P 1-48

Effect of Equine-assisted activities and therapy on aerobic capacity and endurance in children with cerebral palsy: A Pilot study

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Purpose

Equine-Assisted Activities and Therapy (EAAT) are known to give beneficial effects on gaits in children with cerebral palsy (CP). This may lead to improvement in exercise tolerance in children with CP. There has been little evidence of effects of EAAT on aerobic capacity and endurance so far. Therefore the purpose of this study was to evaluate the effect of EAAT on aerobic capacity and endurance in children with CP

Subjects and Method

Twelve children (age, 8.9±1.9; height, 131.7±8.6; weight, 27.9±4.8) with CP (Gross Motor Function Classification System level I-III) participated in this study. Six minute walk tests (6MWT) measured using ActiGraph model GT3X accelerometer (Health One Technology, Fort Walton Beach, FL, USA) on the waist, and polar heart rate sensor (Polar Inc., Oulu, Finland) on the chest. Children received the same verbal instructions to assist in the pace of walking. Temporospatial gait parameters before and after the EAAT were obtained and analyzed with ActiLife 6.0 software (Health One Technology, FL, USA). The metabolic equivalent rate (MET) of each child was calculated using Freedson equations for children (2005); 2.757 + (0.0015 * Counts per minute) – (0.08957 * Age) – (0.000038 * Counts per minute * Age). EAAT program The 40-minute EAAT program was offered twice a week for 16 weeks. The EAAT contents included stretching, strengthening, dynamic balance, postural control, and basic riding skills while walking and trotting.

Results

Walking speed, walking distance in 6MWTs were significantly improved after the 16-week-EAAT program compared with the control group. MET was significantly increased EAAT group after the program.

Conclusion

This pilot study showed beneficial effects of EAAT on aerobic capacity and endurance in children with CP.

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Table 1. Change of HR, MET, and gait parameters

Variables		Pre	Post	P	Different value	p
HR (beats/min)	CON	147.71±19.00	151.17±18.85	.225	5.79±6.43	.629
	EAAT	151.81±23.07	161.79±23.37	.068	3.46±7.79	
MET	CON	5.34±1.32	4.98±1.60	.686	-.37±.65	.109
	EAAT	6.54±1.10	5.60±0.82	.028*	-.94±.56	
Steps (counts/min)	CON	109.63±16.07	94.14±23.55	.225	-15.50±23.19	.631
	EAAT	118.11±13.15	103.58±12.94	.075	-14.54±19.84	
Stride length (m)	CON	.80±12	.80±14	.917	-.003±.042	.394
	EAAT	.83±24	.90±18	.345	.067±.148	
Walking speed (m/min)	CON	54.17±18.35	56.08±21.16	.293	1.92±5.33	.003 †
	EAAT	62.92±13.64	72.50±13.69	.024*	9.58±4.01	
Walking distance (m)	CON	325.00±110.09	336.50±126.99	.293	11.50±3.20	.003 †
	EAAT	377.50±81.84	435.00±82.16	.024*	57.50±24.03	

NOTE. MET: Metabolic Equivalent rate. * Statistically significant difference between pre and post EAAT program (p<.05).

† Statistically significant difference between EAAT and control group (p<.01).

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