Virtual Reality and Orthopedic Surgical Training

Dear Editor,

I read the article "Usefulness of immersive virtual reality simulation during femoral nail application in an orthopedic fracture skills course" by Arroyo-Berezowsky *et al*.,[1] with great interest. I want here to stress on the importance of virtual reality in orthopedic surgical training.

Orthopedic surgical education nowadays is more challenging than ever as it requires obtaining a certain level of competency of a growing number of technical skills, which are assessed accordingly. At the same time, there is a necessity to reduce the traditional "learn on patients" as awareness of patient safety increases over time. Still, residents have to learn on patients. However, a certain level of proficiency has to be reached before they can apply their acquired skills on patients. These concerns were the foundation for the emerging of surgical simulation in surgical education and residents' training.[2]

In 2014, the Institute of Medicine for Graduate Medical Education questioned the amount of money spent on clinical research compared to the amount spent on medical education to ensure the continued competency of the future physicians. They proposed a move toward outcome-based training where a certain level of competency would be associated with better patient outcome; however, this has not been proven yet clinically.[3] Nevertheless, many see the sense behind this approach and have started applying it in their training programs. On that bases, proficiency-based training developed and used in multiple surgical specialties, including otorhinolaryngology and general surgery, to train residents to develop the psychomotor skills needed to safely and efficiently perform surgical procedures.[4,5]

With time surgical simulation training became a popular and valuable method for enhancing trainees' cognitive and psychomotor skills in multiple surgical specialties.[6] In orthopedic surgery, the number of simulators for training is significantly limited, mostly because of the complexity of the validations needed, though there are cadaveric bench models for simulation. This limitation necessitated the use of virtual orthopedic simulators, initially for arthroscopy and later on for other procedures. Virtual reality has many advantages including the introduction of automated proficiency analysis and the introduction of dynamism in the simulations.[7] One of the examples was the Copernicus project that was started by The Arthroscopy Association of North America, which has now resulted in the validation of the Arthroscopic Bankart Repair curriculum and metrics for testing using a cadaver model.[8]

The challenges in the development of simulators are that it requires different types of validities (e.g., face, content, concurrent, construct, and predictive validity).[6] This reflects on the cost and expense of these technologies and might limit the usage of the orthopedic simulators.

With advances in the development of the virtual reality software, soon, it will mimic the surgical experience of the live surgery, which will increase the demands for simulators and will allow this method of training to move to a more cost-effective, more portable, and more efficient way of training and testing.[8]

I strongly think that in the near future, proficiency-based training and virtual reality will be the standard of surgical training and testing for our trainee.

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Conflicts of interest

There are no conflicts of interest.

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