

# Augmented Reality for Neuraxial Back Training

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## WHY WAS IT SO TOUGH?

Complex anatomy  
Difficult to appreciate 3D structures  
Traditionally taught by “feel”  
“Nothing to see”  
Compounding factors - (eg obesity, abnormal anatomy, mobile patient)

## Can You Remember Your First Epidural?



## HOW DID YOU LEARN?

**See one, do one, teach one?**  
Like many centres, currently at our trust a neuraxial part task trainer (NPTT) is available for epidural simulation training, which allows learners to become familiar with epidural kit and practice insertion. **It does not, however, improve understanding of the three-dimensional structures being targeted during insertion and so does not help overcome some of the key challenges.**

**We created a novel augmented reality epidural simulator for anaesthetists new to obstetric anaesthesia. It is a comprehensive, personalised teaching package which uses AR to enable the independent learning of a complex skill in a safe environment and will become part of our routine IAOC teaching programme.**



## WHAT IS IT?

- NPTT with a **superimposed AR 3D holographic image of the lumbar spine anatomy.**
- A dynamic training tool that **targets anatomical appreciation** whilst simultaneously allows trainees to gain confidence and dexterity in epidural insertion.
- Allows varying perspectives** of the anatomy of the back as the user moves around the trainer and **real time visualization of the needle position** in relation to the anatomical structures and its trajectory towards the epidural space.
- Enables **real time modification** of technique and appreciation of why procedure may have failed or been difficult.



## HOW?

We created a working group of anaesthetists, a medical graphics artist, a blended learning expert, and a senior clinical photographer and multimedia developer. The simulator was created using Microsoft HoloLens. All material is accessed within the AR environment using AR headsets.



## WHAT NEXT?

### CHALLENGES

- Changing of epidural equipment in the trust during the project resulted in work duplication and delays.
- Large team with many complex steps also contributed to delays.

### FUTURE DEVELOPMENT

- Expansion to other epidural techniques eg para median approach, thoracic epidural insertion.
- Expansion of technology for other similar procedures such as spinal anaesthesia and peripheral nerve blocks
- Introducing US of back to teaching programme

## ADDITIONAL FEATURES

Built in editable tutorials, video demonstrations and specially produced animations, including 'patient positioning', 'kit set up' and 'insertion method comparisons (continuous v intermittent)', allowing direct reference to gold standard technique throughout the learning process.