EFFECT OF TABATA INTERVAL TRAINING ON ANAEROBIC ENDURANCE

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ABSTRACT

The purpose of the study was to find out the t abata interval training on anaerobic endurance among school boys. In this study 30 male students were randomly selected from A.P.C. Veerabahu Matric.Hr.Sec.School, Tuticorin and divided into two groups as one experimental group and a control group. Anaerobic endurance as measured as fatigue index and it was tested by using Running Based Anaerobic Sprint (RAST) Test from each subject before the training period, after the fourth, fifth and sixth week of training period. The collected data were statistically analysed by using 2 X 4 factorial experiment factorial experiment [group TITG and CG) X test (pre, after the 4^{th} week, 5^{th} week and 6^{th} week)] with repeated measures on the last factor was used on fatigue index. It was found that there was a significant improvement on fatigue index due to the influence of tabata interval training among school boys.

Key Words: Tabata interval training, High intensity interval training and anaerobic endurance.

INTRODUCTION

Anaerobic literally means without oxygen. It relates to short-term high-energy production where the predominant fuels are produced without the necessity of oxygen. Anaerobic performance is obviously relevant to sprinters, but also to those who play team and individual sports where there is an anaerobic component such as sprinting in football or hockey. Assessment of anaerobic performance can provide the coach with valuable information about the athletes' fitness status as well as allowing them to monitor improvement through training (Inbar, et al., 1996, http://www.pponline.co.uk/ encyc/0155.htm#). RAST stands for **R**unning-based **A**naerobic **S**print **T**est and was devised at the University of Wolverhampton in the UK. Basically, it uses the power formula to work out the rate at which the athlete is able to work. The RAST is capable of identifying two primary measures via a running-based protocol: 1) anaerobic capacity; and 2) anaerobic power. As these values are vital factors in sports which demand repeated short-duration maximal efforts, this particular test may be a suitable assessment tool for athletes who compete in running-based sports and are exposed to similar workloads – such as football (soccer), basketball, and handball (Zagatto et al., 2009). At the elite level, research has identified the intermittent high-intensity exercise as predominant and fitness improvements to this activity pattern have further been defined as power endurance (Siegler et al., 2003; Thomas, 2000; Trinic et al., 2001). How much Horsepower does Usain Bolt Generate? The short answer is 2165 Watts. Divide that by 746 watts per horsepower and you get 2.9 HP, very close to 3 horsepower. For a comparison, assuming 1kg to a height of 1 meter in 1 second = 10 Watts of power, then the WR Deadlift is 6.6 HP for men, 4.2 HP for women. For the Squats WR, we have 7.6 HP for men, 5.2 HP for women (http://speedendurance.com/2011/03/01/what-is-the-rast-test-for-speed-endurance/). Interval training is based on a very simple concept: go fast then go slow. For those who are always using the excuse that there is not enough time to exercise, there is a new solution – **Tabata Training**. Tabata interval training is the single most effective type of high intensity interval training, it's also the most intense by far, and surprisingly it's the shortest in duration, it only last for four minutes… but those four minutes produce remarkable effects. Lose Fat, Get Fit in four minutes (*http://www.intervaltraining.net/tabata.html*). The importance of developing good conditioning programs based on the specific physiological demands of each sport is considered a key factor to success (Gillam, 1985; Taylor, 2003; 2004). Based on the specific needs, researcher made an effort to observe the effect of tabata interval training with 20secons active : 10seconds rest period on fatigue index among school boys.

OBJECTIVES

The following are the specific objectives of this study.

1. To find out the effect of tabata interval training with 20 seconds active period: 10 seconds rest period on fatigue index.
2. To find out the appropriate training duration needs to increase the fatigue index level among school boys.

METHODOLOGY

To achieve the purpose of this study, 30 male school students were selected from A.P.C. Veerabahu Matric.Hr.Sec.School, Tuticorin, Tamilnadu, India, at random and their age ranged from 14 to 15 years. The selected subjects were divided into one experimental group and a control group with 15 subjects (n=15) each. Group I (TITG) underwent tabata interval training with 20seconds active period: 10seconds rest period. The duration of the training period was six weeks with three sessions per week. Group II (CG) served as control group. However, control group was not exposed to any specific training but they participated in the regular scheduled work. Selected subject's fatigue index (anaerobic endurance) was tested three days before, one day after the 4th week, 5th week and two days after the training period (6th week) by conducting RAST test.

ANALYSIS OF DATA

The data pertaining to the variables in this study were examined by using 2 X 4 factorial experiment [group TIG and CG) X test (pre, after the 4th week, 5th week and 6th week)] with repeated measures on the last factor was used on fatigue index. Whenever the 'F' ratio for interaction was found to be significant, simple effect test was used as a post-hoc test to determine which of the group was significant and whenever the 'F' ratio for interaction was found to be significant in the simple effect test, Scheffe's test was used as a post-hoc test to determine which of the paired means were significant. In all the cases 0.05 level was fixed as the significant level.

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TABLE I Summary of Descriptive Statistics on Fatigue Index of TITG and Control Groups

Groups	Tests	Mean	SD	Min	Max
TITG	Pre	5.57	0.03	5.53	5.62
	4th week	5.62	0.04	5.55	5.74
	5th week	5.65	0.05	5.59	5.80
	6th week	5.66	0.06	5.60	5.83
CG	Pre	5.56	0.03	5.53	5.61
	4th week	5.58	0.04	5.53	5.64
	5th week	5.57	0.03	5.53	5.63
	6th week	5.58	0.03	5.54	5.64
Tabata Group		5.62	0.06	5.53	5.83
Control Group		5.63	0.06	5.53	5.83

TABLE II Summary of Analysis of Variance for 2 X 4 Factorial Experiment with Repeated Measures on the Last Factor on Fatigue Index

Source	SS	df	MS	F
Between Ss	0.225409	29	0.007773	
A (Group)	0.082425	1	0.082425	16.14108
Ss w. groups				
(Err. Between)	0.142983	28	0.005107	
Within Ss	0.126426	90	0.001405	
B (Tests)	0.051354	3	0.017118	31.00505
AB (Groups X Tests)	0.028696	3	0.009565	17.32504
BxSs w. groups				
Error Within	0.046377	84	0.000552	
Total	0.351835	119		

* Significant at 0.05 level.

Table value required for 0.05 level of significance with df (2,28, 1,84 & 3,84) are 4.2, 3.96 and 2.72 respectively.

TABLE III Simple Effect Post-Hoc Test for Groups X Tests Interaction on Fatigue Index

Source	SS	df	MS	F
Group for Pre test	0.000141	1	0.000141	0.255085
Group for 4th week	0.016333	1	0.016333	29.58384
Group for 5th week	0.042563	1	0.042563	77.09308
Group for 6th week	0.052083	1	0.052083	94.33623
Tests for TITG	0.077591	3	0.025864	46.84586
Tests for CG	0.002458	3	0.000819	1.484223
Error Within	0.046377	84	0.000552	

Table value required for 0.05 level of significance with df (1,84 & 3,84) are 3.96 and 2.72 respectively.

TABLE IV Scheffe's Test for the Differences between the Paired Means of Tests Irrespective of Groups on Fatigue Index

Pre	4th week	5th week	6 th week	MD	CI
5.5655	5.6			0.0345*	0.21
5.5655		5.607667		0.042167*	0.21
5.5655			5.621667	0.056167*	0.21
	5.6	5.607667		0.007667	0.21
	5.6		5.621667	0.021667*	0.21
		5.607667	5.621667	0.014	0.21

* Significant at 0.05 level.

TABLE V Scheffe's Test for the Differences between the Paired Means of Tests at Tabata Interval Training Group on Fatigue Index

Pre vs 4th week	Pre vs 5th week	Pre vs 6th week	4th week vs 5th week	4th week vs 6th week	5th week vs 6th week	CI
0.056*	0.078*	0.096*	0.022	0.04*	0.018	0.03

* Significant at 0.05 level.

RESULTS AND DISCUSSION

The results of the study indicates that significant difference exist between the experimental and control groups on fatigue index. Besides, significant difference exists between the pre test and 4th week, pre test and 5th week, pre test and 6th week, 4th week and 6th week on fatigue index among school boys. At the same time that was there were no significant difference found between the 4th week and 5th week and between the 5th week and 6th week on fatigue index.

The present research findings may depend on the following factors: Anaerobic endurance was tested in the form of maximum power (Pmax), minimum power (Pmin), average power (Pavr) and fatigue indices. From the metabolic energy cost point of view, according to Granier, et al., (1995), it could be assumed that the Pmax describes the capability of the ATP-CP energy mechanism, because the Pmax was calculated basically from the data of the first 35m run. In the next runs (2 - 6), the main energy production mechanism was the anaerobic glycolysis, due to the fact that the rest between the runs was too small (lOs) and the ATP-CP levels were too low (Klissouras, **1989**). The Pavr, Pmin and the FIl and FI2 (Fatigue indices) describe the capability of the anaerobic metabolism.

CONCLUSIONS

The current study highlights on tabata interval training on fatigue index among school boys. The present study exposed that tabata interval (20:10 seconds, Work: rest ratio) training had increase the fatigue index. Due to the influence of first four weeks of tabata interval training enhances the fatigue index and it continues to increase after the 5th and 6th week of Tabata interval training.

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