

Robotic training improves the motor control and motor function of Upper extremity after stroke

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Recently, many robotic devices have been developed to improve the function of paretic arms of stroke patients. The Bi-Manu Track, one kind of robotic devices providing bilateral wrist and forearm movement practice, has been reported beneficial for severe stroke patients. A modified protocol, unilateral mode, might be more applicable for patients with mild to moderate impairment. The purpose of this study is to compare the relative effects of unilateral and bilateral robotic training on motor control and function of paretic limbs in stroke patients. Twelve chronic stroke patients were randomized into unilateral or bilateral robotic training group. Each subjects received 1.5 hours therapy, on weekdays, over 4 weeks. Motor control outcome included kinematic analysis and motor function included the Fugl-Meyer Assessment (FMA), Medical Research Council (MRC).

Score for muscle strength and Action Research Arm Test (ARAT), which were administrated immediately before and after intervention. The unilateral and bilateral robot-assisted training group exhibited differential effects on motor control and function of the paretic arms. The unilateral robot-assisted training showed better therapeutic effects on motor impairment of the paretic arms, temporal efficiency and movement smoothness during reaching. The bilateral robot-assisted training group increased more on general muscle strength (MRC score). Therefore, unilateral robot assisted training is a better option if the enhancement of motor impairment and motor control strategies is the treatment goal, and bilateral robot-assisted training is more advantageous for improving general muscle strength. These findings may assist in selecting the most optimal and individual rehabilitation program for each patient.

Biography

Ching-Yi Wu is the professor of Department of Occupational Therapy & Graduate Institute of Behavioural Sciences at Chang Gung University in Taiwan. Her research interests focuses on stroke neurorehabilitation and movement control. Dr. Ching-yi Wu devoted herself to the study of relative effects and predictive models of contemporary upper limb training programs including constraint-induced movement therapy, bilateral arm training, trunk restraint intervention, and robot-assisted training in stroke patients. More than forty papers have been published in reputed journals in the area of rehabilitation in the recent five years.