



LAMBDA HEALTH SYSTEM (LHS)

Rehabilitation robot for the lower limbs

Project Summary

The medical frame of the LHS project is the neurorehabilitation field. This system is a device for lower limbs mobilization, controlled by a robotic parallel structure. The goal is the rehabilitation by therapeutic exercises using a simple, polyvalent and transportable device. The LHS system can be used independently in a hospital or in a physiotherapy practice by paraplegics, hemiplegics, by injured people or elderly. This system is also a new kind of fitness device for subjects without disabilities. From the point of view of development, the LHS is a thematic project of mechatronics and motion control. Complex technological levels are involved as robotic structures, control modes, real-time control, force feedback and human machine interfaces able to handle a very large amount of information and numerous users.

Valorisation

PROGRAMMABLE VARIOUS TRAJECTORIES

LHS introduces one more dimension to current devices by giving more flexibility and proposing totally customizable parameters. Speed, Length, Center of the Exercise could be adapted to a particular therapy. Walk Training is also available as a step during the rehabilitation process, before a possible use of a vertical walk trainers.

HANDLIKE MODE

The LHS offers the functionality of "HandLike" mode. It means the opportunity to teach a complex movement to the robot simply by practicing on the patient's legs, as classical physiotherapy. The robot can then replicate the trajectory autonomously. It becomes nothing more than an extension of the arms of the therapists.

SIMPLE TO USE

The LHS user interface was developed with one main thing in mind: the therapists. Its exercises library makes it really easy to handle, and the intuitive customizable rehabilitation plans are a great time saving to the therapist. Patient management is done with just a few clicks and all settings are stored for the next therapy appointment.

Achievement

The LHS project is an example of a multi-disciplinary research that has required a consortium of professors and researchers from the HES-SO into the Health and Engineering domains. This project has been carried out by a group of 5 HES-SO : HEIG-VD, hepia, HE-Arc, HES-SO Valais-Wallis, HESAV. In total, a group of 25 researchers participated in the work for two years. In addition, therapists have also been involved.

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This project has been carried out by HEIG-VD (project head), hepia, HE-Arc, HES-SO Valais-Wallis, HESAV