香港中文大學
The Chinese University of Hong Kong

Funded by
香港賽馬會慈善信託基金
The Hong Kong Jockey Club Charities Trust
同心同步同進 RIDING HIGH TOGETHER

CUHK Jockey Club *HOPE 4 Care* Programme

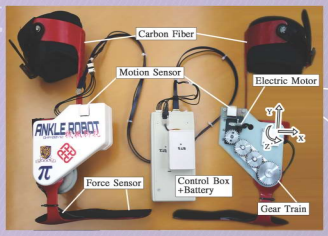
Exoskeleton Ankle Robot for Stroke Rehabilitation

Drop-foot is a gait abnormality that is common among stroke survivors. Patients show muscle weakness at the ankle dorsiflexors and hence experience difficulty in lifting up the foot, resulting in foot dragging on the ground during walking with high falling risk.

Drop foot

The research team of The Chinese University of Hong Kong (CUHK) collaborated with The Hong Kong Polytechnic University, has developed the Exoskeleton Ankle Robot, which is a robot-assisted Ankle-Foot-Orthosis (AFO) to facilitate gait training of stroke patients with drop foot. The robot has the following characteristics:

- Lightweight and portable
- Integrated with force and motion sensors to identify gait phase and classify user walking intention using machine learning control algorithm
- Using electric motor to actively assist ankle dorsiflexion in swing phase on stairs
- Provide sensory feedback to help patients relearn how to walk in correct gait pattern



Exoskeleton ankle robot

In a randomized controlled trial (RCT) on chronic stroke patients (n=19), we found that the Exoskeleton Ankle Robot could have therapeutic effects to their lower-limb functionality after 20-session robot-assisted gait training wearing the Ankle Robot, including:

- Better gait independency on stairs (Functional Ambulatory Category FAC≥5)
- Greater confidence in shifting body weight onto the affected side at Heel Strike Initial Contact

Walking on stairs

- **Awarded the Gold Medal in the International Exhibition of Inventions Geneva 2016**
- **US Patent Application 20160331557 A1**
- **On-going clinical trial in Shatin Hospital and Tung Wah Hospital for gait training of subacute stroke patients**

The Hong Kong Jockey Club Charities Trust has supported CUHK to launch a three-year project "CUHK Jockey Club HOPE 4 Care Programme" to implement four evidence-based advanced rehabilitation technologies in 40 local elderly day care centres and rehabilitation centres, to benefit the community.

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