

Tomosynthesis and Skin Markers

Why Marking Remains a Best Practice in Advanced Breast Imaging

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3D mammography in the form of digital tomosynthesis represents a tremendous breakthrough in the early detection of breast cancer. With 3D mammography, cancer detection rates increase from 4.0 to 5.4 per 1000 screening mammograms and the rate of detection of invasive disease increases from 2.8 to 4.3 per 1000 screening exams.¹

According to the American College of Radiology (ACR) practice guidelines and technical standards for 2D screening and diagnostic mammography, skin markers may be used to identify areas of clinical concern (e.g. palpable masses, postsurgical changes).²

Beekley Medical surveyed radiologists across the country who are using tomosynthesis and asked them if they still used skin markers and if yes, why.³

Do Radiologists Continue to Find Skin Marking a Valuable Communication Tool?

According to the survey, yes. The following represents a synopsis of the comments received as to why radiologists still find skin markers to be a valuable communication tool in 3D mammography.

Rationale for using mole markers in 3D mammography:

Not all moles are obvious skin lesions on tomosynthesis. Mole markers can help reduce callbacks, unnecessary work-ups, or misinterpretation of a benign finding as a breast lesion. In addition, mole markers are extremely helpful for clarifying the presence of a skin lesion on the 2D mammography image on tomosynthesis.

Rationale for using nipple markers in 3D mammography:

Nipple markers are always cited by those using them on every patient as the best way to track the nipple during positioning. Tracking the nipple marker with one's finger helps to keep the nipple in profile, especially when there is natural medial or lateral deviation.

Identifying nipples in profile is usually straightforward on tomosynthesis. However, in those situations when the nipple is not in profile (e.g. the surgically altered breast), a nipple marker can help to accurately localize its position. This can help avoid mistaking an abnormality as a nipple out of profile, or a nipple out of profile as a suspicious lesion – thus avoiding further work-up and extra radiation dose to the patient.

The nipple marker is also extremely helpful for eccentrically placed nipples, inverted nipples, and on all male patients.

Rationale for using scar markers in 3D mammography:

Because signs of a prior surgical intervention (e.g. postoperative architectural distortion) remain nonspecific on tomosynthesis, it is important to communicate that a finding may be the result of a prior procedure and not a new cancer. This helps to reduce callbacks, increases positive predictive value of mammography, and helps to reduce anxiety in patient's status post-breast conservation.

Rationale for using palpable mass or point of pain markers in 3D mammography:

Marking a palpable or painful abnormality helps to correlate clinical findings with the mammographic findings. This is in addition to localizing the area of clinical concern to a particular breast quadrant which increases the positive predictive value of diagnostic mammography. Using markers is especially helpful when the radiographic findings are subtle. Some practitioners place their cursor over the palpable marker and scroll through their tomosynthesis images knowing the cursor will communicate the location of the marker.

What about Artifact from Dense Objects?

The survey also asked radiologists to comment on any challenges arising from artifact due to dense objects in tomosynthesis.

No radiologist reported artifact from skin markers to be a major hindrance to interpreting images. Several radiologists noted that the low density markers used today do not cause a significant artifact, and that biopsy clips and even some calcifications in the breast can induce a more significant artifact than skin markers on mammography.

Referencing the 2D images and “reading around” the artifact were the most common comments made by the radiologists should an artifact be encountered on a 3D image.

Conclusion:

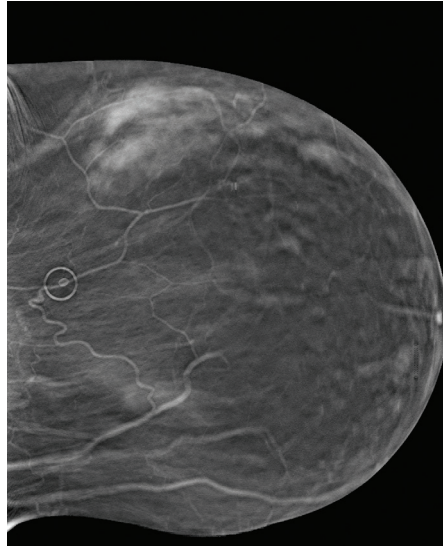
Despite advances in technology, mammography remains one of the most difficult disciplines to master in radiology. As with digital imaging before it, uncertainty regarding imaging findings still occurs on tomosynthesis, which typically increases interpretation time and may lead to unnecessary diagnostic workups for patients. Skin markers continue to add value to interpreting physicians by providing instant visual cues that can help reduce uncertainty and, most importantly, digitally document physical exam findings on mammography.

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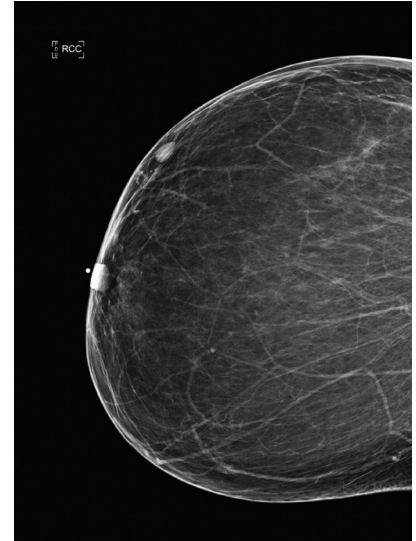
¹ S. Rose, A. Tidwell, L. Bujnoch, et al., “Implementation of Breast Tomosynthesis in a Routine Screening Practice: An Observational Study,” *American Journal of Roentgenology*, 200:6, 1401-1408, 2013.

² *ACR Practice Guidelines for the Performance of Screening and Diagnostic Mammography*, Revised 2013 (Resolution 11)

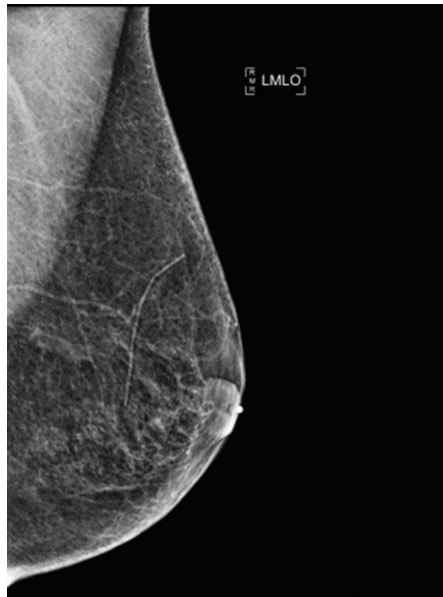
³ Survey Monkey, “Tomosynthesis and Skin Marking – Radiologist Survey”, Beekley Medical, April 23, 2013



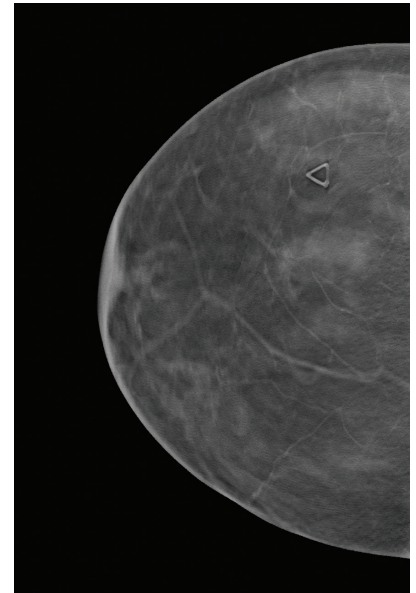
Mole Marker on a 3D image*



Nipple Marker on a 3D image*



Scar Marker on a 3D image*



Palpable Mass Marker on a 3D image*

