



Fake it 'till you make it: a randomized prospective cohort study examining the educational role of ultrasound simulation

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Introduction

- Traditional educational methods for regional anesthesia (RA) struggle to address the procedural aspect of the specialty.
- There is a growing market for technology-guided training in RA.
- This educational prospective randomized trial addresses how we approach novice RA learners with hopes to promote learner performance and confidence, and in turn improve patient safety and outcomes.

Materials & Methods

- All participants completed a baseline survey. Participants were randomized into Group 1 (2 hours of independent study using traditional methods) or Group 2 (2 hours of access to the same materials in addition to an ultrasound task trainer, Valkyrie eZSimulator).
- Both groups performed 3 procedures: in-plane nerve block, out-of-plane nerve block and intravenous access, then completed a post-survey.

Results

- 14 learners completed the study, split evenly between the study groups.
- Per Table 1, time that needle tip was in view was statistically significant for the in-plane nerve block.
- One critical error was encountered in the control group
- There was no difference between the groups in performance of the ultrasound guided intravenous access procedure.
- The control group identified the simulator as more helpful than the intervention group.

Item	Control Group (n=7)	Intervention Group (n=7)	p-Value
<u>In-Plane Block</u>			
Time to Completion (s)	57 (25, 135)	25 (18, 32)	0.14
Number of Redirections	1.0 (0.5,3.0)	0.0 (0.0, 1.5)	0.23
Needle Tip in View (%)	32 (24, 53)	82 (69, 95)	0.05
Critical Error	1 (14)	0 (0)	1.00
<u>Out-of-Plane Block</u>			
Time to Completion (s)	16 (14, 27)	14 (14, 22)	0.95
Number of Redirections	0.0 (0.0, 0.0)	0.0 (0.0, 0.8)	1.00
Needle Tip in View (%)	31 (29, 45)	25 (20, 28)	0.12
Critical Error	0 (0)	0 (0)	1.00
<u>Intravenous Access</u>			
Time to Completion (s)	21 (14, 56)	21 (15, 23)	0.95
Number of Redirections	1.0 (0.0, 1.0)	0.0 (0.0, 0.8)	0.75
Needle Tip in View (%)	38 (22, 41)	21 (17, 41)	0.41
Critical Error	0 (0)	0 (0)	1.00
<u>Survey Data</u>			
Improved comfort	4 (57)	5 (71)	1.00
Improved confidence	6 (86)	5 (71)	1.00
Simulator Helpfulness*	7 (100)	5 (71)	0.46

Table 1. Control versus intervention data. Continuous and categorical data presented as median (25th, 75th percentiles) and frequency (%), respectively. Continuous and categorical data compared using the Wilcoxon rank-sum test and Fisher's exact test.

* Score of 1 or 2 defined as helpful and 3 or 4 as not helpful.

Discussion

- In this randomized prospective trial, increased exposure to an ultrasound task trainer statistically significantly improved needle tip visualization with the in-plane approach to RA.
- Out-of-plane procedural practices may struggle with the fidelity limitations of the current technology.
- Learners endorsed improved comfort and confidence after utilization of the simulation regardless of their group assignment.
- This specific trainer is unique in that it can be operated independently from any location, making practice of RA simple, cost-efficient and independent.
- This study is limited by a small sample size of novice learners.
- Further investigation on a larger scale is warranted to provide clarity on the possible utilization in learning curriculums in the future.

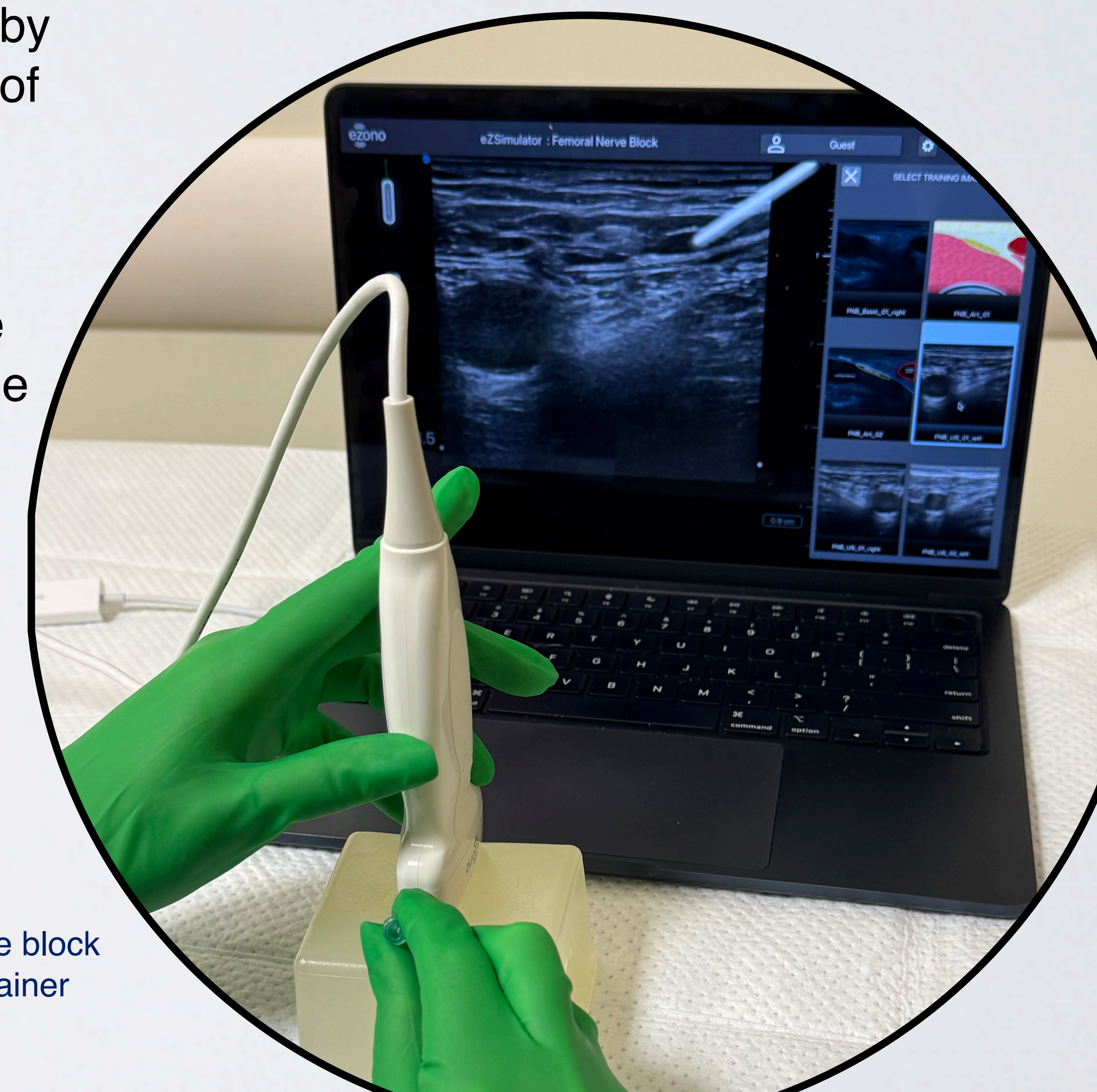


Fig 1. Model of in-plane nerve block simulation using the task-trainer