit B. An important role in image critique is to examine the nipple. Without a nipple marker it is more difficult and will often be overlooked during image critique.

A

B

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"We are in a position of trust and the patient has no control over the outcome. We must use our skills and the technology available to do the very best mammograms we can on each and every patient. Your patient depends on you. Be an expert at positioning and image critique."

-Susan Sprinkle-Vincent
When critiquing the CC view, you must answer the following questions:

1. Is all the medial tissue imaged?
2. Is the nipple centered on the image?
3. Does the posterior nipple line measure 2.0 cm or less? If the posterior nipple line measures more than 2.0 cm, there is exaggerated medially which tells us that medial tissue is missing.
4. Does the nipple line measure greater than 2.0 cm on the MLO view to assist in the detection of breast cancer. How does the nipple marker assist from year to year? On the MLO view it helps by looking at the level of the nipple in the MLO view. It is important that positioning is optimal and consistent from year to year in order for the physician to use the very important comparison of mammograms. How does the nipple marker help to determine motion? A nipple marker is a valuable indicator of motion blur, see exhibit I. If you are questioning motion on your image look closely at your nipple markers, if they are blurry or oval you have answered your question.

When critiquing the MLO view you must answer the following questions (refer to exhibit D):

1. Is the pectoral muscle wide superiorly with a convex anterior border?
2. Is the inframammary fold open?
3. Are the deep and superficial tissues well separated?
4. Is the pectoral muscle large, the breasts are sagging and do not have adequate anterior compression.
5. Nipple markers help to determine motion
6. Nipple markers assist us with comparing positioning from year to year or facility to facility

F.

G.

H.

I.

J.
When critiquing the MLO view you must answer the following questions:

1. Is the pectoral muscle wide superiorly with a convex anterior border?
2. Is the inframammary fold open?
3. Are the deep and superficial tissues well separated?
4. Does the pectoral muscle extend to or below the posterior nipple line?

When critiquing the CC view, you must answer the following questions:

1. Is all the medial tissue imaged?
2. Is the nipple centered on the image?
3. Does the posterior nipple line measure 2 cm of the MLO view?

It is important that positioning is optimal and consistent from year to year to ensure the physician can use this important comparison of mammograms to detect the occurrence of breast cancer. How does the nipple marker assist from year to year? On the MLO view it helps by looking at the level of the posterior nipple line in comparison to the inframammary fold. On the CC view it helps by indicating if all the breast was properly included on the image and if the nipple marker is centered properly from year to year.
When critiquing the MLO view you must answer the following questions:

1. Is the pectoral muscle wide superiorly with a convex anterior border?
2. Is the inframammary fold open?
3. Are the deep and superficial tissues well separated?

When critiquing the CC view, you must answer the following questions:

1. Is the nipple centered on the image?
2. Is the posterior nipple line measured to within 1 cm of the MLO view?
3. Does the posterior nipple line measure within acceptable limits? (MLO drawn along the axis). A CC view that does not measure within 1 cm of the MLO view indicates that the breast tissue is not fully mobilized anterior and medial during positioning.
4. Is all the medial tissue imaged?
5. Is the nipple centered on the image?
6. Are the deep and superficial tissues well separated?

To determine if the inframammary fold is open, look at the two MLO views in film exhibit E. The nipples in both breasts are rotated medially indicating that the deep and superficial tissues are not well separated and are overlapping the posterior fat.

Without a nipple marker it would be harder to determine the answer to the question above. Look at these two CC views in film exhibit C in the right CC the nipple is centered. In the MLO the nipple is exaggerated medially which tells us the medial tissues are not senting.

Look at the two MLO views in film exhibit F. The pectoral muscle is large, the breasts are sagging and do not have adequate anterior compression.

In the right CC the nipple is centered. In the left CC the nipple is rotated laterally on the MLO view indicates that the lateral tissue was not fully mobilized anterior and medial during positioning.

As you can see in the MLO views in film exhibit H, the nipple marker is a valuable tool in comparing positioning from year to year or facility to facility. The nipple marker is also valuable on the spot or spot magnification films for repositioning and referencing the area of concern and additional landmarks in the breast tissue in a 4-view fashion. The measurement for the spot views are much easier, faster and accurate for the technologist and the use of a nipple marker.

When measuring the posterior nipple line in the MLO and CC projections, the rule is that the CC view must measure within 1 cm of the MLO view (MLO drawn along the axis). A CC view that does not measure within 1 cm of the MLO view indicates that the breast tissue is not fully mobilized anterior and medial during positioning.

A landmark for the posterior nipple line measurement tool is a sharp nipple marker. A blurry nipple marker is a valuable indicator of motion blur, see exhibit I. If you are questioning motion on your images look closely at your nipple markers. If they are blurry or not visible you have answered your question.

When critiquing the CC view, you must answer the following questions:

1. Does the breast tissue cover the whole breast?
2. Are the deep and superficial tissues well continued?
3. Is the breast tissue well rotated?
4. Is the nipple centered on the image?
5. Are the deep and superficial tissues well separated?

In the MLO view we must look at the pectoral muscle with a nurse's patient's hand in it. In agreement with a nurse anterior border is the lowest point of the nipple later. You can be asked what 65% of women. The pectoral muscle is the most difficult area to capture opacity when positioning the patient due to the large muscle mass. This can be achieved with 85% of women.

The nipple marker is an excellent reference for diagnosing when the breast tissue is compressed to the level of the nipple on the image. As a result for the CC anterior compression we can visually identify, we can use our sense of touch to locate the nipple in the CC view. We use our hands and positioning the CC view to optimize, maximize and secure the tissue prior to compression.

The nipple marker is a valuable tool in this process. A nipple that has not moved medially on the MLO view is a good indication that the patient was not fully turned into the unit. A nipple that rotated medially on the MLO view indicates that the lateral tissue was not fully mobilized anterior and medial during positioning.

Motion blur on a mammogram is more detrimental to breast cancer detection than poor contrast. Even the most subtle motion can affect diagnostic information on the image. There are times it is questionable on the image has motion. This is both for the double barrel effect and compare with the image the same study. This nipple marker is a valuable indicator of motion blur, see exhibit I. If you are questioning motion on your images look closely at your nipple markers. If they are blurry or not visible you have answered your question.

The nipple marker on the screening mammogram will assist the technologist performing the diagnostic views. The nipple marker is a valuable tool in comparing the diagnostic views to the orthogonal views in the same study.

It is important that positioning is optimal and consistent from year to year in order for the technologist to understand the positioning of the patient, understand the positioning of the patient, and understand the positioning of the patient. The nipple marker on the screening mammogram will assist the technologist in obtaining the diagnostic views. This is especially valuable when performing diagnostic views of a difficult anatomy. The nipple marker is also valuable on the spot or spot magnification films for repositioning and referencing the area of concern and additional landmarks in the breast tissue in a 4-view fashion. The measurements for the spot views are much easier, faster and accurate for the technologist and the use of an anterior compression view is quickly identified. Similar to using your sense of touch to locate the nipple marker in the CC view, we use our hands and positioning the CC view to optimize, maximize and secure the tissue prior to compression. The nipple marker is a valuable tool in this process. A nipple that has not moved medially on the MLO view is a good indication that the patient was not fully turned into the unit. A nipple that rotated medially on the MLO view indicates that the lateral tissue was not fully mobilized anterior and medial during positioning.

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Nipples are not always naturally in the perfect position. In the C.O. view if the nipple points lateral, this indicates we are missing some lateral tissue, refer to exhibit A.

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Hint: When applying a nipple marker to a protruding nipple, apply it around the protrusion of the nipple; do not flatten the nipple with the marker. If the nipple is flattened, the marker will pop off on one side when compression is applied.

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