Armeo®Power

Goalie: With arm movements, the patient has to prevent the ball from going into the goal.

The Armeo®Power is a rehabilitative exercise device that allows early rehabilitation of motor abilities and provides intelligent arm support in a large 3D workspace. As a part of the sustainable Armeo Therapy Concept, the ArmeoPower is designed for individuals who have suffered strokes, traumatic brain injuries or other neurological disorders resulting in hand and arm impairment. The ArmeoPower is based on the ARMin technology developed at ETH Zurich and University Hospital Balgrist under the supervision of Prof. R. Riener.

Early Rehabilitation Therapy

The ArmeoPower has been specifically designed for arm and hand therapy in an early stage of rehabilitation. The device enables even patients with severe movement impairments to perform exercises with a high number of repetitions, which is paramount for relearning motor function.

Improved Therapy Efficiency

The ArmeoPower allows the therapist to focus on the patient and the actual therapy by reducing the therapist's physical effort. This liberation allows for a more efficient use of staff resources. Therapists are enabled to make better use of their clinical know-how and expertise leading to optimized patient care.

Extensive 3D Workspace

The robotic exoskeleton with six actuated degrees of freedom allows training in an extensive 3D workspace. This enables patients to practice the movements important for their therapy progress and daily life.

Augmented Performance Feedback

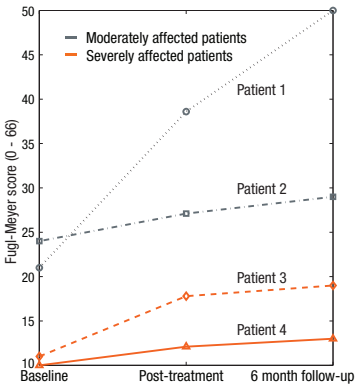
An extensive library of motivating, game-like exercises has been designed to train activities of daily living. Immediate performance feedback helps patients to improve their motor abilities, leading to more independence in daily routine and therefore better quality of life.

"With the ArmeoPower we are able to train severely affected patients with an intensity that was not possible before."

Dr. med. Verena Klamroth-Marganska, Institute of Robotics and Intelligent Systems, ETH Zurich, Switzerland

The advantages of the Armeo®Power therapy:

- Early rehabilitation with highly repetitive training for severely affected patients.
- Improved therapy efficiency and patient care.
- An extensive 3D workspace.
- Augmented Performance Feedback with motivating exercises to train activities of daily living.
- Assist-as-needed support provided by the robotic arm exoskeleton that automatically adapts to the patients' capabilities.
- Objective analysis and documentation of the patient's progress.



Fugl-Meyer score of four chronic stroke patients at baseline, after 8 weeks of therapy and at 6 months follow-up in a pilot trial with the research prototype of the ArmeoPower (ARMin robot). Figure adapted from Staubli et al. 2009.[1]

Assist-as-Needed Support

The ArmeoPower recognizes when the patient is not able to carry out a movement and assists the patient's arm as much as needed to successfully reach the goal of the exercise. It adapts the arm support to the individual needs and changing abilities of each patient – from full movement guidance for patients with very little activity to no support at all for more advanced patients. This assist-as-needed arm support enables and motivates patients to participate actively in their training, which effectively supports motor relearning.

Assessment Tools

The ArmeoPower precisely records how patients perform and how much support they need during their therapy sessions. Standardized Assessment Tools evaluate the sensors and motors of the device to investigate specific function. The results can be used to analyze and document the patient's state and therapy progress.

Scientific Results

The development of the ArmeoPower has been performed in close collaboration with research partners. Pilot trials with the research prototypes of the ArmeoPower (ARMin robot) have demonstrated in a number of single cases that therapy of severely and moderately affected stroke patients with the device is safe and effective. Patients improved during therapy and sustained their functional gains.[1]

Patient R. Bolliger with the ArmeoPower.

"The training with the device is fun and makes me go to my limits. Today, I can already use my arm again and accomplish things I couldn't do before."

R. Bolliger, patient, Switzerland

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[1] P. Staubli, T. Nef, V. Klamroth-Marganska, and R. Riener, "Effects of intensive arm training with the rehabilitation robot ARMin II in chronic stroke patients: four single-cases." Journal of neuroengineering and rehabilitation, vol. 6, no. 1, pp. 46+, 2009. [Online]. Available: http://dx.doi.org/10.1186/1743-0003-6-46