# Regional Anesthesia Simulation: The Use of Pork for Nerve Block Models

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## Background

Ultrasound-guided regional anesthesia (UGRA)
- innovative
- provides perioperative pain management
- minimizes: perioperative opioid consumption, recovery time, and inpatient hospital stay
- all models do not have human-like structures → unrealistic simulation
- artificial phantoms lack fascial planes that mimic human muscle echogenicity
- lower success rates in the clinical setting

Pork meat models
- allow superior ultrasound-guided needle visibility and maneuvering
- human-like structures → realistic experience
- inexpensive
- disposable
- Injectable (appreciation of local anesthetic spread)

## Clinical Question

Does using pork meat as a nerve block model, compared to other teaching simulation prototypes, influence students' nerve block performance in the clinical setting?
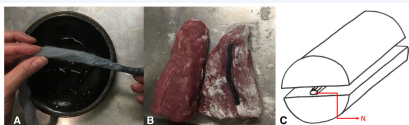


**Fig. 1** Gel soaked yam (a). Yam between the two meat layers sprinkled with meat glue (b). Cartoon representation of assembled model (c). N, nerve.
Naraghi et al, 2019.


Blue phantom

https://images.app.goo.gl/EuZsWmFQAh5xw8um7

## Case Report

- 34-year-old Caucasian female; breast cancer
- Bilateral mastectomy and breast reconstruction with tissue expanders
- Ultrasound-guided pectoralis and serratus place nerve (PECS I & II) blocks
- Bilateral PECS I & II blocks completed by CRNA due to unsuccessful attempts by SRNA
- Fentanyl 100 mcg IV on induction and 50 mcg IV during maintenance
- Smooth emergence with 0/10 postoperative pain
- No additional narcotics in the post-anesthesia care unit
- Hospital admission within one hour



https://nysora.wpenginepowered.com/wp-content/uploads/2018/09/unnamed-5.jpg
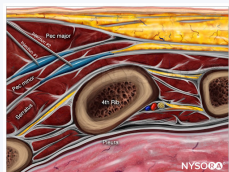
## Evidence-Based Discussion

Ideal UGRA training model
- should look, feel, and behave similarly to the intended educational focus
- facilitates procedural steps, dexterity, target identification, needle guidance, and proper hand-eye coordination
- blue phantoms lack human-like anatomical landmarks and are not injectable
- phantoms do not produce accurate US images or the "feel" of needle manipulation
- cadavers require maintenance and pose ethical concerns
- Cadavers scored comparably to meat models based on sonographic imaging (p=0.24)[7]

## Evidence-Based Discussion (cont.)

Pork meat models
- resemble human-like anatomical landmarks
- fascial planes allow accurate reflection of US waves and needle maneuvering
- can be frozen for future use and disposed of when no longer needed
- facilitate an entire needle picture using ultrasound
- discrimination between injectable and non-injectable tissue
- hydro dissection (local anesthetic spread)
- identification of potential needle tip locations
- "look" and "feel" scores for a blue phantom were significantly lower than meat models (p =0.01)[6]
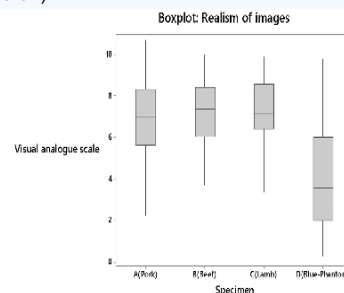


Samuel et al., 2022
Comparison of the realism of the appearance of US images (0 least likely human tissue-10 most likely human tissue)

## Translation to Practice

Pork meat models facilitate:
- 1) an entire needle picture with the in-plane technique, 2) discrimination between injectable and non-injectable tissue, 3) hydro dissection, and 4) identification of potential needle tip locations[1]
- Proposed plan → nurse anesthesia programs to implement pork meat training models in skills lab curricula.

## Implementation

- Analyze regional anesthesia success rates in the clinical setting
- Associate different simulation models with the overall success and complication rates
- Employ only meat models for simulation in an academic curriculum
- Measure outcomes once meat model simulation has been implemented
- Future research could evaluate students' trajectories through simulation labs using meat models and their success rates in the clinical setting after graduation.

## EBP Framework Algorithm and References

Scan this QR code for the algorithm and a complete reference list.
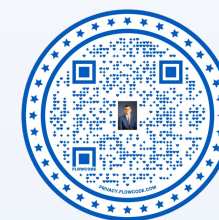


## Questions?

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