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Life Sciences



Nominated for the CTI Swiss Medtech Award 2017

A revolution in locomotion therapy



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A rehabilitation system for secure locomotion training can benefit neuro and orthopaedic patients, as well as therapeutic staff. The system developed by Balgrist University Hospital, the University of Basel and Lutz Medical Engineering is being honed as part of a CTI project.

People who have undergone orthopaedic surgery or who have sustained injuries to the central nervous system are often no longer able to walk and require intensive musculoskeletal training. Walking aids help therapeutic staff support these patients. However, walking aids have drawbacks: they do not respond to patients' individual needs; they partially restrict movement; and support only a limited number of movements.

As head of research at Balgrist University Hospital Paraplegic Centre, Dr Marc Bolliger was looking for an optimised system to replace the walking aids for patients with spinal cord injuries a few years ago. In 2011, he commissioned Lutz Medical Engineering AG (LME) to develop and build a body weight support system based on the clinical needs defined by the centre. LME worked with Dr Heike Vallery, Dr Georg Rauter, Dr Joachim von Zitzewitz and Bolliger to develop the idea of a cable robot capable of supporting a person's body weight.

The FLOAT system was patented in 2012, and a year later, the first version of the system was used for gait training with neuro and orthopaedic patients. To use the FLOAT system patients are fitted into a harness, leaving arms and legs free, and giving therapists a free view of the patient.

Body weight support and safety

The FLOAT is unique in three respects: First, it can support up to 60% of a patient's bodyweight if need be. This is often the prerequisite for patients to be able to stand at all. Second, the system recognises when a patient is about to fall, and catches them safely. Third, The FLOAT allows for



free gait training and three-dimensional movement, providing patients with the opportunity to practise everyday activities such as climbing stairs. "As soon as we set up the equipment in the gait laboratory, we received very positive feedback from therapists and patients. We realised we had developed a very good training device," recalls Bolliger. This increased the university hospital's desire to use the prototype to develop a complete rehabilitation system for gait training.

CTI project leads to clinical use

Dr Georg Rauter from the Department of Biomedical Engineering at Basel University has been working with Bolliger and LME since May 2015 in a CTI project to improve The FLOAT for clinical use. In addition to an improved central control panel, The Float has a rotary sensor which allows the patient's orientation to be tracked continuously and training settings to be adapted accordingly. The wireless transmission of the signals from the bracket sensor eliminates previous cable routing issues. Thanks to the improved control software, patients barely notice the support provided by the system. The new training scenarios will help patients reach new limits.



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Dr Marc Bolliger, Head of Research at Balgrist University Hospital Paraplegic Centre

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The CTI is the Confederation's innovation promotion agency. It provides consultancy and networking services and financial resources to help turn scientific research into economic results. Making the Swiss economy strong. In 2018 the CTI will become Innosuisse – the Swiss Agency for Innovation Promotion. However, the task of promoting science-based innovation in the interests of business and society remains.

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