A RANDOMIZED CONTROLLED TRIAL OF GRAVITY-SUPPORTED, COMPUTER-ENHANCED ARM EXERCISE FOR INDIVIDUALS WITH SEVERE HEMIPARESIS.

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ABSTRACT

BACKGROUND/OBJECTIVE: The authors previously developed a passive instrumented arm orthosis (Therapy Wilmington Robotic Exoskeleton [T-WREX]) that enables individuals with hemiparesis to exercise the arm by playing computer games in a gravity-supported environment. The purpose of this study was to compare semiautonomous training with T-WREX and conventional semiautonomous exercises that used a tabletop for gravity support.

METHODS: Twenty-eight chronic stroke survivors with moderate/severe hemiparesis were randomly assigned to experimental (T-WREX) or control (tabletop exercise) treatment. A blinded rater assessed arm movement before and after twenty-four 1-hour treatment sessions and at 6-month follow-up. Subjects also rated subjective treatment preferences after a single-session crossover treatment.

RESULTS: All subjects significantly improved (P < or = .05) upper extremity motor control (Fugl-Meyer), active reaching range of motion (ROM), and self-reported quality and amount of arm use (Motor Activity Log). Improvements were sustained at 6 months. The T-WREX group maintained gains on the Fugl-Meyer significantly better than controls at 6 months (improvement of 3.6 +/- 3.9 vs 1.5 +/- 2.7 points, mean +/- SD; P = .04). Subjects also reported a preference for T-WREX training.

CONCLUSION: Gravity-supported arm exercise, using the T-WREX or tabletop support, can improve arm movement ability after chronic severe hemiparesis with brief one-on-one assistance from a therapist (approximately 4 minutes per session). The 3-dimensional weight support, instant visual movement feedback, and simple virtual reality software provided by T-WREX were associated with modest sustained gains at 6-month follow-up when compared with the conventional approach.

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