

# Tomosynthesis in Multimodality Imaging

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Tomosynthesis has revolutionized the practice of mammography. More than just reducing false positive recalls and increasing cancer detection in screening, it is improving the diagnostic workflow as well. Work ups are expedited, as far fewer additional images are required to fully characterize lesion morphology and location, permitting many women to avoid additional mammographic imaging and undergo directly ultrasound. At another level, the combination of tomosynthesis information along with findings on ultrasound or MRI can yield a far better diagnostic assessment than what we have been achieving with conventional 2D mammography. The combined information from these imaging tests allows us to increase our sensitivity and specificity of interpretation. PPVs for biopsy recommendations are dramatically increased. This profound improvement in interpretation will greatly benefit patients and mammography in general, and our clinical colleagues will have greater appreciation for and value the information we provide them with.

### **Adequate assessment of tomo images:**

Using tomosynthesis properly first relies on careful assessment of the tomosynthesis images. This involves careful scrolling through images in the standard projections, often looking for subtle findings and carefully localizing findings to a specific region of the breast. Sometime spot tomosynthesis views can be useful for very subtle or one view only findings. With careful assessment of the tomo images, the level of suspicion of the finding is already well established.

Steps in tomo assessment:

1. Using the CC and MLO projections properly.
2. Is it real? Is it new or possibly stable?

3. Where is it located?
4. Are the tomo features benign or suspicious?
5. Tomo assessment of calcifications may reveal masses or asymmetries not appreciated on 2D. These may be benign, such as in fibrocystic changes (milk of calcium), or suspicious, such as in DCIS or invasive cancers. Look carefully. It may both help determine the level of suspicion of the lesion as well as provide easier biopsy guidance.

### **Targeted Ultrasound for tomo findings:**

Ultrasound goes hand in hand with tomosynthesis. Both for its negative predictive value – i.e. a normal US helps establish a questionable or ‘soft’ tomo finding as likely normal – and its positive predictive value – a correlative characteristically benign or suspicious US finding helps determine final BIRADS. In challenging tomo cases such as architectural distortion or small asymmetries, subtle US findings will be expected. Lesions may be found on careful US scanning that might otherwise have been missed. Meticulous US scanning can further define a lesion as real or not and fine tune the level of suspicion. And further, will facilitate biopsy if found by US.

### **Steps in US assessment:**

1. Location in breast. Distance from nipple on US is different than what is measured on mammography and therefore not absolutely reliable. In mammo/tomo imaging the breast is stretched and compressed, not supine. Clockface location is probably most important with distance from nipple variable depending on breast composition and size.
2. Landmarks such as cysts or lymph nodes in the vicinity of a subtle tomo finding may aid in detection.

3. Subtle distortion or disruption of architecture can be seen in cases of radial scars/complex sclerosing lesions and invasive carcinomas, particularly invasive lobular. These are found more commonly now with tomosynthesis, and often pose a diagnostic challenge. US assessment can help in management. More obvious, suspicious US findings may point to malignancy, whereas negative or extremely subtle findings may support radial scar.
4. Use of a skin marker ('BB') placed on the skin directly overlying US findings with subsequent tomo spot images obtained can be very helpful to correlate findings and is encouraged. This allows better determination of whether the US and tomo findings match and the degree of suspicion.

## **“Second Look tomo” for Screening US or MRI findings**

As more screening US is being performed in women with dense tissue and MR for high risk or newly diagnosed cancer patients, many false positive findings occur. Reducing false positives in these modalities should be a goal. Careful review of tomo images is encouraged to further assess and refine level of suspicion of such findings. For MR findings, is there a stable small mass noted hiding in the tissue, possibly representing a lymph node or fibroadenoma? For US, could small hypoechoic areas or small oval masses be seen on tomo to be stable? If the tomo shows only normal tissue, could the finding be an artifact or otherwise less suspicious?

A great deal of information can be gleaned by careful review and correlation of these different modalities. The whole is greater than the sum of the parts! Combined analysis should decrease the number of false positives and improve the PPV

of breast imaging, resulting in more directed management of suspicious cases and fewer patients undergoing unnecessary biopsies.

Interactive case examples will highlight and demonstrate the techniques and tips presented.