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Effect of reducing assistance during robot-assisted gait training on step length asymmetry

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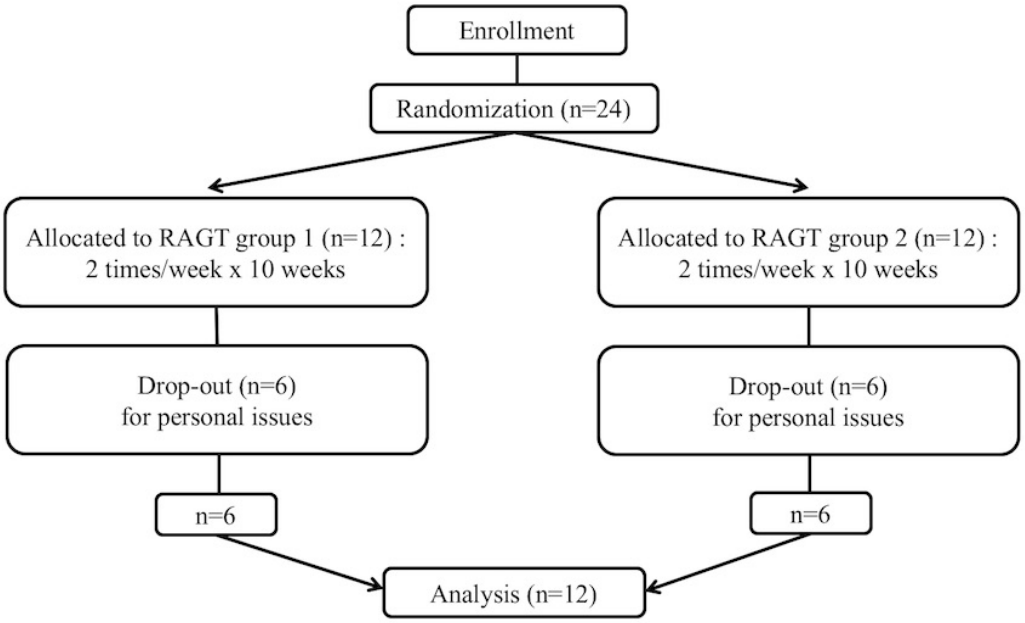
Objective
An assist-as-needed robot-assisted gait training protocol was recently developed. It allows active movement during training, but its exact criteria remain unknown. Asymmetric step length is a common abnormal gait pattern in hemiplegic stroke patients. We compared the effects of assist-as-needed robot-assisted gait training on the unaffected and affected limbs of hemiplegic stroke patients.

Method
Twenty-four chronic stroke patients with asymmetric step lengths were randomly assigned to one of two groups. Twelve completed the study protocol. Group 1 underwent 20 sessions of assist-as-needed robot-assisted gait training for the unaffected limb and fully-assisted robot-assisted training for the affected limb. Group 2 underwent 20 sessions of robot-assisted gait training using the opposite protocol. Clinical measurements were obtained and three-dimensional gait analyses were performed at baseline and after 10 and 20 training sessions.

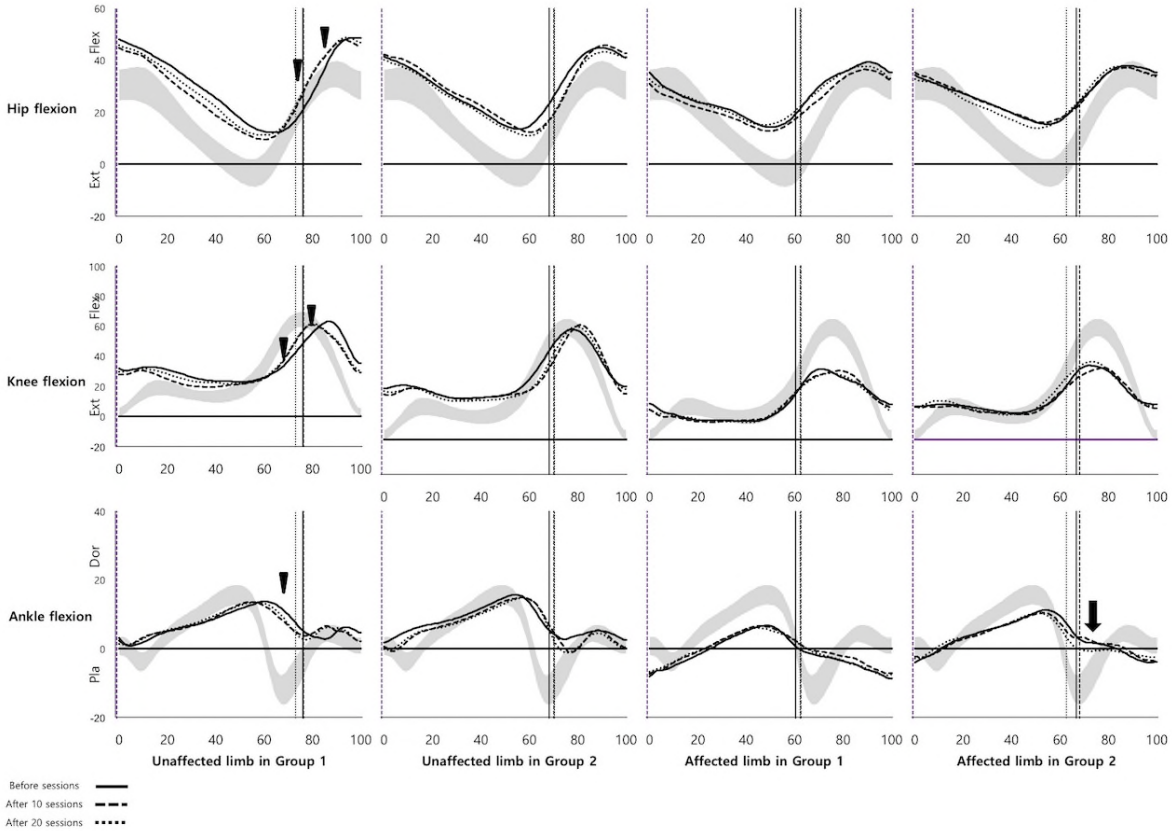
Results
Clinical measurements improved in both groups after 20 training sessions. The unaffected limb's step length asymmetry ratio and hip maximal extension moment significantly improved in group 1. The affected limb's maximal dorsiflexion angle for the ankle in the swing phase significantly improved in group 2.

Conclusion
Application of the assist-as-needed training mode for the unaffected limb helped improve step length asymmetry in chronic stroke patients.

Acknowledgment
This work was supported by the National Research Foundation of Korea (NRF) grant funded by the Korea government (MSIT) (No. 2017R1C1B1003)



CONSORT flow diagram.



Changes in kinematic variables at baseline, after 10 sessions, and after 20 sessions of training.