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3. Abstract title - limited to 25 words in UPPER CASE

HYBRID ROBOTIC SYSTEM COMBINING PASSIVE EXOSKELETON AND FUNCTIONAL ELECTRICAL STIMULATION FOR UPPER LIMB STROKE REHABILITATION: PRELIMINARY RESULTS OF THE RETRAINER MULTI-CENTER RANDOMIZED CONTROLED TRIAL

Topics : C2.11 Electrotherapy (including Functional Electrophysiological Stimulation)
C2.17 Rehabilitation Technology, including Implants, Prosthesis, Orthoses
C2.18 Robots, Aids and Devices

4. Abstract text – limited to 250 words

Background and aims

Stroke is the main cause of acquired adult disability with major impact on arm function. The combined use of Functional Electrical Stimulation (FES) and robotic technologies is strongly advocated to improve rehabilitation outcomes after stroke. We present the preliminary data of a multicenter Randomized Controlled Trial aimed at evaluating the effectiveness of this system with respect to conventional therapy for subacute strike upper limb rehabilitation.

Methods

The RETRAINER system consists of a lightweight and non-cumbersome passive arm exoskeleton for weight relief, a current-controlled stimulator with 2 channels of stimulation and 2 channels of EMG recordings.

In this work we are presenting the preliminary results of 39 sub-acute stroke patients with a distance from the acute event between two weeks and nine months. The inclusion criteria was: age between 18 and 85 years, Motricity Index (MI) < 80%, muscular activity for arm and shoulder at least 1 Medical Research Council (MRC) with a visible contraction, no joint limitation, pain or spasticity. They were randomized in

two group: 1 conventional rehabilitation methods, 2 experimental group using Retrainer System. Each participant performed 9 weeks of treatment 3 times for week. We measured MI, Action Research Arm Test (ARAT) and Motor Activity Log (MAL)at beginning (T0) and at the end of treatment (T1).

Results

Results are showed in Figure 1.

Results are showed in the next table

Statistics are performed using linear mixed model. * $p<0.05$

Conclusions.

Both groups showed statistical improvement in outcome measures. Experimental group showed a statistical better improvement regarding time and group effect.

	Group	T0	T1
ARAT	Control	12.5 (18.1)	17.7 (20.3)*
	Experimental	6.2 (12.9)	32.3 (20.2)*
MI	Control	39.7 (19.6)	54.6 (16.8)*
	Experimental	40.8 (15.6)	62.8 (15.4)*
MAL quantity	Control	0.3 (0.4)	0.9 (0.9)
	Experimental	0.2 (0.3)	1.2 (1)
MAL quality	Control	0.2 (0.4)	0.8 (0.9)*
	Experimental	0.1 (0.2)	1.2 (1.1)*