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Reducing assistance force during robotic-assisted gait training improves motor function: A randomized controlled trial in patients with subacute stroke

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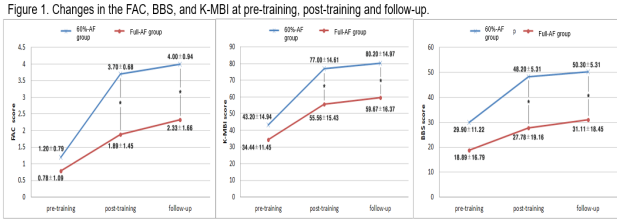
Background: In order to determine optimal control strategies for robotic-assisted gait training (RAGT), it is essential to take into account, the level of assistance force of the robot system affect locomotor control. However, none of the studies investigated the effects of different level of assistance force control during RAGT on motor function in patients with subacute stroke.

Figure 1. Changes in the FAC, BBS, and K-MBI at pre-training, post-training and follow-up.



Objectives: To compare the effects of full assistance force (Full-AF) versus 60% assistance force (60%-AF) RAGT on motor function in patients with subacute stroke.

Methods: 23 patients (age >19 years; 4 weeks after the onset but 6 months) with subacute stroke at Functional Ambulation Category (FAC) 0-3 were randomly assigned into two different RAGT groups. 11 were treated with Full-AF RAGT combined with conventional physical therapy and 12 were treated with 60%-AF RAGT combined with conventional physical therapy. Two groups performed 5 days a week for 4 weeks, with a total of 40 sessions. After 4-weeks of RAGT combined with conventional physical therapy, all patients underwent only conventional physical therapy 5 days a week for 4 weeks, with a total of 20 sessions. Clinical outcomes included FAC, Berg Balance scale (BBS) and Korean version of the modified Barthel index (K-MBI) measured at pre-RAGT, post-RAGT and 4-week follow-up.

Results: In the intention-to-treat analysis, there were between two groups effects for clinical motor functions (Figure-1). In addition, both groups showed significantly improved at post-training (P=0.01) and follow-up (P=0.01) in the FAC; post-training (P=0.01) and follow-up (P=0.006) in BBS and post-training (P=0.022) and follow-up (P=0.017) in K-MBI.

Conclusion: Reducing robotic assistance force during RAGT may be more effective robotic control strategy than full robotic assistance force RAGT in facilitating motor recovery and retention of trained locomotor functions in patients with subacute stroke.

Biography

Jiho Park received her BSc degree in the department of Physical Therapy from Yonsei University, Wonju, South Korea. She is currently a PhD student at the Yonsei University. Her research interests include robotic-assisted gait training, human-robot interaction, gait-related brain dynamics, control strategies, neuromuscular control and motor learning in patients with neurological impairments.

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