AN EVALUATION OF GAIT PARAMETERS AFTER THE UTILIZATION OF NOVEL MULTI-PAD FUNCTIONAL ELECTRICAL STIMULATION IN STROKE PATIENTS

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Introduction: Foot-drop is a common motor impairment seen among stroke patients, results in an inefficient gait pattern, and often increases the risk of falls. An active approach to the treatment of foot-drop is functional electrical stimulation (FES). However, several studies have demonstrated the disadvantages of FES associated with their application. To reduce the disadvantages of FES, we present in this study a novel FES protocol based on multi-pad electrodes for correcting foot drop.

Objective: To evaluate the efficacy of an additional novel FES system to conventional therapy in facilitating motor recovery in the lower extremities and improving walking ability after stroke.

Method: Sixteen subjects were randomly assigned to an FES group and a control group (conventional therapy). The FES was applied using a FESIA WALK system (Tecnalia R&I, Spain) during gait, for 30min per day - 5 days a week over four weeks. Main outcome measures: gait speed (10 MWT), Fugl-Meyer Assessment (FMA), Berg Balance Scale (BBS), Modified Barthel Index (MBI), and surface electromyography of m. tibialis anterior (TA).

Results: A significant increase in mean walking speed between the beginning and end of the trial was in the FES group (p <0.001). Mean scores in the FES group increased from 0.25±0.11 to 0.38±0.15 in contrast to the control group 0.23±0.10 to 0.27±0.14. The FES group showed improvement in functional independence in the activities of daily living, motor recovery, and gait performance. The EMG maps showed an improvement in the amplitude and frequency spectrum, which indicates an improvement in muscle power of TA treated with FES therapy.

Conclusion: This clinical study shows that FES therapy using a multi-pad electrode combined with conventional rehabilitation significantly increases muscle recruitment and improves recovery of functional locomotion in patients with stroke-related drop foot.