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The additional functional gains using robot-assisted gait training in chronic traumatic brain injury: A case study

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Introduction

Robot Assisted Locomotive Training RALT was commonly used in neurological rehabilitation due to its advantages on providing safe, task specific, high intensity and interactive training. Also, it relieved much physical strain of the therapists. Several studies had been shown the effectiveness of the RALT in improving over ground walking speed and endurance, functional balance, lower limb motor recovery and symmetry in gait patter. Beside, what else can RALT change for a severe physical handicapped? A single case study was performed to drill in “other” effectiveness of RALT.

Objectives

To investigate the possibility of using robot-assisted gait training for improving locomotive function of a chronic traumatic brain injury survivor with severe motor impairments over the trunk and extremities.

Methodology

A 32 years old female with severe chronic traumatic brain injury was studied. The time post-injury was 4 years. The baseline Modified Barthel Index MBI was 38 out of 100, Modified Rivermead Mobility Index MRMI was 10 out of 40. Functionally, she was unable to sit unsupported and needed 3 heavy assistants in practicing exercise walking for a few steps only. The subject underwent 72 sessions (3 times per week for 24 weeks) of robot-assisted gait training. It included 30 mins treadmill walking at 2.5km/h with 30% body weight partially supported. Meanwhile, she received 45 mins conventional physiotherapy trainings that included general stretching exercise, strengthening exercises, standing exercise, and functional training.

Result

On completion of training, the MBI score improved by 26.3% (38 to 48) and MRMI score improved by 80% (10 to 18). The strength of both lower limbs improved by 40%. Functionally, patient can manage sitting unsupported for half an hour independent. A significant reduced assistance was also observed in bed mobility and transfers tasks.

Moreover, patient can ambulate with quadripod for 50 m with one fair assistant only. Conclusion In addition to the improved gait performance, the additional gains in improved active control over the trunk and lower limbs, and an increased participation in activities of daily living were also observed and those were the big leap for the patient and their relatives.