

# Addition of Metamucil to Gelatin for a Realistic Breast Biopsy Phantom

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Some expertise as well as hand-eye coordination is required to perform a successful sonographically guided breast biopsy. A simple phantom allows beginners to practice freehand, real-time sonographically guided needle biopsy, aspiration, core biopsy, and needle localization. Several homemade sonographic biopsy phantoms have been proposed, using agar,<sup>1-3</sup> gelatin,<sup>4-6</sup> liver,<sup>7,8</sup> and turkey breast.<sup>9</sup> The addition of Metamucil (Proctor & Gamble, Cincinnati, OH) to gelatin results in an echogenic medium that resembles anatomic breast tissue to facilitate the teaching of freehand biopsy techniques of the breast.

## Materials and Methods

The gelatin-Metamucil phantom is prepared using common low-cost household materials. In a 4-qt microwave-safe container, prepare a mixture of 4 envelopes of Knox Gelatine (Kraft Foods Inc, Northfield, IL) with 2 cups of water. Add 1 tablespoon of Metamucil to this mixture, and microwave for 2 minutes. Add 2 more cups of cold water to this mixture and let it cool for 5 to 10 minutes. If an opaque mixture is desired, a food coloring agent or diet gelatin can be used or added to the gelatin-Metamucil mixture. This mixture is poured into zip lock bags, and targets are placed into the gelatin-Metamucil mixture with the depth varied from 0.5 to 5.0 cm (Figure 1).

Place the zip lock bags into a freezer for 4 to 5 hours; rotate every 10 minutes to ensure that the targets are centrally located in the bags. Then leave the bags in a refrigerator for 4 to 5 hours and then at room temperature for 8 to 10 hours. The bags can be frozen for future use. This phantom can be reused, provided it is refrigerated between use. The more Metamucil added to the mixture, the more echogenic the phantom becomes.

Targets to mimic solid lesions, including grapes, peas, potatoes, strawberries, and olives, were used (Figure 2).

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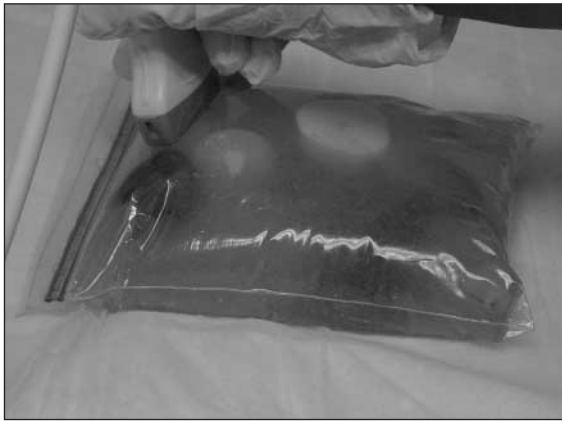


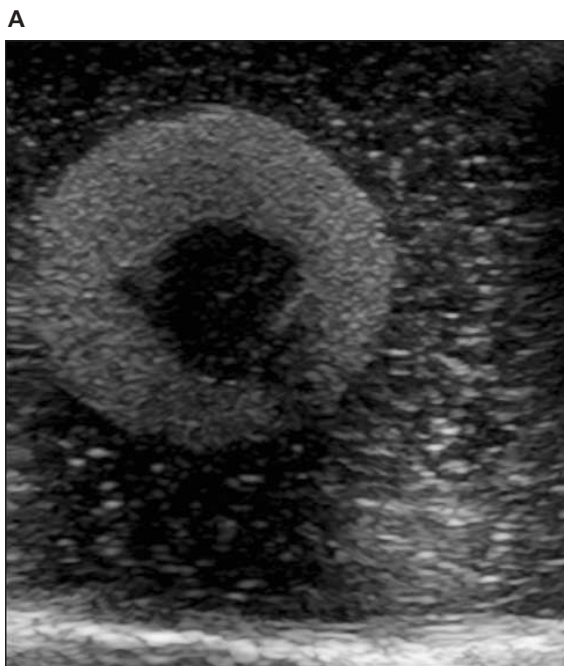
Figure 1. Gelatin-Metamucil breast phantom.

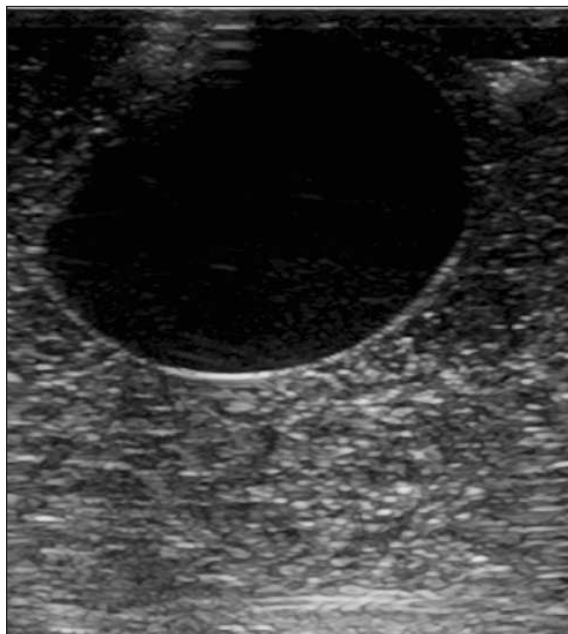
Targets to mimic cystic lesions were created by water-filled balloons (10–15 mm in diameter) made from self-tied latex glove fingers filled with water (Figure 3). Targets for imaging practices, including furry balls for crafts and potatoes, were made to mimic fibroadenomas (Figure 4). Also, furry balls with metallic fibers and strawberries were used to mimic calcified tumors (Figure 5). These targets remain immobile during biopsy.

### Results and Conclusions

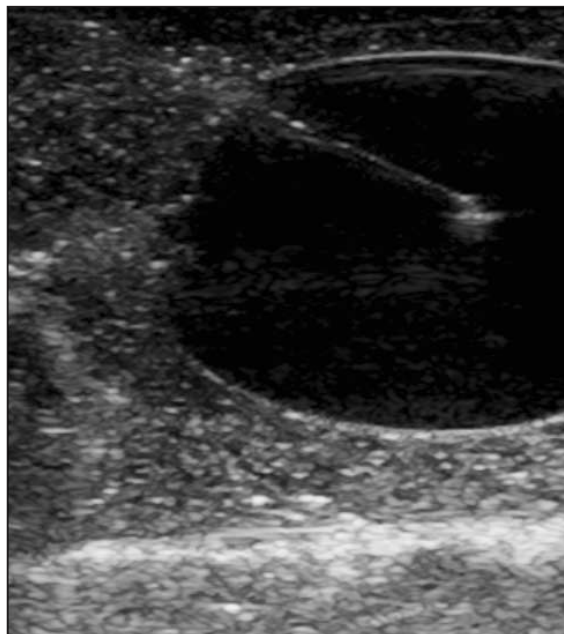
The sonographic texture of the gelatin-Metamucil phantom simulates breast parenchyma. This simple phantom can be made quickly at virtually no cost and can be used to improve performance as well as increase confidence for learning sonographically guided freehand breast biopsy, aspiration, core needle biopsy, and needle localization.

Figure 2. A, Olive. B, Biopsy of olive.





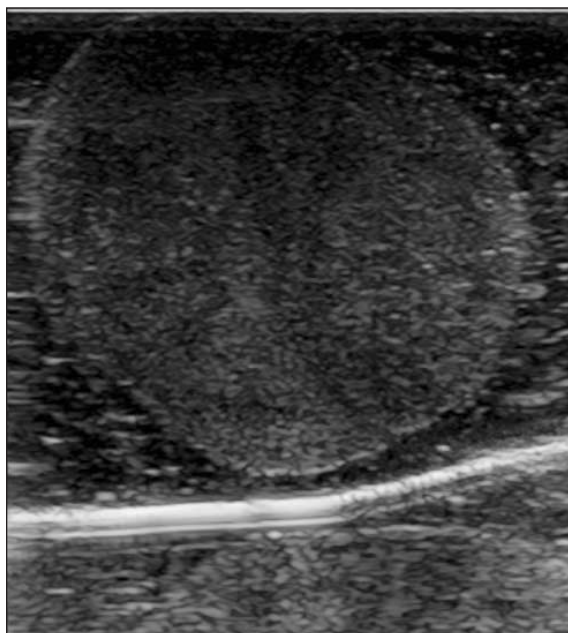
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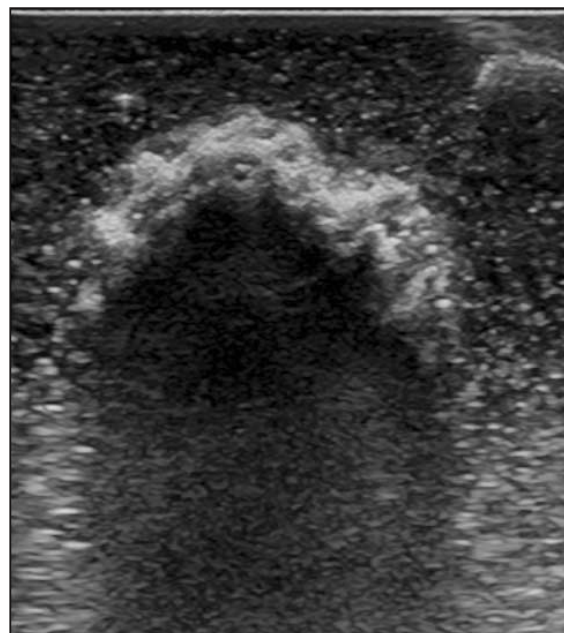
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**Figure 3.** A, Cyst. B, Cyst aspiration.

**Figure 4.** Potato mimic of a fibroadenoma.



**Figure 5.** Strawberry mimic of a calcified lesion.



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