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Technology & Instruments: Surgical Education & Skills Assessment/Ureteroscopy II Moderated Poster

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1507: Learning effects using a TURP simulator: Assessing changes in visual control and performance.

Samuel Vine
Thomas Dutton
Mark Wilson
Elizabeth Bright
John McGrath

Introduction and Objectives

Surgical simulators afford trainees the chance to practise skills in a safe environment and without the need for supervision. Although they have been proposed to shorten the learning curve for complex surgical skills, there is concern that they do not prepare trainees for the demanding conditions of the operating room. Research in skill learning (including surgical skills) has shown that experts and novices can be distinguished by differences in their visual control strategies, with experts using fewer fixations of a longer duration. The aim of this study was to assess the learning benefits of a TURP simulator by examining, not only changes in novice performance, but also changes in their visual control.

Methods

11 novices (no TURP experience) completed a basic training task on a virtual reality TURP simulator (Simbionix, USA Corp) whilst wearing an eye tracker to measure their visual control (number and duration of fixations). Performance measures (% prostate & % capsule resected per second) were provided by the simulator. All participants performed a baseline trial, 5 learning trials, a retention trial (to asses learning) and a tone counting trial (to mimic the multi-tasking demands of the operating theatre). All data were subjected to one-way repeated measures ANOVA and significant effects were followed up with pair-wise comparison tests.

Results

Results revealed a significant improvement in performance from baseline to retention, with increases in the % of prostate resected ($p < .001$) and reductions in the % of capsule resected ($p < .005$). There was also a significant improvement in visual control from baseline to retention, with reductions in the number ($p < .005$) and duration of fixations ($p < .05$). However, there was a significant breakdown in both performance and visual control under multi tasking conditions (p's $< .005$).

Conclusions

After only five repetitions of a simple training task, novices became more proficient (% prostate resected) and less error full (% capsule resected), supporting the use of simulation for surgical skills training. The novices also developed more 'expert like' visual control, which has been shown to underpin technical skill performance. However, these changes were not robust under multi-tasking conditions, highlighting the limitations of simulated training. Future research should examine training interventions designed to ensure that visual control and motor skill performance remain robust in stressful conditions.