Increasing Mammography Tissue Acquisition through Positioning Training and Use of a Foam Breast Cushion

National Consortium of Breast Centers
16th Annual National Interdisciplinary Breast Conference
March 12–15, 2006 - Las Vegas, Nevada

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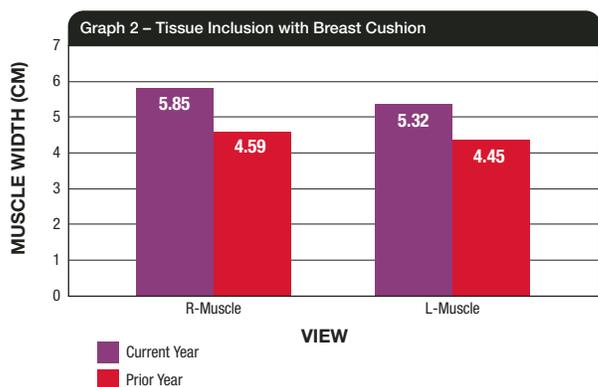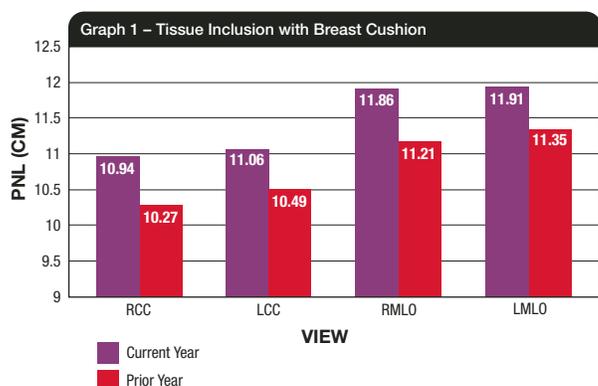**Springfield, MO**

Objective

Proper positioning of the breast is crucial in mammography.[1] A patient's breasts must be properly placed, and held in place during compression for the duration of each view, to obtain adequate image quality for breast cancer detection.

Numerous obstacles can interfere with good positioning. Many patients find the positioning procedure uncomfortable and will not permit the technologist to pull the necessary breast tissue onto the image receptor or apply sufficient compression to achieve a high-quality image. In addition, certain patient populations are difficult to position for a variety of anatomical reasons. Finally, some technologists lack the skills to maximize breast positioning.

Anecdotal reports and preliminary studies have shown that an FDA-cleared mammography aid called MammoPad®—a radiolucent foam cushion that adheres to the mammography device—is useful in improving breast positioning.[2] This current study was undertaken to measure tissue acquisition differences in mammograms when the cushion was used and technologists were given training in positioning.

Methods

- **Image comparison.** Images from each subject's most recent previous mammogram at the same facility (none of them taken using the breast cushion) were compared to new images taken of the subject, using the breast cushion and after technologists had received the training. In all cases, analog images were compared only to other analog images, and digital images were compared only to other digital images.

Graph 1 – Tissue Inclusion with Breast Cushion

PNL (CM)

	RCC	LCC	RMLO	LMLO
Current Year	10.94	11.06	11.86	11.91
Prior Year	10.27	10.49	11.21	11.35

VIEW

Current Year
Prior Year

Graph 2 – Tissue Inclusion with Breast Cushion

MUSCLE WIDTH (CM)

	R-Muscle	L-Muscle
Current Year	5.85	5.32
Prior Year	4.59	4.45

VIEW

Current Year
Prior Year

View	Current Year (with MammoPad)	Prior Year (without MammoPad)	Difference (Current – Prior)	P-value
RCC	10.94	10.27	0.67	0.000
LCC	11.06	10.49	0.57	0.000
RMLO	11.86	11.21	0.65	0.000
LMLO	11.91	11.35	0.56	0.000

View	Current Year (with MammoPad)	Prior Year (without MammoPad)	Difference (Current – Prior)	P-value
R-Muscle	5.85	4.59	1.26	0.000
L-Muscle	5.32	4.45	0.87	0.000

Participating Breast Centers

- 7%
- 17%
- 76%

Legend:
- Non-Academic
- Academic
- Physician-Owned
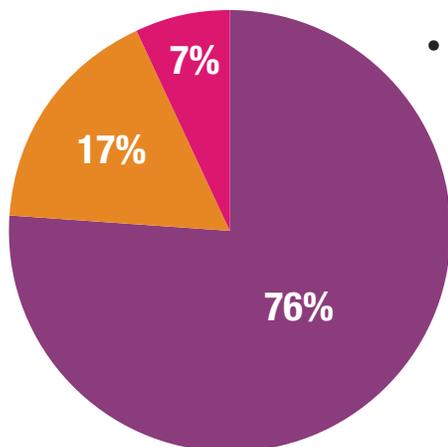
- **Subjects.** Mammograms for 211 patients from 31 facilities were studied. Facilities included a range from large hospitals to small breast centers. This study includes both analog and digital facilities.

- **Technologist training.** All technologists received a 2-hour, ASRT-approved course, including training specific to the use of the cushion.

- **Mammogram.** A standard 4-view mammogram was performed with the cushion applied to the mammography device.

  - **Measurements.** To determine tissue acquisition, the posterior nipple line (PNL) on both craniocaudal (CC) and mediolateral oblique (MLO) views was measured.

  The width of the pectoralis muscle visualized was also measured for 169 of the patients, since the amount of pectoralis muscle in the image strongly correlates with the amount of posterior tissue visualized and overall image quality.

  The pectoralis muscle was measured at its widest visible point.

  The exam using the cushion was then compared to the patient's most recent prior mammogram.

- **Time span.** The data was collected between November 2004 and December 2005.

Results

- All four views showed statistically significant greater tissue acquisition when the cushion was used (p-value for all measurements = 0.000).

- The differences for the right and left craniocaudal views were 0.67 cm and 0.57 cm, respectively.

- The differences for the right and left mediolateral oblique views were 0.65 cm and 0.56 cm, respectively.

- Differences for the pectoralis muscle visualized were also statistically significant in favor of the cushion. Differences for right- and left-side views were 1.26 cm and 0.87 cm.

Measuring the PNL

Tammy Coryell and technologist train with MammoPad

Conclusion

Using the breast cushion in mammography, combined with positioning training, yielded significant benefits for tissue acquisition. The cushion-specific benefits are likely due to two attributes of the cushion:

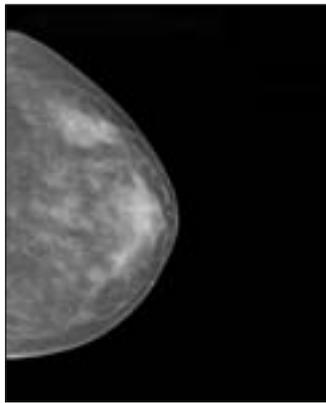A grip-like surface, which helps hold a properly positioned breast in place.

The cushion's ability to significantly reduce breast positioning-related discomfort.

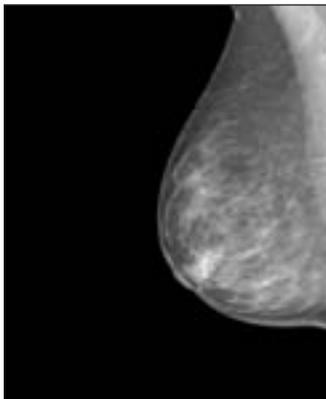For all views, an average of 0.6 cm additional tissue was acquired with training and use of the breast cushion.
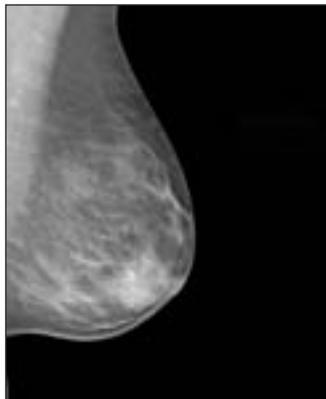
2004 Images without MammoPad
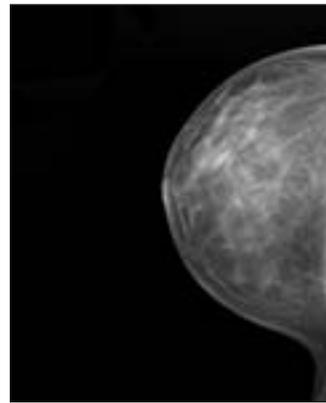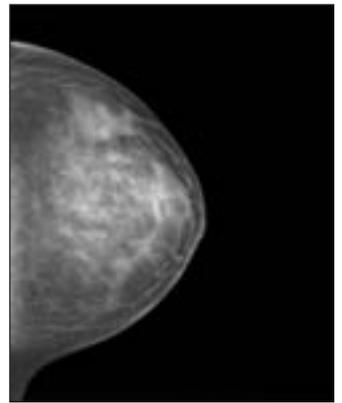

RCC 2004, 9.0cm

LCC 2004, 10.0cm

RMLO 2004, 12.0cm
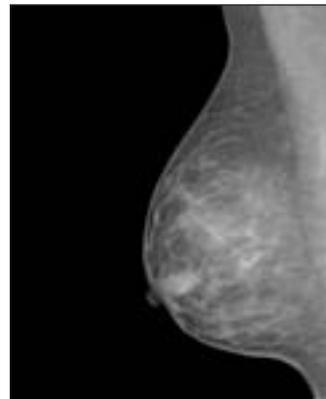

LMLO 2004, 12.5cm

2005 Images with MammoPad

RCC 2005 with MammoPad
10.25cm (+1.25cm)

LCC 2005 with MammoPad
11.5cm (+1.5cm)

RMLO 2005 with MammoPad
13cm (+1cm)

LMLO 2005 with MammoPad
12.75cm (+.25cm)

References

1. Taplin S., et al. Clinical Image Quality and the Risk of Interval Breast Cancer: AJR 2002; 178: 797-803.
2. Everett-Massetti, E and Watt, A.C. Use of a Mammography Comfort Aid and Education to Improve Breast Positioning: NCBC Poster 2005.