

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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Benefit of Wearable Robotic-assisted Training for Elderly Persons: A Randomized Controlled Trial

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Objective

The purpose of this study was to investigate the effect of wearable robotic-assisted training of 18-sessions intervention program with a hip-assist robot on balance and locomotor function in elderly persons.

Methods

Twenty-four elderly adults (experimental group: n=12, mean aged 76.4±4.93; control group: n=12, mean aged 74.9±3.88) were enrolled and randomly assigned to experimental or control group. The Gait Enhancing and Motivating System-Hip (GEMS-H, Samsung Electronics Co., Ltd., Korea), which functions as a wearable hip-assist robot was used. All participants received 45-minute training (15 min: functional training including sit-to-stand and balance training / 30 min: gait training including over-ground and stair-up) with GEMS-H in the experimental group or without GEMS-H in the control group, for 18 sessions during the consecutive 6 weeks. Locomotor functions as a muscle efforts, spatio-temporal and ground reaction force data were acquired and analyzed using the 12-channel surface electromyography (sEMG) system (Desktop DTS system, Noraxon, USA) and 3D motion capture system (Motion Analysis Corporation, USA) at preferred speed. In addition, cardiopulmonary metabolic energy consumption measurements were obtained during 6 minutes of treadmill walking using portable cardiopulmonary metabolic system (Cosmed K5, Rome, IT). Balance assessments were performed using Berg Balance Scale, Four Square Step Test and Timed Up and Go test.

Results

After completion of 18-training sessions, the experimental group showed significantly more improvement in balance function than the control group. In locomotor function data, the experimental group demonstrated lesser muscular effort of the trunk and lower limb muscles during gait than the control group. Also, the experimental group demonstrated faster gait speed than the control group. Specifically, metabolic energy consumption

during 6 minutes treadmill walking was significantly lower in the experimental group than the control group

Conclusion

These results demonstrated that a newly developed wearable hip assist robot, the GEMS-H, is a potentially useful training device for improving balance and locomotor function in elderly persons.

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