

Long-Term, Intensive Robot-Assisted Therapy Helps Paraplegic Patients Walk Again

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Last week, Nature Publishing Group sent the scientific areas of the Internet into a frenzy by publishing a groundbreaking study that proves the positive effects of long-term training with Brain Machine Interfaces (BMI) on patients who have suffered a spinal cord injury (SCI).

The study titled “Long-Term Training with a Brain-Machine Interface-Based Gait Protocol Induces Partial Neurological Recovery in Paraplegic Patients” was conducted by an international group of scientists, led by the Duke University neurobiologist Miguel Nicolelis and demonstrates that it’s never too late to start intensive therapy.

Eight patients with chronic paraplegia, who have been completely paralyzed for 3 to 13 years, participated in a 12-month training program which they called the Walk Again Neurorehabilitation (WA-NR) protocol. Participants first learned to control a 3D avatar on a screen by imagining moving their arms or legs. In further stages, they learned how to control a robotic gait trainer in the same way. The final stage consisted of gait training with a brain-controlled robotic exoskeleton. In addition, patients also trained many hours with a traditional robotic gait trainer throughout the study period.

Finally giving proof to a well-known fact in leading rehabilitation centers

The results now give strong scientific evidence to the experience and long standing argumentation of leading rehabilitation centers that the correct, intensive mixture of robotic and traditional movement therapy will lead to significant improvements in the recovery of patients. All patients in this study, who previously did not exhibit any sensory or motor function below the level of injury, started to show signs of motor recovery after seven months; and by the end of the treatment, this recovery stabilized. Patients’ walking independence improved significantly, and they exhibited improvements in gastrointestinal function and skin condition as well.

Studies like this give hope to patients with neurological conditions and prove that medical technology companies that develop solutions to foster neuroplasticity are on the right track. Brain Machine Interfaces combined with other therapies will improve current therapy standards.

It’s not a miracle

“We are really pleased that more and more studies like this are conducted and published,” states Dr. Gery Colombo, CEO of Hocoma, the leading player in robotic and sensor-based movement therapy. “After the American heart/stroke association (AHA/ASA) already officially recommended the positive effects of robotic therapy for patients with stroke earlier this year, this study confirms reports and feedback we receive on a daily basis from our clinical partners. While media often speaks about ‘a miracle in recovery,’ we know that these are not miracles. The better the patient’s outcome, the better is the mix of intensive therapy with advanced technologies. All of them are based on principles of physiology and motor learning.”



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One example from Germany is Samuel Koch who severely injured his spinal cord on live television in 2010. The tetraplegic was told that in his case, robotic gait training with the Lokomat would not help him. Starting a few months ago, Koch has had access to regular Lokomat training and already reported to the newspaper Darmstädter Echo: "Since I started training on the Lokomat, my body awareness has significantly improved. While walking in the Lokomat, I feel the pressure of my entire sole walking on the treadmill and surprisingly even my left shinbone."

Hocoma works internationally with leading rehabilitation centers to integrate intensive therapy models into the daily routines of clinics and hospitals worldwide. "When you buy a Hocoma solution, you buy more than a product," Colombo continues. "We have dedicated service and education teams who help integrate advanced technologies into your clinical setting. This is crucial for success of the therapy."

Keywords: Brain Machine Interfaces, spinal cord injury (SCI), robot-assisted therapy, paraplegic patients, chronic paraplegic patients, Duke University, Miguel Nicolelis, Lokomat, Hocoma, AHA/ASA, neurological recovery, Walk Again Neurorehabilitation (WA-NR), robotic exoskeleton, Samuel Koch

References:

Long-Term Training with a Brain-Machine Interface-Based Gait Protocol Induces Partial Neurological Recovery in Paraplegic Patients

<http://www.nature.com/articles/srep30383>

Walk Again Project Video

<https://vimeo.com/178225409>

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Press images

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About Hocoma

A successful therapy begins in patients' heads. In the firm belief that – step by step – they can reach their goals and regain quality of life.

This is what we work for at the Swiss medtech company Hocoma. With technologies and ideas that look at functional movement therapy from a completely different angle. Because they enable independent exercises and create maximum motivation. Because they challenge people to take courage and support their hopes with personal achievements.

We are committed to creating the ideal therapy. Our awarded robotic and sensor-based devices offer solutions for intensive gait therapy (Lokomat®, Andago®), functional therapy of the upper extremities (Armeo®), robotic mobilization and functional electrical stimulation in early rehabilitation (Erigo®) as well as functional movement therapy within low back pain treatment (Valedo® Therapy Concept) at home and at the clinic. They are the result of intensive research, consistent development and continuous exchange with patients, therapists and partners in research and science.

Those who see to break new grounds need to stay open to exceptional ideas. They have the potential of being exceptionally effective. This guiding principle by Hocoma founder and CEO Dr. Gery Colombo has accompanied us since our start in 2000 and is still lived and implemented by our dedicated employees around the world. At the headquarters in Volketswil near Zurich (Switzerland) and the subsidiaries in the USA, Singapore and Slovenia they achieved a turnover of more than 30 million CHF in 2014.

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