Virtual Reality and understanding of TBI in Cognitive Rehabilitation

Anna-Lena BELLNERa,1, Britt JOHANSSONb, Krister PETTERSSONb, Ola GÖRANSSONb, Magnus FOGELBERGa, Daniel GOUDEd, Martin RYDMARKd, Jurgen BROEREn, Martin RYDMARKd, Jurgen BROEREn and Pär A. LARSSONa

a Fyrbodal Research Institute, Uddevalla, Sweden
b Department of Social Healthcare, Uddevalla, Sweden
c Department of Geriatric and Rehabilitation, Uddevalla Hospital, Uddevalla, Sweden
d Institute of Biomedicine, Mednet, Göteborg University, Göteborg, Sweden
e Sahlgrenska University Hospital, Department of Occupational therapy, Göteborg, Sweden

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Physical and cognitive deficits are consequences of traumatic brain injuries (TBI). Without rehabilitation activity problems persist i.e. limitations to handle personal care, the work situation, and recreational activities. The aim of this study is to test an application of Virtual Reality (VR) technology with 3D computer games as an occupational assessment/treatment method in rehabilitation for patients with cognitive and physical deficits. An easy-to-use VR activity station was located at an activity centre. The training activities were 3D computer games. Every time an activity was run, data about the hand movements were collected and analyzed. Quantitative variables were time (s) to perform the test, velocity (m/s) and, tremor or uncertainty in movements. A 48 years male patient participated, who in 2002 had a cranio-encephalitic trauma, caused by an accident. Since the autumn of 2007 he has received two weekly sessions of VR-training (60 minutes) by a special trained occupational therapist. The first weeks he was extremely tiered, tensed and unmotivated after 5-10 minutes. Cognitive deficits, motor and personality disorders were observed and assessed. The results revealed great problems in most observed and tested areas. After this initial period the patient took place in front of the VR-station. He was instructed to pick up the haptic stylus and start the tests. The whole procedure took 5 minutes and then he needed to relax the rest of the session. However, forthcoming sessions were breaking points, with an unexpected outcome. The patient increased his exercise potential from 5 to 40 minutes. Quantitative data revealed that the VR tasks gave a possibility to record time and to exact record the movement of the hand during the training. Qualitative data revealed that the patient’s increased motivation supported him to be active in everyday life. One outcome was an invitation from his employer to extend his working time within a computer department. After 6 months of VR-technological treatment sessions the patient improved significantly concerning cognitive and sensory-motor deficits. Thus, he was more competent to do what he wishes to do.

1 Fyrbodalinstitutet, 451 80 Uddevalla, Sweden
anna-lena.bellner@fyrbodalinstitutet.se