

ORIGINAL RESEARCH

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MANUFACTURE AND EVALUATION OF AN AFFORDABLE HIGH FIDELITY ULTRASONIC GUIDED RECTUS SHEATH BLOCK MODEL FOR TRAINING IN REGIONAL ANAESTHESIA

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Introduction: Rectus Sheath Block (RSB) is a 'Plan A' regional anaesthesia technique used for perioperative pain management in abdominal surgeries [1]. Anaesthetists must perform these blocks proficiently, yet limited training opportunities reduce confidence and procedural uptake. Simulation training offers a solution, but existing models are often costly or lack anatomical realism. This study aims to develop and evaluate a cost-effective, anatomically representative, and reusable RSB training model.

Methods: This prospective quality improvement project was registered with University Hospitals Sussex NHS Foundation Trust. A portable anterior abdominal wall model was constructed in a 1L storage container using ADAMgel, a low-cost, ultrasound-compatible material, alongside commercially available components such as chia seeds and latex exercise band [2]. The prototype was refined based on expert feedback. Anaesthetists from two hospitals evaluated the model by performing ultrasound scanning and needle insertions, on the 22/01/2025 and 07/02/2025 respectively. Feedback was then collected via an online questionnaire assessing ease of use, anatomical realism, needling practice, and overall usefulness on a 5-point Likert scale. Free-text responses provided additional insights. Quantitative data were analysed using descriptive statistics in Microsoft Excel, while qualitative data underwent thematic analysis.

Results: Twelve anaesthetists (10 trainees, 2 consultants) evaluated the model. The majority (83%) found it easy to use (Likert score 4 or 5), and the same proportion considered it anatomically realistic. However, the most frequent suggestion was improving anatomical accuracy, particularly by varying the thickness of the transversus abdominis, internal oblique, and external oblique muscles. The model was especially valued as a medium to practice needling, with 92% rating it 4 or 5. This idea was further reflected in the free-text feedback where the realistic tactile response and reusable nature of the model were identified as key strengths.

Discussion: This study demonstrates that a low-cost, reusable RSB training model can be effectively constructed using ADAMgel and other commercially available materials. The model was well received, particularly for its suitability for needling practice and realistic tactile feedback. Future improvements will focus on enhancing anatomical accuracy and enabling local anaesthetic injection to create a more lifelike experience. By providing an accessible training tool, this model has the potential to improve

trainee confidence and proficiency, supporting regional anaesthesia training.

Ethics Statement: As the submitting author, I can confirm that all relevant ethical standards of research and dissemination have been met. Additionally, I can confirm that the necessary ethical approval has been obtained, where applicable.

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