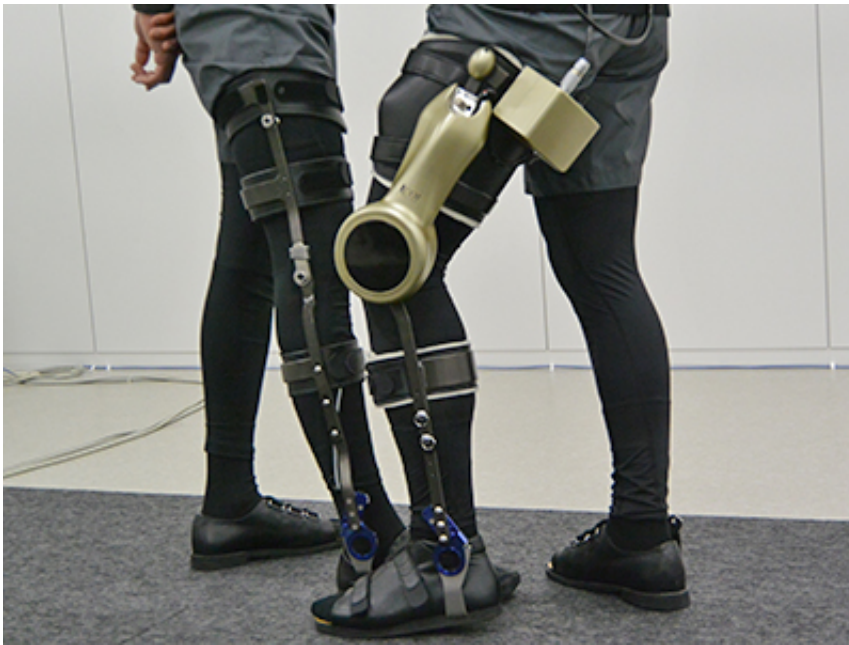


Wearable modular device to facilitate walking rehabilitation

March 11 2016



The wearable walking assist device in action

In collaboration with Suncall Corporation, and with support provided by the Japan Science and Technology Agency (JST) under the Center of Innovation (COI) Program, Professor Tadao Tsuboyama of the Graduate School of Medicine and his collaborators have recently succeeded in developing an "Attached Robotic Unit Knee-Ankle-Foot Orthothesis", a modular wearable walking assist device designed to aid the rehabilitation of people with walking difficulties.

The [device](#) consists of a motor-and-sensor unit that can be attached to a knee-ankle-foot orthosis (KAFO) to guide the wearer through walking movements.

A wide variety of rehabilitation robots is available today to help patients of stroke and spinal cord injury recover from walking difficulties. With their large sizes, however, many of those devices can place a significant burden on both the patient and therapist, preventing wider adoption. Smaller, more efficient robots that meet the needs of users are in much demand.

Professor Tsuboyama and his team at the Human Health Sciences Department of KU Graduate School of Medicine created the modular device concept based on the medical understanding of post-stroke rehabilitation and of the robotic technologies that can be applied to the process. Kyoto Institute of Technology (KIT) designed the control algorithm, and Suncall developed the hardware in collaboration with Kawamura Gishi Co Ltd and Funai Electric Co Ltd.

Features

1. Ease of use to encourage practical use
2. The light-weight sensor-motor module can be attached to any type of KAFO to turn it into a walking assist robot. The device can be used with either leg to accommodate a wide range of conditions.
3. High functionality to facilitate rehabilitation
4. Based on an understanding of human walking movements and those of post-stroke hemiplegia patients, the device automatically assesses the user's gait characteristics to enable effective training.

Robots designed to support the rehabilitation of people who have difficulties with daily activities have become icons of "human-robot

collaboration". The newly developed walking assist device represents a step forward in the development of such robots, and can lead to the advent of wearable solutions to walking difficulties.

Beginning in FY2016, the device will be tested for safety and efficacy at hospitals and rehabilitation centers.

At the same time, the project team will work on computer programs for the training of other movements, such as climbing up and down the stairs, so as to expand the device's versatility to make it useful for different types of [walking](#) difficulties (such as those resulting from stroke, spinal cord injury, and cerebral palsy).

Also in development are additional modules to enhance training efficacy (such as one focused on motor assessment).

Provided by Kyoto University

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