Research

PhyMill helps children with cerebral palsy

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PAYA BESAR, 10 December 2021 - PhyMill is an automatic exercise device to train walking movements for paediatric patients with a disability to control their position and activation due to damage to the developing brain or better known as cerebral palsy.

A researcher and senior lecturer from the Department of Mechanical Engineering, College of Engineering, Universiti Malaysia Pahang (UMP), Ts. Dr. Mohd Azrul Hisham Mohd Adib, 38, designed Physio-Treadmill (PhyMill) to assist therapists in undergoing rehabilitation training for patients during physiotherapy sessions especially involving movement in the lower extremities or lower body parts.

According to Dr. Azrul, the research, which started at the end of 2017, has considered all the needs and several aspects, especially the safety of users.

“PhyMill has also undergone several improvements to the design and functionality of the product.

“Circa the beginning of 2019, the first prototype was produced, and by the end of 2020, the second prototype was successfully built with several new aspects and features introduced according to the needs of both patients and physiotherapists.

“This study started when my colleagues and I conducted a study on the needs of patients in the rehabilitation unit, especially those involving children,” said the Taiping-born.

To this day, he said, most rehab products require care and management by the therapists

“The existing rehab devices are also manual and obtained overseas at incredibly high prices.

“With the help and advice from a physiotherapy expert, Narimah Daud, we came up with the idea to create a simple and fully automated device to help children with cerebral palsy to walk.

“PhyMill is fully developed by a research team under the Centre for Human Technology, which I lead and is assisted by Ts. Dr. Nurul Shahida Mohd Shalahim (College of Engineering), Idris Mat Sahat (Faculty of Mechanical and Automotive Engineering Technology), Mohd Hanafi Abdul Rahim (College of Engineering), Rabiatul Aisyah Ariffin (College of Engineering), and graduates under the Integrated Design Project (IDP), namely Afiq Ikmal Zahir, Ahmad Hijran Nasaruddin, Muhammad Shazzuan Sharudin, and Muhammad Rais Rahim,” he said.

He added that PhyMill has three operation modes; the first mode can control the patients’ forward and backward walking movements.

“This movement is controlled fully automatically simply by pressing the allocated button.

“Speed control is also provided to enable the patients to adjust the speed according to the rehabilitation level specified by the therapist.

“The second mode involves automatic height adjustment. PhyMill lets patients set the level of the handle according to their body height,” he said.

He said the third mode involves a special display screen.

“The third more is a special screen to catch the patients’ attention and to avoid boredom while undergoing a rehabilitation session.

“Furthermore, PhyMill is specially developed for cerebral palsy patients, so it is perfectly suited to their needs and requirements.

“I hope that this product will become a pilot product in the field of rehabilitation medicine in Malaysia,” he said, who holds a doctorate from Osaka University, Japan.

He added that PhyMill can help with rehabilitation training for paediatric patients with cerebral palsy.

He hoped that PhyMill can be an enabling device for therapists in reaching their goal towards zero lifelong treatment for all patients.

He plans to improve the existing prototype in the future, especially in terms of aesthetic value and function.

He said there may be several more special functions such as remote controls using light on the patients’ foot movements to make the product achieve specifications towards the treatment of active movement of the patients.

“We also intend to commercialise this product to make it more accessible for paediatric physiotherapy experts in Malaysia.

“However, cooperation from the industry or either government or private institutions is very much needed, especially hospitals and rehabilitation centres.

“To date, we have an LoI with Kuantan Physical Therapy Center (KPTC) under physiotherapy expert Narimah Daud, Rehabilitation Department of Hospital Universiti Teknologi MARA (UiTM), Department of Orthopaedic, Traumatology & Rehabilitation of SASMEC-IIUM, and Department of Rehabilitation Medicine, Hospital Tengku Ampuan Afzan (HTAA) Kuantan.

“The PhyMill project has also received a grant allocation from the Ministry of Higher Education (MoHE) through the FRGS scheme (RDU210129) of RM91,000 and also an internal UMP grant (RDU210332) of RM34,500,” he said.

Dr. Azrul said that currently they have not yet identified the cost estimate for the production of this device.

“We can expect that it is cheaper than the market price of similar products,” he said.

For the record, PhyMill won silver medals in the Creation, Innovation, Technology & Research

Exposition (CITREx 2019) and International Festival of Innovation in Green Technology (i-FINOG 2019).

Latest for 2021, PhyMill managed to bag a third place in Ergolympic 2021 and won the Outstanding Research Award and a gold medal at MTE SDG 2021.

He and his friends also hoped that this product could be introduced to the relevant agencies and industries such as the Ministry of Health Malaysia (MOH) and private parties such as rehabilitation centres to help them solve rehabilitation problems, especially those involving children with cerebral palsy.

He added that they have also successfully produced products such as WrehabDevice, InfaWrap Device, and PhyWalk for CP Kids.

“While other products such as Ankle & Finger Rehab Gamification, CardioVASS Device, BiliDice Device, Anxiety Monitoring Index, and Smart Thoracic Table are still in the development and fabrication stage,” he said, who has expertise in biomechanics, biomedical engineering, medical devices, medical imaging and biofluids in modeling & simulation.

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