

노인재활

게시일시 및 장소 : 10 월 18 일(금) 08:30-12:20 Room G(3F)

질의응답 일시 및 장소 : 10 월 18 일(금) 10:00-10:45 Room G(3F)

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Wearable Ankle-assist Robot Improves Gait Patterns in Stroke Patients

Hwang-Jae Lee^{1,2*}, Su-Hyun Lee¹, Jinuk Kim², Won Hyuk Chang¹, Byung-Ok Choi³, Gyu-Ha Ryu⁴, Yun-Hee Kim^{1,2†}

Samsung Medical Center, Department of Physical and Rehabilitation Medicine, Center for Prevention and Rehabilitation, Heart Vascular Stroke Institute¹, Sungkyunkwan University, Department of Health Sciences and Technology, Samsung Advanced Institute for Health Science and Technology (SAIHST)², Samsung Medical Center, Department of Neurology, Neuroscience Center³, Sungkyunkwan University, Department of Medical Device Management and Research, SAIHST⁴

Objective

The purpose of this study was to investigate the effect of wearable ankle-assist robot on spatio-temporal parameters and muscle activation pattern during gait in stroke patients.

Methods

Forty-five stroke patients participated and divided into three groups according to their gait pattern; 17 patients with foot drop gait group, 17 with ankle spastic gait group, 11 with circumduction gait group. The Gait Enhancing and Motivating System-Ankle (GEMS-A, Samsung Electronics Co., Ltd., Korea), which functions as a wearable ankle-assist robot was used in this experiment. All participants performed randomly assigned sessions of three conditions; free gait without robot assistance [FG], robot-assist gait with zero torque [RAG-Z], and robot-assist gait [RAG]. In all conditions, muscle activation pattern and symmetry during gait were acquired and analyzed using the 12-channel surface electromyography system (Desktop DTS system, Noraxon, USA) at preferred speed on 8 m walkway. Also, Spatio-temporal parameters of gait function were determined by 3D motion capture system (Motion Analysis Corporation, USA).

Results

The RAG condition with foot drop gait group demonstrated significantly greater gait speed and stride length than the FG and RAG-Z ($P<0.05$). We observed that the abnormal muscle activation patterns of medial gastrocnemius, soleus, and tibialis anterior muscles in affected side are changed in close proximity to normal pattern. In addition, the compensatory activation of the affected hip flexor muscle due to foot drop and ankle spasticity was significantly reduced ($P<0.05$). In all groups, A significantly improved muscle activation symmetry of bilateral tibialis anterior, gastrocnemius, and hip flexor muscle are also demonstrated ($P<0.05$).

Conclusion

This study demonstrate that the GEMS-A is a potentially useful robotic device for improving gait function by improving the muscle activation pattern and symmetry of the lower limbs during walking in stroke patients. We will perform a study to confirm the effect of rehabilitation effect of GEMS-A with stroke patients in the near future.

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