

ABSTRACT

Title: Evaluation of the spasticity level in wheelchair bound individuals, observing movement in a virtual reality environment

Objective: Investigate whether people watching movement in virtual reality, experience changes in the level of spasticity due to intervention of the therapeutic programme.

Methods: A pilot study was orchestrated with probands diagnosed with spastic paraplegia due to an incomplete spinal cord lesion. Seven probands have partaken in the study (5 men and 2 women) aged 49 ± 8 years. All probands were clients of Centrum Paraple, where they have been undergoing a regular rehabilitation programme. In addition to their regular programme they have undergone a virtual reality therapeutic programme, where each intervention consisted of 10 minutes spent in a therapeutic virtual environment. 3 probands resigned after the first intervention. Interventions were organized into 5 consecutive days. The levels of spasticity were evaluated by a modified Tardieu scale on plantar flexors of both ankles and knee joints of both lower limbs. Furthermore, a modified, subjective spasticity scale was created in order to observe individual, subjective inputs of each proband. Using this scale, probands evaluated their feelings towards individual spasticity changes on a scale 1-10 (0 = no spasticity, 10 = unbearable spasticity sensations) during each measurement. Measurements were taken on the first day before intervention, and before and after intervention and on the third and fifth day.

Results: Seven hypothesis were defined in the thesis, two of which have been confirmed. The findings were most profound in the case of subjective evaluation, where we found an immediate change in the proband's average subjective evaluations from $3,5 \pm 1,5$ to $2,5 \pm 0,9$ on the third day and from $2 \pm 1,9$ to $1,25 \pm 1,1$ on the fifth day. In the case of the modified Tardieu scale, the most significant finding is the R1 – R2 angle difference. Here a decrease was found in three of the four observed muscles groups compared to the initial measurements, and a decrease of the average values on the third and fifth day of the study in all observed muscle groups immediately after the virtual reality intervention.

Key words: spinal cord injury, virtual reality, spasticity, Modified Tardieu scale