Impact stories

How to improve quality of life for patients with Intermittent Claudication using a smartphone

About the collaboration

The Jeroen Bosch Hospital is a Dutch hospital with multiple auxiliary locations south of the Netherlands. The hospital has 4,000 employees and 240 physicians and surgeons in 29 specialties, leading to a yearly total of 500,000 outpatient and 60,000 inpatient treatments.

This project was done in collaboration with the Technical University of Eindhoven.

The challenge

The diagnosis of intermittent claudication (IC) is challenging because the main symptom, pain while walking, is also caused by several other pathologies.

Current diagnostic tools to measure intermittent claudication are not always adequate to determine whether other diseases are the primary cause of any walking complaints, which makes it difficult to decide on the optimal treatment for the patient and impairs the proper follow-up. Furthermore, it is challenging for the physician and patient to monitor daily disease development.

The solution

As a solution, a smartphone accelerometer was used to investigate the feasibility of measuring disease-specific changes in the gait pattern of intermittent claudication patients.
The smartphone app used

The JBZetje app manages remote supervised walking therapy, which captures motion data. The group of patients performed a walking test true to their daily environment: they walked outside on a flat course, wearing their usual shoes, at their preferred pace. Tri-axial acceleration was measured while the subjects walked with the smartphone horizontally in their right hand in front of them, at approximately belly button height.

By touching a button on the smartphone, the patients could report when they experienced pain. They walked until they could no longer continue due to the pain. This way, data on the gait pattern with active symptoms was acquired. All patients completed a disease-specific questionnaire about the walking test. This questionnaire is also part of the JBZetje app.

In addition, managers are much more involved in drawing up the budget because they have insight into the most important data – in real time.

The impact

The app shows the potential clinical applicability of measuring changes in intermittent claudication gait characteristics.

With the help of the app (native, secure and connected to the Electronic Health Record), the walking data of patients can be monitored in an accessible, inexpensive, natural and reliable manner. This improves the diagnosis and follow-up of IC patients in daily life.

Furthermore, gait pattern measurements with a smartphone accelerometer could be combined with an algorithm that detects IC-specific anomalies in walking patterns. This feature predicts and follows up on whether supervised walking therapy and/or surgery will improve each patient's clinical and patient-experienced outcomes. The same algorithm could then deploy telemedicine and remote monitoring for IC patients.

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