

Abstract

Title: The Possibilities of Influencing the Neuropathic Pain via Virtual Reality in Incomplete Spinal Cord Injury Patients.

Objectives: The goal of this thesis is to determine how a long-term exposure to virtual reality affects experiencing neuropathic pain in the case of patients with incomplete spinal cord lesions.

Methods: The study included 8 probands (3 females and 5 males) aged from 30 to 64 years (average age 49.5 ± 12.0 years) from among the clients of a charitable trust „Centrum Paraple“. At the entrance examination, the participants received a pair of VR BOX VR-X2 virtual reality headsets enabling viewing of two-dimensional (2D) videos in the three-dimensional (3D) format. Thereafter they were watching, in their home environment, varied therapeutic videos depicting "virtual walking" - human walking viewed from a first person perspective. After 3 months of therapeutic intervention, a follow-up examination was carried out to determine the effect of the therapy. The Neuropathy Pain Scale and the International Spinal Cord Injury Pain Basic Data Set were used to assess changes in the perception of neuropathic pain. The results were statistically processed by means of a paired t-test in the R program. To monitor objective changes in the somatosensory and motor nervous systems, the evoked somatosensory and motor potentials were examined using the Magstim 200 and Synergy CareFusion devices. The analysis of evoked potentials was carried out by MUDr. David Panek, Ph.D. The amplitude and latency of evoked somatosensory and motor potentials were evaluated during the examination of evoked potentials.

Results: The exposure to therapeutic videos resulted in a statistically significant ($p = 0.008$) reduction of the area affected by the 1st largest neuropathic pain by an average of 3.1 points according to the ISCI-PBDS questionnaire. A reduced area affected by neuropathic pain was also noticed in the 2nd and the 3rd largest neuropathic pain, but only with a very low level of statistical significance ($p \geq 0.30$). Furthermore, there were no statistically significant changes in the intensity ($p \geq 0.10$) and quality ($p \geq 0.058$) of neuropathic pain. It was not possible to reach evoked response when examining somatosensory and motor evoked potentials in all probands.

Keywords: neuropathic pain, virtual reality, spinal cord lesions, evoked potentials