Zurich University
of Applied Sciences

School of
Health Professions

Physiotherapy Science Research Unit

ExerUP!: Design and Evaluation of a Digital Exergame-Based Solution for Effective and Attractive Sports Rehabilitation

Exergaming combines physical exercise with entertaining, motivating, and challenging games. The ExerCube offers optimal physical and cognitive challenges which could also benefit sports rehabilitation. In this study, we explore the potential of the ExerCube during rehabilitation after knee injury.

Background

The digital transformation is having a lasting impact on how we live and move. Whether in prevention or rehabilitation – new technologies are revolutionizing the traditional offering of customized solutions for a beneficial and future-oriented range of digital training and therapy services. In this context, the design for and with the end-users and stakeholders, as well as questions about the optimal design of high-quality, attractive, and effective tools take on a central role. However, on both the product side as well as the research side, many questions and processes have not yet been tapped, and so the potential of these digital solutions often remains unexploited.

Objectives

Therefore, the goal of this R&D work is the research-based and user-centered co-creation of immersive, digital exergame scenarios that are safe to perform during rehabilitation after musculoskeletal injury. Further, the potential of digitized training and rehabilitation in home and therapeutic settings will be explored.

Methods

The project will be structure into five work-packages (WPs):

WP1: Motor performance during ExerCube training, Lead: ZHAW, Michelle Haas

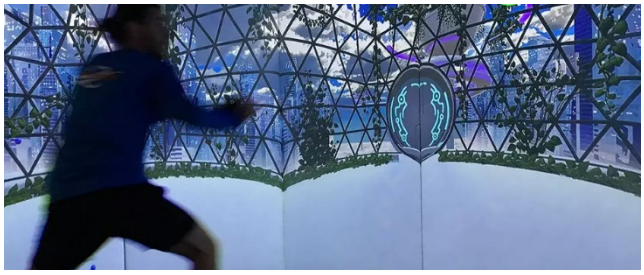
The goal is to identify movement patterns that are known risk factors for knee injuries occurring during ExerCube training in healthy and injured athletes. The biomechanics of the athletes during training with the ExerCube will be analysed in the movement laboratory at ZHAW.

WP2: User requirements for rehabilitative ExerCube use, Lead: ZHAW, Prof. Dr. Eveline Graf
The expectations and demands of the future users of the ExerCube in a rehabilitative setting (athletes, physical therapists, sports physicians) will be assessed following user-centered design principles.

WP3: Rehabilitation specific motivating workout scenarios for the ExerCube, Lead: ZHdK, Anna Lisa Martin-Niedecken and Sphery AG, Stephan Niedecken
Incorporating both the results of WPs 1 and 2, rehabilitation specific workout scenarios will be explored and implemented in collaboration with developers at Sphery Ltd as well as game researchers at ZHdK.

WP4: Efficacy and attractiveness of the ExerCube training during rehabilitation, Lead: ZHAW, Prof. Dr. Eveline Graf and ZHdK, Dr. Anna Lisa Martin-Niedecken
The exergame scenarios developed in WP3 will be examined for their efficacy and attractiveness to improve both physical and cognitive performance during rehabilitation after knee injury. Both the ExerCube as well as the @home version of the ExerCube will be utilized.

WP5: Public outreach and dissemination, Lead: ZHAW, Prof. Dr. Eveline Graf and ZHdK, Dr. Anna Lisa Martin-Niedecken
After completion of the R&D work, all project partners will jointly disseminate the results to health professionals, therapists, educational institutions as well as the general public.



Project leadership
Prof. Dr. Eveline Graf

Project duration
2021 - 2023

Project team

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