LAPAROSCOPIC TRAINING IN VIRTUAL REALITY: HAPTIC VS. NONE HAPTIC

A Bouhelal, S Badiani, B Alaraimi, W ElBakbak, B Patel
Barts Cancer Institute Queen Mary University Of London

Background:
Laparoscopic skills acquisition using virtual reality is a novel approach with proven efficacy and can be used to enhance our current conventional surgical training and add the objective assessment. However, the different available simulators and their superiority is still under investigation. In our study, we examine the effect of haptic feedback on learning processes.

Methodology:
42 novices were recruited and randomly assigned to Haptic (HG) and None-Haptic (NHG) groups. Candidates were trained using a validated training curriculum. Expert performance used as benchmark for proficiency. Using a commercially available VR simulator, With and without haptic feedback. All other variables were standardized for both groups.

Results:
Thirty-nine novices completed the training curriculum and reached proficiency levels. In basic tasks 5 in HG proficiency reached in MTST of 12:49 compared to 16:28 minute for NHG with average number of trials of 7.3 and 7.3 respectively.

In basic tasks 6 in HG proficiency reached in MTST of 12:20 minute compared to 19:22 minute for NHG with average number of trials of 7.2 compared to 9 respectively.

In procedural task 3 in HG proficiency reached in MTST of 26:42 minute compared to 59:19 minute for NHG with average number of trials of 5.33 and 12.4 respectively.

In procedural task 4, In HG proficiency reached in mean total simulator of 27:40 compared to 1:05:25 minute for NHG with average number of trials of 5.2 and 8 respectively.

In full Procedural LC in HG proficiency reached in MTST of 30:04 compared to 1:27:43 minute for NHG with average number of trials of 3.4 and 8.1 respectively.

Conclusion:
As the complexity of the tasks increases the superiority of the haptic feedback becomes more prominent. While both groups reached proficiency at rather close averages, the novices trained on haptic feedback simulator demonstrated faster learning curve and required less simulator time. Despite the cost effectiveness and size of the none haptic simulators. Haptic feedback appears to enhance the learning experience.

Abbreviations:
HG: Haptic Group
NHG: None Haptic Group
MTST: Mean Total Simulator Time
LC: Laparoscopic Cholecystectomy

References
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