

3. APPLICATION OF VIRTUAL REALITY (VR) IN THE PLANNING AND SIMULATION OF URGENT NEUROSURGICAL INTERVENTIONS.



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Introduction. Emergency neurosurgery is required for acute cerebrovascular disorders, intracranial and spinal cord traumas, and pre-cerebral artery occlusion/stenosis. It requires immediate and accurate management. Virtual reality (VR) is a technology that creates immersive and three-dimensional worlds. It is increasingly being used for surgical planning and training. The uses of this technology encompass anatomic modeling, computer-generated graphics, visualization, haptic feedback, and physical simulation. These advancements have the potential to greatly transform surgical education and preparation.

Aim of study. This study seeks to clarify the function of virtual reality in the planning and simulation of urgent neurosurgical operations, emphasizing its advantages in improving surgical readiness.

Methods and materials. A systematic literature review was conducted across major databases, including Hinari, PubMed, and NCBI. A search using keywords such as "neurosurgical planning," "neurosurgical simulation," "three-dimensional reconstruction," and "virtual reality" resulted in finding 294 studies that were related to the topic. This research investigated the application of virtual reality (VR) in the fields of surgical planning and simulation.

Results. The integration of virtual reality (VR) technology in the field of neurosurgery has demonstrated a significant enhancement in the understanding of intricate anatomical structures and the spatial perception abilities of inexperienced neurosurgeons. Virtual reality (VR) technology allows the surgical team to plan surgeries in advance, helping them to spot probable difficulties and choose the most effective surgical methods. This improves the overall results of the surgery.

Conclusion. Virtual reality is at the forefront of surgical innovation, as it enhances the comprehension of patient-specific anatomy during surgical planning. It provides a comprehensive educational experience in medical anatomy and allows neurosurgeons to participate in safe and practical training. Moreover, virtual reality (VR) plays a crucial role in neuronavigation systems by enhancing surgical visualization, leading to enhanced accuracy and effectiveness. The implementation of this technology in neurosurgery not only enhances the level of patient care but also guarantees safer and more precise surgical procedures.