GAMES FOR **HEALTH** EUROPE
2025

StableHandVR – Virtual Reality Training for Restoring Hand and Finger Function
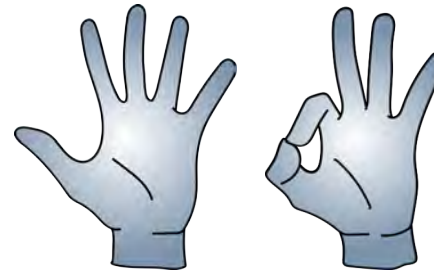
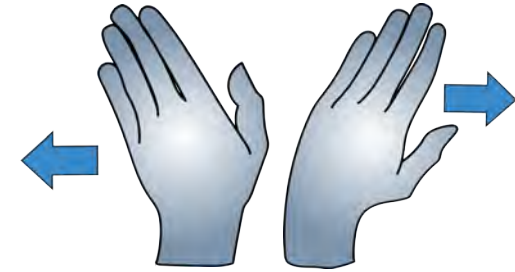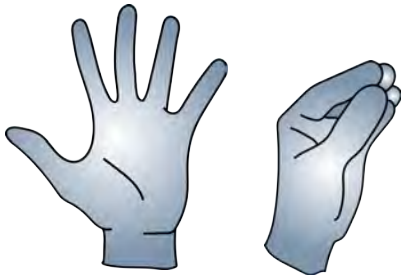# Functional movements

open - fist
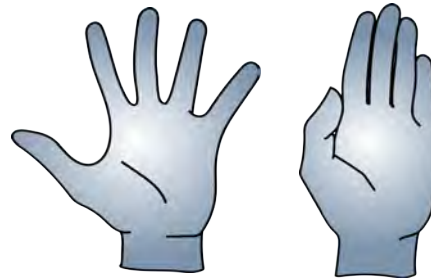
extend - flex

open – pinch grip

radial/ulnar abduction

open – lumbric grip

extend fingers /close

- 12 further combined movements (17 in total)
- To be executed synchronously or alternately

Objective

- To iteratively develop a serious virtual reality game for hand and finger rehabilitation within an appealing and engaging digital environment, encouraging patient motivation for at least 2 weeks of continuous therapy.

Study design

BG Klinik
Berufsgenossenschaftliche
Unfallklinik Tübingen

universität
wien

PLAY BIONIC

.R³.E.S

EBERHARD KARLS
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Prototype

- **Gameplay basics**
- **Evaluation of motivational elements**
- **3 practice stations**
- **6 functional movements**

↓

- **Evaluated with 18 healthy test persons and 7 inpatients**
- **4 VR-sessions, 15 minutes max.**

Version 1

- **Extended farm scenery**
- **Use of all motivational elements**
- **12 practice stations**
- **17 functional movements**

↓

- **Evaluated with 20 inpatients, split into an intervention and a control group**
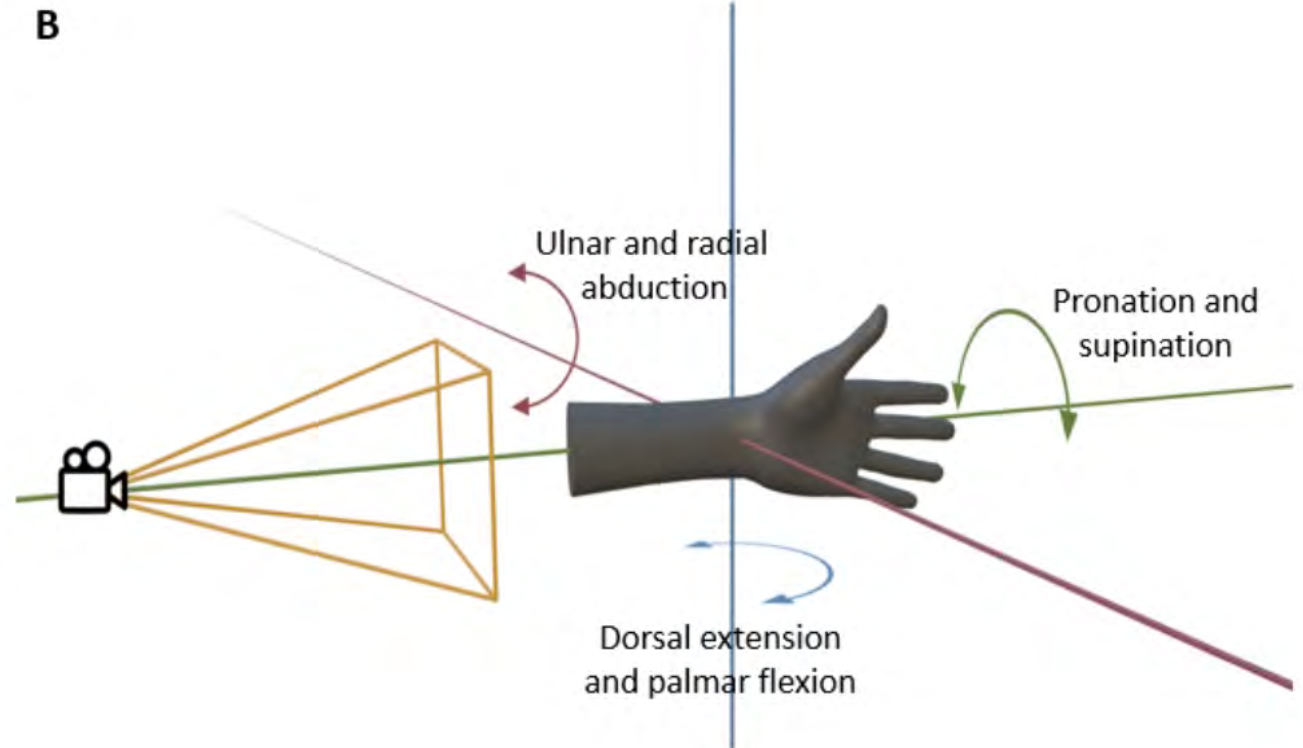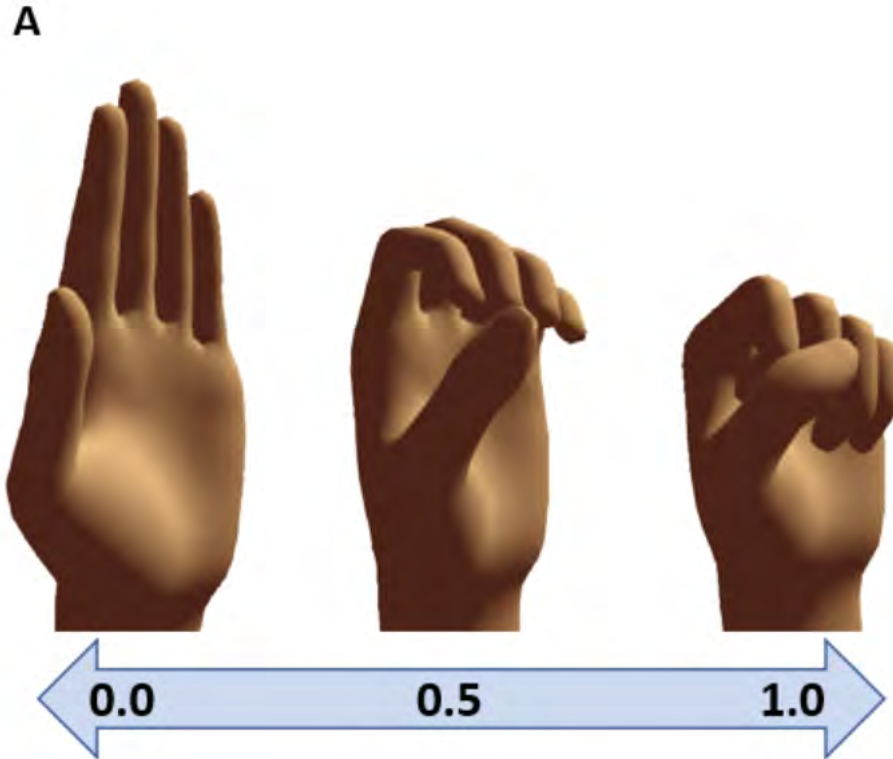- **12 VR-sessions, 30 minutes max.**

Version 2

- **Improved interaction feedback**
- **Improved movement recognition**
- **Adaptive customization to patient's range of movement**

↓

- **Evaluated with 20 inpatients, same as Version 1**
- **Add-on for the control group activity: practice ball**

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A

0.0   0.5   1.0

B

Ulnar and radial abduction

Pronation and supination

Dorsal extension and palmar flexion

Game design

- Companion dog
- Teleport
- Interaction with NPCs
- Preview hands

Motivational design

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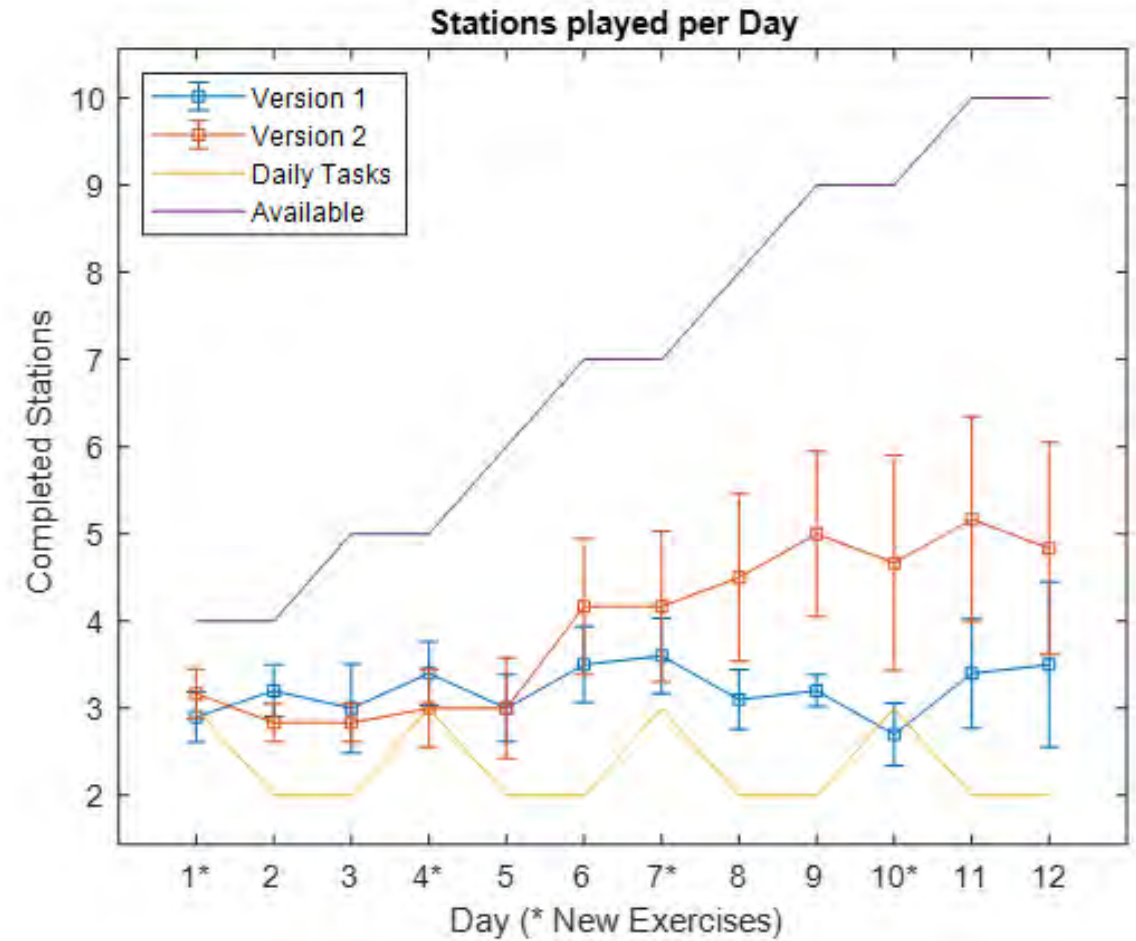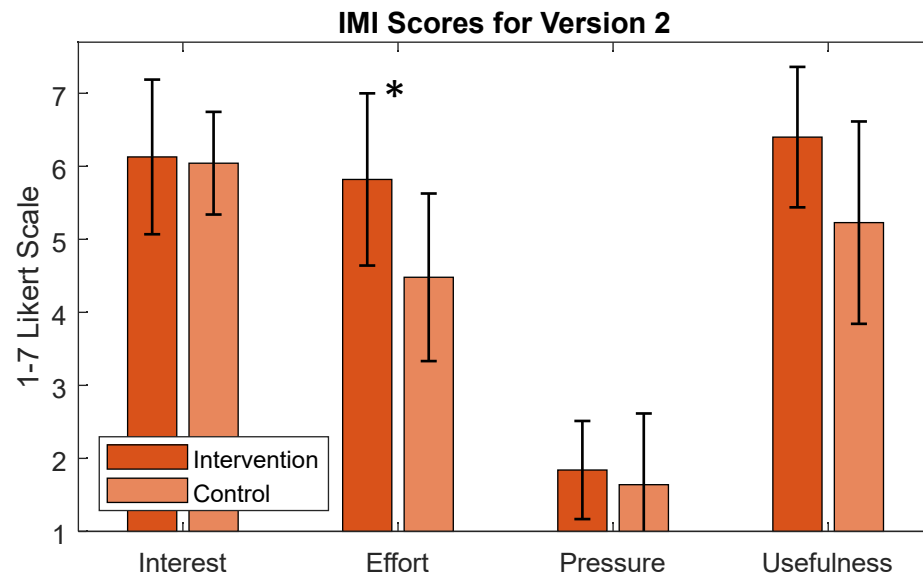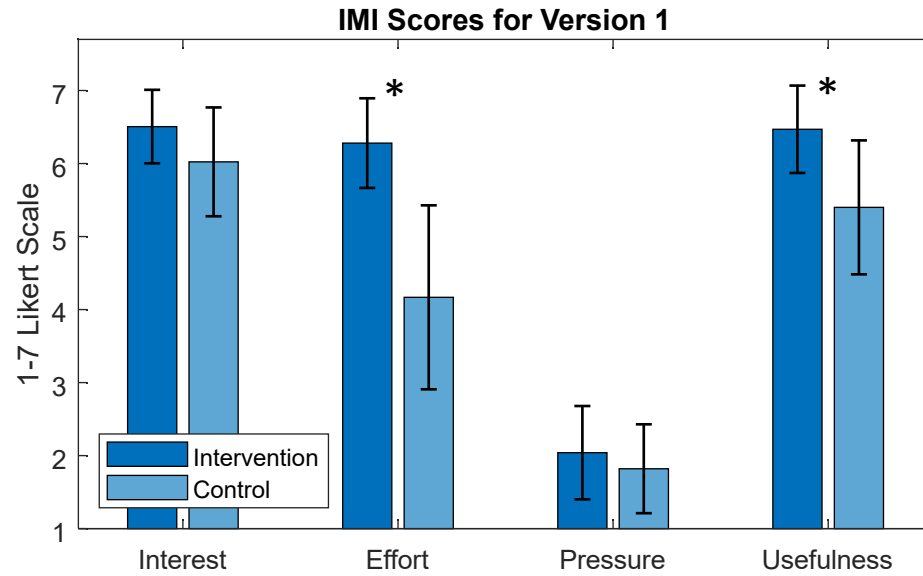- 12 VR-sessions, 30 minutes max.

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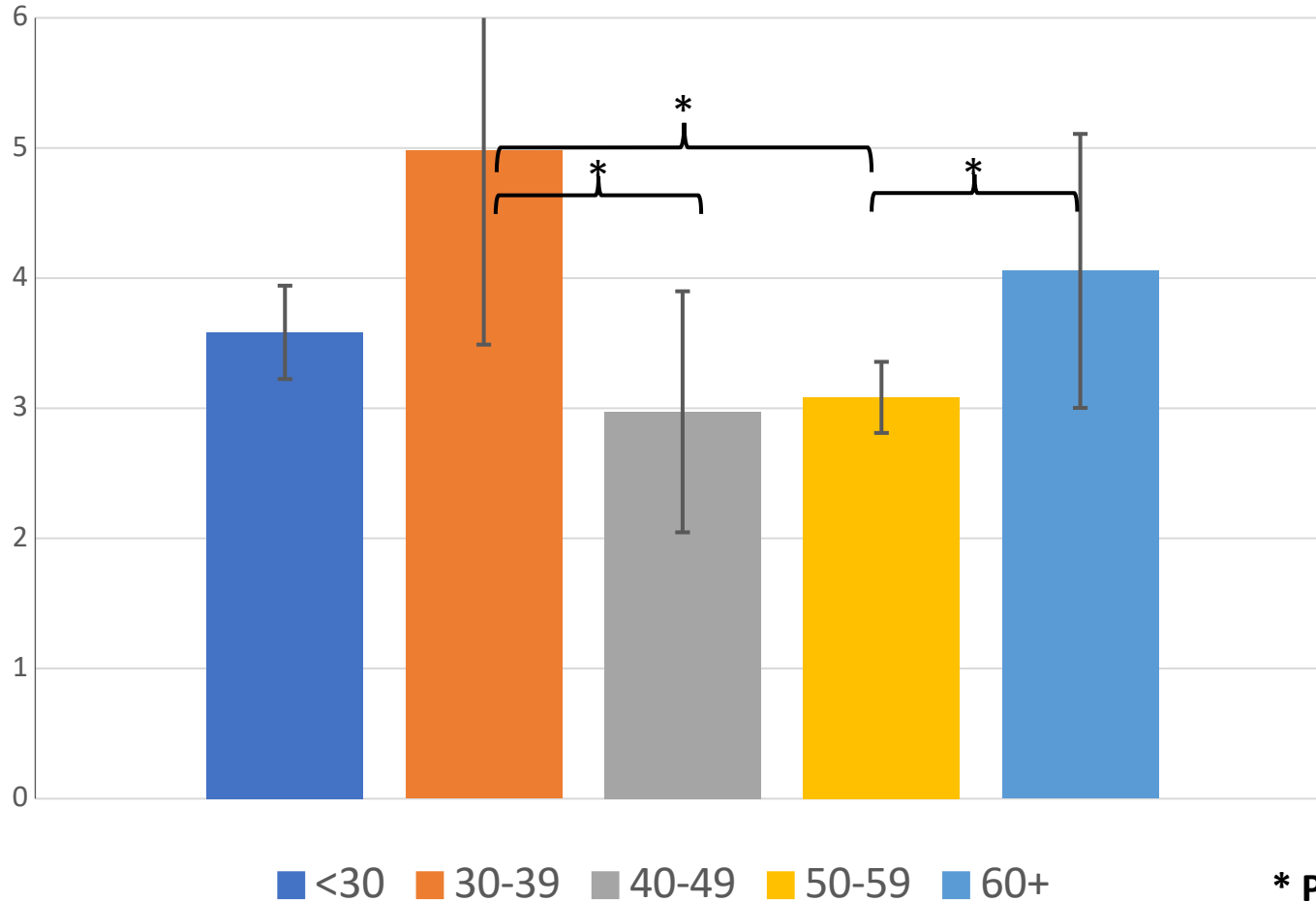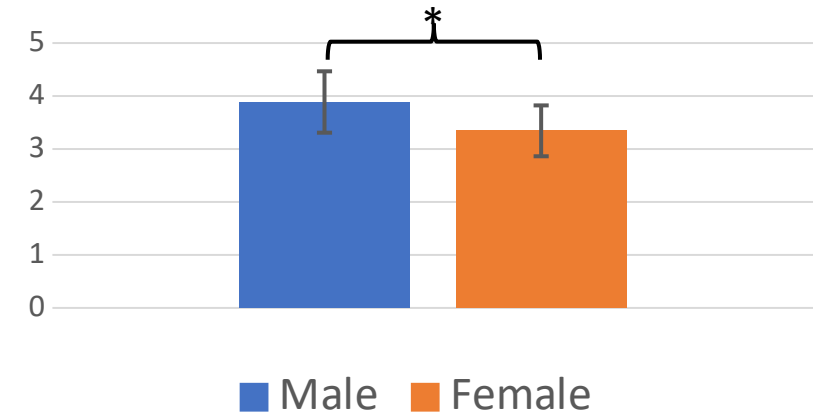- Add-on for the control group activity: practice ball

Results

IMI Scores for Version 1

IMI Scores for Version 2

Stations played per Day

* P<0.05

Preliminary results

Stations played per day
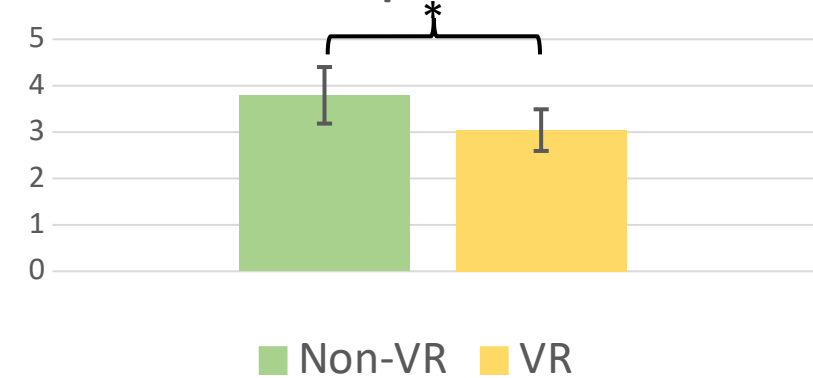
What patients say

I forget about the pain while I'm practicing – it's as if I'm tuning out.

I liked practicing with the StableHandVR, because I was distracted. I was able to forget about my pain some of the time and my ambition was sparked while doing the movements.

You can tune out from your worries, simply switch off and immerse yourself in another world...

During the game I know that I'm doing the exercises correctly because of the colors. Much better, than when I'm practicing by myself.

You forget the exercises and the many repetitions and only notice that you have practiced a lot, once you get tired. You are concentrating on the game and not on the injury.

Conclusion

- This study presented a virtual reality serious game designed for hand and finger rehabilitation. The game was well received and provided an environment that effectively motivated the users. The iterative development process incorporated user feedback, confirming the game's ease of use and feasibility even for patients with severely limited hand function.

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