Urol. 2011 Sep;186(3):1019-24. Epub 2011 Jul 23.

Face, content and construct validity of a novel robotic surgery simulator.

Hung AJ, Zehnder P, Patil MB, Cai J, Ng CK, Aron M, Gill IS, Desai MM.

Source

University of Southern California Institute of Urology, Keck School of Medicine, University of Southern California, Los Angeles, California 90089, USA. ajhung@gmail.com

Abstract

PURPOSE:

We evaluated the face, content and construct validity of the novel da Vinci® Skills Simulator™ using the da Vinci Si™ Surgeon Console as the surgeon interface.

MATERIALS AND METHODS:

We evaluated a novel robotic surgical simulator for robotic surgery using the da Vinci Si Surgeon Console and Mimic™ virtual reality. Subjects were categorized as novice-no surgical training, intermediate-surgical training with fewer than 100 robotic cases or expert-100 or more primary surgeon robotic cases. Each participant completed 10 virtual reality exercises with 3 repetitions and a questionnaire with a 1 to 10 visual analog scale to assess simulator realism (face validity) and training usefulness (content validity). The simulator recorded performance based on specific metrics. The performance of experts, intermediates and novices was compared (construct validity) using the Kruskal-Wallis test.

RESULTS:

We studied 16 novices, 32 intermediates with a median surgical experience of 6 years (range 1 to 37) and a median of 0 robotic cases (range 0 to 50), and 15 experts with a median of 315 robotic cases (range 100 to 800). Participants rated the virtual reality and console experience as very realistic (median visual analog scale score 8/10) while expert surgeons rated the simulator as a very useful training tool for residents (10/10) and fellows (9/10). Experts outperformed intermediates and novices in almost all metrics (median overall score 88.3% vs 75.6% and 62.1%, respectively, between group $p<0.001$).

CONCLUSIONS:

We confirmed the face, content and construct validity of a novel robotic skill simulator that uses the da Vinci Si Surgeon Console. Although it is currently limited to basic skill training, this device is likely to influence robotic surgical training across specialties.