Functional Electrical Stimulation in Combination with Treadmill Training in Improving Gait Among Patients with Stroke: A Systematic Review

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BACKGROUND & PURPOSE

It has been shown that many conventional physical therapies fail to restore normal gait in persons after stroke. The combination of treadmill training (TT) and functional electrical stimulation (FES) has emerged as an effective training method for recovery of mobility after stroke. The purpose of this systematic review was to determine the effectiveness of the combination of FES and TT on improving gait among patients with stroke.

METHODS

Outcomes

A total of 82 articles were screened and 5 studies fulfilled the criteria. The PEDro scores ranged from 8-10 (8.2 mean). Samples ranged from 30 to 52 subjects (183 total) who ambulated independently with or without assistive devices in inpatient rehabilitation or community-based settings. Outcome measures included: Gait Assessment and Intervention Tool (i.e., quality of gait), Tinetti gait scale, 10 m walk test, and temporal-distance gait characteristics (velocity, cadence, step and stride lengths).

In 2 studies, intramuscular (IM)-FES was implamented in 8 lower extremity muscles in patients with chronic stroke (average of 9 months post). Three studies used surface electrode FES on muscles including the tibialis anterior and/or gluteus medius on patients with either subacute (4 months post) or chronic stroke (>6 months post). TT velocity ranged from 0.4-0.894 m/s (0.644 m/s average). Interventions were performed 4-7 times per week (30-90 min/session) ranging 4-12 weeks in duration (9 week average).

All 5 studies found statistically significant between group improvements in all primary balance and gait outcomes (p<0.045-0.001). The greatest treatment effects were found with the use of IM-FES and longer duration of treatment (at least 12 weeks) in adults with chronic stroke.

REFERENCES


Presented at APTA CSM 2016, Anaheim, CA