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Research Article

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The effect of a selective training program on the rate of walking endurance in stroke patients

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ABSTRACT

Stroke patients by many problems such as disruption of balance and gait face. This many negative consequences for their health problems to follow. In this study selected an training program on walking endurance stroke patients is studied. This study is experimental. Among the 100 patients who referred to the specialized clinic of Neurology, 24 participants were selected based on inclusion criteria were randomly assigned to two experimental groups (n = 12) and control (n = 12) groups. After performing initial test, the experimental group selective training program for 24 sessions were performed with intensity of 50 to 60 percent of maximum heart rate. To measure the endurance walking test were used 6minutes walking. To analyze the data, independent t-test was used. (P≤0 / 05). Data analysis showed that eight weeks on endurance exercise is effective in stroke patients walking(p <0/0001). This study shows that selective training can have a positive effect on endurance walking of stroke patients and is a complement to drug therapy.

Keywords: resistance training, stroke, endurance walking

INTRODUCTION

Stroke is the most common cause of physical disability and the third leading cause of death in the world (1). Reduction in muscle strength and disruptions in mobility and balance and walking abilities are the major problems of the patients. The reduction in strength, speed and motion control are due to the reduction in the number of muscle fibers, motor units and atrophy of type II fibers (2). Stroke (CVA or Stroke) occurs when blood flow to an area of the brain will be faced with an obstacle; As a result, brain function will be lost for about 24 hours or more, or even lead to death (3).About 50 percent of the patients cannot acquire the ability to walk 6 to 9 weeks after the stroke (3).A decrease in muscle strength, balance and walking disorders are the major problems in this patients (4). Performing fine movements and balance such as sitting, standing, walking, running, sports, and many rotating motions need coordination of member of the human body. The sense of visual, auditory and cerebellum, brain stem and equilibrium paths' communication with the cerebral cortex and spinal cord are the main factors creating balance and a healthy motion that each of these centers dysfunction or lack of coordination between them can feel imbalances (5). One type of muscle strengthening methods is physical selective training method. Different researches have been done to study the effect of physical exercises on the walking endurance of stroke patients that each one has different results according to the intensity and duration of training. In this regard, Monaco et al. (2009)

examined the trunk balance and control and postural of stroke patients during their rehabilitation program. They concluded that activities in the trunk in sitting, balance in sitting and sleeping positions can be effective in improving the ability of stroke patients (6). Laurence (2009) investigated the impact of symmetry trainings on the power and harmony of stroke patients who had positive results. Also, Perry Meyer et al (2009) achieved a significant negative correlation between balance test and performance of walking with weight bearing on the non-infected lower limb, there was no significant correlation between the test with symmetry index and weight bearing on the infected lower limb (7). The studies indicated that there are more than half of patients with problems such as difficulty in walking, balance and daily life activities. taking advantages of training as a complementary treatment is a new hope and spirit for the stroke patients to relieve their physical pain In order to the increasing number of stroke patients, increased costs of treatment, its destructive effects on the quality of life. Therefore, these studies were considered to reveal more about the disease and strategies to deal with its complications. Creating these kinds of trainings were to Contribute to the advancement of science and research in physical education and raise the discipline as a complementary therapy (along with drug treatments) in order to improve physical health of stroke patients. Answering to the questions and ambiguities such as, does physical activity conflict if symptoms interfere and does physical activity and selective trainings have an effect on walking endurance in stroke patients? Were this research's concerns.

The authors have tried to investigate performing selective physical training for 8 weeks alongside drug treatment to help the patients to reduce symptoms and improve of walking endurance Due to physical impairment of stroke patients. Finally, the question is whether selective training programs have significant effect on the rate of walking endurance in stroke patients or not?

Methodology:
This is quasi-experimental and applied research. Considering the limitations of the research, research design includes pre and post test on the experimental and control groups. The population under study were 100 stroked patients that the neurologists has been proven of stroke patients.24 people were selected as targeted and based on input criteria in simple random as the sample among the statistical population. Then they randomly divided into two experimental groups (n = 12) and one control (n = 12) equally. The age range was between 45 to 60 years. Inclusion criteria for participants included: being Iranian and residing in Mashhad, the lack of a history of cardiovascular disease, no history of epilepsy, lack of metabolic diseases and having the desire to participate in the research projects.

The experimental group training program was consists of a combination of 25 types of joints and general mobilization training, 17 types of balance training, 5 types of growing isotonic strengthening training during 3 days of a week and for 8 weeks (preliminary phase for two weeks, advanced stage for four weeks and consolidation phase for two weeks),.The classes have begun by walking and stretching exercises to warm up for 10 minutes. Joint mobilization and movement exercises to mobilize hip, knee, ankle joints, static and dynamic balance training and extensor and flexor strengthening trainings had done at the three preliminary, advanced and consolidation phases in each session. The program was set in accordance with the principle of overload at every stage of training that its intensity was added so that a 5 minutes session in a day for three days of a week and for two weeks, 8 minutes session for four weeks, and 11 minutes session for two weeks with 2-3 minutes rest between each step was performed (8). Polar pulse meter would be closed during the training in the patient's wrist to measure and control their heart rate and exercise intensity. Parametric Independent t test was used to compare the difference between two groups pre-test and post-test. Standard research tool was used which was used for more than 100 researches and similar projects inside and outside the country and it has had good results. Meanwhile the techies have approved it. Tools and methods of measurement included selection form of the study subject, demographic questionnaire, a brief mental state examination, check list of recording sports training, measuring walking endurance, 6-minute walking test, the digital pressure gauge and Polar pulse meter. For data analysis, Kolmogorov-Smirnov test was used to check the normality status of the data distribution, parametric independent t test was used to compare the mean difference in two groups Pre-test and post-test. All the procedures and statistical calculations were performed by specialized statistical software of SPSS.

RESULTS

The mean age of the patients was 55/58±8/68. Statistical tests showed that there was not significantly different between experimental groups and control group in terms of age, height, weight, body mass index. The data about the background variables were measured and normality of all data was verified by using the Kolmogorov-Smirnov test.

It was a statistically significant difference between the pre-post test score of couples T test (p =0/0001) in walking endurance of physical training groups. Couples t-test showed no statistically significant difference between walking endurance pre-post test scores of control group. As well as it was a significant statistical difference between the experimental and control groups post-test scores for walking endurance (p =0/0001).

Table 1. Background variables of stroke patients based on the two experimental and control groups

Groups	Age (years)	Height (cm)	Weight (kg)	BMI (kg/m2)
Experimental	55/58±8/68	169±7/39	69/91±5/94	24/61±2/91
Control	56/83±5.30	169/33±644/8	71/41±5/74	24/91±1/71

Table 2: the walking endurance scores of stroke patients before and after doing the selective training program based on the two experimental and control groups

Groups	Phase	Mean ± SD	Mean difference	t value	The significance level
Experimental	Pre-test	515±35/949			
	Post-test	547/6±32/808	32/66	-6/516	0/0001
Groups	Pre-test	509/5±53/041			
	Post- test	506/25±52/057	3/25		

Based on the results of Table 2. the selective training program has a significant effect on walking endurance of stroke patients according to the independent t-test results.

CONCLUSION

The results of this study that investigated the effect of eight weeks of selective physical trainings in walking endurance of stroke patients, showed that this trainings had a positive effect on the walking endurance so that the patients needed help at the 6-minute pretest during walking or standing, and they were unable to walk whole 6-minute, completely. But patients could stand without or less assistance at the end of training, and what was more important was that the patients could walk longer distances compared with pre-test stage. Perhaps, the selective physical trainings strengthened the stroke patients'hip flexors and muscles of lower limb considering that they have weak muscles with deformity resulting from the disease. Increased walking endurance may also was due to the selective physical trainings protocol and increase in synchronization of motor units operation (9). Physical activity is a way to help these patients (Weiss, 2007). Applying selective physical trainings is better due to the patients' physical disability, lack of balance and poor movement (8).

This study is consistent with many other studies results including Gholami et al (12) and Larg Hammer et al (13) and Monaco et al. (14);So that creating symmetry trainings by weight-bearing have an effect on the stroke patients' balance and walking how that the results were positive in most cases. In the other hand, the findings of Perry Meyer et al (15) and Cherne et al (11) studying the effect of resistance training (weight-bearing) on the patients' organs, with no significant correlation between walking, balance and tolerated weight were inconsistent with this studys' results. Inconsistency may be due to the type of training, conditions and treatment environment, how to survey and scholars different commentary. According to the theories regarding the effects of exercise and motion techniques on the stroke patients, it makes twofold the value of training and further investigation in this area. The importance of regular training can be sought in order to speed and performance of walking and balance. Exact and accounted trainings can create a permanent and irreversible in patients' condition and change the patients' attitude toward his abilities in a positive direction.

The results indicated that we can be benefited from selective physical trainings coupled with drug therapy and monitored training to increase walking endurance in stroke patients. Also, selective physical training can be used to prevent the motor deficiency in these patients. Therefore, doing this trainings as a complementary therapy along with drug therapy for the patients is recommended.

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