Virtual reality simulator for neurosurgery

- The Impact of Virtual-, Augmented- and Mixed Reality during Preoperative Informed Consent: A Systematic Review of the Literature
- Mapping the use of extended reality (XR) in radiation oncology education: a scoping review protocol
- Patient-centered insights into virtual reality rehabilitation for stroke: a systematic review and qualitative meta-synthesis
- Simulators with Haptic Feedback in Neurosurgery: Are We Reaching the "Aviator" Type of Training? Narrative Review and Future Perspectives
- Seeing Is Believing: Real-Life 360-Degree Virtual Reality as a Catalyst for Neurosurgical Interest
- Meditation in the third-person perspective modulates minimal self and heartbeat-evoked potentials
- Training in Endoscopic Endonasal Neurosurgical Procedures: A Systematic Review of Available Models
- Effectiveness of virtual reality rehabilitation for cervical spinal cord injury: A systematic review and meta-analysis

see Augmented reality.

Virtual reality has made numerous advancements in recent years and is used with increasing frequency for education, diversion, and distraction. Beginning several years ago as a device that produced an image with only a few pixels, virtual reality is now able to generate detailed, three-dimensional, and interactive images. Furthermore, these images can be used to provide quantitative data when acting as a simulator or a rehabilitation device. In this article, we aim to draw attention to these areas, as well as highlight the current settings in which virtual reality (VR) is being actively studied and implemented within the field of neurosurgery and neurosciences. Additionally, we discuss the current limitations of the applications of virtual reality within various settings. This article includes areas in which virtual reality has been used in applications both inside and outside of the operating room, such as pain control, patient education and counseling, and rehabilitation. Virtual reality's utility in neurosurgery and the neurosciences is widely growing, and its use is quickly becoming an integral part of patient care, surgical training, operative planning, navigation, and rehabilitation [1)].

The use among patients has the potential to unintentionally transmit pathogens between patients and hospital staff. No standard operating procedure for disinfection exists to ensure safe use between patients.

This study aims to determine the efficacy of disinfectants on VR devices in order to ensure safe use in healthcare settings.

Three types of bacteria were inoculated onto porous and nonporous surfaces of 2 VR devices: the Meta Oculus Quest and Meta Oculus Quest 2. Disinfection was performed using either isopropyl alcohol or alcohol-free quaternary ammonium wipes. A quantitative culture was used to assess the adequacy of disinfection. A survey was separately sent out to VR device technicians at other pediatric healthcare institutes to compare the methods of disinfection and how they were established.

Results: Both products achieved adequate disinfection of the treated surfaces; however, a greater log-kill was achieved on nonporous surfaces than on porous surfaces. Alcohol performed better than quaternary ammonium on porous surfaces. The survey respondents reported a wide variability in disinfection processes with only 1 person reporting an established standard operating procedure.

Conclusions: Disinfection can be achieved through the use of either isopropyl alcohol or quaternary ammonium products. Porous surfaces showed lesser log-kill rates than nonporous surfaces, indicating that the use of an added barrier may be of benefit and should be a point of future research. Given the variability in the disinfection process across healthcare systems, a standard operating procedure is proposed [2)]

1)
Scott H, Griffin C, Coggins W, Elberson B, Abdeldayem M, Virmani T, Larson-Prior LJ, Petersen E. Virtual Reality in the Neurosciences: Current Practice and Future Directions. Front Surg. 2022 Feb 18;8:807195. doi: 10.3389/fsurg.2021.807195. PMID: 35252318; PMCID: PMC8894248.
2)
Roberts SC, Havill NL, Flores RM, Hendrix Ii CA, Williams MJ, Feinn RS, Choi SJ, Martinello RA, Marks AM, Murray TS. Disinfection of Virtual Reality Devices in Health Care Settings: In Vitro Assessment and Survey Study. J Med Internet Res. 2022 Dec 1;24(12):e42332. doi: 10.2196/42332. PMID: 36269222; PMCID: PMC9756115.