E-Poster

EP-832

Functional Electrical Stimulation for Gait Improvement in Neurological Impairment: A Case Report

Topic: Neurostimulation (rTMS, tDCS, etc.)

Anna Boada-Pladellorens, Merce Avellanet, Christian Grillo, Esther Pages

PMR Department, Hospital Nostra Senyora de Meritxell, Escaldes-Engordany, Andorra

BACKGROUND

Functional electrical stimulation (FES) is a subtype of neuromuscular stimulation that is used to assist functional and purposeful movements. It is commonly used as a neurorehabilitation therapy for drop foot in patients after stroke and spinal cord injury (SCI). FES allows for a more natural gait pattern, improving stability, balance, and overall functional mobility. Unlike traditional ankle-foot orthoses (AFOs), which provide passive support, FES actively engages the muscles, promoting strength and neuromuscular retraining.

CASE DESCRIPTION

A 23-year-old man with multiple sclerosis (MS) and traumatic and chronic (> 3 years) motor incomplete SCI (level C5, American Spinal Cord Injury Impairment Scale D) was assessed in our rehabilitation outpatient consultation. Clinically, he presented with left spastic hemiparesis. He required an ankle-foot splint to ambulate. Clonus prevented the patient from lifting and properly stabilizing the foot during the swing phase, with a high risk of falling. He received FES stimulation (with the XFT2001E G4 programmable device) while ambulating. The electrodes were placed on the patient's skin corresponding to anterior tibialis muscle. After some training the patient was able to properly lift the forefoot, neutralize clonus, and maintain a stabilized gait. No pain or adverse skin effects were observed.

DISCUSSION

Drop foot severely impacts mobility and increases the risk of falls in patients with SCI. Functional electrical stimulation works by delivering controlled electrical impulses to the peroneal nerve, stimulating the tibialis anterior muscle to lift the foot during walking. XFT2001E G4 is a FES device that has a gyroscope and acceleration sensor in the host. Immediate functional improvements in gait are observed right after FES training with low pain (while adjusting intensity) and low rate of side effects. In the long term, FES may facilitate partial reactivation of dormant neural circuits, leading to improved voluntary control even when the device is not in use. These physiological benefits make FES a valuable tool for rehabilitation and overall health maintenance in individuals with SCI. Functional electrical stimulation has a significant impact on quality of life by enhancing independence and confidence in ambulating. To fully assess therapeutic outcomes, analysis of functional and gait improvements is recommended.

CONCLUSION

Functional electrical stimulation improved the ability to walk in a patient with incomplete SCI and MS. FES stood out as a transformative intervention that addressed the mechanical aspects of drop foot promoting our patient's functionality in society.

Statement of Disclosures

None

Corresponding Author:
Anna Boada-Pladellorens
PMR Department, Hospital Nostra Senyora de Meritxell, Escaldes-Engordany, Andorra
Email: annaboada@gmail.com

Doi: 10.5606/archisprm.2026.EP-832