Early Performance on an Eye Surgery Simulator Predicts Subsequent Resident Surgical Performance


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OBJECTIVE: To examine early performance on an eye surgery simulator and its relationship to subsequent live surgical performance in a single large residency program.

DESIGN: Retrospective study.

SETTING: Massachusetts Eye and Ear, Harvard Medical School, Department of Ophthalmology.

METHODS: In a retrospective study, we compared performance of 30 first-year ophthalmology residents on an eye surgery simulator to their surgical skills as third-year residents. Variables collected from the eye surgery simulator included scores on the following modules of the simulator (Eyesi, VRmagic, Mannheim, Germany): antitremor training level 1, bimanual training level 1, capsulorhexis level 1 (configured), forceps training level 1, and navigation training level 1. Subsequent surgical performance was assessed using the total number of phacoemulsification cataract surgery cases for each resident, as well as the number performed as surgeon during residency and scores on global rating assessment of skills in intraocular surgery (GRASIS) scales during the third year of residency. Spearman correlation coefficients were calculated between each of the simulator performance and subsequent surgical performance variables. We also compared variables in a small group of residents who needed extra help in learning cataract surgery to the other residents in the study.

MAIN OUTCOME MEASURES: Relationships between Eyesi scores early in residency and surgical performance measures in the final year of residency.

RESULTS: A total of 30 residents had Eyesi data from their first year of residency and had already graduated so that all subsequent surgical performance data were available. There was a significant correlation between capsulorhexis task score on the simulator and total surgeries ($r = 0.745$, $p = 0.008$). There was a significant correlation between antitremor training level 1 ($r = 0.554$, $p = 0.040$), and forceps training level 1 ($r = 0.622$, $p = 0.023$) with primary surgery numbers. There was a significant correlation between forceps training level 1 ($r = 0.811$, $p = 0.002$), and navigation training level 1 ($r = 0.692$, $p = 0.013$) with total GRASIS score. There was a significant inverse correlation between total GRASIS score and residents in need of extra help ($r = -0.358$, $p = 0.003$).

CONCLUSION: Module scores on an eye surgery simulator early in residency may predict a resident’s future performance in the operating room. These scores may allow early...
identification of residents in need of supplemental training in cataract surgery.

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