spent by the visiting physical therapists on travel, client care, and electronic data entry was 87.1 min/day, 220.0 min/day, and 44.5 min/day, respectively. The time spent per household and senior citizen center or facility were 51.9 min/day and 81.5 min/day, respectively.

Conclusion(s): It is considered that 5 patients a day is proper workload for visiting physical therapy in Korea, provided that work hour is 540 minutes a day.

Implications: Judging from these results, it seems necessary to standardize the working patterns of visiting physical therapists in Korea. Additionally, more efficient therapy management system and program development are needed, as well as more research and institutional support in order for visiting physical therapy to gain a foothold at the community level.

Keywords: Visiting health center; Visiting physical therapy; Workload

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Ethics approval: Ethics approval was not required.

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THE EFFECTS OF TREADMILL TRAINING USING REAL-WALK SIMULATION IN STROKE PATIENTS

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Background: Virtual reality (VR) has recently been used to provide stroke patients with opportunities for interaction with environments similar to the real-world. In particular, the combination of VR and treadmill training can motivate users by allowing them to interact with a virtual environment and sending real -time feedback during treadmill training.

Purpose: The purpose of this study was to investigate the effectiveness of the treadmill training using a real-walk simulation on visual perception, functional abilities and muscle architecture of lower extremity in patients with stroke.

Methods: Forty patients with stroke were randomly assigned to either the treadmill treadmill training based real-walk simulation (TT-RWS) group ($n = 20$) or the treadmill training (TT) group ($n = 20$). Both groups underwent a standard rehabilitation program, in addition, the TT-RWV group was participated treadmill training based real-walk simulation for 30 minutes a day, 5 times a week, for 5 weeks and the TT group was participated treadmill training for 30 minutes a day, 5 times a week, for 5weeks. The treadmill speed was increased by 5% during the subsequent training session if the subject was able to maintain the training speed while feeling safe for a period of 2 minutes. In all participants, visual perception was measured Motor-free Visual Perception Test-3evaluation (MVPT-3). In functional abilities, walk balance was measured using the Berg Balance Scale (BBS) and Timed Up and Go test (TUG), gait speed was measured using 10 m walking test (10MWT), and autonomic nervous system (ANS) function test was measured using pulse wave analyzer (ubpulse T1). In additional, rehabilitative ultrasound image (RUSI) was used for measurement of muscle architecture of lower extremity (rectus femoris, tibialis anterior, medial of gastrocnemius) of paretic side.

Results: MVPT-3 in the TT-RWS group showed significantly greater improvement, compared TT group ($p < .005$). In walking balance, greater improvement on the BBS (TT-RWV group: 10.75 *vs.* TT group: 4.22) and the TUG test (TT-RWS group: −6.95 *vs.* TT group: −4.08) was observed in the TT-RWS group compared with the TT group ($p < .005$). 10MWT in the TT-RWS group showed significantly greater improvement, compared TT group ($p < .05$). ANS function in the TT-RWS group showed significantly greater improvement, compared TT group ($p < .005$). In addition, the TT-RWS group showed significantly more improvements than the TT group on lower extremity muscle architecture of paretic side ($p < .05$).

Conclusion(s): This study demonstrated the positive effects of the treadmill training program using a real-walk simulation on visual perception, functional abilities and muscle architecture of lower extremity in patients with stroke. These findings suggest that the virtual gait training program using real-walk simulation may be a valid approach to enhance visual perception, functional abilities and muscle architecture of lower extremity in stroke patients.

Implications: VR technology uses the principles of motor learning and neural plasticity to optimize recovery after brain damage. This study evidence on virtual gait training based real-walk simulation suggests that the VR based real-walk video may be a valid approach to enhancement of visual perception, functional ability and muscle architecture of lower extremity in stroke patients.

Keywords: Stroke; Ultrasound image; Virtual reality

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Ethics approval: Ethic approval was gained from Myongji Choonhey hospital research ethics committee and written consent was received from all subjects.

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