

AbstractID: 1390 Title: Dual-energy digital mammography for calcification imaging: a phantom study

**Purpose:** Overlapping tissue structures on mammograms may obscure small calcifications that are essential to the early detection of breast cancer. We report on a full-field dual-energy digital mammography (DEDM) technique that suppresses tissue structures and enhances the visualization of calcifications.

**Materials and Methods:** The DEDM calcification images were constructed from separately acquired low- and high-energy images using a nonlinear inverse-mapping function. We imaged a special phantom with calcification clusters of different thicknesses (ranging from 250 to 800 microns) placed over 5 cm thick breast-equivalent tissue of varying tissue composition (100% adipose to 100% glandular tissue). The images were evaluated on soft-copy display to determine the smallest calcification size visible over the different tissue compositions. Algorithms for noise reduction in the DEDM images were also explored.

**Results:** Although the DEDM calcification image showed increased noise, all calcifications larger than 300 microns were visible over all tissue compositions. Although most calcifications of size 250-300 microns were also visible, their visibility was sensitive to the image window and level settings. Use of correlated noise reduction techniques significantly reduced the image noise and improved the visibility of calcifications smaller than 300 microns.

**Conclusions:** DEDM could be used to suppress the contrast due to overlapping tissue structures and aid visualization of calcifications clusters larger than 300 microns. The DEDM images contained higher noise that could be reduced using correlated noise reduction techniques.

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