

Using robotics in rehabilitation

Malaysia is the first country in the region to offer state-of-the-art Japanese neurobotic technology

THE inability to be mobile after traumatic accidents or diseases will cause workers to be out of employment and have to focus on restoring their health.

As time is of the essence, workers will have to go through rehabilitation process so that they will be able to resume their life as it was.

A lorry driver, Mohan Chandran, 28, is one of the workers who had been through a journey of recovery at Tun Razak Rehabilitation Centre (TRRC) in Malacca after he suffered from C4/C5 ASIA D spinal cord injury.

He was wheelchair-bound during his initial admission.

The Social Security Organisation (Socso), a government agency that provides social security protection to workers in Malaysia has collaborated with Japanese company Cyberdyne Inc, to establish the first Neuro-Robotics Rehabilitation and Cybernics Centre.

Mohan, who was admitted to this centre in December last year had benefited greatly from the Hybrid Assistive Limb (HAL®) Robot Suit lower limb treatment with three sessions weekly.

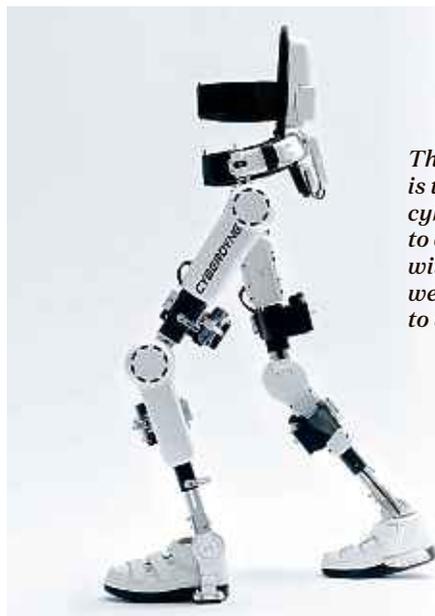
In February, he has started to walk with the aid of walking frame and now, he is able to walk without any walking aids.

With the remarkable improvement, he plans to return to work as a lorry driver.

A stroke patient, Mohd Amali Ismail, 46, has undergone 12 sessions of HAL training from December last year until February this year. Initially, he needed walking aids (quadripod) to walk.

At that time, his walking performance was slow and imbalance with high risk of fall. However, after 12 sessions, he can walk without any walking aids at a normal pace with good balance.

Socso chief executive officer Datuk Seri Dr Mohammed Azman Aziz Mohammed said HAL® Robot Suit,



The HAL® Robot Suit is the world's first cyborg-type robot to assist a person with paralysis or weakening limbs to walk again.



which is available at the centre is a state-of-the-art neurobotic technology from Cyberdyne.

"This makes Malaysia the fourth country in the world and the first in the Asian region after Japan to offer this treatment to patients," he said, adding that this is also the biggest one after Japan.

The HAL® Robot Suit is the world's first cyborg-type robot that was invented by Cyberdyne chief executive officer Prof Dr Yoshiyuki Sankai to assist a person with paralysis or weakening limbs due to injury or disorder to the central nervous system such as spinal cord injury, stroke, traumatic brain injury, multiple sclerosis and neurodegenerative diseases, to regain the ability to walk.

"The robot suit is able to improve, support and enhance the wearer's limb mobility function on the basis of cybernics technology that combines interactions between man, machine and information," he said.

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DATUK SERI DR MOHAMMED AZMAN AZIZ MOHAMMED
Socso chief executive officer

In a healthy body, each muscle is able to receive signals destined from the brain and move as strongly and quickly as intended. However, injuries to the nervous system (brain and spinal cord) often cause transmission disruptions of brain signals to the muscles for movement generation like walking.

Thus, signals sent to muscles by the brain leak on the skin surface as very faint signals, called "bio-electric signals" (BES).

"Cyberdyne's HAL® Robot Suit can detect this weak bio-electric signals through the electrode or detectors attached to the surface of the leg muscles and then analyse the signal through the control system on the robot suit. This means that even though the leg muscles cannot respond to the brain signal to walk, the robot suit can accelerate the learning process of the muscles and make them move the leg again," said Dr Mohammed Azman.

By consolidating various information, HAL® recognises what kind of motions the wearer intends and assists the wearer's intended movements by



exerting bigger power than he or she ordinarily exerts.

Apart from Japan, Cyberdyne HAL rehabilitation treatment services are currently only available in Germany and the United States. Through collaboration between Socso and Cyberdyne, Malaysia has the largest Cybernics centre in Asia outside Japan with 24 units of HAL® Robot Suits.

The Socso Neuro-Robotics Rehabilitation and Cybernics Centre will be officiated by Human Resources Minister M. Kula Segaran on May 13. The official launching ceremony will be held at the TRRC, with attendance of invited guests from among others, Japanese Embassy and Cyberdyne.

To date, a total of 100 patients or Socso's insured persons have undergone the HAL® rehabilitation treatment since November at the Neuro-Robotics Rehabilitation and Cybernics Centre in TRRC.

Majority of these patients suffered from spinal cord injury or stroke. The Cyberdyne HAL® rehabilitation programme involves therapy sessions

between 60 to 90 minutes a day, three to five days a week for 12 weeks, depending on the condition and problem of each patient.

There are three types of Cyberdyne HAL® rehabilitation treatment available at this centre, which are HAL® Lower Limb Type, HAL® Single Joint Type and HAL® Lumbar Type. HAL® Lower Limb Type is a robot suit that helps the patients to regain the ability to walk while HAL® Single Joint Type is used to strengthen the arm and knee joints.

Meanwhile, HAL® Lumbar Type is used to strengthen the lumbar muscles and increase the ability to perform industrial type activities such as lifting loads.

The Cyberdyne HAL Robot Suit technology has a significant impact on the recovery of patients treated at TRRC and enables them to return to work earlier.

This will not only benefit the workers and their families but also the country's economy as the period of being out of work is shortened and workers can contribute to the nation's productivity.



A Japanese company, Cyberdyne Inc, is opening the first Neuro-Robotics Rehabilitation and Cybernics Centre in Malaysia.