INVESTIGATION OF THE CHANGES ON SELECTED BIO-MOTOR ABILITIES IN RESPONSE TO AEROBIC AND ANAEROBIC TRAINING AMONG FOOTBALL PLAYERS

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ABSTRACT

The purpose of this study is to investigate the changes on selected bio-motor abilities in response to aerobic and anaerobic training among football players. To achieve the purpose of this study, the investigator selected thirty football players as participants in the age group of 18 to 23 years. They were divided into three groups of ten subjects each. Group-I underwent aerobic training, group-II underwent anaerobic training and group-III acted as control. The selected bio-motor variables such as speed and cardio-respiratory endurance are assessed by standard test and procedure. During the training period, the experimental groups underwent their respective training six days per week for twelve weeks. The data collected from the three groups prior to and post experimentation on selected dependent variables was statistically analyzed to find out the significant difference if any, by applying the analysis of covariance (ANCOVA). It was concluded that both aerobic and anaerobic training groups have significantly improved the speed and cardio respiratory endurance of the football players. However, anaerobic training is significantly better than aerobic training in improving speed and aerobic training is significantly better than anaerobic training in improving cardio respiratory endurance of the football players.

Key words: Bio-motor abilities, Aerobic and anaerobic training, Football players

INTRODUCTION

Football is one of the most popular sports in the world with a massive, global base of enthusiasts and practitioners of all ages. Today's football performers must be "complete athletics". They have to be quick off the mark and over 10-20 yards. They need excellent levels of both aerobic and anaerobic endurance to last the duration. They have the upper body strength to resist challenges. Upper body strength is required for shielding the ball, holding off opponents, throw-ins and also contributes to overall power and explosiveness. Lower body strength is required for kicking, jumping, tackling, twisting and turning and also forms the foundation for explosive speed. In football, good maximal strength is beneficial for holding off opponents and shielding the ball.

For the longest time a lot of the training done for soccer have been centered around aerobic conditioning, while overlooking important aspects like, strength, speed and power, agility and flexibility. Most players on the pitch run a great deal in the game (estimates of between 11-13km during a 90 minute game), so endurance training is very important but should not be done exclusively at the expense of the other aspects of conditioning. The benefit of aerobic and anaerobic training is not only to provide the players with the necessary skills and strength but also help to keep them intact for the entire session of the play.

One of the surefire ways to ensure fitness is aerobics. Apart from ensuring physical fitness, a number of health benefits are associated with aerobics. The real benefits of aerobic exercise are achieved by increasing one's heart rate and breathing hard for an extended period of time. During this aerobic activity one's body produces more energy and delivers more oxygen to one's muscles. Anaerobic training involves exercise that is intense enough to trigger anaerobic metabolism. It greatly increases the body's functional capacity for development of explosive strength and maximization of the short-term energy systems. Non-endurance sports athletes using anaerobic training to promote speed, strength, power and muscle mass. This leads to greater performance in high intensity, short duration activities.

The aerobic and anaerobic training programmes have become highly structured training for enhancement of bio-motor abilities. It has vastly different training effects depending upon the intensity and duration of the work and rest period. More research is required concerning the variation in aerobic and anaerobic training and its effects. The applicability of this method of training to improve the bio-motor abilities is not yet completely known. Consequently, the aim of the present study is to compare the aerobic and anaerobic training for differences in their effectiveness on selected bio-motor abilities of football players.

METHODOLOGY

Selection of the Subjects

To achieve the purpose of this study, the investigator selected thirty football players as participants in the age group of 18 to 23 years from Margasius College of Arts and Science, Nazareth, Tuticorin district, Tamilnadu, India. They were divided into three groups of ten subjects each. Group-I underwent aerobic training, group-II underwent anaerobic training and group-III acted as control. The selected subjects were medically examine by a qualified physician in order to check whether they are medically and physically fit enough to undergo the training programme.

Selection of Variables

In this experimental study aerobic and anaerobic training are selected as independent variables and the selected bio-motor variables such as speed and cardio-respiratory endurance are selected as dependent variables for this study. The speed was assessed by 50 meters run and cardio-respiratory endurance of the football players was assessed by conducting Cooper's 12 minutes Run / Walk test.

Training Programme

In this study, training was done under close supervision with frequent adjustments in training intensity to maintain the desired training stimulus. The training programme was scheduled for one session a day for both aerobic and anaerobic training groups. Each session lasted sixty minutes approximately including warming up and warming down. During the training period, the experimental groups underwent their respective training six days per week for twelve weeks. The experimental group-I performed aerobic running and experimental group-II performed anaerobic training.

Statistical Technique

The data collected from the three groups prior to and post experimentation on selected dependent variables was statistically analyzed to find out the significant difference if any, by applying the analysis of covariance (ANCOVA). Since three groups are involved, whenever the obtained 'F' ratio for adjusted post test means was found to be significant, the Scheffe's test is applied as post hoc test to determine the paired mean differences. In all the cases level of confidence was fixed at 0.05 for significance.

RESULT

The data collected during the pre and post test period among aerobic and anaerobic training groups and control group on speed and cardio respiratory endurance have been statistically analyzed and the details are presented in table –I.

Table – I: Analysis of Covariance on Speed and Cardio Respiratory Endurance of Aerobic and Anaerobic Training Groups and Control Group

Variable	Aerobic Training Group	Anaerobic Training Group	Control Group	Source of Variance	Sum of Squares	df	Mean Squares	Obtained 'F' ratio
Speed	7.56	7.28	8.03	Between	2.21	2	1.10	23.87*
				Within	1.20	26	0.05	
Cardio respiratory endurance	2246..42	2099.08	1942.50	Between	482443.58	2	241221.79	18.08*
				Within	346813.78	26	13338.99	

The required table value for significance at 0.05 level of confidence with degrees of freedom 2 and 27 is 3.35 and degree of freedom 2 and 26 is 3.37.

The adjusted post-test means on speed of aerobic, anaerobic training and control groups are 7.56, 7.28 and 8.03 respectively. The obtained 'F' ratio value of 23.87 of adjusted posttest data on speed is greater than the table value of 3.37 required for significance at 0.05 level of confidence with degrees of freedom 2 and 26.

The adjusted post-test means on cardio respiratory endurance of aerobic, anaerobic training and control groups are 2246.42, 2099.08 and 1942.50 respectively. The obtained 'F' ratio value of 18.08 of adjusted posttest data on cardio respiratory endurance is greater than the table value of 3.37 required for significance at 0.05 level of confidence with degrees of freedom 2 and 26.

The result of the study shows that, significant differences exist among the adjusted post-test means of aerobic, anaerobic training and control groups on speed and cardio respiratory endurance. Since the 'F' ratio is found to be significant, the Scheffe's post hoc test has been applied to find out the significant paired mean differences, and it is presented in table-II.

Table II: Scheffe's Test for the Differences between the Adjusted Post Test Paired Means on Speed and Cardio Respiratory Endurance

Variable	Adjusted Post Test Mean			Mean Differences	Confidence Interval
	Aerobic Training Group	Anaerobic Training Group	Control Group		
Speed	7.56	7.28		0.28*	0.26
	7.56		8.03	0.47*	0.26
		7.28	8.03	0.75*	0.26
Cardio respiratory endurance	2246.42	2099.08		147.34*	134.09
	2246.42		1942.50	303.92*	134.09
		2099.08	1942.50	156.58*	134.09

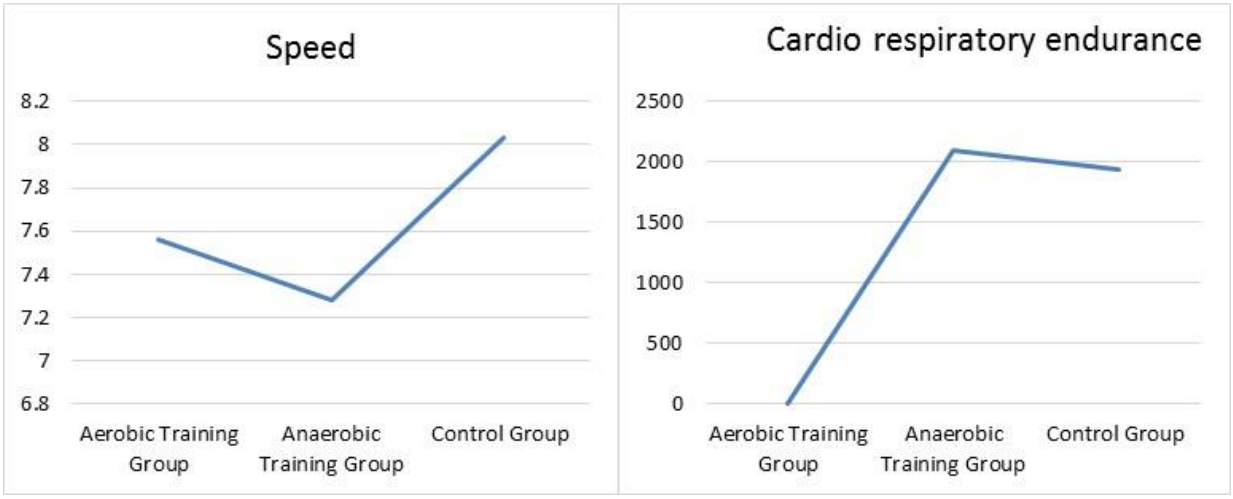
**Significant at .05 level.*

Table-II shows that the adjusted post test mean differences between aerobic and anaerobic training groups, aerobic training and control groups, and anaerobic training and control groups on speed are 0.28 and 0.47 and 0.75 respectively. The values are greater than the confidence interval value 0.26, which shows significant difference at .05 level of confidence.

The adjusted post test mean differences between aerobic and anaerobic training groups, aerobic training and control groups, and anaerobic training and control groups on cardio respiratory endurance are 147.34 and 303.92 and 156.58 respectively. The values are greater than the confidence interval value 134.09, which shows significant difference at .05 level of confidence.

The result of the study shows that significant differences exist between the adjusted post test means of aerobic and anaerobic training groups, aerobic training and control groups, and anaerobic training and control groups on speed and cardio respiratory endurance. It reveals that both aerobic and anaerobic training groups have significantly improved the speed and cardio respiratory endurance of the football players. However, anaerobic training is significantly better than aerobic training in improving speed and aerobic training is significantly better than anaerobic training in improving cardio respiratory endurance.

Figure- I: Graphical Representation of the Adjusted Post Test Mean Values of Aerobic, Anaerobic Training and Control Groups on speed and Cardio Respiratory Endurance



DISCUSSION

In response to aerobic training program, type I and II muscle fibers have been shown to increase in size (Nelson et al., 1990). More consistent and well documented adaptations to aerobic training include increases in capillary and mitochondrial densities (Crenshaw et al., 1991) as well as oxidative enzyme activity (Bell et al., 2000; Nelson et al., 1990) all of which contribute to the enhanced delivery, extraction, and utilization of oxygen by skeletal muscle. Aerobic training causes the heart and lungs to work harder. The endurance training increased peak aerobic power by 12% decreased the heart rate and increased all heart rate variability indices at absolute submaximal exercise intensities, but not at rest (Martinmaki et al., (2008).

Anaerobic training increases the body's functional capacity for maximization of the short-term energy systems. to promote speed, strength, power and

muscle mass non-endurance sports athletes using anaerobic training. It leads to better performance in short duration high intensity activities. This energy system provides great energy but quickly fatigues. Participating in speed or power events are familiar with this form of energy. Satheeskumar (2012) suggested that anaerobic interval exercises can be imparted in order to improve the bio motor abilities.

CONCLUSION

It was concluded that both aerobic and anaerobic training groups have significantly improved the speed and cardio respiratory endurance of the football players. However, anaerobic training is significantly better than aerobic training in improving speed and aerobic training is significantly better than anaerobic training in improving cardio respiratory endurance of the football players.

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