

## **Effects of creatine supplementation and aerobic training on VO<sub>2</sub> Max**

**Hassan Abdi\*<sup>1</sup>, Seyed Hadi Naghibi<sup>1</sup>, Maryam Faraeen<sup>2</sup> and Bahman Alizadeh<sup>3</sup>**

<sup>1</sup>Department of Physical Education, College of Humanities Sciences, Shahrood Branch, Islamic Azad University, Shahrood, Iran

<sup>2</sup>Department of Physical Education, College of Humanities Sciences, Khoy Branch, Islamic Azad University, Khoy, Iran

<sup>3</sup>Department of Physical Education and Sport Science, College of Humanities and Social Sciences, Tehran Science and Research Branch, Islamic Azad University, Tehran, Iran

---

### **ABSTRACT**

*The effect of using creatine on aerobic activities has less been noticed. The data suggests that creatine increases the in use substrate during aerobic activities and probably leads to an improvement in aerobic performance. The main purpose of this research is analyzing the effect of creatine supplementation combined with aerobic training on anaerobic threshold in young men. The following study is a quasi-experimental study. The population of this study is formed by young healthy men of Shahrood city who do recreational activities. The primarily samples were volunteer selected. A group of 32 young healthy men (between the ages of 18 to 30) agreed to participate in this research. The study was done in 4 weeks and the data needed for a four-week-course was collected before and after the test. The statistical analysis was performed by "SPSS ver.16". To analyze the data, ANOVA variance test was used. The results showed that using creatine over the course of four weeks, along with aerobic exercise, has effected on vo<sub>2</sub> max (p=0.001). Therefore, it can be concluded that creatin supplementation probably have significant effects on VO<sub>2</sub> max after 28 days aerobic exercise and consumption of creatin supplementation.*

**Keywords:** Creatine Supplementation, Aerobic Training, VO<sub>2</sub> Max

---

### **INTRODUCTION**

One of the challenges that the athletes have been struggled with since a long time ago, is improving the athletic performance. In recent years hundreds of supplements have been released exclusively for athletes in the markets. One of them is creatine. Extensive researches have studied the influence of this supplement on the athletic performance [1, 2, 3 and 4]. Therefore, since a major part of the energy is provided from ATP and creatine phosphate during intense activities and before the beginning of anaerobic glycolysis, it seems that increasing the creatine phosphate supplies probably will increase the amount of produced ATP during extreme activities [5].

The effect of using creatine on aerobic activities has less been noticed. The data suggests that creatine increases the in use substrate during aerobic activities and probably leads to an improvement in aerobic performance. The available data in this field are in contrast [6].

The results of the research showed that using creatine for 5 days increases the active power of muscles and may increase the aerobic metabolism in the lower body and improve the performance [7].

## MATERIALS AND METHODS

After getting written testimonial from the volunteers, to confirm their health, they were under medical observations. The volunteers who had a record of cardiovascular diseases, diabetes, thyroid diseases, or any known diseases, or any type of diets, were out of the research. Addiction to any drugs, cigarettes, alcohol and caffeine also were the reasons that led to exiting some of the volunteers. The final group of study was chosen via daily activity questionnaire. The sample of this research included 32 young healthy men (ages 18 to 30) with athletic activities who were interested in cooperating in this study. Samples that used creatine in last 6 months were out of the research.

The population of this study is formed by young healthy men of Shahrood city who do recreational activities. The primarily samples were volunteer selected. A group of 32 young healthy men (between the ages of 18 to 30) agreed to participate in this research. The study was done in 4 weeks and the data needed for a four-week-course was collected before and after the test. The samples were divided in four groups of control (n=8), creatine (n=8), Practice (n=8) and practice + creatine (n=8) through "double blind and randomized manner". The practice group are using 20 grams of creatine on daily basis (four 5gr sets) in the first week of study and in the remaining 21 days, 10 grams on daily basis (two 5gr sets). The time for using these dozes is during the daylight. The control group uses the placebo in the same routine.

The study was done in four weeks and the needed information for a four-week period was collected via before and after test. All the data was collected in special hours of the day. The ventilatory and cardiovascular evaluation was done in following manner. It was requested from the samples to avoid intense activity 48 hours before the test. The ventilator ability was evaluated via calculating the ventilator anaerobic threshold and the maximum used oxygen. For that, the samples participated in an additive work out until the failure on an ergometer bicycle. The samples started the test in 50 watt after a 5 minute warm up in 25 watt. The cardiovascular performance of the samples was evaluated by impedance cardiography in relaxed and seated condition before the test.

After that the samples entered series of aerobic exercises on a bicycle for four weeks, 3 sessions every week. The aerobic exercises were done in 65 to 85 percent of the maximum heartbeat controlled by polar watch in 40 minutes and in 2 stages with 10 minutes of rest between the 2 stages. The statistical analysis was performed by "SPSS ver.16". To analyze the data, ANOVA variance test was used

## RESULTS

**Table 1. Statistical index of group's Charactrestic**

	Variables	Mean	SD	max	Min
Control Group	Age	23.12	4.086	29	18
	Hight	167	9.411	178	150
	Weight	65.12	6.175	77	58
Creatin Group	Age	23.62	4.241	30	18
	Hight	171	9.681	190	161
	Weight	65.88	6.534	60	79
Training Group	Age	25.12	3.720	30	20
	Hight	169.88	7.160	80	158
	Weight	66.25	8.102	82	58
Training Group + Creatin Group	Age	25.12	3.834	30	19
	Hight	171	8.332	185	160
	Weight	66.38	7.230	80	58

**Table 2. Statistical index of group's VO2 Max**

Statistical index	Mean	SD	max	Min
Control Group	59	4.071	65	52
Creatin Group	59.57	3.694	65	55
Training Group	59.38	3.249	64	55
Training Group+ Creatin Group	60.38	13.378	65	55

**Table 3. Factor Variance Analyze of VO2 Max**

Statistical index	SS	df	MS	F	P Value
Between Groups	30.36	2	10.12	3.08	0.001
Within Groups	91.08	7	3.37		
Total	121.44	10			

The results showed that using creatine over the course of four weeks, along with aerobic exercise, has effected on vo2 max ( $p=0.001$ ).

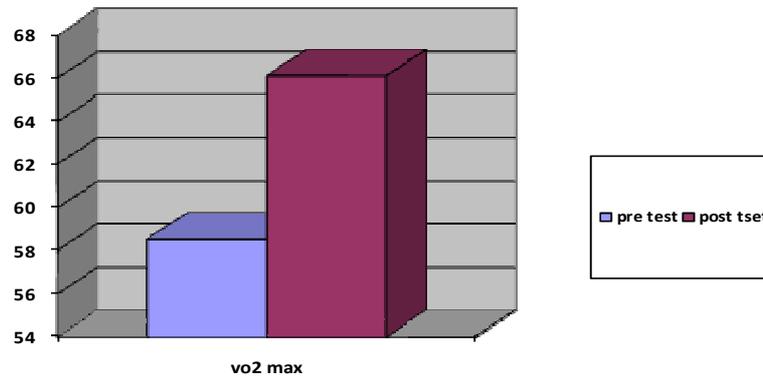


Figure 1. The comparison of pre and post test means VO2max

### CONCLUSION

Balsam's research (1995) shows, 2-3% VO<sub>2</sub> related with anaerobic exercise in repeat bouts [8]. The results of this study consistent was with a few studies such as Nelson (2000) and Jones (2002) that shows creatin supplementation effects of submaximal VO<sub>2</sub>, VO<sub>2</sub> and VO<sub>2</sub> peak; also decreased VO<sub>2</sub> during submaximal exercise above the ventilator threshold [9 & 10]. Therefore, it can be concluded that creatin supplementation probably have significant effects on VO<sub>2</sub> max after 28 days aerobic exercise and consumption of creatin supplementation.

### Acknowledgements

This study was carried out with the grant of Islamic Azad University, Shahrood Branch. The author expresses his gratitude of the research assistant of Islamic Azad University.

### REFERENCES

- [1] Havenetidis, K. Boone, T. **2005**, *Journal of Exercise Physiologyonline* 8(1):26-33.
- [2] Kreider, RB. et al. **2003**, *Mol Cell Biochem* 244(1-2):95-104
- [3] Harris, RC. Soderlund, K. Hultman, E. **1992**, *Clin Sci* 83:367.
- [4] Bermon, SP. Venembre Sachet, C. Vlour S. Dolisi C. **1998**, *Acta physiol Scand*: 147-164.
- [5] Rawson, ES. Volek, JS. **2003**, *J Strenght Cond Res* 17 (4):822-31.
- [6] Branch, JD. **2003**, *International Journal of Sport Nutrition & Exercise Metabolism* 13(2):198-226.
- [7] Juhász I, Györe I, Csende Z, Rácz L, Tihanyi J. **2009**, *Acta Physiol Hung. Sep*;96(3):325-36.
- [8] Balsom, PD, Soderlund, K, Sjodin, B, Ekblom, B. **1995**, *Acta Physiol Scand* 154: pp. 303-310.
- [9] Nelson, AG, Day, R, Glickman-Weiss, EL, Hegsted, M, Kokkonen, J, Sampson, B. **2000**, *Eur J Appl Physiol* 83: pp. 89-94.
- [10] Jones, AM, Carter, H, Pringle, JSM, Campbell, IT. **2002**, *J Appl Physiol* 92: pp. 2571-2577.