Motivation
Current screening practices for patients with augmentation mammoplasty create unwarranted outcomes:
• Doubles radiation dose to patient
• Causes pain to patients with implant encapsulation
• Drastically increase the total imaging time, reducing patient throughput

Goal
Determine the feasibility of s-DBT as an effective screening tool for patients with augmentation mammoplasty.

Methods
Mammoplasty models were created using a combination of BR3D phantom slabs (CIRS Model 020) and Natrelle brand implants (Allergan, Inc.).
• Either two or four BR3D slabs were used (one was the target slab).
  - 6 spec clusters (400 µm - 130 µm in diameter)
  - 7 fibers 10 mm in length (150 μm - 600 μm in diameter)
  - 6 spheroidal masses (1.8 mm - 6.32 mm in diameter)
• 200 cc saline and gel silicone implants, 400 cc saline implant

All models were imaged on an s-DBT system and on a Hologic Selenia Dimensions using 2D mammography.
• Equivalent entrance doses were used between modalities.

All images were scored by a trained radiologist by counting the number of visible structures.

Results
In all models, s-DBT performed better or equivalent to 2D mammography in visualization of fibers, masses, and specs.

From the plot above, it can be seen that there is no significant difference between s-DBT and 2D mammography in visualization of specs (p > 0.01).

S-DBT significantly outperformed 2D mammography in visualization of fibers (p < 0.01). An average of 3 more fibers were visible in s-DBT than 2D mammography for each model.

When imaging masses, s-DBT significantly outperformed 2D mammography (p< 0.01). An average of 2 more masses were visible in s-DBT than 2D mammography for each model.

Advantages over DBT systems
• Higher spatial resolution than continuous motion DBT systems (for visualization of microcalcifications)
• Faster acquisition time than DBT systems
• High system stability
• Capable of producing various configurations without a change in spatial resolution

Conclusions
• S-DBT significantly outperformed 2D mammography in visualization of fibers and masses.
• There was no statistical difference between s-DBT and 2D mammography in visualization of microcalcifications.
• An s-DBT system could be a valuable tool for screening patients that have breast augmentation. S-DBT could have a potential decrease in pain, radiation dose, and an increase in patient throughput for these patients.

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References