

A gelatine-based ultrasound phantom

When teaching ultrasound-guided central venous access or regional blockade, hand-eye-hand co-ordination using the ultrasound probe and needle simultaneously needs to be learnt before use on patients. Although their tissue properties make chicken breasts or a joint of pork the most realistic training phantoms, their use within the theatre environment is controversial. The use of ultrasound phantoms made from gelatine has been described previously [1, 2], but we found these phantoms unsuitable for anaesthetic use (for example, they lack a three-dimensional outer appearance) and the instructions given to prepare the gels cumbersome.

We propose a three-dimensional phantom rather than just filling a square food jar with jelly. To achieve this, a round salad bowl of ~2 l capacity is used to build up the gel, which is then turned out of its mould. The gel phantom can be made easily by using

commercially available dessert (fruit) gels at a cost of less than £5. The gel can be produced as described on the packaging with a few minor, but important, alterations.

Use quadruple strength gelatine for a more durable and firm result. To suspend target objects in the solution (such as macaroni, grapes, red currants) build up the phantom in layers. Prepare the whole volume of gelatine you are likely to use and keep it warm in a covered bowl in the oven at 50 °C. Fill the first 500 ml of the salad bowl and let the gel solidify in the fridge. Then add additional portions of ~500 ml which you should first gently cool to almost room temperature by stirring in a bowl placed in a cold water bath. This will prevent warm solution re-dissolving the already set previous layers of gelatine. Add the target objects as desired. Each additional layer of gelatine should have solidified before the next layer is applied; this will take ~30 min per 500 ml. A household sponge cloth should be incorporated

into the last layer of gelatine, which will be at the bottom of the phantom once it has been turned out of its mould. This is to absorb ultrasound and prevent reflection artefacts. To turn the solidified gelatine block out of its mould it should be warmed on the outside in a hot water bath.

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References

- 1 McNamara MP, McNamara ME. Preparation of a homemade ultrasound biopsy phantom. *Journal of Clinical Ultrasound* 1989; **17**: 456–8.
- 2 Fornage BD. A simple phantom for training in ultrasound-guided needle biopsy using the freehand technique. *Journal of Ultrasound Medicine* 1989; **8**: 701–3.

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