Neuroendoscopical surgical training for assessment of a pediatric mixed-reality model

João Paulo Mota Telles, Gisele Coelho, Eberval Gadelha Figueiredo, Nicollas Nunes Rabelo, Manoel J. Teixeira, Nelci Zanon
Disclosure

The authors have no disclosures to report.

I acknowledge my continuing obligation to disclose to AANS/NREF/NPA, promptly and in writing, any change in my circumstances. I further acknowledge that if there is any case where my private interest conflict with the interests of AANS/NREF/NPA, I will indicate that I may have a conflict and abstain from any vote, speaking engagement, planning related to that issue.
Neurosurgical training requires many years of supervised procedures and represents a long and challenging process. The development of surgical simulation platforms is essential to reducing the risk of potentially intraoperative severe errors arising from inexperience. Objective: To perform a phase I validation process of mixed reality simulation (realistic and virtual simulators combined) for neuroendoscopy surgical training.
Tridimensional videos were developed by 3DS Max program. Physical simulators were made with a synthetic thermo-retractile and thermo-sensitive rubber which, when combined with different polymers, produces more than 30 different textures that simulate consistencies and mechanical resistance of human tissues. Questionnaires regarding the role of virtual and realistic simulators were applied to experienced neurosurgeons regarding the applicability of the mixed reality simulation for neuroendoscopy surgery training.
Experienced surgeons considered the mixed reality simulation as a potential tool for training new residents in neuroendoscopy surgery and considered the model adequate to practical application with inexperienced surgeons, suggesting its use for surgical training.
According to the general score, (83%) Surgeons believed that the realistic physical simulator presents distortions when compared to the real anatomical structure, (66%) with tridimensional reconstruction and (66%) reported that the virtual simulator allowed multiangular perspective.
Conclusions and Summary Points

- This model provides a highly effective way of working with 3D data and significantly enhances the learning of surgical anatomy and operative strategies.
- The combination of virtual and realistic tools may safely improve and abbreviate the surgical learning curve.