

CONTROL ID: 372753

TITLE: THE EFFECTS OF ELECTROMYOGRAPHICALLY-TRIGGERED ELECTRIC STIMULATION ON ACTIVE DORSIFLEXION ROM OF THE ANKLE IN CHILDREN WITH SPASTIC, DIPLEGIC CEREBRAL PALSY: A PILOT STUDY.

PRESENTATION TYPE: Poster

SECTION: Pediatrics

Author Details

AUTHORS (LAST NAME, FIRST NAME): Elbaum, Leonard¹; Rossi, Mark D.¹

INSTITUTIONS (ALL): 1. Physical Therapy, FIU, Miami, FL, USA.

SPONSOR NAME: None

Student Category: Not a Student

Abstract

ABSTRACT BODY:

Purpose/Hypothesis : The use of electromyographic (EMG) biofeedback has been suggested as a training tool to improve the ability to increase activation of weak and/or partially paralyzed muscles. Our goal was to examine the usefulness of electromyographically-triggered electric stimulation (EMG-ES, Biomove 3000, Curatron LTD, Israel) for children who present with an inability to voluntarily dorsiflex the ankle secondary to spastic, diplegic cerebral palsy

Number of Subjects : Eight Subjects, with an age range from eight to 14 years (4M/4F), with a diagnosis of diagnosis of spastic diplegic cerebral palsy participated in this study.

Materials/Methods : Each subject participated for a total of eight weeks while continuing their participation in physical therapy. At the beginning of the 8-week period, the project was explained to the subjects and their caregivers. Active dorsiflexion range of motion (ADROM) in a seated position with knees flexed to approximately 90 degrees was measured using standard goniometer. Following, was a 4-week no-intervention period. At the end of the no-intervention period, ADROM measurements were repeated and the subjects and their caregivers were introduced to the EMG-ES system. Caregivers choose which ankle to be treated. Electrode sites for stimulation were over the tibialis anterior and extensor digitorum longus muscles. Sites for placement for all electrodes were marked with indelible pen for ensuring repeated placement. Caregivers were instructed to set the stimulation at the highest comfortable level, and the sensitivity of the EMG at the lowest level which allowed for triggering. Caregivers were asked to use the EMG-ES for every day for 20 to 30 minutes for four weeks. We performed an analysis of variance to examine the effects of treated versus untreated leg and intervention versus non-intervention period on ADROM.

Results : Except for one subject, every ankle demonstrated clinically significant limitations bilaterally in ADROM at the beginning of the study (range:-28 degrees to 10 degrees). During the non-intervention period, four of the treated ankles and four of the untreated ankles showed loss of AROM. During the intervention period, only one of the treated ankles demonstrated a loss of ADROM; all the other ankles increased in ROM. There was a statistically significant difference in ADROM between the intervention and the non-intervention period ($p = .003 < 0.05$). The mean improvement in ADROM during the non-intervention and intervention periods was 3.63 and 7.81 degrees, respectively.

Conclusions : A four-week period of caregiver supervised, home-use electromyographically-triggered electrical stimulation, resulted in clinically significant improvements in ADROM of the ankle in children with spastic, diplegic cerebral palsy.

Clinical Relevance : Results of our study suggest that it EMG-ES could be a useful adjunct to traditional PT programs for children with spastic cerebral palsy when one of the goals is the improvement of active dorsiflexion range of motion.