Augmented Reality May Change The Way Surgeons Learn Robot-Assisted Surgery

A new study validating a first of its kind prototype using augmented reality in surgical training was recently presented. Augmented reality combines three-dimensional (3D) computer-generated objects and text superimposed onto real images and 3D surgical video footage, all in real time.

“The study’s results represent a significant move forward in training technology for robotic surgeons,” says Dr. Inderbir S. Gill, chairman & professor, Catherine and Joseph Aresty Department of Urology, Keck School of Medicine, University of Southern California. “After using the new prototype, experienced surgeons rated the new training module as ‘very realistic’ and ‘very useful’ for new residents after performing hundreds of robotic cases.”

Mimic Technologies, the company that developed the simulation platform for the da Vinci robot, has built a proof of concept simulator by which surgeons manipulate their own virtual robot and interact with content within a 3D recording of robotic surgery. Researchers at the University of Southern California are collaborating with Mimic to determine the training value of a prototype training module that introduces this simulation technology.

The study evaluated the validity of all aspects of the prototype and will give feedback on what concepts provide the best training value. The knowledge gained will provide valuable insight as development moves from prototype to commercial product. This study will be presented with a published abstract at the American Urological Association (AUA) meeting on May 7, 2013.

“Surgeons will now be able to have a more genuine experience prior to surgery, which will help better prepare them for actual surgery,” added Dr. Gill.

Pre-study questionnaires were used to classify participants as either novice or experts. Further exercises then assessed the levels of expertise. Study participants tested the first application of the technology, which allows surgeons to observe 3D video of an actual robotic kidney surgery while operating with virtual reality instruments. This combination of technologies allows the surgeon to identify the anatomy, demonstrate technical skills, and learn the steps of a highly complex operation.

“Augmented reality may prove to be an effective means for introducing surgeons to unique surgical scenarios that might not be encountered under a normal case load,” says Dr. Jeff Berkley, founder and CEO of Mimic Technologies. “This new technology addresses the challenge of procedure-specific training, where every recorded surgical case has the potential to be converted into an augmented reality training experience.”

In surgical centers worldwide, existing virtual reality simulators for robotic surgery focus training on basic surgical skills. Future research will focus on organ-specific procedures, in order to further replicate highly specialized training procedures.

“Now we can train using real live video footage from the operating room that simulates the actual surgical environment, allowing the surgeon to operate in an interactive way,” says Dr. Andrew Hung, principal investigator and chief resident of Urology at the University of Southern California. “After all, if it does not seem real, you are basically just playing a video game.”

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