Content Validity Evidence for a Novel Mixed Reality Percutaneous Nephrolithotomy Simulator

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Background

Advances in simulation technology continue to push the field of surgical education forward. Coupling immersive virtual reality (VR) simulation with a physical console allows the incorporation of haptic feedback into a virtual operating room, to more accurately simulate the technical steps of advanced surgical procedures. The Marion K181 PCNL Simulator is a mixed-reality percutaneous nephrolithotomy (PCNL) platform, designed to train users to navigate the pelvicalcyeal system.

Objective

Provide initial content validity evidence for novel, immersive simulation platform for PCNL, by eliciting feedback from trainee and faculty surgeons experiencing the device.

Methods

- Three endourology centers in Canada and the United States
- Platform consists of
  1. HTC ‘VIVE’ virtual reality headset (Taipei, Taiwan)
  2. Nephroscope and grasper connected to two 6-degrees of freedom (DOF) haptic robots
- Feedback collected via questionnaire (7-point Likert-scales)
- Responses stratified to understand differences in opinion/perception between participant-types

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Conclusions

1. Novel combined VR and physical simulator among the first of its kind in PCNL
2. Incorporation of haptic feedback a significant step forward in procedural learning
3. Future work includes
   - Incorporating percutaneous access into model
   - Expanding platform to additional procedures

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