



REHABILITATION CONCEPT

FOR THE LOWER LIMBS



Life by motion

LAMBDA CONCEPT

The Lambda is the only rehabilitation device that offers the freedom of a plan workspace in which the leg can be manipulated throughout almost its entire working area. Because of this quality, various existing and innovative exercises and therapies could be realized without patient transfert between machines. All exercises are fully customizable and can therefore follow the patient from the early days after the trauma until the ambulatory care. All this, controlled by a complete and intuitive user interface, allowing a fast mastery of the therapists.



Innovative Therapies

Its unique robotic qualities open a new area of possible treatments, combining :
Passive or Active (Isokinetic, Isometric and Isotonic).
Concentric or Eccentric.



Enhanced Feedback

Serious Games and Virtual Reality elements are available for their joyful qualities but also to augment the feedback to the patient in order to improve motor learning.



Learning Mode

Because the therapist alone can handle the uniqueness of his patient, this mode was created to become nothing more than an extension of the arms of the therapist.



Polyvalent Training

The Lambda offers fully customizable exercises, normally contained in different devices without the time consuming patient de-installation and re-installation.



Evaluation & Data

The device could be used to evaluate the strength and power of muscles. The performances and evolution of the patient could easily be monitored and exported.

" The Lambda is a user-friendly device which is impressively flexible. It answers to the current needs and opens a wide range of applications for future therapies. "

Dr Rolf Frischknecht, Past-President of the European Board of Physical and Rehabilitation Medicine



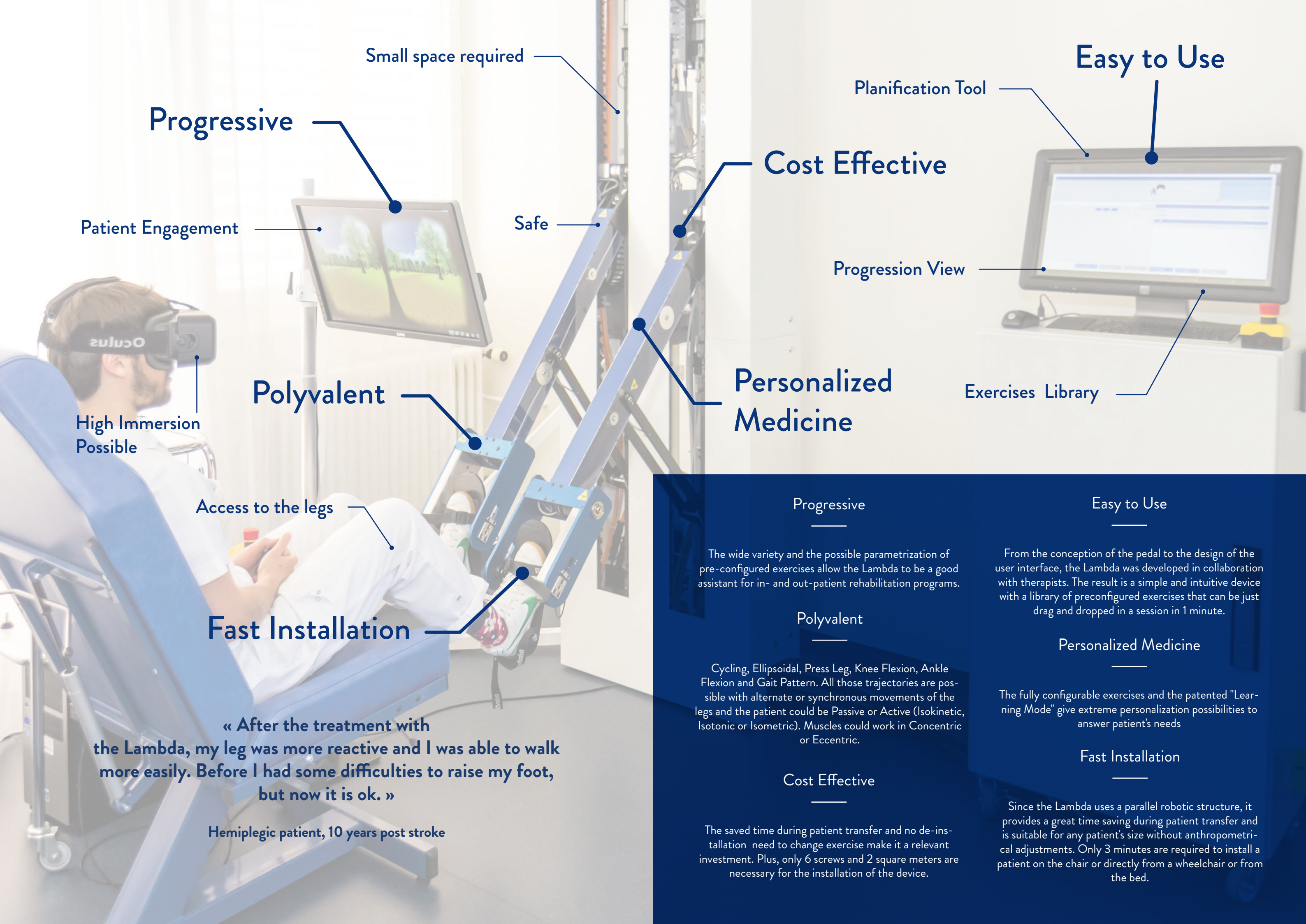
Lambda Control Center

The LHS user interface was developed focusing on therapists and provides concise and intuitive tools bringing a fast learning curve. Patient management is done with just a few clicks and all settings are stored for the next therapy.

Its exercises library makes it really easy to handle. The exercises could be launched directly or inserted in a session. Those sessions could be organized in a rehabilitation plan on a daily and weekly basis which is a big saving of time.

Analytic tools are available to monitor the performances and evolution of each patient, and personalizable automatic reports could be directly generated to facilitate therapist work.





Progressive

Small space required

Easy to Use

Patient Engagement

Safe

Cost Effective

Planification Tool

Progression View

Polyvalent

Personalized Medicine

Exercises Library

High Immersion Possible

Access to the legs

Fast Installation

« After the treatment with the Lambda, my leg was more reactive and I was able to walk more easily. Before I had some difficulties to raise my foot, but now it is ok. »

Hemiplegic patient, 10 years post stroke

Progressive

The wide variety and the possible parametrization of pre-configured exercises allow the Lambda to be a good assistant for in- and out-patient rehabilitation programs.

Easy to Use

From the conception of the pedal to the design of the user interface, the Lambda was developed in collaboration with therapists. The result is a simple and intuitive device with a library of preconfigured exercises that can be just drag and dropped in a session in 1 minute.

Polyvalent

Cycling, Ellipsoidal, Press Leg, Knee Flexion, Ankle Flexion and Gait Pattern. All those trajectories are possible with alternate or synchronous movements of the legs and the patient could be Passive or Active (Isokinetic, Isotonic or Isometric). Muscles could work in Concentric or Eccentric.

Personalized Medicine

The fully configurable exercises and the patented "Learning Mode" give extreme personalization possibilities to answer patient's needs

Cost Effective

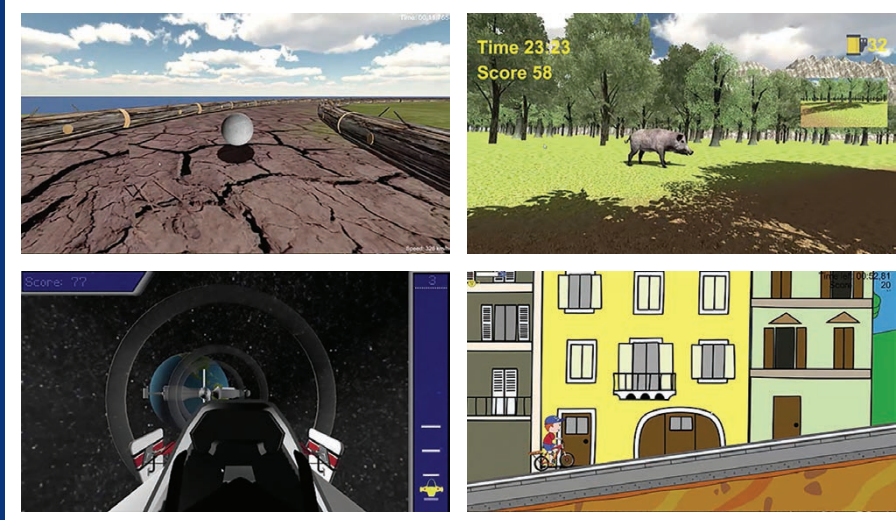
The saved time during patient transfer and no de-installation need to change exercise make it a relevant investment. Plus, only 6 screws and 2 square meters are necessary for the installation of the device.

Fast Installation

Since the Lambda uses a parallel robotic structure, it provides a great time saving during patient transfer and is suitable for any patient's size without anthropometrical adjustments. Only 3 minutes are required to install a patient on the chair or directly from a wheelchair or from the bed.

ENHANCED FEEDBACK

The main advantage of the Lambda is its haptic possibilities: its ability to interact with the patient through touch. The patient could partially or totally define the robot movement and the robot could return a tactile feedback by applying forces to the patient.



This fact combined with best-in-class Virtual Reality technologies have been used to fully develop this potential. Different games have been developed, targeting various cognitive disorders and pathologies such as Hemiplegia or Hemineglect. The patient activity during those training is oriented to improve leg coordination, strengthen muscles or train gait pattern.

Some applications also include an avatar or a limb of the person in the virtual world, in order to stimulate mirror-neurons. The activation of those neurons was shown effective in the motor learning, and the learning effect on the motor skills is expected to be superior.

Patient Engagement

Patients often have difficulties to maintain their attention and concentration on monotonous exercises. The playful aspects and the progression required to pass some levels are a good asset for the therapist.

Head-Mounted Display

We do not yet have enough return on the use of head-mounted display in rehabilitation. That's why all the games could be played with or without it. The choice is up to the therapist and the patient.

Coherent Feedback

The Lambda is reactive and precise due to its high quality robotic, and because it is combined with last generation Virtual Reality technologies, it allows fast and coherent visual, sound and force feedback.

LEARNING MODE

Because we are convinced that the therapist alone can handle the uniqueness of his patient, the Learning Mode was created to become an extension of his arms. Technically, the therapist can teach the robot a complex movement just by practicing on the patient's legs, as conventional physiotherapy. The robot can record and then replicate the professional gesture automatically and multiply the possible number of repetitions. This personalized therapy could be setup in a minute, without any anthropometrical adjustments. Discover a world where the advantages of the robotic meet the sensitivity and experience of the human!

Transparent Learning

During the teaching phase, the robot is as transparent as air.

Smart Enough

As your starting and ending points will be different, the robot will join them smoothly.

Easy Integration

When your new trajectory is perfect, you can save it as an exercise for the next time.

Variable Parameters

The speed or trajectory is not perfect? Just edit it!



" Since the training, I walk better and I feel more confident on my feet! Exercising is very comfortable, even when I had back pain or was tired. Every stroke patient should have access to this therapy because using the Lambda robot changed my life! "

Hemiplegic patient, 20 years post stroke



" The interface is easy to use and the feedback that is given during the entire movement is really useful to guide the patient. With training on the Lambda, I saw improvements on the medial rotation of the hip, gait speed, balance and spasticity." »

Nicolas Perret, Physiotherapist, using the device since 6 months

TECHNICAL FEATURES

Exercise	Parameters	Speed
Round Cycling	Radius :	1 - 22 cm
Ellipsoidal Cycling	Radius A & B :	1 - 22 cm
Press Leg	Length	1 - 44 cm
Knee Flexion	Flexion	0° / 120°
Ankle Flexion	Flexion	-20° / 45°
Gait Pattern	Length	10-50 cm
		1 - 40 cycles/s
		1 - 40 cycles/s
		1 - 40 cycles/s
		1 - 100 °/s
		1 - 120 °/s
		0 - 3 km/h

SUPPORT ORGANIZATIONS



Swiss Confederation
Commission for Technology and Innovation CTI



Lambda
Health System

Y-PARC - Swiss Technopole
Rue Galilée 7
1400 Yverdon-les-Bains

Tel : +41 79 826 96 90
info@lhs-sa.ch

www.lhs-sa.ch

PARTNERS



Hes·so
University of Applied Sciences
Western Switzerland