

Purpose:

The goal of this study was to investigate the effect of varying geometric magnifications on the edge definition as well as conspicuity of calcifications in images obtained using a full field digital mammography system.

Method and Materials:

Images of the wax insert of an ACR mammography phantom, sandwiched between two clear acrylic slabs simulating scattering in breast tissue were obtained on flat panel FFDM system at five different geometric magnifications between 1.4 and 2.2 plus a contact image. The x-ray technique was the same for all images. All images were viewed on a soft copy work station. Observers were asked to judge the quality of the images in terms of edge definition (largest speck group) and conspicuity (two smallest speck groups) and assign a score on a scale of 1 to 4 for each speck in the group.

Additionally, the system MTF was measured using the edge method at each of the magnifications in order to correlate the system response with the observer scores. The MTF was measured in the anode-cathode (AC) direction as well as perpendicular (LR) to it.

Results:

The trends in the scores indicated that the conspicuity of the smallest speck group increased with magnification. The edge definition of the largest speck group was found to increase and then decrease depending on the magnification, reaching a maximum at a magnification of 1.6. This correlates well with the measured MTF in the LR direction.

Conclusion:

Geometric magnification improves image quality in digital mammography. Conspicuity of the smallest calcifications improves with magnification. However, this is accompanied by a decrease in the edge definition of the larger calcifications after a magnification of 1.6. The optimum magnification depends on the specific task (edge definition or conspicuity).

Conflict of Interest: NA