

From pixels to pain relief – virtual reality's therapeutic landscape in burn care

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To the Editor.

Virtual reality (VR) has emerged as a promising tool in the realm of burn pain management. VR pertains to computer-generated simulations of a three-dimensional environment enabling interaction between human subjects and digital elements. The growing experience with VR in a range of biomedical disciplines including psychological therapy, rehabilitation as well as surgical training and planning serves as a testimony for its potential towards alleviating the physical and psychological distress associated with burn injuries.

From a technical perspective, VR provides an immersive experience that can distract patients from the acute sensations of burn wound care and treatment, potentially reducing the need for medication and overall distress. Evidence from neurobiology suggests that VR engages multiple sensory and cognitive pathways, influencing the perception of pain. Immersing patients in a virtual environment may disrupt the transmission of pain signals, resulting in a significant reduction in pain intensity during medical procedures, such as clinical examinations, wound debridement, and application of burn dressings. VR can modulate the perception of pain management by creating positive and personalized experience.

The potential of VR in burn management among patients with burns has been stressed by clinical studies. Investi-

gations employing rigorous methodologies, including randomized controlled trials and objective pain assessment measures, consistently demonstrate the efficacy of VR in burn pain management. Positive outcomes include reduced pain scores and improved physiological responses. This supports the integration of VR as an adjunctive therapy in burn care [1–3].

Empirical evidence shows that integrating VR into burn care protocols leads to a significant reduction in the reliance on opioid medications. Patients who are exposed to immersive VR experience consistently report lower pain scores and a reduced need for opioids during and after medical procedures [4]. Additionally, VR extends its impact beyond acute pain management to rehabilitation and therapy for burn survivors.

The integration of VR in this context presents several challenges, which may be outweighed by the scalable benefits of this technology. VR adoption demands significant investment. It has been estimated that the development and integration of a customized VR modality costs between \$40,000 and \$200,000 [5]. The investment in VR technology for pain management is expected to result in cost savings by reducing the need for medications and interventions, as well as decreasing the frequency of medical visits for pain management. The adoption of VR technology is dependent on

the readiness of healthcare personnel and infrastructure to interact with, maintain, and use this type of equipment. Considering the increasing rates of digital literacy among younger patients and healthcare workers, as well as the growing use of VR devices in commercial settings, it is reasonable to assume that VR will be widely accepted in the mid- and long-term [6].

As the scientific evidence supporting the use of VR in burn pain management continues to grow, there is an increasing interest in integrating VR into standard clinical practices. Ongoing research aims to refine our understanding of VR's mechanisms, optimize its applications, and establish standardized protocols to ensure its efficacy and safety in diverse burn care settings.

Roles of the authors

Júlia Bartková – conception and design, writing the article;

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Bohumil Bakalář – critical revision of the article.

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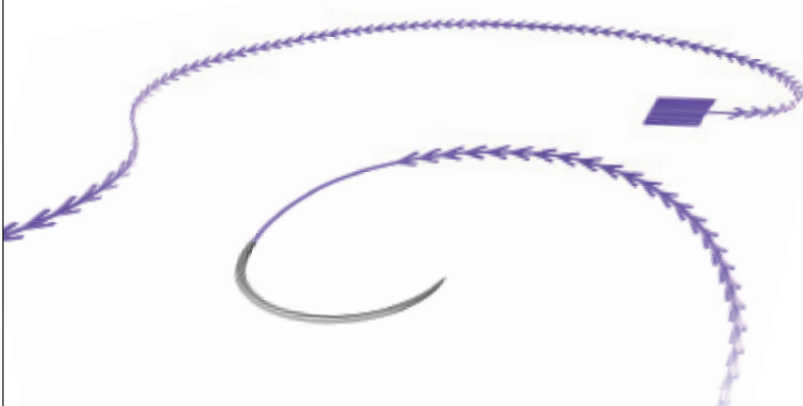
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