
Skin Marking in Mammography Beneficial for Radiologists, Technologists, and Patients

Consistent Use of Mole Markers in DBT Improves Clinical Workflow and Patient Safety

Christina V. Jacobs, MD
Director of Breast Imaging
Bronson Health System

Consistent Use of Skin Markers is Vital

In mammography, as in most other clinical specialties, we are always looking for ways to work more efficiently and improve the patient experience. We have found that using skin markers not only facilitates the radiologist's interpretation and improves workflow, it also helps reduce avoidable patient callbacks and increases standardization across exams.

At our institution, we use markers with specific shapes to designate different areas of clinical concern such as palpable lumps, areas of pain or concern, scars, and moles or other skin lesions. This is in accordance with recent guidelines from the American College of Radiology (ACR) that state "Facilities should require consistent use of radiographically distinct markers to indicate palpable areas of concern, skin lesions, and surgical scars."¹ The ACR has a big impact on our practice and guides us in the standards and protocols we use every day.

We perform both 2D full field digital mammography (FFDM) and 3D mammography or digital breast tomosynthesis (DBT) and use skin markers designed specifically for DBT that generate less artifact.

Why Moles Pose an Interpretation Challenge in DBT

While variation in equipment, technique, patient positioning, and anatomy are commonplace in all mammography,

identifying skin lesions in DBT is inherently more challenging than in traditional 2D digital mammography. Using mole markers is particularly helpful to address these challenges.

- Some manufacturer's equipment may add five extra reconstructed slices to the compression paddle side to eliminate the possibility of displaying the breast incompletely, thus causing a skin lesion to not appear on the initial slices. This means that in small breasts, lesions will appear to localize closer to the detector side of the scroll bar.²
- In addition, if the paddle flexes, an anterior skin lesion will be on a deeper slice because the breast is thickest at the chest wall.³ A skin lesion may not appear on the initial slices when the lesion is on a curved surface of the breast that is not in contact with the detector or compression plate.
- Rolling of the breast on the orthogonal view can change apparent skin lesion location and mislead the radiologist.⁴ In larger breasts, the craniocaudal (CC) view is more susceptible to this rolling of superficial tissue.⁵

"Skin markers save the radiologist time, decrease avoidable callbacks, and improve patient safety."

This variation can result in things not being where you expect them to be on one view versus another or not being in a consistent location from year to year. This can be especially true for superficial skin lesions in women whose breast tissue is very pliable and tends to stretch more.

The manner in which the tissue is spread out by the technologist can also make a difference. Moles that are closer to the chest wall where the tissue is less mobile tend to be more consistent and have less variation in their image location from year to year or view to view.

However, moles that are further out on the breast can, depending on anatomy and positioning, be represented in significantly different locations. If a skin lesion is in the lateral portion of the breast, the true lesion location will be inferior to what is shown on the mediolateral oblique (MLO) view. If the skin lesion is located in the medial breast, the lesion will be superior to what is shown on the MLO view. This has led to the mnemonic “lateral lesions move lower.”⁶

In some instances, moles may even look like they’re in a completely different quadrant.

Figure 1 shows a R MLO view from four different years. The skin mole is marked with a circular skin marker on the

far left image. These images demonstrate the potential for significant variability in location of the skin lesion due to movability of the skin during positioning.

“Using skin markers lets you correlate with 100% certainty that it is the same finding on the two views.”

Mole Markers Reduce Avoidable Callbacks

To further emphasize how skin markers clarify findings and improve interpretation, Figure 2 shows a L CC view with a circular marker denoting a skin mole. Figure 3 shows the corresponding MLO view. The retroareolar asymmetry on the CC view would not be as obvious as corresponding to the skin lesion on the MLO view without the mole marker. If the marker had not been placed during the screening exam, this patient would have been called back for additional views. Having the skin marker lets you correlate with 100% certainty that it is the same finding on the two views.

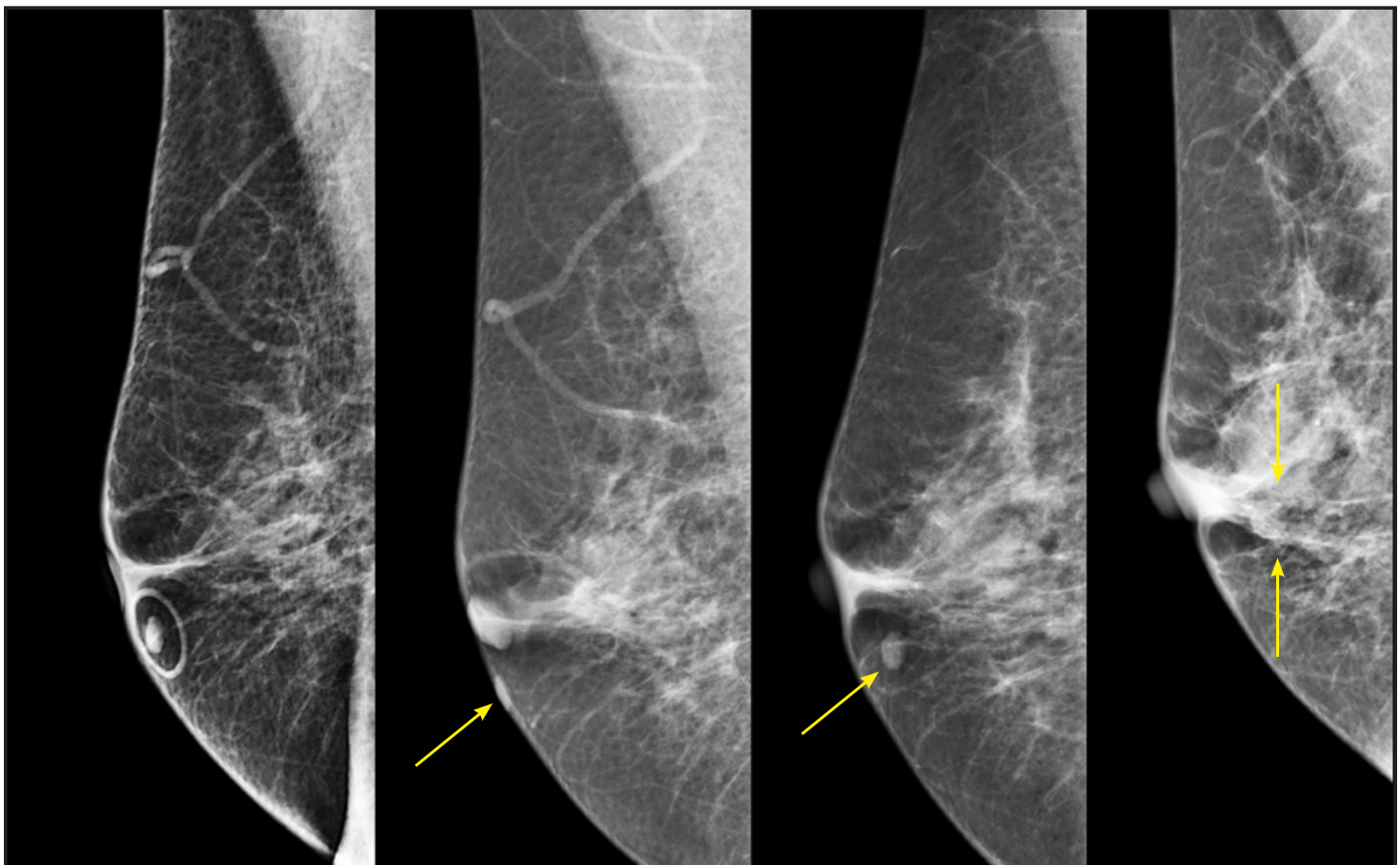


Figure 1. Screening mammogram from four different years demonstrating significant variability in location of skin lesion.

Improved Communication and Workflow

In a health system such as ours that has multiple facilities, having a standard protocol for the use of skin markers decreases the chance of misinterpretation and improves communication between the technical staff and the radiologists.

Figure 4 shows the CC view of a patient who was imaged without any skin markers. A potential mass was identified and the patient returned for additional imaging. When the patient returned, the technologist noticed a mole in the area of concern and marked it with a circular mole marker, as shown in Figure 5, thus allowing us to confirm this was a pseudolesion from a skin mole and not a mass.

When our technologists use markers with specific shapes to indicate areas of concern such as moles it makes our workflow more efficient.

When I'm reading an exam with skin markers, I know what each shape means. This facilitates efficient interpretation and reduces the need to review technologist's notes on prior exams. It saves time, decreases avoidable callbacks, and makes it safer for the patient.

Breast Maps Alone Are Not Sufficient

Our technologists are required to note the area of interest or concern on the breast map in our electronic reporting system, regardless of whether they mark the area with a skin marker or not.

However, the drawing is just a mock-up and is not exactly what you see on the CC and MLO views. Plus, patients have variability in their breast size and pliability of the breast tissue that can affect location on the image. It doesn't always match the drawing, and the breast map doesn't always correspond with where an area might end up on the actual image. It leaves room for potential misinterpretation. Therefore, using skin markers is important even when there is a breast map.

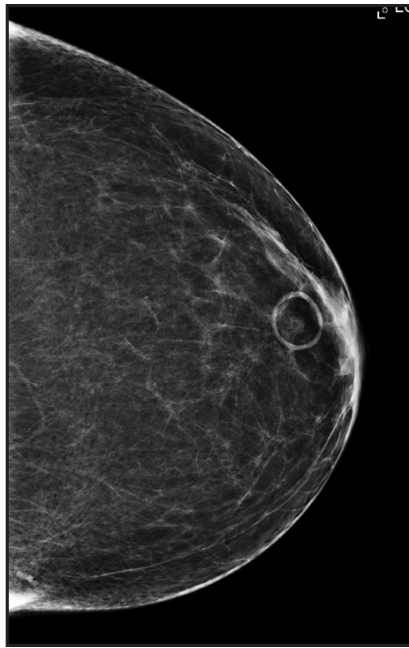


Figure 2. Mole marker on CC view.



Figure 3. Corresponding mole marker on MLO view. Without mole marker, patient would have been called back for the CC finding.

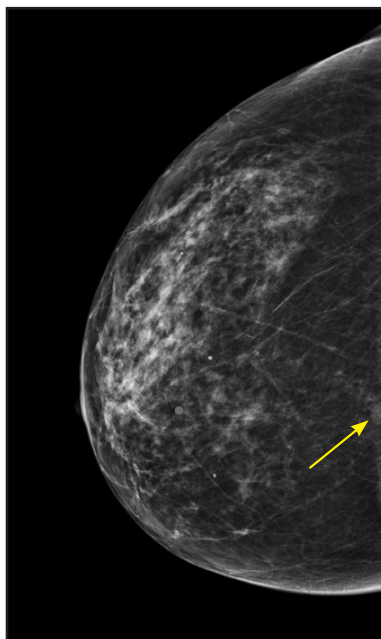


Figure 4. Area of concern.

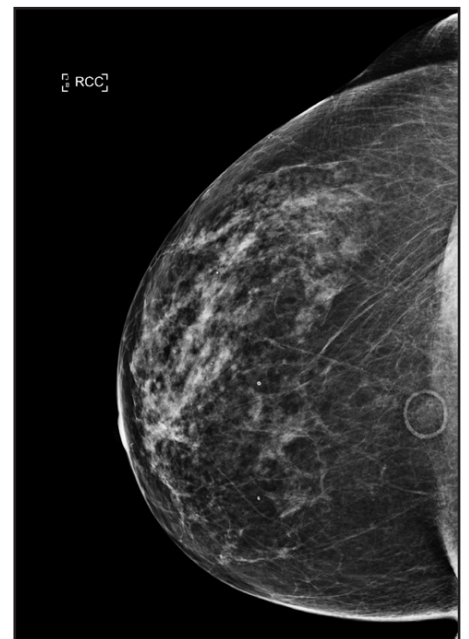


Figure 5. Technologist noticed mole in area of concern and placed skin marker. This confirmed it was a pseudolesion from a skin mole and not a mass.

Skin Markers Broadly Beneficial

Using skin markers has been very beneficial for our practice. They improve the efficiency and workflow of our radiologists and improve communication between the technologists and radiologists by eliminating guesswork. It makes for a much more standardized process.

For the patient, reducing avoidable callbacks means we can minimize inconvenience, anxiety, and additional radiation exposure. It makes the overall experience that much better for our patients.

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About the Author

Christina V. Jacobs, MD, is a board-certified radiologist with Advanced Radiology Services and is the Director of Breast Imaging at Bronson Health System in Kalamazoo Michigan. Dr. Jacobs also serves as Medical Director of the Breast Program Leadership Committee at

Bronson and is a Clinical Assistant Professor at Western Michigan University School of Medicine and Michigan State University College of Human Medicine. She attended New York University School of Medicine and completed her residency at the University of Rochester where she was Chief Resident.

References:

- 1 The American College of Radiology, ACR Practice Parameter for the Performance of Screening and Diagnostic Mammography, Revised 2018 (Resolution 35), retrieved from <https://www.acr.org/-/media/ACR/Files/Practice-Parameters/Screen-Diag-Mammo.pdf>.
 - 2 The American College of Radiology, ACR BI-RADS® Atlas – Mammography, Digital Breast Tomosynthesis (DBT) Guidance, (A supplement to ACR BI-RADS® Mammography 2013), retrieved from <https://www.acr.org/-/media/ACR/Files/RADS/BI-RADS/BI-RADS-Digital-Breast-Tomosynthesis-Supplement.pdf>.
 - 3 Ibid.
 - 4 Lesion localization using the scroll bar on tomosynthesis: Why doesn't it always work?, Friedewald, Sarah M. et al., Clinical Imaging, Volume 47, 57 - 64.
 - 5 Ibid.
 - 6 Ibid.
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