

Therapeutic Support for Outpatient Rehabilitation

Sensor-based Rehabilitation Shoe

By participating in the AiF research project «Sensor-based Rehabilitation Shoe» PFI and ISC have taken on the task of developing a measuring system for gait analysis and a special shoe into which the system can be completely integrated.



A shoe with an integrated miniaturised gait laboratory could be used to support rehabilitation of outpatients with injuries or illnesses affecting the human gait. After appropriate instruction, these patients are required to use the newly developed system themselves during their everyday activities between appointments at the rehabilitation centre. The measuring system in the shoe records the specified parameters (gait parameters), and the attending physician or physiotherapist evaluates the recorded data during the treatment appointments. He or she can then draw conclusions about the success of the therapy applied so far and give instructions for further treatment according to the individual progress made by the patient.

Technical Implementation: Measuring System, Shoe Concept, Shoe Production

The measuring system should be completely accommodated in the shoe – a wearable device with high-performance miniaturized components such as Inertial Measurement Units (IMUs) and flexible

printed circuit boards. It has to acquire and save relevant gait parameters over an appropriate period of time. In a parallel process, evaluation software is to be developed to enable the attending physician to read out and evaluate the recorded data.

At the same time, a special shoe is to be designed and manufactured which can accommodate the measuring system without influencing the gait pattern. Since some components of the measurement system have to be integrated during shoe production, a special production technique also has to be developed. The rehabilitation shoe will have to demonstrate its suitability for everyday use in wear tests.

Therapeutic Aid

The rehabilitation shoe could become an important therapeutic aid for patients, physicians, and physiotherapists. Shoe manufacturers and manufacturers of electronic medical devices could offer a product helping a large and steadily growing target group to possibly recover their health and mobility faster than with conventional treatment thanks to a new approach permitting a greater degree of persistency and more independence.

The project bears AiF Number 19132 N. It began on 1 September 2016 and ends on 28 February 2019. PFI is the project management organisation; ISC is the second research organisation. The project accompanying committee has already been constituted; however, interested companies are invited at any time to participate in the project.

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