

REHA TECHNOLOGY



G-EOS

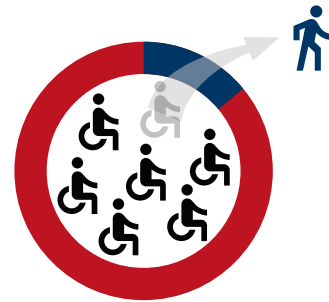
The power of end-effector-based gait therapy

Reha Technology – Passionate about robot-assisted gait therapy

For over 10 years, Reha Technology has been successfully developing innovative, robot-assisted gait therapy systems for use in the field of neurological rehabilitation. Based on the end-effector principle, the **G-EO** range of systems facilitates the work of therapists, reduces the physical burden and supports a wide and varied spectrum of patients with limited mobility and physical capacity.

Reha Technology products provide personalized therapy with intelligent robot technology and allow the treatment intensity to be increased in line with patient needs.

**One in 7
after stroke**



Study: Mehrholz, et al "Electromechanical-assisted training for walking after stroke." Cochrane Database Syst Rev. 2013 Jul 25;7 The Cochrane Library 2013, Issue 7 (2)

"Who wants to relearn walking, has to walk."

Prof. Dr. Stefan Hesse (1960–2016)

- Former Head of the Neurology Department at the Rehabilitation Clinic, Medical Park, Berlin
- Founding member of Reha Technology AG

Robot-assisted gait therapy is an effective method in the rehabilitation of neurological patients. In recent years, the technology has been greatly refined in collaboration with leading clinics and universities. Today, robot-assisted therapy has become an indispensable tool in neurological rehabilitation.

Countless studies confirm the clinical evidence of end-effector-based gait therapy in comparison with conventional therapy.

In clinics and medical practices, the use of gait trainers has brought about a significant increase in cost-effectiveness and efficiency in gait rehabilitation, reduced the physical burden on therapists and helped

patients to walk unassisted more effectively and purposefully.

End-effector-based **G-EO** gait trainers from Reha Technology enable performance-related therapies for a wide range of neurological pathologies to be employed at a very early stage.

G-EO – High performance with end-effector gait training Geared to everyday and patient needs

- Climbing up and down stairs
- Walking up and down slopes
- Level walking – forward and backward
- Passive, active and active-assisted mode



10 cm / 4 in

Step height

20 cm / 7.8 in



6 GAIT TRAINING TRAJECTORIES

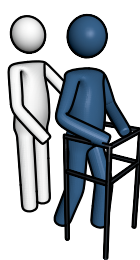


3 ACTIVITY MODES FOR PERFORMANCE-BASED THERAPY

passive

active

active-assistive



FAC 0
FIM 1

FAC 1
FIM 2

FAC 2
FIM 3

FAC 3
FIM 4-5

FAC 4
FIM 6

FAC 5
FIM 7

FAC = Functional Ambulation Category, Score 0-5; Holden et al., 1984; Holden et al., 1986; Collen et al., 1990.

FIM = Functional Independence Measure, Score 1-7; Chau, Daler, & Andre, 1994; Crewe & Dijkers, 1995; Dodds, Martin, Stolov, & Deyo, 1993; Granger, Cotter, Hamilton & Fiedler, 1993.

End-effector principle – short patient set-up time

The **G-EO** gait trainer with its end-effector principle represents a significant reduction in therapist workload. Guidance of the affected limb calls only for distal fixation, in this case, the feet. No complicated adjustment and fitting steps are needed and the average patient set-up time is reduced to around five minutes. This value represents a vital factor for an efficient therapy cycle in machine-based gait rehabilitation.

The patients begin their therapy quickly and without time-consuming set-up procedures. The physical burden on therapists is reduced considerably and therapy time can be used more effectively on and with the patients. Other therapy disciplines such as speech therapy or cognitive training can also be integrated.

Oriented to the needs of patients and everyday life and optimized for the therapist

Geared to the needs of everyday life, the varied gait activities of the **G-EOs** from level walking to dealing with slopes and stairs, both upwards and downwards, in different activity modes – passive, active or active-assistive – benefit an extremely broad patient population and enable a personalized gait therapy in different indications.

The movement segmentation function also enables the therapist to train specific gait movements in terms of quality and performance from «Initial Contact» through «Midstance» to «Terminal Swing» individually and taking the clinical patient image into account.

The **G-EOs** function-related modularity enables a flexible, holistic therapy tailored to the patient's walking ability.

Functionality and modularity – broad and diverse

The great functionality of the **G-EOs** assists therapists and the overall therapy process in the customization of the therapy goals and the expansion of the patient population.

The application spectrum is broad and diverse:

- Stroke
- Parkinson's disease
- Multiple sclerosis
- Spinal cord injuries
- Cerebral palsy
- Traumatic brain injuries

The **G-EOs** sets new standards in modern, robot-assisted gait therapy.



Stair climbing with the **G-EOs**

Intelligence and sensor technology in the footplates

The **G-EOs** footplates are equipped with intelligent pressure sensors and show the patient and therapist what amount of force is used where to initiate movement via the distal fixing – in this case the feet. This intelligence supports and ensures good gait quality and performance. This and a great deal more important data on the gait therapy of each individual patient can be saved by the therapist in personal patient profiles. This ensures highly reproducible and controllable rehabilitation to be achieved in follow-on therapies.

Natural gait pattern – continuously adjusted during the therapy

The **G-EOs** helps patients by simulating a physiological gait pattern leading to a natural muscle activation. An extensive range of configuration options can be applied without interrupting the therapy and enable the gait pattern to be customized based on the patient's clinical image.

«With the **G-EO**, we are able to reproduce everyday walking situations and train them intensively.»

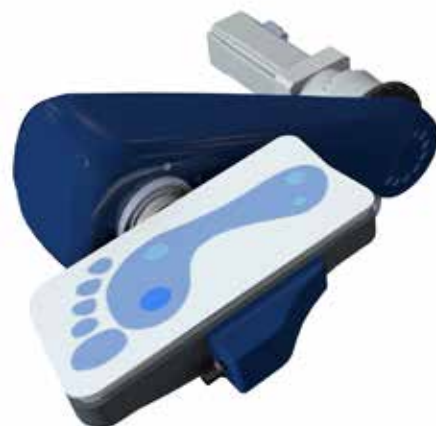
Susanne Sitterberg, B.Sc. Physiotherapy,
Head of Physiotherapy, Neurorehabilitation in the
Aphasie-Zentrum Vechta, Germany

Stair climbing – boost your gait therapy

The **G-EOs** physiological gait pattern helps patients by simulating walking on the flat, on slopes and climbing stairs. The **G-EO** enables patients to receive intense, performance-oriented preparation for demanding everyday challenges such as stair climbing in an optimal and controlled manner by means of a large number of reproducible repetitions.

Climbing stairs significantly improves and enhances a patient's gait quality.

With the **G-EOs**, the therapist has the technical support to prepare a patient specifically for stair climbing. Stair climbing stimulates the physiological muscle activation of the legs and results in a greatly improved ability to walk. Increased cardiovascular activation, stimulation of weight transfer and increased strength requirements are important aspects of stair climbing.



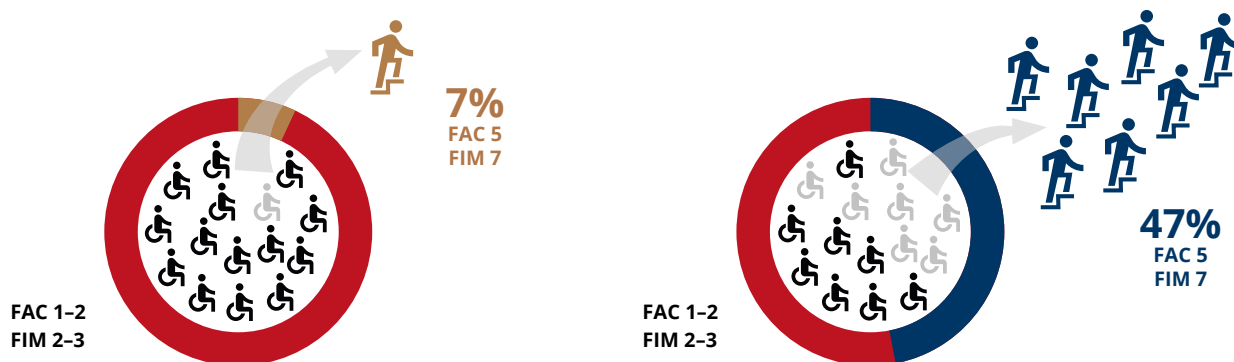
Footplate with intelligent pressure sensors

Enhancing the therapy – at high intensity, quickly & reproducibly

Neurological rehabilitation must be customized at the correct intensity for individual patients right from the beginning. For the long-term success of the therapeutic procedure, it is important to perform a movement with a high number of repetitions specific to the task in question and in a physiologically correct manner. And this is precisely where the **G-EO** from Reha Technology plays a key role in this target-oriented, early and intensive therapy.

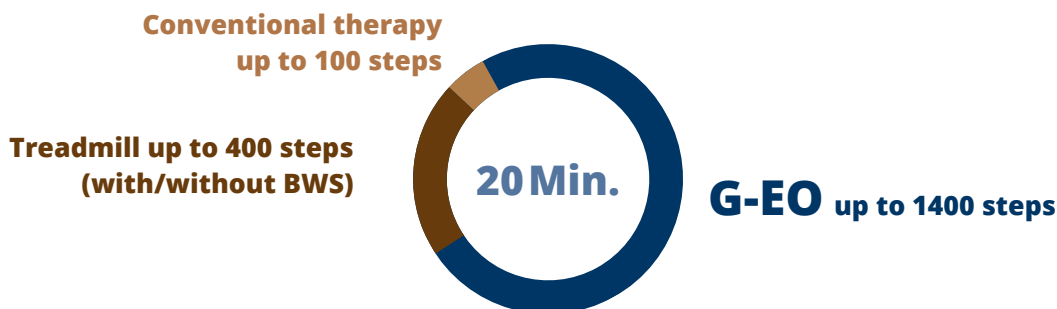
The robot-assisted gait trainer simplifies and enhances both the therapy procedure for the therapists and the therapeutic process as a whole. The patients, the therapists and the entire therapeutic environment benefit in equal measures.

The use of robot-assisted gait therapy minimizes the physical burden on the therapist. It allows the therapist to focus on the patients and their therapy more precisely and in a more target-oriented manner. This enhancement to the therapy allows additional time in which to observe and inform the patients, leading to an important positive boost in the intrinsic and extrinsic motivation on the part of the patients and therapists.



A comparison of conventional versus additional robot-assisted gait training with G-EO

Study: Hesse, et al. «Robot-assisted practice of gait and stair climbing in nonambulatory stroke patients». JRRD Volume 49, Number 4, 2012, p. 613-622.



Therapy comparison in terms of number of steps

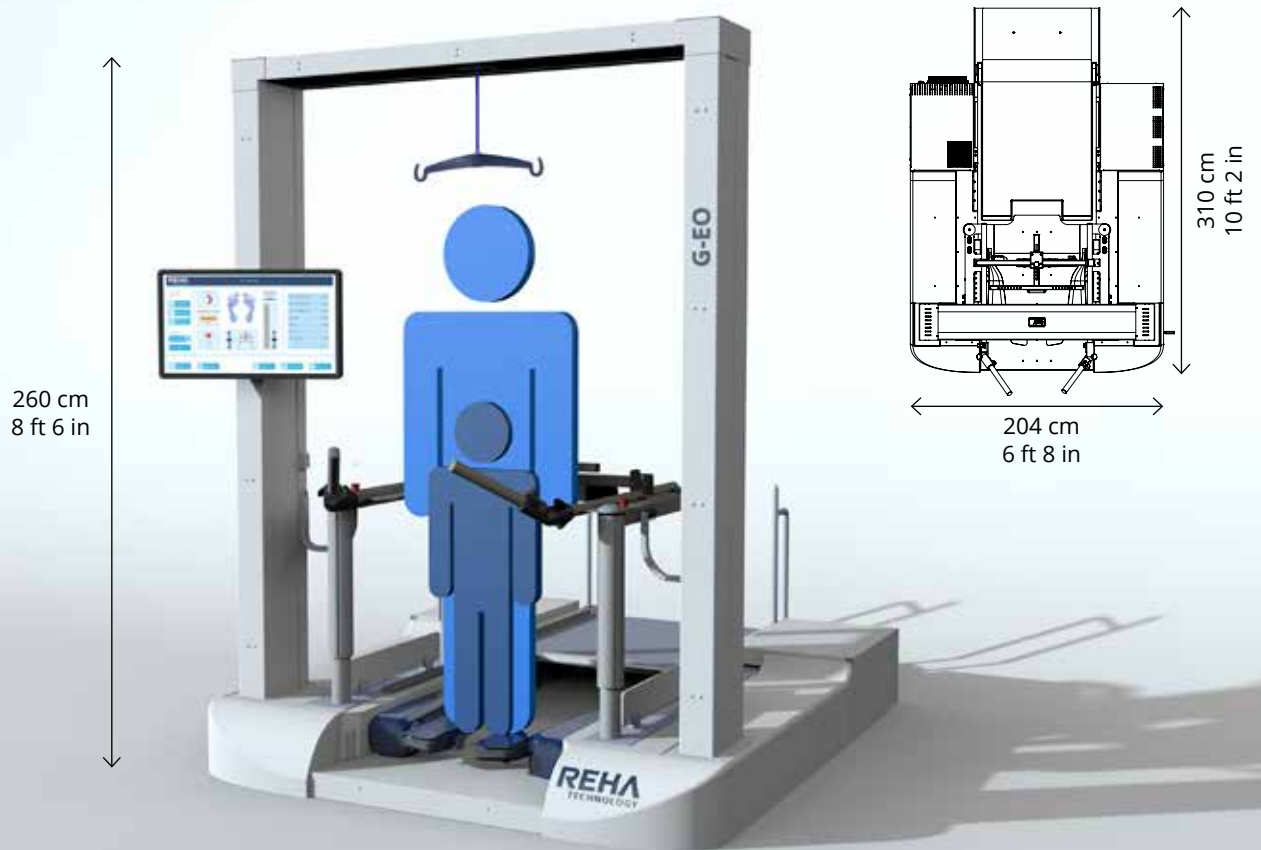
Study: Moseley, et al., «Treadmill training and body weight support for walking after stroke.» Cochrane Database. Syst. Rev. 2005 Oct 19;(4):CD002840.
Hesse, et al. «Robot-assisted practice of gait and stair climbing in nonambulatory stroke patients». JRRD Volume 49, Number 4, 2012, p. 613-622.

Hip and body position – the basis for good gait quality

Body position control is a further important element in successful, long-term neurological gait rehabilitation. The **G-EO** gait trainer has a mechanical torso and hip control on three levels – frontal, transversal and sagittal. It enables the therapists to control the patients body position as well as the natural knee and hip extension. In addition, the graphical user interface enables the hip and torso movement to be optimally adjusted to the patient's needs at all times without interruption to the therapy.

- Motorized weight relief up/down 0–5 cm; 0–2 in; dynamic/static
- Progression through precise depiction of the weight relief
- Customized hip and torso guidance, right/left $\pm 7,5$ cm / 3 in; dynamic/static
- Continuous, static adjustment of body position; anterior/posterior

Technical data



Specifications

Weight	800 kg / 1760 lb	Step height	10–20 cm / 4-7.8 in
Power supply	230V	Ankle angle correction	-10° / +10°
Max. speed	2.3 km/h / 1.43 mph	Torso guidance (right/left)	± 7,5 cm / 3 in
Max. cadence	70 steps per min.	Weight support	up to 200 kg / 440 lb
Max. step length	55 cm / 22 in	Patient height (min./max.)	90–200 cm / 2.9-6.5 ft

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