

Lokomat[®] Pro

Functional Robotic Gait Therapy



We move you

During early rehabilitation, high-repetition gait training ensures the optimum utilization of neuroplasticity and recovery potential. Robotic therapy enables very intensive training, which is crucial during this phase. Scientific evidence shows that in contrast to conventional therapy alone, robot-assisted gait training improves the chances of regaining independent walking after a stroke.¹

¹ Mehrholz J, Elsner B, Werner C, Kugler J, Pohl M. Electromechanical-assisted training for walking after stroke. Cochrane Database Syst Rev. 2013 Jul 25;7:CD006185.





Patient Story

Phillip Bryant – The Beginning

"When I woke up I couldn't feel anything below my chest. My doctors told me I would never be able to walk again and that I would have to adjust to a life in a wheelchair." A serious car accident on his way from home to work left Phillip with a T10 complete spinal cord injury, Asia A, with nine fractured vertebrae and a spine fusion from T7 to L4. But he was not willing to accept the doctor's verdict. "After I got home, I bought parallel bars and braces online and just went for it!" He worked as hard as he could and finally managed to stand and take a few steps with the parallel bars. That was when his doctor prescribed him 16 therapy sessions with the Lokomat.

After the second therapy session, Phillip started to feel his calf muscles pulsating. "I couldn't explain it, but I felt that it was doing something good," he says. "I fell in love with the Lokomat that day!" After 16 therapy sessions, Phillip's force measured by the LokomatPro sensors had improved greatly and he decided to move closer to the hospital in order to be able to continue the therapy with the Lokomat (read more on page 13).



Patient Story

Gabriele Lilienkamp – Giving Up Is Not An Option

Gabriele was an active person and only 44-years-old when she suffered a stroke which led to a hemiparesis of her left side. "I led a very active life; I always had many goals and worked hard to achieve them. It took me a lot to get used to the new situation," explains Gabriele.

But 12 years after the stroke, not much had changed and walking still required a lot of effort. Then, a friend told her about the Lokomat. "I find the training with the Lokomat very helpful, as I can work on my balance and I feel safer while walking," she says happily. "I can already walk much faster and roll my foot through the step." The progress she has made after two months of therapy has fired her motivation. "It's fantastic what the training has achieved so far, even all these years after the stroke! I wish all stroke patients could have access to this therapy."

Key Elements of the Lokomat[®] Pro Therapy

The LokomatPro offers a most physiologic gait pattern with constant feedback and therapy assessment. It improves patient outcome by increased therapy volume and intensity, task-specific training and high patient engagement. The LokomatPro is the ideal addition to in- and out-patient rehabilitation programs and for use in long-term care facilities.



Product Overview

Features and Functions

Effective Gait Training

Scientific evidence shows that Lokomat training improves the outcome of physical therapy.

Increased Efficiency

Therapists can provide longer treatment sessions with higher intensity.

Most Physiologic Gait

The individually adjustable exoskeleton ensures a most physiologic gait pattern with essential sensory feedback.

Assist-as-Needed Support

Assist-as-needed support enables clinicians to optimally shape training challenges based on the patient's capabilities.

Motivating Augmented Performance Feedback

Exciting, game-like Augmented Performance Feedback exercises increase the patient's effort.

FreeD Module

The optional FreeD module improves the therapy by allowing lateral translation and transverse rotation of the pelvis, thus providing a more physiologic gait pattern.



More Repetitions

Robotic therapy allows highly intensive training even in the early stages of rehabilitation.



High Therapy Efficiency

Simultaneous therapy with three LokomatPro devices at the State Hospital Hochzirl, Austria.

Patient Story

Step by Step Towards Long-Term Goals

After suffering a respiratory arrest, HB was connected to a heart-lung machine and subsequently suffered a stroke in the right side of his cerebellum. When he came to the State Hospital Hochzirl in Austria, his legs were so weak that he couldn't carry any weight at all and transfer was not possible without help from the therapists. "The training with the LokomatPro is good because I have to be active and because it challenges me," explains HB. "There are new situations over and over again where I have to react differently." He is now training four times a week with the LokomatPro and the LokomatPro with FreeD. "The training with the Lokomat is diverse and exciting because I can control the directions myself with the amount of strength I put in. And with the FreeD I have even more freedom of movement."

HB is excited about the training and looks forward to reaching his goal of being able to stand on his own again. "I can already see and feel my muscles getting stronger," he says with a smile. "I will reach my long-term goal of being able to walk again step by step."



Robotic Gait Rehabilitation

The LokomatPro automates locomotion therapy on a treadmill and improves the efficiency of gait training. Developed in close cooperation with leading clinical and scientific partners, it supports therapists and patients in successfully reaching their therapy goals.

Improve Therapy Outcomes

Therapy with the LokomatPro has established itself as an effective intervention for improving over-ground walking function in neurological patients worldwide. More publications on the Lokomat training have been published in peer-reviewed journals than for any other robotic device for lower extremity rehabilitation, showing positive results and functional improvements.²

A Cochrane Review³ on the efficacy of robot-assisted gait training in stroke patients found significant evidence that patients who receive this training in combination with physiotherapy are more likely to achieve independent walking than people who receive only conventional gait training. The review concludes that every fifth dependency in walking after stroke could be avoided if robot-assisted devices were used.⁴

Treat More Patients

The LokomatPro has a high potential of return on investment. It allows the therapist to focus on the patient and the actual therapy by relieving the physical strain on the therapist. Thus, it enhances staff efficiency and safety, leading to higher training intensity, more treatments per therapist and consistent, superior patient care⁵.

Based on strong scientific evidence and its excellent reputation among experts worldwide, the LokomatPro offers your patients a modern, renowned and effective locomotion therapy that attracts referrals and patients. As a pioneer in robotic gait training, the LokomatPro is based on more than 15 years of experience with over 600 devices installed worldwide.

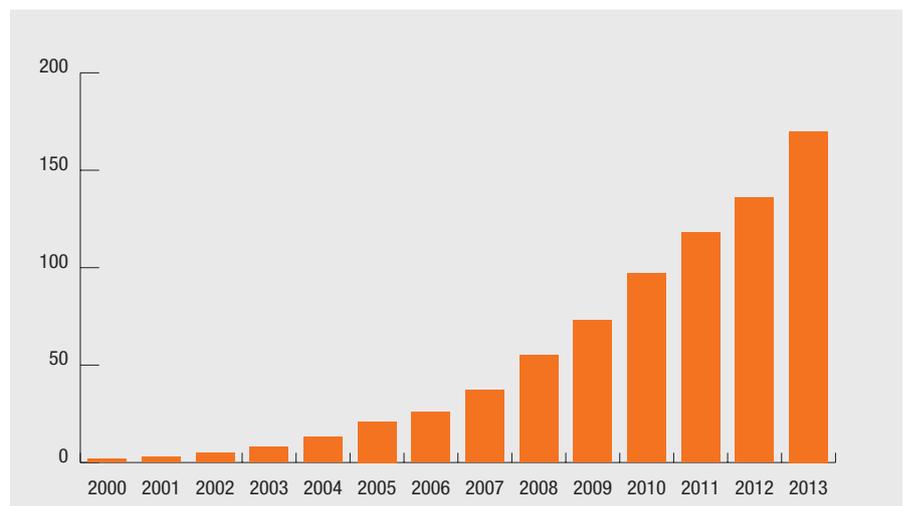


Fig. 1: Number of peer-reviewed studies conducted with the Lokomat, 2000 to end of 2013. For a full list, visit knowledge.hocoma.com.

- 2 By end of 2013 more than 180 studies had been published on the Lokomat therapy in peer-reviewed journals.
- 3 Cochrane Reviews are systematic reviews of primary research in human health care and health policy, and are internationally recognized as the highest standard in evidence-based health care.
- 4 Mehrholz J, Elsner B, Werner C, Kugler J, Pohl M. Electromechanical-assisted training for walking after stroke. *Cochrane Database Syst Rev*. 2013 Jul 25;7:CD006185.
- 5 Morrison, SA. Financial Feasibility of Robotics in Neurorehabilitation. *Top Spinal Cord Inj Rehabil* 17(1): 77-81.



Most Physiologic Gait

The individually adjustable exoskeleton ensures a most physiologic gait pattern with essential sensory feedback.



Expert Opinion

Alberto Esquenazi, MD

"Our results have convinced us that the Lokomat with its robotic exoskeleton ensures consistently more natural walking patterns than manually assisted body-weight supported treadmill training or other mechanical approaches."

Alberto Esquenazi, MD; John Otto Haas Chair and Professor Department of PM&R & Chief Medical Officer; Director Gait & Motion Analysis Laboratory and Regional Amputee Center, USA

Most Physiologic Gait Therapy

The individually adjustable therapy with the LokomatPro ensures a comfortable and most physiologic gait pattern with essential sensory feedback. The FreeD module further expands the therapy options by enabling lateral and rotational movements of the pelvis, thus inducing gait balance training.

Individually Adjustable Training

The Lokomat orthosis is adjustable to the patient's individual anatomy. The width of the pelvis, length of upper and lower leg, and size and position of the leg cuffs can be conveniently adjusted assuring a comfortable training. The hip and knee joint angles are constantly monitored by the software to ensure the most physiologic and precisely reproducible gait pattern.⁶

Combined with Levi®, the patented dynamic body weight support system, the orthoses ensure a natural swing phase, physiologic weight-bearing during stance phase and significant hip extension at terminal stance. These factors are considered to be of crucial importance in relearning a natural gait pattern and the effectiveness of the training.⁷

FreeD Module

Available as a module for the LokomatPro, FreeD improves the therapy by allowing lateral translation and transverse rotation of the pelvis (fig. 2). While training, patients can shift their weight completely over their stance leg, activating their core muscles and experiencing aspects of balance. This is a key success factor in the relearning of independent walking. The passively guided hip abduction and adduction and the driven lateral translation of body weight support are fully synchronized with pelvis movements and the movement of the orthoses.

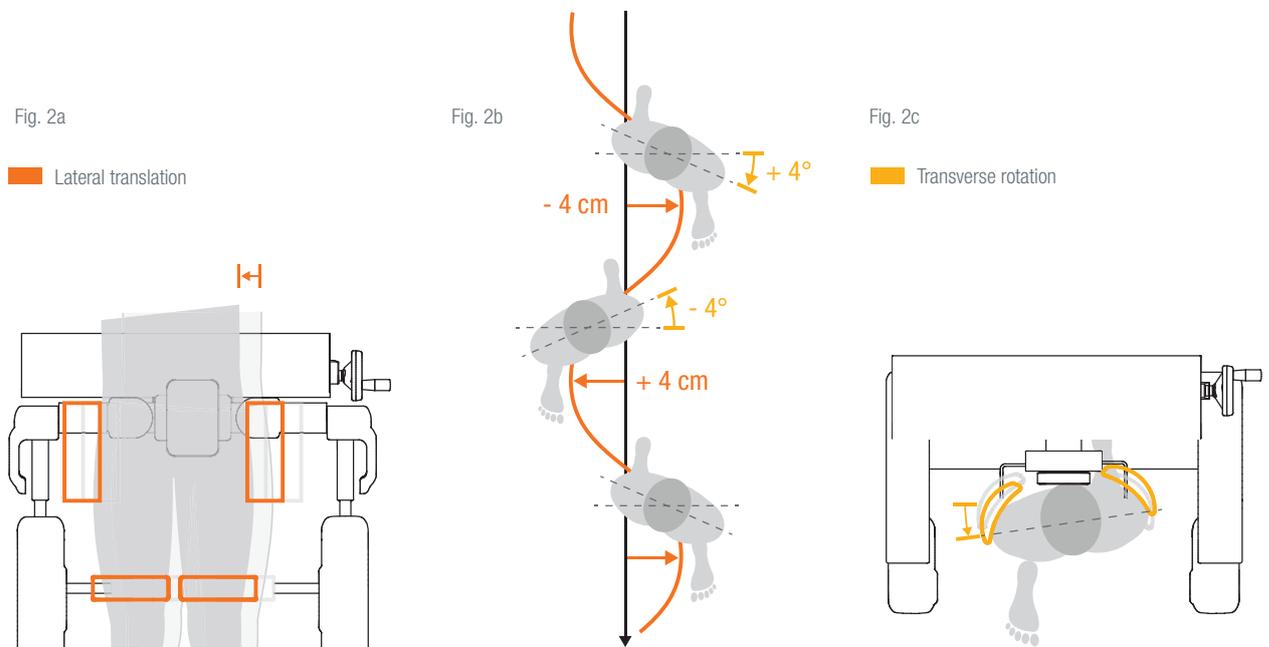


Fig. 2: Adjustable lateral translation of up to 4 cm (fig. 2a) and transverse rotation of the pelvis of up to 4° (fig. 2c) to each side during walking (fig. 2b).

6 Esquenazi A, Lee S, Packer AT, Braitman L. A randomized comparative study of manually assisted versus robotic-assisted body weight supported treadmill training in persons with a traumatic brain injury. *PM R* 2013 Apr;5(4):280-90.

7 Dietz V, Harkema SJ. Locomotor activity in spinal cord-injured persons. *J Appl Physiol* (1985). 2004 May;96(5):1954-60.



Patient Story

Towards an Independent Daily Routine Through Play

MS was only 16 when he suffered a stroke in his left hemisphere resulting in a right-sided hemiparesis with a sensitivity disorder. After training with the LokomatPro with FreeD four times a week for a mere three weeks, he has already been able to improve the stability in his right knee. "I can stand on my own again and I feel much safer in my daily routine," he explains. "I like the games best! The training is much more fun." MS is continuing his therapy with the LokomatPro at the State Hospital Hochzirl, Austria, with the goal of regaining his independence and the ability to walk again.



Balloon Chase

Specific aspects of gait such as foot clearance and step length can be trained by kicking the balloons.



Faster!

The advanced exercise allows the patient to actively increase the walking speed by putting in more effort, resulting in higher training intensity. By walking faster, the patient reaches the golden coins before they are snatched away by the opponent.

Recovery Through Intensive Challenges

The LokomatPro is a sophisticated gait training device that motivates patients to improve their movement quality. It makes highly repetitive therapy challenging and enjoyable, which increases neuroplastic changes and motor relearning.

Assist-as-Needed Support

The Lokomat orthoses are equipped with force sensors that accurately measure the patient's strength and effort, and provide information about the interaction between the patient and the Lokomat. The adjustable Guidance Force allows optimal challenge by providing the patient with as much freedom as possible for each leg. In combination with the Path Control feature, patients can actively influence their leg movements within a safe and supportive environment. These possibilities provide a most challenging training at each stage of rehabilitation, as well as specific therapy for unilaterally affected patients.⁸

Augmented Performance Feedback

The Augmented Performance Feedback gives patients the opportunity to playfully exercise functional movements by measuring their performance and presenting it within task-specific exercises (fig. 3). As they receive a score for active movements, the patients are motivated to improve their movement quality. This reward-based training makes the highly repetitive therapy challenging and enjoyable. Patients are thus motivated to practice longer and with more commitment, which increases neuroplastic changes and motor relearning.⁹

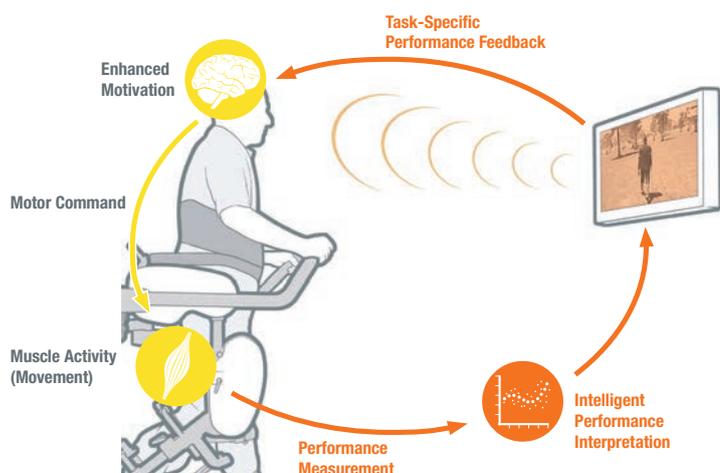


Fig. 3: The Augmented Performance Feedback of the LokomatPro motivates patients with playful exercises and specific feedback based on their performance.

Challenge Package

The Challenge Package of the LokomatPro offers highly attractive exercises that boost the patient's motivation and effort by providing competitive elements and intuitive scoring. With the Speed-Up function, the patient can actively increase the walking speed by putting in more effort, resulting in higher training intensity. The Augmented Performance Feedback explicitly rewards the patient for improvements in specific aspects of functional gait training, such as foot clearance and step length. Even severely affected patients who still require full guidance may profit from the option to increase gait variation, which is beneficial in the relearning process.



Expert Opinion

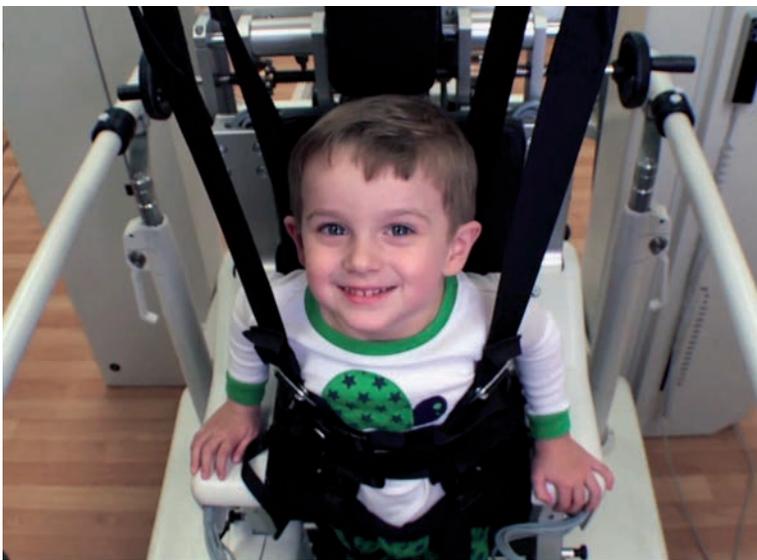
Dale B. Hull, MD, Jan Black, MS, PT

"The Lokomat allows us to provide our patients with more intensive gait therapy. They experience more repetitions and are motivated by the Augmented Performance Feedback to actively contribute with maximum effort to their therapy. We are reminded daily how this intensity translates into an increase in functional mobility. The Lokomat technology allows us to provide patients with the opportunity for best possible outcomes."

Dale B. Hull, MD, MPA, Executive Director, Jan Black, MS, PT, Neuroworx, USA

⁸ Krishnan C, Kotsapouikis D, Dhaher YY, Rymer WZ. Reducing robotic guidance during robot-assisted gait training improves gait function: a case report on a stroke survivor. Arch Phys Med Rehabil. 2013 Jun;94(6):1202-6.

⁹ Schuler T, Brutsch K, Muller R, Hvan Hedel UJ, Meyer-Heim A. Virtual realities as motivational tools for robotic assisted gait training in children: A surface electromyography study. NeuroRehabilitation 28(4): 401-411.



Patient Story

Carson Rush – 100 Miles For The Best Therapy

As a three-year-old, Carson was the youngest Lokomat patient at the Cincinnati Children's Hospital in Ohio, USA. He was born with cerebral palsy and due to his illness was never able to learn to walk correctly. When his mother Carla learned about the LokomatPro with Pediatric Orthoses, she didn't hesitate to drive more than 100 miles twice a week for the therapy sessions at the Cincinnati Children's Hospital. "I thought it was phenomenal to have such a device so close", she says.

"Carson came to us with strength and gait impairments," explains his therapist Jenny Schmit. Using a walker, Carson's legs criss-crossed and he was able to walk only very slowly. "He jumped into the Lokomat and had so much fun during the therapy," explains Carla.

With games and fun exercises, the staff at Cincinnati Children's Hospital offer intensive and motivating therapy, and very soon, Carson started showing great improvements. "He was just flying! His mobility was better and he was so much more self-confident," says Carla happily. "I was just delighted at his improvement. Driving 100 miles is nothing when you want to get the best care for your child."



Functional Locomotion Therapy For Children

The LokomatPro with Pediatric Orthoses allows functional locomotion therapy for small patients. It has been specifically designed for the needs of children, and ensures optimal fit and patient comfort with all the therapy benefits of the LokomatPro.

The Lokomat®Pro With Pediatric Orthoses

The LokomatPro can be fitted with standard orthoses for adults or with Pediatric Orthoses, which are available as an optional add-on module. The Pediatric Orthoses are designed to accommodate small children by offering a special set of harnesses and cuffs that provide a precise fit for patients with femurs longer than 21 cm (8.3 inch).

The two interchangeable sets of orthoses can be easily swapped out by the therapist and both offer the same wide range of therapy benefits.



Gabarello

Exploring new planets: The award-winning exercise included in the Challenge Package was specifically designed to motivate children.



Expert Opinion

Prof. Dr. med. Florian Heinen

"Our data shows that significant improvement in clinically meaningful effect size can be achieved with gross motor abilities using robot-enhanced treadmill therapy in children also beyond natural motor development."

Prof. Dr. med. Florian Heinen, Medical Director, Director, Pediatrician, Neurologist, Specialist Neuropediatrics, University Hospital Munich, Germany



Standard And Pediatric Orthoses

The easily interchangeable Lokomat orthoses offer adjustable gait therapy for adults and children with femurs longer than 21 cm (8.3 inch).



Patient Story

Phillip Bryant – Wait Until I Get Back Up And Running. Just Wait!

Despite being told he would never walk again, Phillip experienced great initial therapy success and decided to move closer to the hospital to continue the therapy with the LokomatPro (read more on page 3). “I noticed that my steps had become easier,” explains Phillip. “I’ve continued home therapy in addition to the Lokomat and now I’m doing leg presses pushing 30 pounds!” In June 2012, he was standing on the beach as the best man at his friend’s wedding.

With his motor function improving day by day, Phillip’s biggest motivation is his baby daughter. “I have to get myself together for the sake of being a father. I would like to walk her down the aisle one day. And I will!” Besides his own therapy goals, Phillip wants to help and pass on his strong motivation and spirit to as many other patients as he can. “I want to give them hope. It’s not only about being able to walk, it’s about where your heart is.”



Easy Integration Into Clinical Routine

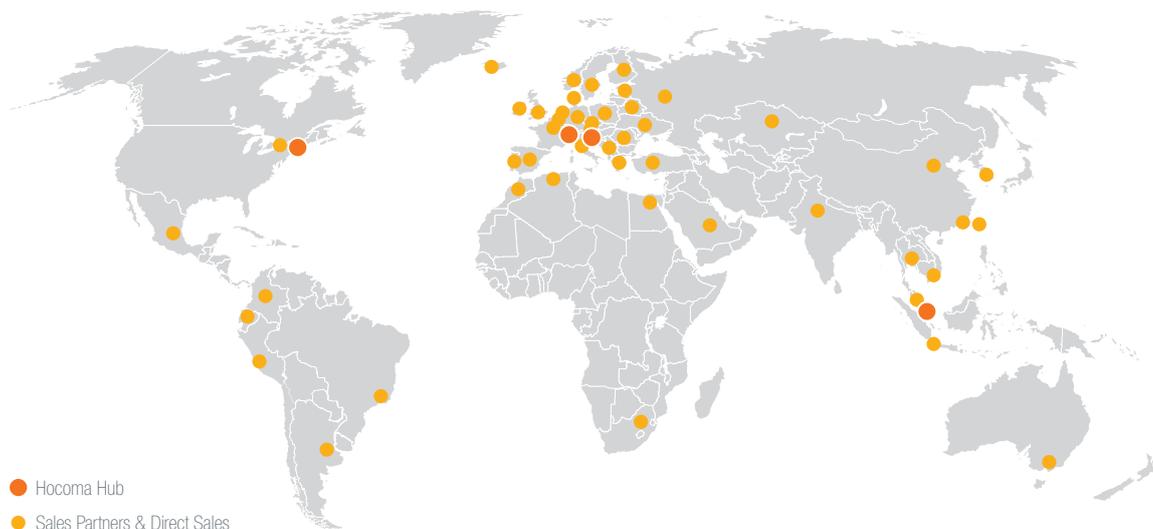
The Lokomat is easily integrated into the clinical settings of in- and outpatient rehabilitation programs as well as long-term care facilities, and meets the individual needs of health care providers and patients.

Lokomat® Product Line

The Lokomat product line includes various products that cover the individual needs of patients, therapists, clinics and hospitals. They fit into a normal therapy room and do not require any additional installations.

		Lokomat®Pro	Lokomat®Nanos
Effective Gait Training	Robotic gait orthoses for adults	•	•
	Robotic gait orthoses for children	accessory	
	Training programs	•	
	Gait variation	•	
	Manual training	•	
Increased Efficiency	Intuitive touch screen user interface	•	•
	Training of severely affected patients	•	•
Most Physiologic Gait	Dynamic body weight support	•	•
	FreeD module for pelvis movements	accessory	
Assist-as-Needed Support	Guidance Force	•	•
	Path Control	•	
Augmented Performance Feedback	Biofeedback	advanced	basic
	Challenging therapy exercises	•	
Assessments and Reporting	Assessment tools	•	
	Training reports as PDFs	advanced	basic
	Recorder tool	•	
Service	Worldwide 24h Service Hotline	•	•
	Remote support	•	•
	Knowledge Platform	•	•

Hocoma is the global market leader providing most advanced devices for functional movement therapy.



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Product Disclaimer

The Lokomat is a rehabilitative exercise device intended for medical purposes and must be used in strict compliance with the User Manual; failure to do so may result in serious personal injury. It is strongly recommended that you regularly consult Hocoma's website (www.hocoma.com/legalnotes) for the latest available information. Please contact Hocoma should you have any questions.

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