Preliminary User Evaluation of a Novel Software Tool for Ultrasonographic Anatomy Visualisation

B. O'Donnell[1], C. Burns[1], F. Lindseth[2], E. Smistad[2], C. Huygens[3], S. Coppens[3], V. Voski[4].

1. University College Cork; 2. SINTEF Trondheim; 3. KU Leuven; 4. Uniklinik RWTH Aachen

INTRODUCTION

Participants were guided through a regional ultrasound scanning exercise using the Regional Anaesthesia Assistant system (RAAs) with a live human model, simulating the initial scanning procedures for a femoral peripheral nerve block. The RAAs system is described in detail in Smistad and Lindseth (2016); it is a novel combination of hardware and software designed to guide novice or infrequent ultrasound users through the process of identifying the major internal anatomical structures of the upper femoral region required for a femoral peripheral nerve block. When a tracked ultrasound probe is placed on the inguinal region of the thigh and ultrasound imagery is obtained, the RAAs software attempts to visually identify the femoral nerve, femoral artery, fascia lata and fascia iliaca from the ultrasound image, advising the user on probe orientation and positioning until an optimum image is obtained. Once an image is obtained, the RAAs software visually outlines the anatomical features to assist needling.

OBJECTIVE(S)

Representing a spectrum of professional development, attendees at KU Leuven's 31st International Winter Symposium (2016) were opportunistically surveyed for their attitudes towards and experience of using the RAAs device. We were interested in user feedback on the utility of RAAs' functionality according to the individual's self-reported levels of expertise.

METHOD(S)

- 63 participants used the RAAs system on a live human scanning model to locate the femoral artery as if for a femoral PNB.
- After being guided to the artery by the RAAs, participants were asked to complete a short questionnaire describing :
- How frequently they conduct US-guided regional anaesthesia (Daily, Weekly, Monthly, Never)
- Their level of professional development (trainee years 1-3, trainee years 4-6, Registered specialist anaesthetist, or medical student/perioperative nurse/other)
- Whether they would use the RAAs system in their daily practise.
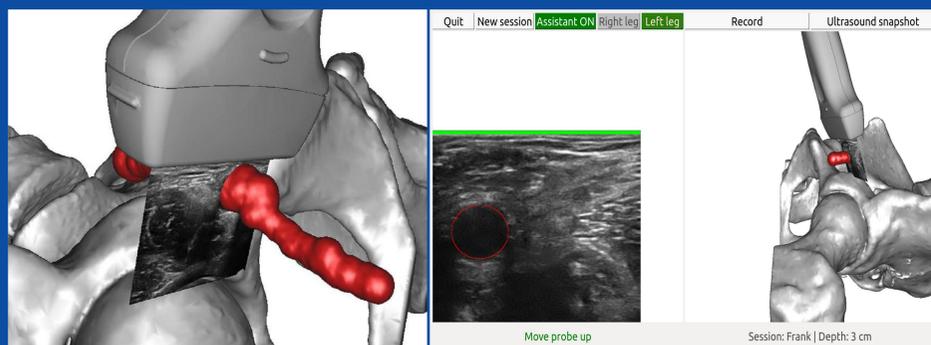
RESULT(S)

Participants reported themselves to be 15 medical students or other practitioners, 12 trainees in years 1-3, 8 trainees in years 4-6, and 28 registered specialist anaesthetists.

-Willingness to use the RAAs system was significantly associated with :

- Self-reported professional specialisation (χ^2 (3) =11.39, p<0.010, Cramer's V = 0.409, p<0.015)

- Frequency of the conduct of US-guided regional anaesthesia (χ^2 (3) = 14.58, p<0.002, Cramer's V = 0.47, p<0.003)
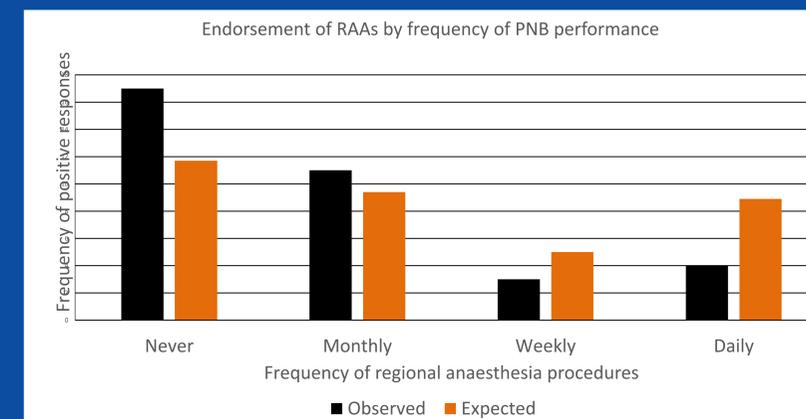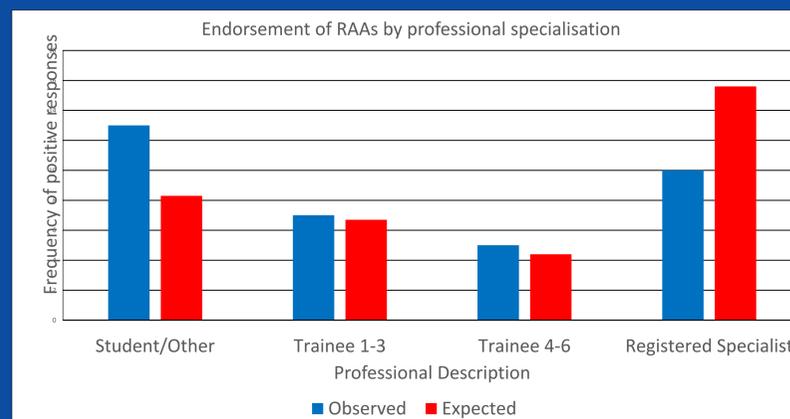
CONCLUSION(S)

-The RAAs software and hardware components were considered to be desirable and useful tools by all respondents "under" the level of registered specialist anaesthetist, and by those practitioners who perform PNBs less frequently than monthly.

-Practitioners who carry out PNB procedures frequently and routinely felt they would not benefit from the system, indicating that the RAAs software and hardware is likely to be a useful training tool for trainee and newly-qualified anaesthetists becoming familiar with PNB.
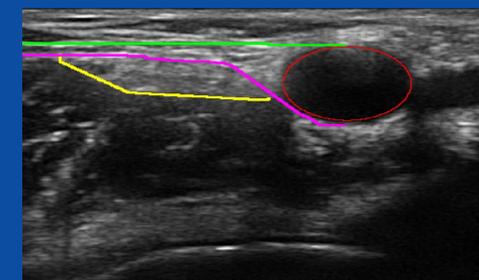
REFERENCES

Smistad, E. and Lindseth, F. Real-Time Automatic Artery Segmentation, Reconstruction and Registration for Ultrasound-Guided Regional Anaesthesia of the Femoral Nerve. IEEE Transactions on Medical Imaging 2016; 35(3); 752-761.

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CONTACT INFORMATION

Dr. Brian O'Donnell, Cork University Hospital Department of Anaesthesia / University College Cork
b.odonnell@ucc.ie