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ANALYSIS OF AEROBIC TRAINING VERSUS ANAEROBIC TRAINING IMPACT ON SELECTED BIO-MOTOR ABILITIES OF CRICKET PLAYERS

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ABSTRACT :

The purpose of this study was to analysis of aerobic versus anaerobic training impact on selected bio-motor abilities of cricket players. To achieve the purpose of this study, the investigator selected forty five cricket players as participants in the age group of 18 to 22 years. They were divided into three groups of fifteen 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 were 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 cricket 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 cricket players.

KEYWORDS : *Aerobic and anaerobic training, Bio-motor abilities, Cricket players.*

INTRODUCTION:

In order to compete at peak levels, athletes need strength, endurance, speed, flexibility and other physiological characteristics. To attain high levels of these attributes, one needs specific physical training. Athletic training requires careful planning to create a calendar of workouts that progress from general to specific exercises. Athletic movement patterns are variable and dynamic, and require proper neuromuscular training to respond and react to loads placed on the body. Training can be accomplished using a variety of methodologies and equipments.

There are two main types of exercises: aerobic exercise and anaerobic exercise. Aerobic and anaerobic training focuses on very different results on the body, it is easy to assume there are many different adaptations the body must make if one were to choose to only exclusively train aerobic or anaerobic. There is a scarcity of research work carried out to identify the impact of aerobic and anaerobic training modalities on bio-motor abilities of cricket players.

Aerobic training has numerous health and fitness benefits that can result in improved performance in any sport. Regardless of the sport we play, aerobic training increases our body's ability to supply oxygen and nutrients to the working muscles and tissues. With the improved heart function, resting and exercise heart rate is lowered. This results in using oxygen and energy more efficiently during exercise. The focus of aerobic training is to progressively

overload the cardio respiratory system and not the musculoskeletal system. Aerobic training consists of performing low to medium intensity exercise for long periods of time. In this present investigation continuous running was given to the players as aerobic training.

Anaerobic exercise is used by athletes in non-endurance sports to build power and by body builders to build muscle mass. Muscles that are trained under anaerobic conditions leads to greater performance in short duration-high intensity activities. Anaerobic training involves exercise that is intense enough to trigger anaerobic metabolism. It greatly increases the body's functional capacity for development of physical fitness and maximization of the short-term energy systems.

Aerobic exercise and fitness can be contrasted with anaerobic exercise. The two types of exercise differ by the duration and intensity of muscular contractions involved, as well as by how energy is generated within the muscle. Because aerobic and anaerobic training focuses on very different results on the body, it is easy to assume that there are many different adaptations the body must make if one were to choose to only exclusively train aerobic or anaerobic. Various studies have suggested the relative contributions of aerobic and anaerobic pathways in endurance events are approximately 80% and 20%, respectively (Neuman, 1992). Therefore, in order for exercise physiologists and trainers to create successful training protocols for players, a more complete understanding of physical and physiological responses to exercise is essential. To date, there has been a lack of research conducted to identify the physical fitness responses to aerobic and anaerobic training that contribute to successful sports performance for cricket players.

The sound knowledge of the various training methods are most required for the coaches, trainers and players to achieve the goal. Through the study of science and various sports training, researchers have developed a greater understanding on how the human body reacts to exercise, training and many other stimuli. The effects of aerobic training and anaerobic training on bio-motor abilities of cricket players are useful research objectives and it has drawn the attention of the investigator. The present scientific study is one of the efforts to explore and suggest a best scientific method for the development of bio-motor abilities of cricket players.

METHODOLOGY

Selection of the Subjects

To achieve the purpose of this study, the investigator selected forty five cricket players as participants in the age group of 18 to 22 years from SCSVMV University, Kanchipuram District, Tamilnadu, India. They were divided into three groups of fifteen 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 were selected as independent variables and the selected bio-motor variables such as speed and cardio-respiratory endurance were selected as dependent variables for this study. The speed was assessed by 50 meters run and cardio-respiratory endurance of the cricket players was assessed by conducting Cooper's 12 minutes Run / Walk test.

Training Programme

In this study, 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. To fix the training load for the aerobic training group, the subjects were examined for their exercise heart rate in response to different work bouts, by performing continuous running of two minutes duration for proposed repetitions and sets, alternating with active recovery based on work-rest ratio. The subject's aerobic training zone was computed using Karvonen formula and it was fixed at 70%HRmax to 95%HRmax. To fix the training load for the anaerobic training group, the subjects were

examined for their exercise heart rate in response to different anaerobic work bouts by the anaerobic exercise of 50 metres sprinting was performed for proposed repetitions and sets, alternating with rest time that enables complete recovery. The subject's anaerobic training zone was computed using Karvonen formula and it was fixed at 70%HRmax to 95%HRmax. The work rest ratio of 1:1 between exercises and 1:3 between sets was given.

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 was 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	'F' ratio
Speed	7.44	7.27	7.87	Between	2.359	2	1.179	29.48*
				Within	1.634	41	0.040	
Cardio respiratory endurance	2349.00	2258.00	2126.00	Between	368383.31	2	184191.7	30.20*
				Within	250063.05	41	6099.10	

*(The required table value for significance at 0.05 level of confidence with degrees of freedom 2 and 41 is 3.22) *Significant at .05 level of confidence*

The adjusted post-test means on speed of aerobic, anaerobic training and control groups are 7.44, 7.27 and 7.87 respectively. The obtained 'F' ratio value of 29.48 of adjusted posttest mean on speed is greater than the table value of 3.22 required for significance at 0.05 level of confidence with degrees of freedom 2 and 41.

The adjusted post-test means on cardio respiratory endurance of aerobic, anaerobic training and control groups are 2349.00, 2258.00 and 2126.00 respectively. The obtained 'F' ratio value of 30.20 of adjusted posttest mean on cardio respiratory endurance is greater than the table value of 3.22 required for significance at 0.05 level of confidence with degrees of freedom 2 and 41.

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	7.44	7.27		0.17*	0.19
	7.44		7.87	0.43*	0.19
		7.27	7.87	0.60*	0.19
Cardio respiratory endurance	2349.00	2258.00		91.00*	72.37
	2349.00		2126.00	223.00*	72.37
		2258.00	2126.00	132.00*	72.37

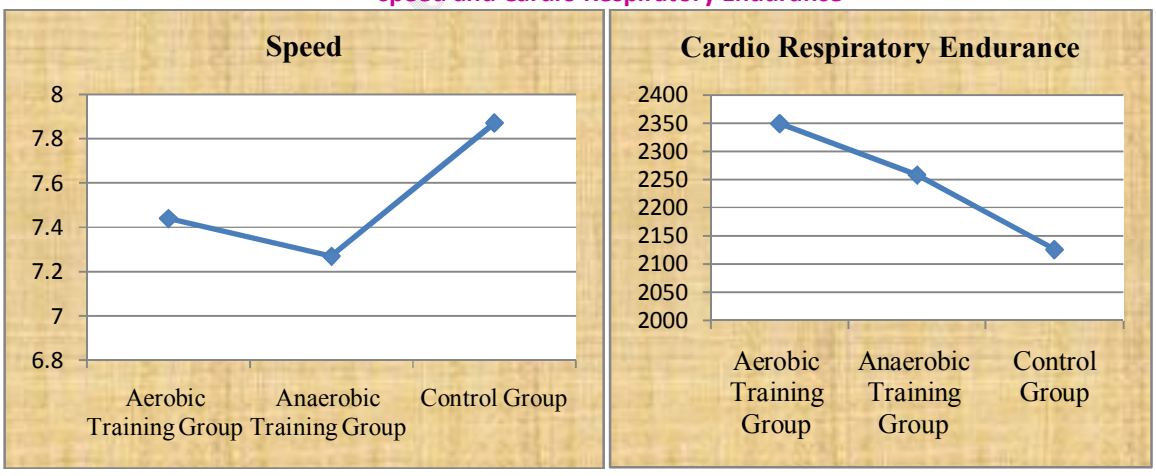
**Significant at .05 level.*

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 0.17, 0.43 and 0.60 respectively. The values are greater than the confidence interval value 0.19, 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 91.00, 223.00 and 132.00 respectively. The values are greater than the confidence interval value 72.37, 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 cricket 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: **Diagram Showing the Adjusted Post Test Mean Values of Experimental and Control Groups on speed and Cardio Respiratory Endurance**



DISCUSSION

The effects of high intensity endurance training not only improve endurance capacity but also on underlying changes in the aerobic energy system. Endurance therefore refers to sustained high-intensity events powered mainly by aerobic metabolism. Such events last ~30 s or more (Greenhaff & Timmons, 1998). Miller, Laurance and Austin (1971) stated that repeated and continuous physical exercises may produce extensive change in the respiratory system. Regular aerobic training improves physical fitness and recovery rate (Sloan et al., 2011). Short-term daily conditioning protocol of aerobic exercise program induces significant improvements in both aerobic capabilities and anaerobic performance (Sartorio et al., 2003). Aerobic training causes the heart and lungs to work harder. The aerobic 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).

The performances in anaerobic types of sports are improved by high intensity interval running interspersed with periods of active recovery are used as the training stimulus. Dawson et al., (1998) found significant improvement in speed and repeated sprinting performance among male subjects, after six weeks of short sprint training sessions. The training distance sprinted were 30-80m at 90-100% maximum speed and 20-40 sprints were performed in each session. They also suggested that increases in the proportion of type-II muscle fibers are also possible with this type of training. In addition, Casey et al., (1996) reported that during sprints, type-II muscle fibers are recruited to a large extent to produce high power output as fast as possible.

It has been reported by Sebastian (1998) that, progressive training and alternative high and low intensity training improved speed. Majdell and Alexander (1991); and Sharin et al., (1997) have found an increase in speed performance following sprint training. Satheeskumar (2012) suggested that anaerobic interval exercises can be imparted in order to improve the bio motor abilities. In addition, Dawson et al., (1998) found significant improvement in endurance performance following six weeks of short sprint training sessions. Aerobic and anaerobic training leads to significant cardiovascular and respiratory changes at rest and during steady state exercise at both submaximal and maximal rates of work. The magnitude of these adaptations may be due to the person's initial fitness level, intensity, duration, and frequency of exercise; and on the length of training. Thus, in analyzing such dominance of aerobics and anaerobic training in the development of bio-motor abilities both in the scientific and logical aspects, it was found that the findings are based on its scientific structure.

CONCLUSION

The aerobic and anaerobic training groups have significantly improved the speed and cardio respiratory endurance performance of the cricket 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 cricket players.

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