Face, content, and construct validity of dV-trainer, a novel virtual reality simulator for robotic surgery.

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Abstract

OBJECTIVES:
To assess the face, content, and construct validity of the dV-Trainer. The dV-Trainer is a virtual reality simulator for the da Vinci Surgical System that is in beta development.

METHODS:
Medical students, residents, and attending surgeons were enrolled in a prospective, institutional review board-approved study. The subjects were prospectively categorized as novice or experienced. Each subject completed 2 EndoWrist modules and 2 needle-driving modules. The performance was recorded using a built-in scoring algorithm. Each subject completed a questionnaire after finishing the modules.

RESULTS:
The novice group (n = 19) consisted of 3 students (16%), 11 residents (58%), and 5 attending surgeons (26%). The novices had operated an average of 1.3 +/- 2.2 hours at the da Vinci console before using the simulator. The experienced subjects (n = 7) had performed an average of 140 robotic cases (range 30-320). Experienced robotic surgeons outperformed novices in nearly all variables, including total score, total task time, total instrument motion, and number of instrument collisions (P < .01). All experienced surgeons ranked the simulator as useful for training and agreed with incorporating the simulator into a residency curriculum. The virtual reality and instrumentation achieved acceptability. The needle-driving modules did not exceed the acceptability threshold.

CONCLUSIONS:
The results of the present study have shown that the dV-Trainer has face, content, and construct validity as a virtual reality simulator for the da Vinci Surgical System. The needle-driving modules need to be refined. Studies are underway to assess the concurrent and predictive criterion validity. The dV-Trainer could become a beneficial training simulator for robotic surgery.