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The Effects of One Session Aerobic with Anaerobic Exercise on Plasma Protein Carbonyl in Karate Girls

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Abstract:

The purpose of this study was to compare the effects of aerobic and anaerobic activity on protein carbonyl in blood plasma. Subjects was 15 Karate girls from city of Shiraz with a minimum of six years experience. After coordination, 8 to 9 am test was performed. To examine the effect of aerobic activity on the first day, the Wingate test was performed for all subjects and also after one week, modified Bruce test was performed. Bloodletting in 6 stages (before anaerobic exercise, immediately after anaerobic exercise and 24 hours after anaerobic exercise) was performed. To analyze the findings the Kolmogorov-Smirnov test, analysis of variance with repeated measures was used to compare variable (a =/005). The results of the analysis showed that there is no significant difference between aerobic and anaerobic training on plasma protein carbonyl in Karate girls.

Key words: protein carbonyl, aerobic exercise, anaerobic exercise, karate girls

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Introduction

Thousands of articles and scientific articles and research about the different effects of exercise and physical activity have been published in various books and magazines, mainly about the positive effects of exercise on the body systems. One of the best indirect methods for measuring the oxidative stress is oxidation of carbonyl proteins (Bloomer 2009). Reactions associated with protein can be essential to make changes so that it leads to a lack of structural and catalytic functions (Bloomer et al. 2007). Various findings have shown that changes in antioxidant enzymes in various exercises of different patterns do not follow a specific pattern so it seems these changes is not well known yet. In general, the type of exercise, duration and intensity of exercise is great effect (Radak et al. 2008). But since most types of exercise produce free radicals, antioxidant enzyme activity in the liver has the proper ability to neutralize the radical chain reaction. But when the production of free radicals, oxidative capacity is exceeded, creating free radicals causes oxidation of proteins and protein carbonyl formation increases. Observed one session, depending on its intensity and duration, causes oxidative damage however different regular exercises cause an adjustment in the system of anti-oxidant and repaired, which can increases the resistance of oxidative stress. Thus, it seems that the intensity, duration and type of exercise, had a different effect on the oxidative damage and antioxidant system (Hvanlu et al. 2010).

Carbonyl protein produced by the oxidation of proteins is often perceived as a marker systemic of oxidative stress. On the other hand the formation of the PC is expressed as an index of oxidative stress in skeletal muscle. (Bloomer et al. 2007, Ascensao et al. 2007, Morillas-Ruiz et al. 2006, Petibois and Deleris 1996). Given the importance of this protein and its research background, it seems that not enough research in this area has been done. In human subjects, especially the athletes,

there is limited information and there is a need for further research in this area.

Materials and Methods

This study was a quasi experimental study. The population of the current study was all female athletes 14 to 21 years of Shiraz city (All participants were members of Fars province karate team in 2011). The number of 15 volunteers was randomly selected as the sample with at least 6 years of Karate activity. Subjects before participating in the study had regular activities. After selection, familiarity and coordination meeting, test was performed in two separate week-ends from 8 to 9 am. Subjects worked under the supervision of an instructor and researcher at the University of Shiraz. To ensure the water level in the body, half an hour before test, all participants were given 250 mg water which was taken in gradually. Before starting the anaerobic test, a blood sample was taken from each subject. After the warm up, the Wingate test was performed and immediately blood was taken. 24 hours after the test, another blood sample was taken in the lab. The same groups next week-end for aerobic tests were followed by a blood sample from each subject. After warm-up, including stretching, Modified Bruce test was done and blood sample collected. 24 hours after the aerobic test blood sample was taken in the lab for determination of protein carbonyl. All blood samples were transferred to Hormone Laboratories in School of Medicine, Shiraz University.

Results

General characteristics of subjects in Tables 1 and 2, respectively, and the mean protein carbonyl subjects before, immediately after, and 24 hours after the aerobic and anaerobic activities were offered.

Age (Years)	Height (Cm)	Weight (Kg)	Body Mass Index (kg/m2)
17/5±3/5	**163±10**	**54±14**	**21/16±3/74**

Table 1 General characteristic of subjects

Test		Protein Carbonyl (milligrams per deciliter)
Aerobic test	before the test	**71/10±37/43**
	Immediately after test	**71/69±39/69**
	after 24 hours	**63/48±33/70**
Anaerobic test	before the test	**71/42±39/44**
	Immediately after test	**74/83±43/50**
	after 24 hours	**66/08±35/25**

Table 2 Status protein carbonyl before, immediately and after 24 hours of test

Source of variation	sum of squares	degrees of freedom	mean squares	**F**	significant
Active	**92/01**	**1**	**92/01**	**0/32**	**0/58**
ERROR	**4008/25**	**14**	**286/30**		
time	**1178/71**	**1/20**	**979/57**	**2/29**	**0/14**
ERROR	**7183/24**	**16/84**	**426/40**		
Engagement activities and time	**33/66**	**1/11**	**30/10**	**0/09**	**0/79**
ERROR	**5260/13**	**15/65**	**335/97**		

Table 4 Results of ANOVA with repeated measures for changes in protein carbonyl followed by aerobic and anaerobic

As the results in Table 4 are obtained from aerobic and anaerobic exercise have significant effects on changes in protein carbonyl (p= 0/ 58 and F=0/32 and df =1, 14). Also results indicate that exercise, regardless of the measurement time, had no significant effect on protein carbonyl (p =0/14 and F=2/29 and df =1/20, 16/84). A significant interaction between physical activity and time table of measurements was seen (activity before, immediately and after 24 hours of exercise activity) (p =0/79 and F=0/09 and df =1/11, 15/65). For better view, results are presented in Figure 1.

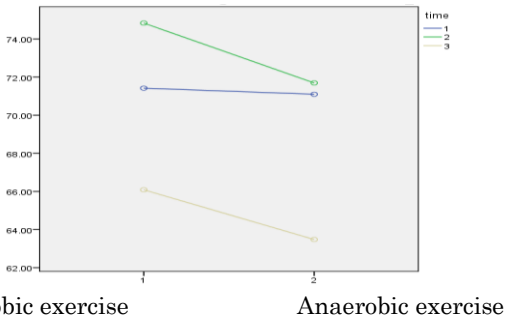

Figure 1 Changes in protein carbonyl subsequent

Discussion and conclusions

The results of this study showed that there is no significant difference between aerobic and anaerobic training on plasma protein carbonyl in the Karate Girls. Carbonyl protein in muscle after concentric exercise increased, but these changes were not seen after eccentric exercise. These findings indicate that the concentric contraction compared with eccentric contractions lead to greater oxidation protein in muscle. In research of Lee et al. (2002), Goldfarb et al. (2005) Blood PC after eccentric contraction climbed and the peak of this increase was seen from 24 to 48 hours after the training so these findings were not consistent with our results in this study that indicated there was no increase in viable after 24 hours.

The results of some studies showed increased lipid peroxides in untrained subjects in compared with trained subjects (Radak et al. 2008). Such findings may be related to anti-oxidation capacity in trained subjects (Radak et al. 2008). After testing Wingate 30 -second test and Scott with 70 % of one repetition maximum, it was shown that oxidation of proteins after squat exercise increased, the results of this research also not being in line with our findings (Bloomer et al. 2007). Also Bloomer et al. (2006) in a study of oxidative stress response to aerobic exercise reported that the protein carbonyl

increased. Therefore, the results were not same with our findings, either.

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