

VIRTUAL REALITY FOR THE TREATMENT OF CHRONIC LOW BACK PAIN: A FEASIBILITY STUDY (WE715)

INTRODUCTION

- Virtual reality (VR): Successfully tested as non-pharmacological treatment for pain patients [1]
- Immersive properties \rightarrow powerful tool to distract patients from pain [2]
- Gamification → increase in user motivation and therapy adherence
- Treatment of **chronic non-specific low back pain** (CLBP) → movement exercises recommended as first-line treatment, **but adherence often low** [3]
- Use of VR as potential way to increase adherence to movement exercises

We developed a VR therapy that combines gamified movement exercises (graded exposure) with full body illusions and tested its feasibility

METHODS

N=20 patients with CLBP \rightarrow prospective and pre-registered trial (German Clinical Trials) Register-ID: DRKS00031535)



Figure 1: Overview of study procedure.

- VR sessions (20-25 min each): patients wore a head-mounted-display (HMD) and were immersed into the virtual environment, where they embodied a virtual avatar and performed gamified movement exercises (graded exposure)
- Required movements were demonstrated by a virtual hologram overlaying the embodied avatar (see figure 4)
- Patients' movements were tracked, and they received continuous visual feedback about the accuracy of their movements in VR
- **Primary outcome measures:** pain intensity ratings (NRS 0-10), adherence, side effects Secondary outcome measures: behavioral effects (e.g., back and task specific performance), and cognitive effects (fear-avoidance beliefs, pain catastrophizing, kinesiophobia)

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References: [1] Pourmand, A., Davis, S., Marchak, A., Whiteside, T., & Sikka, N. (2018). Virtual reality as a clinical tool for pain management. *Current pain and headache reports, 22*, 1-6.

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Figure 2: Experimental conditions in VR from participants' perspective.



Figure 3: Overview of VR environment. The user's task was to teach the toys how to move (4 exercises in total).



pain ("*Please choose your current pain level.*") and presence ("*How present did you feel in the toy fabric?*").

[3] Longtin, C., Decary, S., Cook, C. E., & Tousignant-Laflamme, Y. (2021). What does it take to facilitate the integration of clinical practice guidelines for the management of low back pain into *Contact: isabel.neumann@uni-wuerzburg.de practice? Part 1: a synthesis of recommendation. *Pain Practice*, *21*(8), 943-954. <u>https://doi.org/10.1111/papr.13033</u> twitter: @IsabelNeumann_

RESULTS

Adherence and side effects

Current pain intensity



Mean ± SD of baseline pain and post treatment (A) and means of individual patients (B). * $p \le .05$, ** $p \le .01$, *** $p \le .001$.

Further VR outcome measures



SUMMARY & CONCLUSIONS



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• Out of 20 patients, n = 18 (90 %) completed the study

• No serious side effects occurred \rightarrow only few and minor side effects assessed with the SSQ

Feasibility of the novel treatment approach demonstrated \rightarrow results indicate large analgesic effects despite few sessions (6 sessions)

Combination of gamified movement exercises (graded exposure) with continuous feedback in VR and body illusions \rightarrow potentially several advantages over conventional treatments (increased motivation and adherence = greater treatment success)

Randomized controlled trial is needed to test this

Conflicts of interest: The authors declare no conflict of interest.