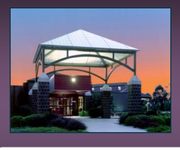

MADONNA RESEARCH INSTITUTE
Rehabilitation Science and Engineering

INDIVIDUAL WITH PROGRESSIVE SUPRANUCLEAR PALSY DEMONSTRATES IMPROVEMENTS IN WALKING DISTANCE AND EFFICIENCY FOLLOWING A MOTOR-ASSISTED ELLIPTICAL TRAINING INTERVENTION

Judith M. Burnfield, PT, PhD; Sonya L. Irons, PT, DPT, CCS; Thad W. Buster, MS
Movement and Neurosciences Center, Madonna Rehabilitation Hospital, Lincoln, NE, USA

Movement And Neurosciences Center

Introduction

Individuals with Progressive Supranuclear Palsy (PSP) typically develop gait disturbances. A recently created motor-assisted elliptical trainer that promotes repetition of walking-like movements and physically assists users could provide an affordable alternative for intensive gait-like cardiovascular training.

Purpose

- To determine whether intensive motor-assisted elliptical training might be used to improve walking and fitness in individuals with PSP.
- We hypothesized that the participant's walking speed, distance and efficiency would improve following a motor-assisted elliptical training intervention.

Participant

A 67 year-old gentleman diagnosed with PSP 1.5 years prior to study initiation who was not engaged in rehabilitation. At baseline, he had difficulties with:

- Walking
- Balance
- Freezing of gait
- Movement initiation

Methods

Instrumentation:

Fig.1 Motor-Assisted Elliptical (*Madonna ICARE by SportsArt; E872MA)*

Procedures:

- 24 motor-assisted elliptical training sessions; three days/week; Target Borg Rate of Perceived Exertion of 12-14
- Speed, motor assistance, body weight support, and total training time manipulated across sessions

Data Analysis:

- Training parameters (i.e., speed, body weight support, total strides, exercise time, and time without motor assistance) recorded during first and last training session
- Gait assessments and energy cost recorded pre-training, post-training, and 1-month follow up

Results

Motor-assisted elliptical training capacity improved across 24 sessions. The participant walked farther and more efficiently post-training. Unfortunately the gains were not sustained at 1-month follow-up (**Table 1**).

Conclusions

Motor-assisted elliptical trainers can provide a viable option for rehabilitation. Intensive training can be used to improve walking and fitness in individuals with PSP. However it is critical that the program is sustained to mitigate functional decline.

Table 1. Changes in training parameters and walking following motor-assisted elliptical intervention

Motor-Assisted Elliptical Training Parameters	Session 1	Session 24	
Weighted Average Speed (revolutions/minute)	31.2	50	
Weighted Average Body Weight Support (kg)	22.7	18.2	
Total Strides	551	1506	
Total Exercise Time (minutes)	18	30	
Total Training Time Without Motor-Assist (minutes)	0	15	
Gait Assessments	**Pre**	**Post**	**1-Month Follow-up**
GaitRite Comfortable Walking Speed (m/min)	25.8	25.2	13.8
6 Minute Walk Test (meters)	129.2	212.1	162.8
Walking Oxygen Cost (mL/kg•m)	0.44	0.41	0.41

Acknowledgements
The contents of this research report were developed, in part, under a grant (H133G070209) from the Department of Education, National Institute on Disability and Rehabilitation Research. However, the contents do not necessarily represent the policy of the Department of Education, and endorsement by the federal government should not be assumed.