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Original Article

Comparison of Teenaged Video Gamers vs PGY-I Residents in Obstetrics and Gynecology on a Laparoscopic Simulator

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ABSTRACT **Study Objective:** To compare the performance of teenaged video gamers verses postgraduate year I (PGY-I) residents in obstetrics and gynecology (Ob/Gyn) on our video trainer laparoscopic simulator.
Design: Randomized controlled trial (Canadian Task Force Classification I).
Setting: Medical school university.
Participants: Teenaged video gamers and PGYI Ob/Gyn Residents.
Intervention: Laparoscopic simulator.
Measurements and Main Results: Fifteen teenaged experienced video gamers and 15 PGYI Ob/Gyn residents without video gaming experience were timed performing 3 laparoscopic simulator assessment procedures. Each drill was timed using a stopwatch. Pretest instructions were given as to how to perform each task. No warm-up was allowed, and each participant was tested during his or her initial performance of each assessment drill. Compared with the PGYI Ob/Gyn residents, the teenaged experienced video gamers completed the Bean and Pom-Pom Drop 27% faster ($p = .05$), the Checkerboard Drill 41% faster ($p = .03$), and the Bead Manipulation 31% faster ($p = .43$).
Conclusion: Virtual reality skills of teenaged video gamers seem to translate into improved video trainer laparoscopic skills. Previous teenage video gaming experience may favorably affect future residents' ability to develop laparoscopic skills. Journal of Minimally Invasive Gynecology (2011) 18, 169–172 © 2011 AAGL. All rights reserved.

Laparoscopic simulators have become increasingly popular over the past 5 to 10 years and have become an accepted and indispensible teaching tool. Laparoscopic simulators enhance surgical education by providing a safe and inexpensive means for practicing surgical technique outside of the operating room without medicolegal or ethical constraints. Compared with laparotomy, laparoscopy requires greater technical training because of the loss of depth perception, lack of haptic feedback, fulcrum effect, and the use of instruments with a limited range of motion; thus, video trainer simulator training is especially beneficial for laparoscopic education.

The 2 main categories of laparoscopic simulators are virtual reality simulators (computer) and video trainer simulators (box trainer) [1–3]. Although virtual reality simulators are technically sophisticated and simulate actual surgical procedures (i.e., surgical treatment of ectopic pregnancy), the environment is artificial and relatively gamelike. Virtual reality simulators lack the tactile feedback of manipulating actual laparoscopic instruments, although some have incorporated haptics, and are frequently costly. Advantages of video trainer laparoscopic simulators are tactile feedback of the instruments and decreased cost. A disadvantage is that the tasks tend to be artificial, such as bead manipulation. Residents prefer video trainers to virtual reality laparoscopic simulators [2], and acquired skills are retained longer with video trainer laparoscopic simulators [3]. We have developed and validated an inexpensive simple video trainer laparoscopic simulator assessment

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tool for objective measurement of residents' laparoscopic ability [1].

Teenaged video gamers have developed excellent virtual reality skills secondary to continuous repetition. Although multiple competencies affect residents' surgical skills, it is possible that future residents with previous teenage video gaming skills may have improved laparoscopic skills. However, it is not known whether teenaged video gamers' advanced virtual reality skills will result in improved laparoscopic skills because of the difference between virtual reality and video trainer laparoscopic skills. Therefore, the objective of the present trial was to compare the performance of teenaged video gamers vs PGYI residents using our video trainer laparoscopic simulator.

Methods

Fifteen teenaged experienced video gamers and 15 postgraduate year I (PGY-I) residents in obstetrics and gynecology (Ob/Gyn) were timed while performing 3 laparoscopic simulator assessment procedures. All 15 teenagers were aged 15 to 19 years, had been actively playing video games for at least 5 years, and had beaten the expert level of an advanced video game (e.g., Call of Duty, Halo, Need for Speed, Guitar Hero). The 15 teenaged experienced video gamers were children and their friends of the authors. Over 25 months, all 15 PGYI residents were evaluated at the beginning of their residency. None of the residents met the above criteria for experienced video gamers. Other possible influences on visual and motor skills such as music experience or chopstick use were not assessed. Institutional review board approval was obtained.

Our laparoscopic simulator assessment tool (Fig. 1), which has been validated and described previously [1], consists of 3 assessment drills. The Bean and Pom-Pom Drop and Checkerboard Drill are 2 of the most common drills used in video trainer laparoscopic simulators [4,5]. In the Bean and Pom-Pom Drop, 3 beans, 3 large pom-poms, and 3 small pom-poms are grasped and deposited into a small flask (Fig. 2). In the Checkerboard Drill, 5 beads are placed on their corresponding letter or symbol on a 3 × 3-inch grid (Fig. 3). In Bead Manipulation, 3 beads are placed on 1 of 2 hooks (Fig. 4).

All drills began with the beans or pom-poms in the same starting position. One of us (J.J.) timed every drill using a stopwatch. Pretest instructions were given as to how to perform each task. No warm-up was allowed, and each participant was tested during his or her initial performance of each assessment drill. The drills were performed in the same order: Bean and Pom-Pom Drop, Checkerboard Drill, and Bead Manipulation.

Determination of sample size using a p value of .05, power of 0.8, to detect a 30% change in time of completion, with an estimated standard deviation of 30 seconds, required a sample size of 8 participants per group. The Wilcoxon rank sum test was used to compare times for completion of each drill.

Fig. 1. Laparoscopic simulator.

Results

The median times in seconds to complete each assessment drill on the laparoscopic simulator are given in Table 1. Compared with the PGYI Ob/Gyn residents, teenaged experienced video gamers completed the Bean and Pom-Pom Drop 27% faster ($p = .05$), the Checkerboard Drill 41% faster ($p = .03$), and the Bead Manipulation 31% faster ($p = .43$).

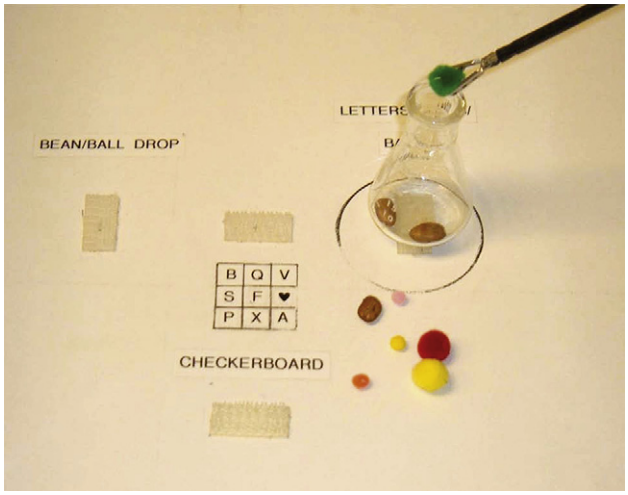

Fig. 2. Bean and Pom-Pom Drop.