New Study shows Advantages of Armeo®Power Therapy after Stroke

Robotic training with the Armeo®Power, an arm exoskeleton by the Swiss medical device company Hocoma, reduces motor impairment faster and more effectively than conventional therapy after stroke. This is the result of a multicenter study1 by Verena Klamroth-Marganska, Robert Riener and other scientists of the ETH Zurich, that was recently published in "The Lancet Neurology".

Volketswil, Switzerland, February 18, 2014 – Patients suffering from stroke, traumatic brain injuries or other neurological disorders often show motor impairments of their hand and arm function that extremely limit their quality of life. In collaboration with four clinical centers in Switzerland, scientists of the ETH Zurich now assessed how robotic training with the ARMin2 (research prototype of the commercially available rehabilitative exercise device ArmeoPower) can improve motor function in the effected arm. The fact that robotic therapy leads to a quicker and more effective recovery of motor function is an important signal for science and practice and proves the increasing importance and efficacy of new rehabilitation methods.

Robotic Therapy Leads to Better Results than Conventional Therapy
The team around Riener and Klamroth-Marganska enrolled 77 chronic stroke patients with moderate-to-severe arm paresis in the trial and trained with these participants for 8 weeks (resulting in a total of 24 sessions). Patients were randomly assigned to two groups where they received either robotic or conventional therapy for at least 45 minutes, three times per week. After therapy, patients assigned to robotic therapy showed significantly greater improvements in motoric function. Although most gains occurred in the first 4 weeks, patients still improved during the second half of the therapy without a plateau at the end of training. These results point at a possibility for further improvements if the training was continued.

Severely Impaired Patients Profit Most from Robotic Therapy
When patients were stratified by severity, most severely affected patients seemed to profit the most from robot assisted therapy. According to Klamroth-Marganska and colleagues, the higher intensity of training with the ARMin might have been an important factor contributing to the differences, especially in patients with severe impairments.

Great Support by Clinical Network
„The eligibility criteria, size and organization were the biggest challenges of the study“ says lead author Klamroth-Marganska. According to the scientist, the great support by the clinical network was crucial for the successful execution of the study. Balgrist University Hospital was not only involved in the initial development of the ARMin, but played a part in every development process of the arm exoskeleton. Scientific and organizational support was provided by different sides, for example by former research colleagues from Berlin who contributed to the success of the study with their many years of experience in the execution of complex studies.

Verena Klamroth-Marganska, who was involved in the study from day one, believes that the results have a huge potential for future research: „the fact that especially severely impaired patients show improved rehabilitation outcomes with the ARMin is something we didn’t expect and a completely new finding. Now we have to look at the full potential of robotic arm therapy with larger follow-up studies and over a longer period.“
About lead author Verena Klamroth-Marganska
Verena Klamroth-Marganska studied Human Medicine at Freie Universität and Humboldt-Universität in Berlin, Germany. She received her doctoral degree from Westfälische Wilhelms-Universität Münster, Germany. After assignments in Spain, USA and England the geneticist worked at the Universitätsklinikum Münster - Institute of Human Genetics - and in the Department of Neurology, MEDIAN KLINIK Berlin. In 2008 Klamroth-Marganska joined the Sensory-Motor Systems Lab team at the ETH Zurich as a medical advisor and leader of the multicenter study with the ARMin.

A summary of the study is available [here](#).
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Hocoma
Hocoma was set up in 2000, as a spin-off of the Swiss University Hospital Balgrist. The company currently employs more than 150 people at its headquarters near Zurich, Switzerland and at its subsidiaries in the US, Singapore and Slovenia. Hocoma develops and produces therapy solutions for neurological patients with movement disorders caused by stroke, spinal cord injury, traumatic brain injury, multiple sclerosis, cerebral palsy or other neurological diseases and injuries as well as for low back pain patients. The product range features devices for intensive locomotion therapy (Lokomat®), functional therapy of the upper extremities (Armeo®), early rehabilitation and patient mobilization (Erigo®) as well as functional movement therapy within low back pain treatment (Valedo®). Hocoma’s products are applied successfully in clinics and research institutes worldwide. This medical technology company has received many awards and was honored with the “Red Herring 100 Global Award” in January 2010, as one of the hundred most innovative companies worldwide. Hocoma generated a turnover of more than 30 million CHF in 2012. Dr. Gery Colombo is the CEO of Hocoma AG.

References
2. Based on the ARMin technology developed at ETH Zurich and University Hospital Balgrist, the ArmeoPower is a rehabilitative exercise device intended for medical purposes, such as to measure, evaluate, and increase the strength of muscles and the range of motion of joints. The device allows a large range of motion in three dimensions and seven degrees of freedom. It supports the physiological movements of the shoulder and arm, as well as the opening and closing of the hand, and provides intensive and task-specific training strategies.

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