

Augmented rehab: using Mixed Reality in spinal cord injury rehabilitation – a pilot study

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Introduction

An active lifestyle is important for persons living with spinal cord injury, but challenging to achieve [1]. Effective counselling about the consequences of the injury to their bodies is essential for long-term health. Conventional education methods, however, have barriers [2]. In co-creation with patients, rehabilitation professionals and a software developer, we developed two Mixed Reality (MR) physical exercise games and an interactive MR patient education intervention explaining the consequences of a spinal cord injury. We hypothesized that

MR games can promote physical activity, and that MR patient education can strengthen knowledge transfers.

Patients and methods

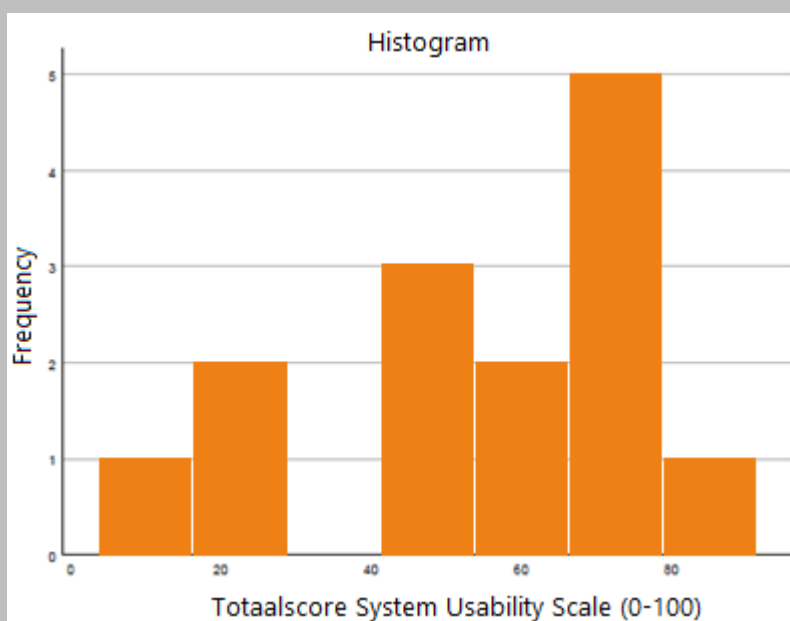
Twenty-five inpatients were enabled to use the MR apps for 2 weeks. During a 3 week pre-post design regular physical exercise was compared with MR physical exercise (on top of planned therapy). Motivation, usability of the apps, and subjective experience were evaluated using questionnaires and interviews.

Results and discussion

Seventeen patients completed the study, two discontinued due to usability problems. Feedback about the experience and usability was widely distributed, varying from "physically challenging" and "entertaining" to "difficult controls" and "too easy". The clear visual explanation of the MR patient education was positively received. The MR games were not used much as physical exercise, possibly due to technical, practical barriers and time-consuming questionnaires.

Results summary

- Little hours used (0-1.3h per patient per week)
- No effect on total amount of exercise or motivation for exercise.
- Mean usability score 55 (low), widely distributed
- Overall satisfaction with patient education module.
- Interviews: overall 14/17 (fairly) positive about the whole experience.



Impression of the exergames (Smashball & Spacediving) and the patient education intervention

Patient expert experience:



Conclusions and clinical implications

MR games can be used for some patients as a method of leisure or exercise, and MR can improve patient education. Technical difficulties were perceived as barriers. The implementation in our spinal cord injury rehabilitation program will further be evaluated.