

# Kinetik

A knee sleeve with integrated strain sensor for knee flexion monitoring within the rehabilitation context

## Background and problem definition

Knee injuries are common and have a significant impact on daily functioning. Current progress measurements in knee rehabilitation are primarily based on subjective observations by physical therapists, while the objective measurements performed are often fragmented, limited to snapshots, and time-consuming.

## The result: A realtime monitoring knee sleeve

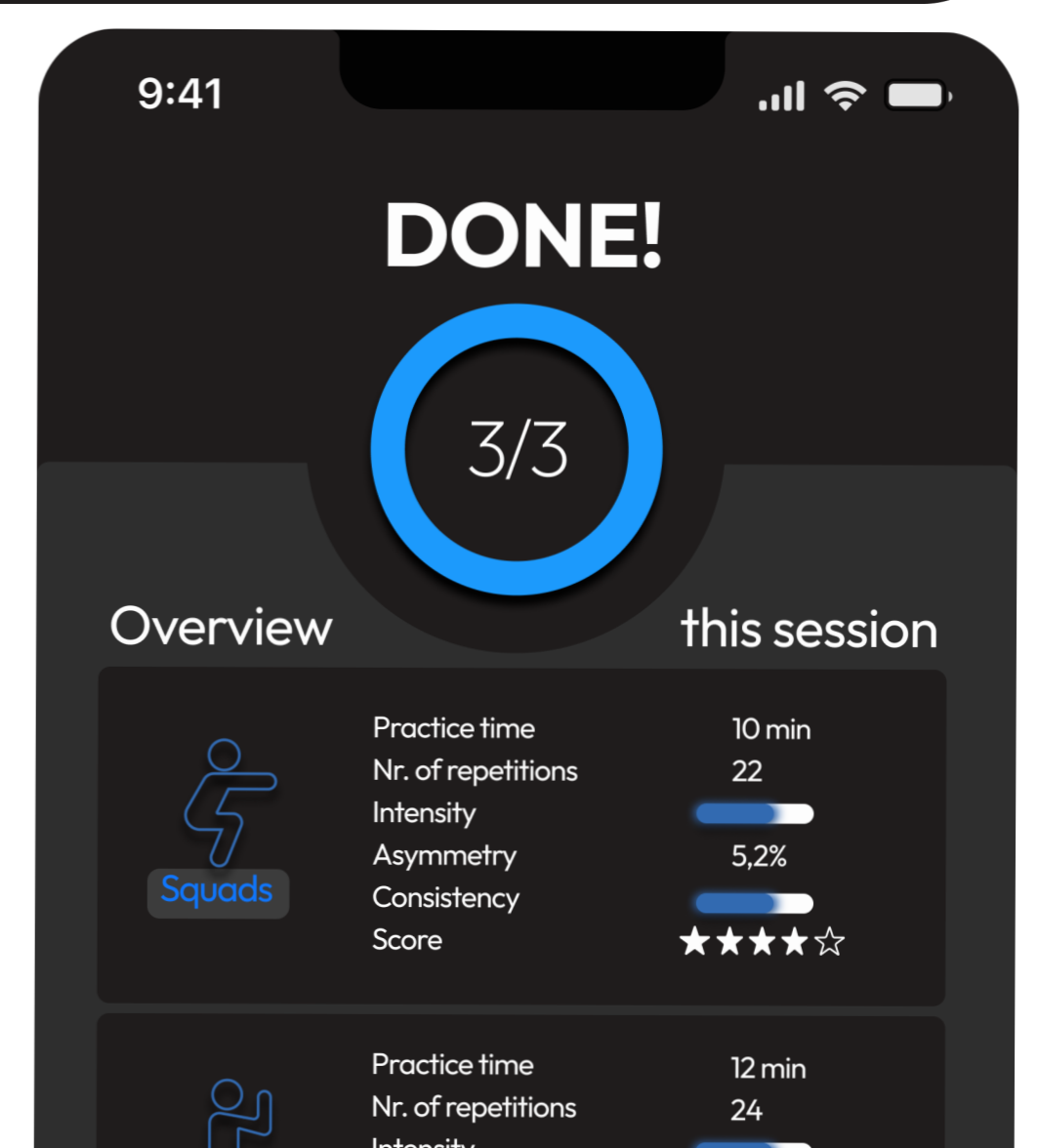
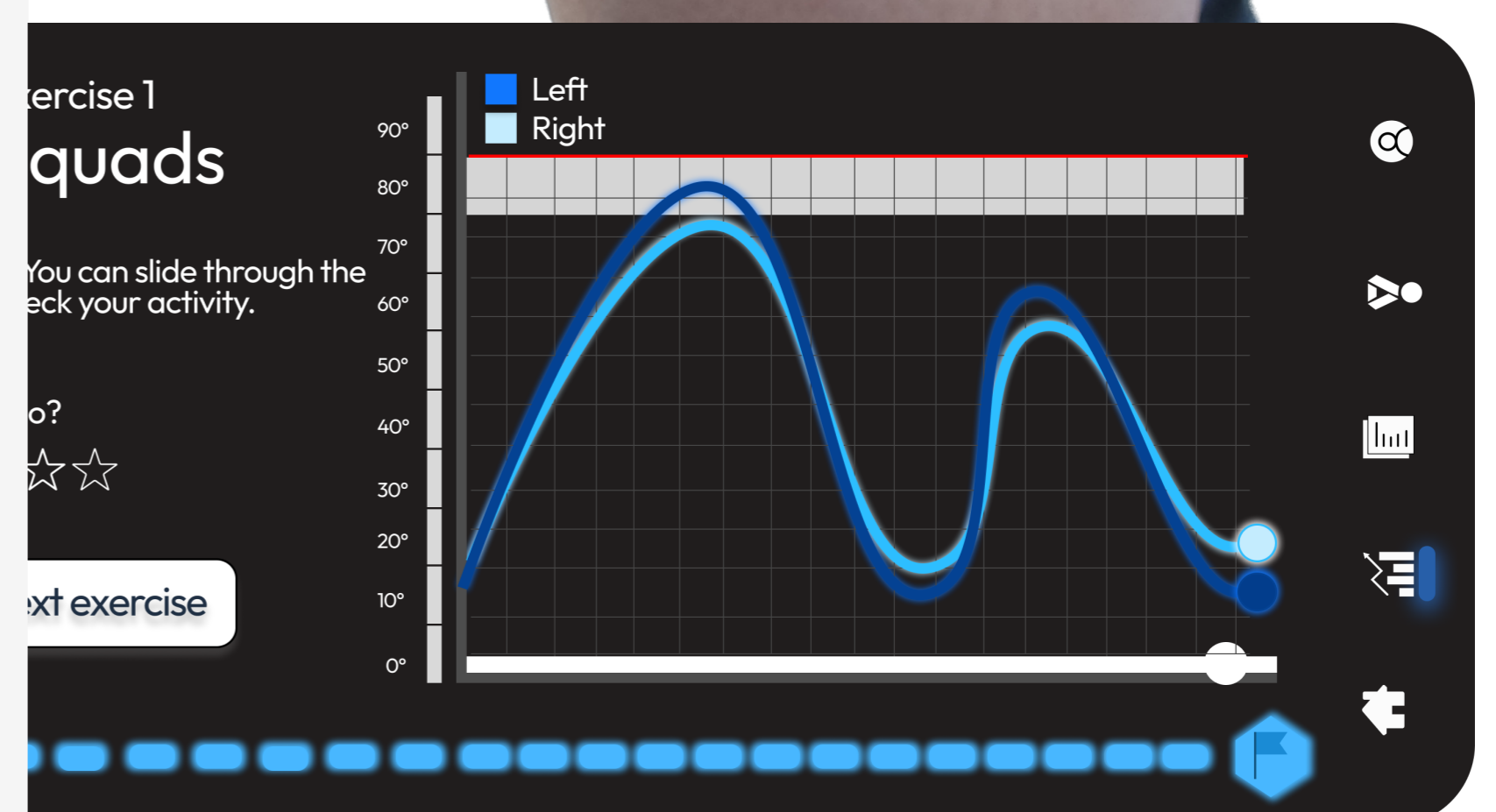
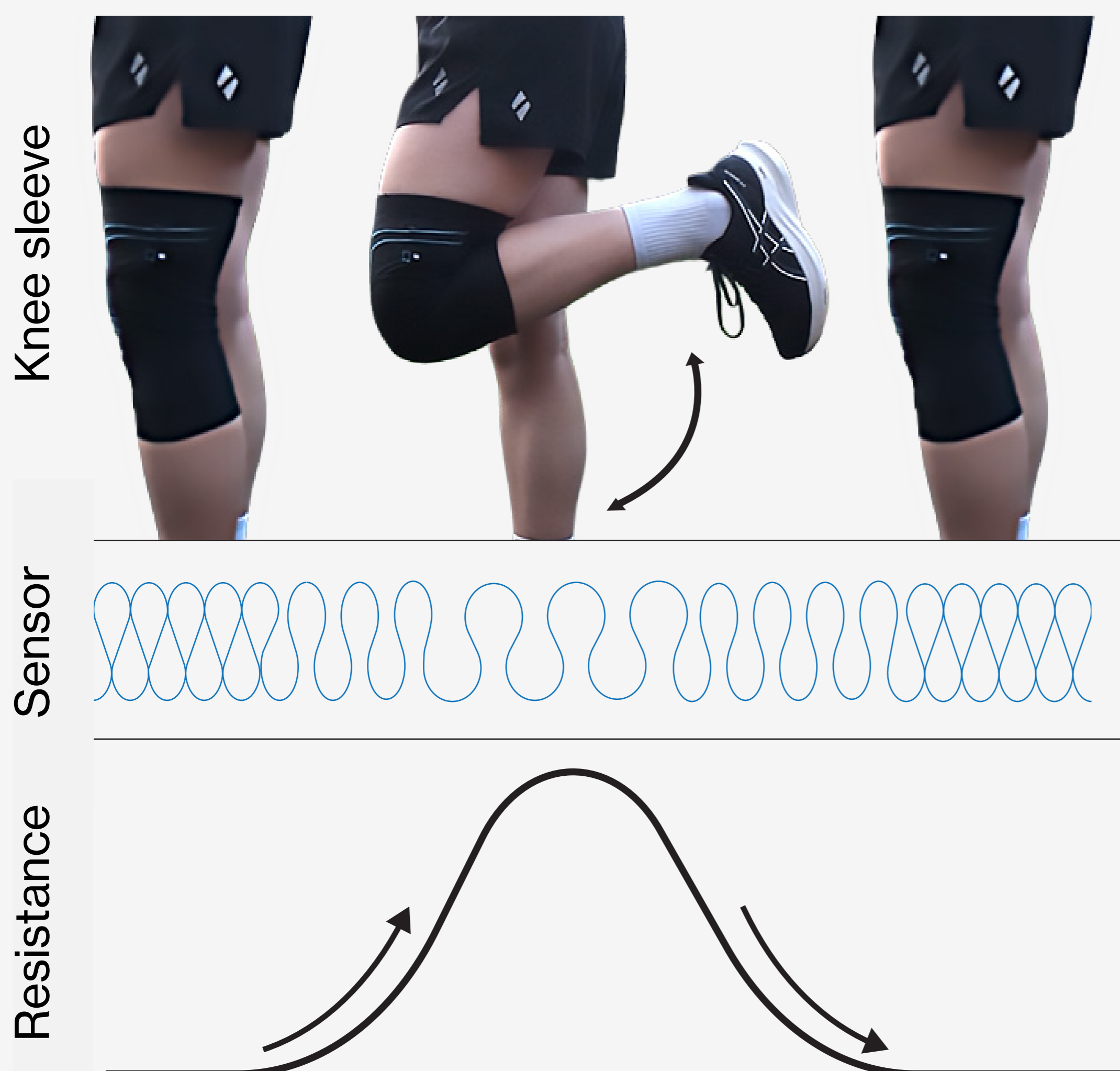
KinetiK is a knee sleeve with an accompanying app interface that allows users to track their movements in real time via a live graph. Direct feedback on movement patterns during rehabilitation exercises allows users to improve and correct their movement during the session. The interface also provides an overview of session results, like the number of flexions, movement consistency, maximum flexion, and asymmetry between the injured and healthy knee. Long-term trends and badges help the user visualize progress, achieve goals, and stay motivated.

## The strain sensor

The research focused on using textile strain sensors as an accessible and affordable alternative to more complex and expensive sensors, like IMUs. These sensors detect strain through changes in contact points, allowing them to track the movement of the knee by positioning the sensor over the knee cap.



## SENSOR OPERATION



Nienke Ickenroth  
Development of a textile strain sensor wearable  
for knee flexion monitoring in rehabilitation  
24/02/2026  
Integrated Product Design

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