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Short and long term biomechanical alterations in the lower extremity in response to functional electrical stimulation of peripheral nerves in a patient with neurological impairments: A longitudinal case report

Suzanne L. Tinsley and Marie Vazquez Morgan
Louisiana State University Health-Shreveport, USA

Individuals that suffer from neurological deficits often experience foot drop and knee instability during gait, related to a lack of active control of lower extremity muscles. These impairments combined significantly hinder gait activity and may place the individual at an increased risk for falls. In order to compensate, individuals will often develop compensatory movements that often produce a greater energy cost. Common solutions for foot clearance and knee instability are the use of an ankle-foot orthosis (AFO) and/ orfunctional electrical stimulation (FES) onlower extremity musculature. Advancements in technology have produced FES systems for the lower extremity that can produce a form functional gait cycle. This single-subject repeated measure study design was used toevaluate the short and long term effects of the BioNess L-300® system on joint angles (ankle, knee and hip) in all phases of the gait cycle. The participant (stroke diagnosis) utilized the BioNesss L-300® for gait training activities two times a week for approximately one hour each session over a two year period. Gait parameters using a motion analysis system and outcome measures were recorded at baseline, twelve months and twenty-four months. Results displayed both short term and longitudinal functional improvementsin joint angles during all phases of the gait cycle, as well as improvements in all outcome measures. The findings indicated that utilizing the BioNesss L-300® system for gait activities on a limited weekly basis may provide both short term and longitudinal functional improvement in gait activity in individuals with neurological impairments.

Biography

Suzanne L Tinsley received her PT degree from Texas Woman's University and earned her PhD in Neuro-pharmacology from Louisiana State University Health Sciences Center. She received her Board Certification in Neurologic Physical Therapy from ABPTS. She has been on faculty at LSU-Health since 1988 and currently holds the position of Associate Professor. She has published a Pharmacology Text book for physical therapy education. She has an active clinical research program in the area of neurological rehabilitation. She has presented her clinical and basic science research in state, national and international scientific forums.

Morgan earned a BSc in Physical Therapy and her academic doctorate in Health Studies in 2006. She has 22 years of rehabilitation experience and has been a faculty member at LSU Health in Shreveport since 1997. She has presented research nationally and internationally on cultural competence, wellness and neurorehabilitation. She was honored by Maybelline as outstanding female educator and featured in People December 2006 issue. Dr. Morgan was also the 2014 recipient of the Allen A Copping Teaching Award, a finalist for the 2011 International Award for Research and recipient of the APTA Minority Faculty National Scholarship in 2003.

mvazqu@lsuhsc.edu, stinsl@lsuhsc.edu

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