## Abstract

**Title**: The usage of virtual reality in therapy of patients with neglect syndrome with consideration of a cybersickness risk.

**Objective**: To find out if stroke patients with neglect syndrome tend to have higher risk of gaining cybersickness after using virtual reality compared to stroke patients without neglect syndrome and healthy population. Also, to find out if the severity of neglect syndrome has correlation with the severity of gained cybersickness. Afterwards to evaluate the trend of making games in virtual reality for treating neglect syndrome with consideration of a cybersickness risk.

**Methods**: The experiment participants played game in virtual reality developed for treating neglect syndrome for ten minutes. During the game participants were seated and were playing using head movements. A HTC VIVE console was used to deliver the virtual reality game.

Participants were divided into 3 groups: the group Zdraví (n = 12) without neurological impairment, the group CMP (n = 6) for stroke patients without neglect syndrome and the group Neglect (n = 10) for stroke patients with neglect syndrome (KF-NAP ≥ 1). Each proband had to fill Sickness Simulator Questionnaire which was used to detect cybersickness before and after playing the game in virtual reality.

Collecting and sorting of the data was done in MySQL database and HeidiSQL programme. Simple tables were done in Microsoft Excel 365 programme. For statistics the non-parametric Kruskal-Wallis test and Mann-Whitney test and Spearman's rank correlation coefficient was used. Tests were done in IBM SPSS Statistics 25 programme.

**Results**: Cybersickness has appeared in groups Neglekt and Zdraví negligibly. Cybersickness did not appear in the group CMP, on the contrary, there was an improvement. Significant relation was proved between the group CMP which had lower risk in gaining cybersickness (part Nausea) and groups Neglekt and Zdraví. Most common symptoms were nausea and fatigue. The severity of neglect syndrome did not have a significant correlation with the severity of gained cybersickness, however, there was a correlation with the final cybersickness (part Nausea).

**Conclusion**: Patients with neglect syndrome do not have a significantly higher risk of gaining cybersickness compared to healthy population. Well prepared games in virtual reality for neglect syndrome are a beneficial addition for post stroke therapy.

**Study background**: The experiment was part of a pilot study „Feasibility of an immersive virtual reality game for the rehabilitation of visuospatial neglect: a pilot study“ which developed a new game in virtual reality aimed to treat neglect syndrome. The study was done under the University of Antwerp and the research group MOVANT. Research leader was Dr. Wim Saeys co-operating with Dra. Elissa Embrechts. Programmer of the game was Ivan de Boi.

**Key words**: Cybersickness, Stroke, Neglect syndrome, Virtual reality, SSQ