A randomized controlled trial of gravity supported, computer enhanced arm exercise for individuals with severe hemiparesis.

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ABSTRACT

Objective: The aim of this study was to compare semiautonomous training with the Armeo Spring (formerly known as the T-Wrex) with conventional semiautonomous exercises that used a tabletop for gravity support of the hemiparetic arm. Setting: Single blinded, randomized controlled study. All patients were trained at the Rehabilitation Institute of Chicago, Chicago, USA. Participants: 34 adult stroke patients with ischemic or hemorrhagic stroke > 6 months previous and moderate to severe hemiparesis (Fugl-Meyr ≥ 10 or ≤ 30) without severe cognitive dysfunction. Intervention: All subjects performed a 24 1-hour training sessions, approximately 3 x per week for 8 – 9 weeks. For Armeo training the first three sessions were under the guidance of a therapist to ensure competence with the device, after that subjects trained with intermittent supervision from the therapist. The initial amount of gravity support was adjusted to provide a neutral, “weight-less” position with 45° shoulder flexion and 80° elbow flexion. After 3 therapy sessions gravity-balance compensation was gradually decreased. For conventional therapy patients participated in conventional therapies like self range of motion stretches and active range of motion exercises where the arm of the patient was supported against gravity by a tabletop. They furthermore used the affected arm as a functional assist through a prescribed list of activities for daily living. Three training sessions were performed under the supervision of a therapist; later training sessions were under intermittent therapist supervision. After the completion of 24 training sessions patients did not receive additional training sessions for the next 6 months. In order to be able to assess customer preference for one intervention subjects crossed over to the alternate treatment for one session. Main Outcome Measures: Patients were tested before and after the training session and 6 months after the treatment. Assessed was the Fugl-Meyer, the Rancho Functional Test for the hemiparetic/plegic arm, the quality of movement and amount of use by the Motor activity Log, Movements were also analyzed using a motion capture system. Patient satisfaction was also assessed with a questionnaire. Results: Significant improvements were found for the Fugl-Meyer, the Motor Activity Log, the quality of movement and the amount of use for both groups after 24 sessions of training and 6 months follow up without significant differences between groups. However there was a significant difference for the Fugl-Meyr at 6 months follow up in favor of the Armeo group. In terms of customer satisfaction 90 percent of patient in the Armeo group had a preference for this type of therapy and would recommend this type of therapy over conventional training. Subjects found this kind of therapy less boring, less confusing and easier to track their progress than conventional tabletop exercises. Conclusions: Conventional as well as Armeo rehabilitation therapy after chronic, severe hemiparesis, with brief one – to-one assistance from therapist, can improve arm movement ability. Armeo training is associated with modest, sustained gains at 6 months follow up when compared to conventional approaches. Patients favor Armeo training over conventional therapies.

Paper Reference: