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Reimagining Recovery: A Patient-Centred In-Hospital Intervention to Motivate Early Mobilisation Post-Surgery

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INTRODUCTION

A lack of physical activity after surgery is a well-known barrier to recovery and a cause of complications. In Denmark, the move to single-patient hospital rooms — meant to improve care — has unintentionally reduced early mobilisation, possibly due to missing social and motivational cues. While HCI research has explored motivation, rehabilitation, and physical activity, it has paid less attention to how clinical contexts shape patient behaviour.

This project uses a mixed-methods, user-centred design approach to create a gamified digital solution that motivates post-surgical patients to be physically active.

METHOD

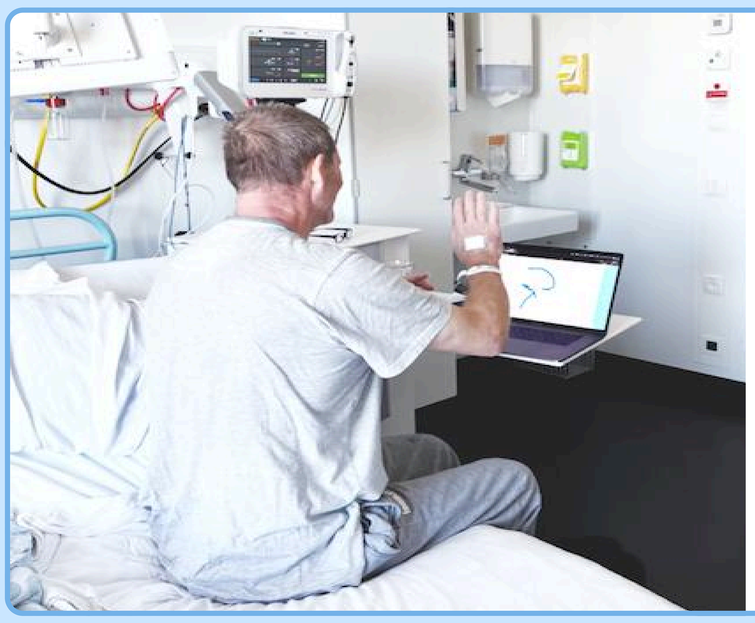
We adopted an interdisciplinary design research approach, following the Double Diamond model. A total of 54 participants were involved throughout this iterative process, including nurses, physiotherapists, and patients.

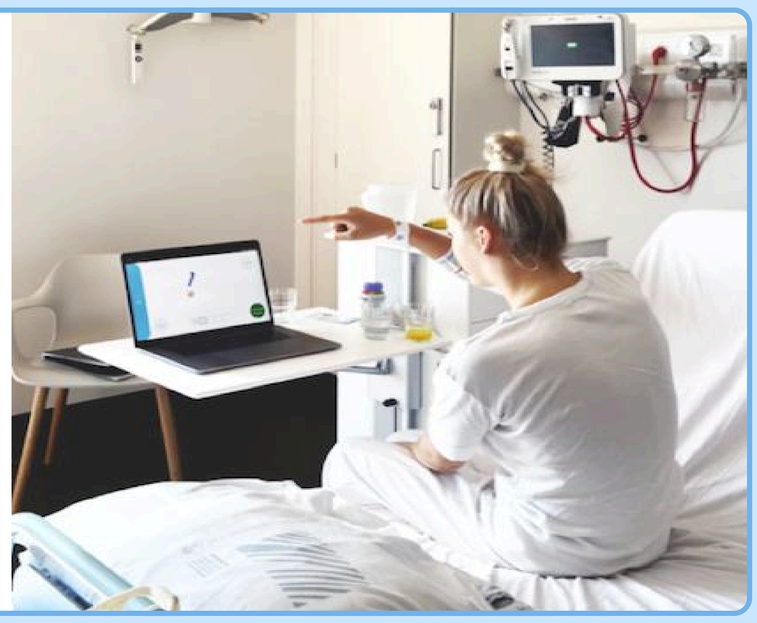
KEY FINDINGS

- Hospitalised patients often feel uninspired and rely on external factors, like hospital staff, for motivation to move.
- Many patients have misconceptions about physical activity, setting unrealistic goals, like walking, without realising light movements are sufficient.
- The hospital environment plays a key role; staff are often unable to prioritise mobilisation, and facilities often don't encourage activity.
- Physical activity assessment is usually ad hoc, lacking standardised methods to track progress, which impacts patients' sense of competence.

Unrealistic goals

Good enough





SOLUTION: KINETIP

The solution is a digital game platform called Kinetip, a web-based solution accessible online at kinetip.dk. Using a **hand tracking model**, the system supports a variety of games that operate through **gesture interaction**; encouraging users to move their upper body while playing and interacting with the hospital terminal device.

The current version of Kinetip implements a word puzzle game, permitting the combination of cognitive and physically-engaging activities. This game draws inspiration from Wordle, where users strive to guess a random word within a fixed number of attempts. While adhering to the rules and dynamics inherent to Wordle, the aim was to leverage the existing engagement afforded by the game to enable a context requiring users to move their bodies.

Through Kinetip, instead of typing letters on a keyboard, users articulate their guesses by using their arms and hands to draw each letter, which is then interpreted by an **optical character recognition model**. By gamifying the experience of physical activity and leveraging established drivers of behaviour change through gesture-based interaction, we sought to render the mundane task of being physically active while hospitalised more enjoyable.

EVALUATION

We evaluated the prototype with 16 patients to explore its feasibility in motivating in-hospital physical activity. After using Kinetip, patients completed a short-form version of the Intrinsic Motivation Inventory (IMI) questionnaire.

The results showed that patients were motivated by the fun and challenge of the activity but felt less competent as pressure increased. While there are signs of intrinsic motivation, further studies are needed.

DISCUSSION

This work highlights how patients rely on external factors to engage in physical activity. In response, we introduce Kinetip, a digital platform aimed at promoting independent, context-appropriate, and enjoyable early mobilisation.

We conclude by discussing key implications for the design of digital rehabilitation technologies.

- Designing **digital platforms** that connect hospitals, homes, patients, and professionals enables accessible, personalised, and continuous care.
- Integrating **gesture-based interaction** makes movement intuitive and encourages safe physical activity through minimal assistance.
- Incorporating **familiar game genres** fosters curiosity and engagement — especially when they include cognitive games that also help train the mind.

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