Neurostatus Changes in Patients with Multiple Sclerosis following an Exercise Program: A retrospective analysis.

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ABSTRACT CATEGORY

Research Report

KEY WORDS

Neurological Status, Multiple Sclerosis, Exercise, Gait Analysis

GENERAL SUBJECT

Neurology

BACKGROUND AND PURPOSE

Research indicates that functional exercise training in individuals with Multiple Sclerosis (MS) will likely result in improved function such as in ambulatory ability. What is unclear is if exercise training in individuals with MS will also drive improvements in their neurological impairments such as strength, tone, sensation, oculomotor function, etc. The purpose of this study was to explore the neurological status of individuals with MS as they participated in an exercise program.

Table 1 - EDSS Criteria Assessed

Area Assessed	Functional System Score Range
1. Visual (Optic) Functions	0-6
2. Brainstem Functions	0-5
3. Pyramidal Functions	0-6
4. Cerebellar Functions	0-5, X
5. Sensory Functions	0-6
6. Bowel and Bladder Functions	0-6
7. Cerebral Functions	0-5

PARTICIPANTS

The research records of 23 participants with MS from a study done by Sandroff et al were anonymously analyzed for specific neurological functions pre and post-exercise. These participants were all at one site of the original multi-site trial. To participate in the original study subjects scored between a 4.0-6.0 on the Expanded Disabilities Status Scale (EDSS) which means they were able to ambulate at least 100 meters.

METHODS

Ten subjects were originally placed in a control group (stretching exercises) and 11 subjects were placed in an intervention group (resistance, aerobic, and balance exercises). Each group participated for 6 months. Only 9 in each group had enough retrospective data to analyze. Specific to this retrospective analysis, all subjects were measured pre and post with the Kurzke Neurostatus tool that measures specific neurological impairments. These measures were not included specifically in the original research except to inform the EDSS. A change score was created across the specific neurological areas from pre to post for each subject and the categories were mathematically added to produce a magnitude of changes score. See table 1 for the areas on the Kurzke that were assessed. A change score was calculated for gait velocity and the 6-minute walk test (6MWT).

		N	Mean	SD	t*	P	d_2
Neurostatus Magnitude of Change	Experimental	9	2.85	8.45	0.95	1.79	0.45
	Control	9	-0.35	5.58	-	-	-
Gait Velocity Magnitude of Change (m/sec)	Experimental	9	35.77	33.46	2.66	.009	1.25
	Control	9	-10.11	39.40	-	-	-
6 MWT Magnitude of Change (feet)	Experimental	9	176.86	199.02	1.58	.067	0.74
	Control	9	31.61	191.49	-	-	-

*Significant 1-tailed

RESULTS

A significant difference was not found between the mean Neurostatus change score for the experimental (M=2.85) and control (M=-0.35) groups (t=0.95, p=1.79, d=0.45). Likewise, there was no significant difference (t=1.58, p=.067, d=.74) in the 6MWT change but there was a significant difference between the experimental and control groups for gait velocity (t=2.66, p=.009, d=1.25). There was no significant correlation between Neurostatus change and gait velocity or Neurostatus change and 6MWT, however, there was a significant correlation between gait velocity and the 6MWT.

DISCUSSION AND CONCLUSIONS

This specific secondary analysis does not support the notion that 6 months of more intensive resistance, aerobic, and balance exercise produces changes in specific neurological impairments in ambulatory individuals with MS, despite seeing improvements in gait velocity. Improvements after exercise in individuals with MS may be related to other physiological factors, such as cardiovascular improvements, and not related to changes in neurological function. The small sample size was a limitation of this retrospective analysis.

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