Assessment of a Three-Dimensional Operating System with Skill Tests in a Pelvic Trainer

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摘要

Abstract

Objectives: To compare the performance of laparoscopic skill assisted by a traditional two-dimensional (2D) and a three-dimensional (3D) endoscopic video system in a pelvic trainer. Materials and Methods: The 3D imaging system (DeepVision®, Automated Medical Products Corp.) consists of a traditional single lens optic laparoscope, a light source, an endoscopic camera (Stryker), a DeepVision processor and a DeepVision monitor. The 2D images could be obtained with the same system without turning on the DeepVision processor. Thirty-four medical personnel with no laparoscopic surgical experience were enrolled to perform two skill tests, the object-pick-up and spatial orientation test in a trainer box. They were randomly divided into two groups, one group performed the test under 2D conditions first and 3D later, and another group performed the test under 3D conditions first and 2D later. The duration needed to complete the skill tests was recorded and the differences on performance time under 2D and 3D conditions were calculated for each participant. Two-way ANOVA was used to analyze the statistic difference on the performance time in two conditions. Results: The duration needed to complete the initial skill tests was similar among 2D and 3D conditions. For both tests, the average performance time decreased significantly for the second attempt regardless of 2D or 3D conditions. Statistic analysis disclosed significant difference for learning factor ($p < 0.001$ for object-pick-up test and $p < 0.01$ for spatial orientation test), but no significant difference betwen 2D and 3D conditions ($p = 0.276$ for object-pick-up test and $p = 0.327$ for spatial orientation test). Conclusion: A significant decrease of the performance time at the second attempt reflected the importance of a learning process in laparoscopic surgery. It appears that no significant benefits were obtained by this 3D operating system for surgeons without laparoscopic surgical experience.