

## *Learning to walk again*

# Gait Analysis and Gait Training for Rehabilitation

NEW



zebris

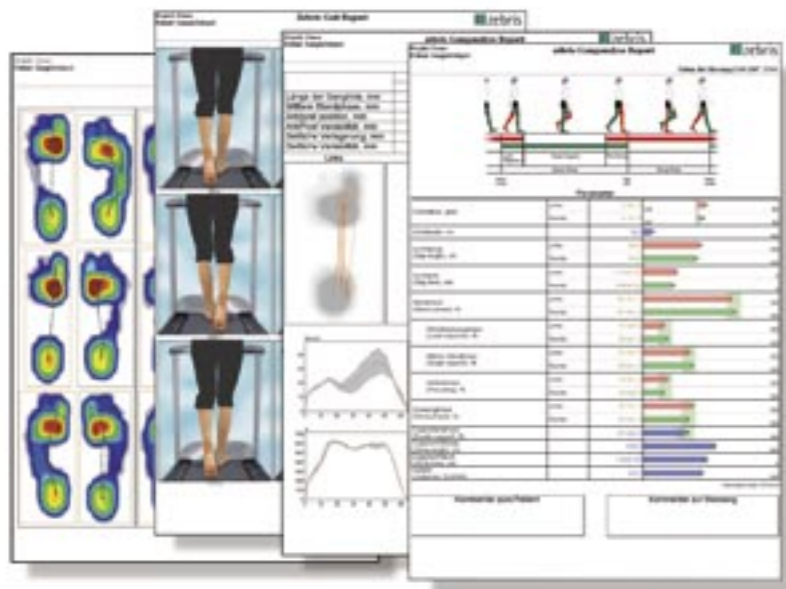
# Rehawalk®-A new concept for treating gait disorders

The Rehawalk® includes a gait analysis and training system. The System includes an instrumented treadmill with a pressure sensor matrix, a unit for projecting the step pattern within the platform, a screen for projecting the individual, virtual feedback training and a processing unit. The system also has a stress and balance testing module.



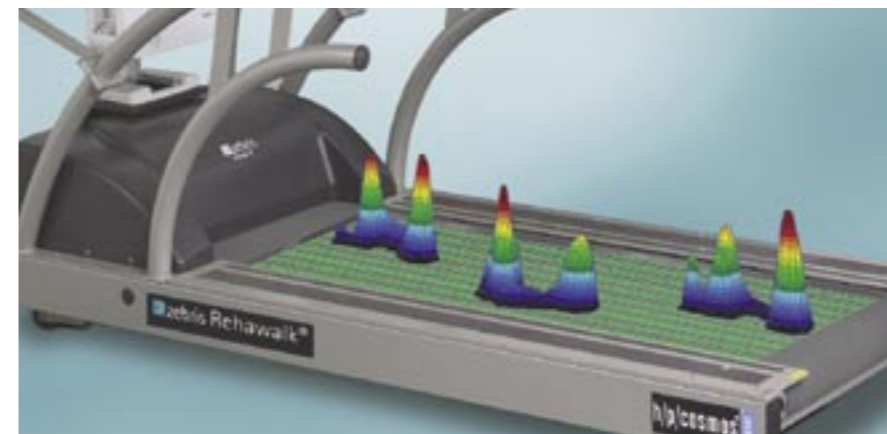
The product line introduced here is based on the proven h/p/cosmos treadmill systems that can be obtained in different sizes and feature variations. The treadmills can, for example, be equipped with different handrails and a safety arch.

By using an integrated un-weighting system, it is possible to commence the locomotion therapy at an early stage. As a complete system, the h/p/cosmos locomotion 150/50 DE med offers additional adjustable handrails, a wheelchair ramp and therapy seats.



The evaluation report on the gait analysis contains all the important place and time parameters, such as the stance, swing and double-standing phases, step length, step width, foot-rotation angle and a detailed analysis of the force distribution under the feet.

The zebris Rehawalk® System is suitable for the treadmill-supported analysis and treatment of gait disorders for neurological and orthopedic rehabilitation. The application possibilities comprise a dynamic, visual stimulation by means of step projection onto the walking range, as well as a virtual screen environment. The course of the treatment is automatically documented by the system.



Underneath the belt a pressure sensor matrix is installed with several thousand calibrated, capacitive pressure sensors. The belt movement is compensated such that stable gait and roll-off parameters can be analyzed.

# Gait training using dynamic, visual simulation

## Gait analysis

**1**

Parameter	Value	Target
Substrat, grad	0.0010	0.00
Schrittlänge, cm	0.7670	0.70
Schrittlänge, cm	0.7670	0.70
Schrittlänge, cm	0.7670	0.70

The important characteristics for preparing the visual simulation are taken over automatically from the evaluation report.

The gait analysis is carried out without any preparations to be done on the patient for taking measurements. The measuring process can be observed on the screen in real-time. The report is automatically processed.

## Gait training

**3**

At the beginning or the entire gait training the patient positions his feet as accurately as possible within the projected surface areas. This is possible when walking freely and also when using body-weight support. The projection shows the actual shape of the footprint, or in another presentation, a rectangle or oval shape with the footprint in.

At the beginning or the entire gait training the patient positions his feet as accurately as possible within the projected surface areas. This is possible when walking freely and also when using body-weight support. The projection shows the actual shape of the footprint, or in another presentation, a rectangle or oval shape with the footprint in.

## Setting the target parameters

**2**

In the settings menu the step length, step width and foot rotation parameters are set according to the training objectives. The values can remain constant during the gait training, or gradually near the target settings during the course of the training.

In the settings menu the step length, step width and foot rotation parameters are set according to the training objectives. The values can remain constant during the gait training, or gradually near the target settings during the course of the training.

## Controlling the process and comparative analysis

**4**

Parameter	Before	After
Substrat, grad	0.0010	0.0010
Schrittlänge, cm	0.7670	0.7670
Schrittlänge, cm	0.7670	0.7670
Schrittlänge, cm	0.7670	0.7670

In the success report, the adherence of the target settings is documented. On that basis the target parameters can be adjusted to the patient's capability.

Before and after rehabilitation comparison of gait analysis parameters is easily accomplished in the comparative report.

# Gait and coordination training using virtual feedback



The patient moves in a virtual walking environment and whilst observing his own footprints, performs tasks that require a continual variation of his gait and balancing.

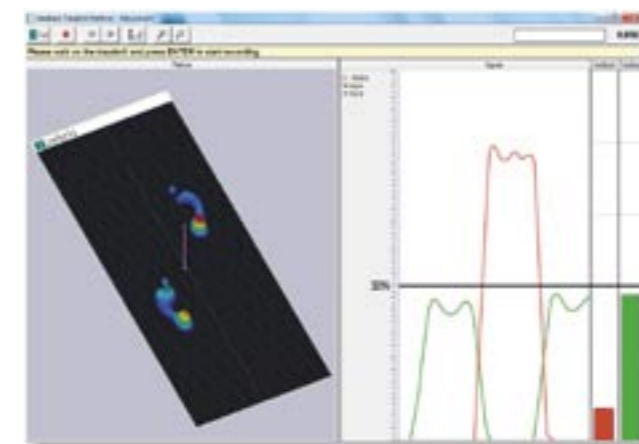
# Controlled training using load feedback



Because the gait patterns are constantly varied different groups of muscles are activated. Furthermore, coordination and cognitive skills are in demand.



For rehabilitation, after an operation for a hip or knee endoprosthesis, for example, the system enables the load feedback to be given for an adjustable strain limit. Using handrails or adjustable arm supports, the patient is in the position, via acoustic or visual feedback, to unload segments to prevent overload, based on predetermined percentage of body weight.

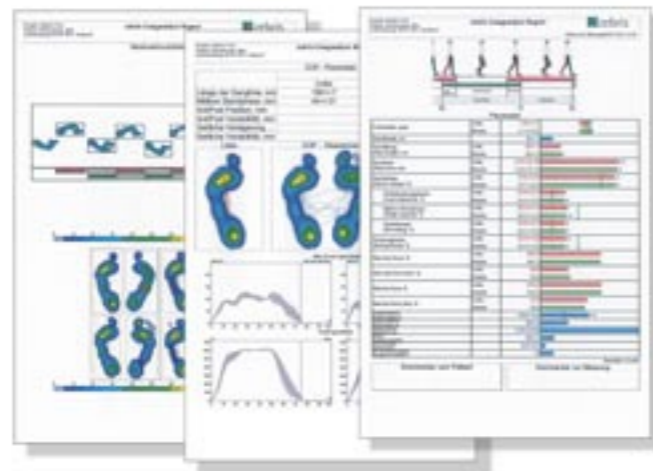


# Rehawalk®-Gait analysis and gait training on the walking range



The sensor plate contains a matrix with calibrated capacitive pressure sensors that can be perfectly be integrated between parallel bars. The evaluation is produced on a PC.

Using the zebris Rehawalk® platform system, gait analysis and gait training can be carried out on the walking range, whereby the system can be integrated excellently between parallel bars with the respective dimensions. Optional projection units for enabling a visual stimulation using step projection are undergoing development. The measuring and training procedure can be repeated as often as required.



The evaluation report contains all the essential parameters for characterizing the human gait. The gait symmetry and the variability of the gait speed are analyzed. Complete video sequences can be shown in individual images.



The sensor plate can be synchronized with other systems for video analysis, electromyography or 3D motion analysis. Two platforms can be combined to increase the size of the walking range.

# Optional extensions of the Rehawalk® Systems



Measuring sequences can be recorded using the zebris illumination and camera system. By means of a calculation module integrated in the software, the maximum joint angles can be documented, such as knee flexion, for example. Both the camera and the illumination unit are synchronized with the treadmill measuring sensors.



The fully synchronized zebris Myography System registers the muscle-action potentials using bipolar electrodes placed on the skin surface. The Myography System comprises 8 analog inputs and is connected wirelessly via bluetooth to the evaluating computer. The evaluation report of the Rehawalk® System shows the time-standardized EMG signals.



For motion analysis there are different measuring systems available which are based on the travel-time measurement of ultrasonic pulses. Using these systems, shoulder and hip movements or the movements of the extremities can be investigated. A measuring system for kinematic analysis based on inertial sensors is undergoing development.



The h/p/cosmos robowalk® expander system supports the movements of the patient by means of elastic cables. The expander support is adjustable from the angle of the traction force and the traction side. The system is ideally suited for patients with restricted mobility during orthopedic and neurological rehabilitation.

Distribution of robowalk® only through h/p/cosmos specialist dealers.

# Technical data of Rehawalk® Systems



**mercury med**



**quasar med**



**platform RW 1,8/RW 2.5**

Speed	0-13,7 m/h (0-6,2 m/h)	0-15,5 m/h	
Running surface	150 x 50 cm	170 x 65 cm	
Drive motor	3,3 kW	3,3 kW	
Weight	approx. 220 kg	approx. 430 kg	
Frame size (L x W x H)	210 x 82 x 136 cm	230 x 105 x 140 cm	182 x 60 cm/244 x 60 cm
Track access height	18 cm	23 cm	2,1 cm
Elevation	0-25 %	0-28 %	
Max. user weight	200 kg	200 kg	
Color	grey-aluminium, RAL 9007	grey-aluminium, RAL 9007	grey
Sensor surface	112 x 49 cm	152 x 59 cm	173 x 56/244 x 56 cm
Number of sensors	3432*	4576**	5984/8448
Sampling frequency	120 Hz	120 Hz	120 Hz
Measuring range	1-120 N/cm <sup>2</sup>	1-120 N/cm <sup>2</sup>	1-120 N/cm <sup>2</sup>
PC-Interface	USB	USB	USB

\*FDM-T mercury med, number of sensors 7168 \*\*FDM-T quasar med, number of sensors 10240

**Distribution through:**