Young gamers offer insight to teaching new physicians robotic surgery

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Using skills gleaned from video games, high school and college students outmatch medical residents in surgical simulations a new UTMB study finds

What can high school and college-age video game enthusiasts teach young surgeons-in-training?

According to a new study from researchers at the University of Texas Medical Branch at Galveston (UTMB) – a world leader in minimally invasive and robotic surgery – the superior hand-eye coordination and hand skills gained from hours of repetitive joystick maneuvers mimic the abilities needed to perform today's most technologically-advanced robotic surgeries.

To offer insight on how best to train future surgeons, the study placed high school and college students head to head with resident physicians in robotic surgery simulations. The results, presented at the American Gynecologic Laparoscopists' 41st Annual Global Congress on Minimally Invasive Gynecology in Las Vegas, were surprising.

Both high school sophomores who played video games on average two hours per day and college students who played four hours of video games daily matched, and in some cases exceeded, the skills of the residents on parameters that included how much tension the subjects put on their instruments, how precise their hand-eye coordination was and how steady their grasping skills were when performing surgical tasks suck as suturing, passing a needle or lifting surgical instruments with the robotic arms.

"The inspiration for this study first developed when I saw my son, an avid video game player, take the reins of a robotic surgery simulator at a medical convention," said Dr. Sami Kilic, lead author of the study and associate professor and director of minimally invasive gynecology in the department of obstetrics and gynecology at UTMB. "With no formal training, he was immediately at ease with the technology and the type of movements required to operate the robot."

Specifically, the UTMB study measured participants' competency on more than 20 different skill parameters and 32 different teaching steps on the robotic surgery simulator – a training tool that resembles a video game booth complete with dual-hand-operated controllers a video monitor that displays real-time surgical movements. As a whole, the nine tenth graders participating in the study performed the best, followed by nine students from Texas A&M University and lastly the 11

UTMB residents; the mean age of each group was 16, 21 and 31 respectively.

For further comparison, the groups were tested in a simulation of a non-robot-assisted laparoscopic surgery. In this scenario, when presented with a complicated surgical technique that does not rely on the visual-spatial coordination present in robotic surgery, the resident physicians scored far higher than the high school gamers.

Kilic notes these observations point to a need for surgical training to adapt to future generations of doctors who will arrive at medical school with an affinity for emerging surgical techniques. "Most physicians in practice today never learned robotic surgery in medical school," said Kilic. "However, as we see students with enhanced visual-spatial experience and hand-eye coordination that are a result of the technologically-savvy world they are immersed in, we should rethink how best to teach this generation."

Since the best results were seen in students who played video games up to two hours daily and not those who played four hours daily, this could indicate the optimal time needed for medical residents to gain these skills according to Kilic.

The high-tech simulators used in this study are a staple of the UTMB training program for performing minimally invasive robotic surgery. The institution is among a handful of academic medical centers that are establishing standardized programs aimed at training both medical students and practicing physicians in how to use robotic surgical tools and techniques most effectively.

Through its minimally invasive and robot-assisted surgery area of excellence, UTMB trains 32 residents and numerous faculty and other practicing physicians, including international surgeons from England, Germany, the Netherlands, Sweden and Turkey, annually.

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