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Research Paper :

Effect of aerobic and aerobic cross training on tidal volume

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ABSTRACT

The purpose of the present study was to find the effect of aerobic cross training and aerobic training on tidal volume. For this purpose, thirty subjects studying for Bachelor degree in the age group of 19 – 21 years were selected. They were divided into three equal groups and each group consisted of ten subjects, in which group–I underwent aerobic cross training, group-II underwent aerobic training and group–III acted as control, who did not participate in any special training. The training period for this study was three days in a week for twelve weeks. Prior to and after the training period, the subjects were tested for tidal volume. The analysis of covariance (ANCOVA) was used to find out the significant difference if any, among the experimental groups and control group on tidal volume separately. In all the cases, .05 level of confidence was fixed to test the significance. Since there was three groups were involved in this study, the Scheffe'S test was used as post-hoc test. From the result it was concluded, after the aerobic cross training and aerobic training the level of tidal volume significantly increased.

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Key words : Aerobic cross training, Aerobic training, Tidal volume

The major objective of training is to cause biological adaptation in order to improve performance in a specific task. To enhance the physiological improvement effectively and to bring above a change, specific exercises and overload must be followed. By exercising at a level about normal, a variety of training adaptations take place in the body that make it function more efficiently. Numerous training procedures are in practice to improve each and every physical and motor fitness quality at various levels.

Sports training are a conscious human activity and it is a goal-oriented activity. Therefore, it is obligatory to include sports training subject matter. The study of sports performance and performance capacity without an understanding theories and method of training is ineffective and meaning less are possible. As a consequence, sports training gives high weightage to study the nature and genesis of sports performance and method of training and competition. A large portion of sports training is devoted to the study of performance capacity, which further comprises of physical condition (physical fitness), technique and co-ordinate abilities tactics, physique and psychic factors (Singh, 1991).

Physical training brings about changes in the muscles, improved neuromuscular co-ordination. in specific it positively manipulate the cardio respiratory mechanism by increasing O_2 diffusion, VO_2 max, vital capacity, lungs volume, forced expiratory volume and tidal volume. An increase in total haemoglobin and blood volume (Anderson, 1971).

Aerobic exercise refers to exercise that involves oxygen consumption by the body. Aerobic means "with oxygen" and refers to the use of oxygen in the body's metabolic or energy generating process. Many types of exercise are aerobic and are performed at moderate levels of intensity for extended periods of time. To obtain the best results, an aerobic exercise session involves a warming up period, followed by at least 20 minutes moderate to intense exercise involving large muscle groups, and a cooling down period at the end.

The concept of cross training is a relatively recent athletic application, in which a training regime includes the use of one distinct athletic discipline to build skills or fitness in another (Eyestone, 2008).

Cross training is not the same as running. However Eyestone found that it the athletic performs cross training at high levels of intensity for one hour the same aerobic benefits will be obtained as running for 5 miles.

METHODOLOGY

The purpose of this study was to find out the effect of aerobic cross training and aerobic training on tidal volume. Thirty college aged male subjects, between 19 and 21 years (mean age = 20 years ± 07 months) were randomly selected and divided into three equal groups of ten subjects each, out of which group – I (n = 10) underwent aerobic cross training, group – II underwent aerobic training (n = 10) and group - III (n = 10) acted as control. Before and after twelve weeks of training, data were collected on tidal volume by using wetspirometer. The analysis of covariance (ANCOVA) was used to find out the significant difference if any, among the experimental groups and control group on selected criterion variables separately. In all the cases, .05 level of confidence was fixed to test the significance. Since there was three groups were involved in this study, the Scheff? *S* test was used as post-hoc test. The subject participated in aerobic cross training at 60 to 72% of this maximum HR (swimming and cycling) and aerobic training at 60 to 72% of this maximum HR (Running). The training was given 45 to 60 min/day for three days / week for twelve weeks. The load was increase 4% once in three weeks (King and Senn, 1996).

OBSERVATIONS AND DISCUSSION

The data collected prior to and after the experimental periods on tidal volume on aerobic cross training group, aerobic training group and control group were analysed and presented in the following Table 1.

The results of the study shows that aerobic cross training and aerobic training were improved tidal volume when compared with control group. However among the training aerobic cross training have better effect in improving tidal volume then aerobic training

The results of the study reveal that there was a significant change after the aerobic cross training and aerobic training in tidal volume which was increased after training. The findings of this study showed that the tidal volume has increased due to the varied aerobic cross training and aerobic training.

The goal of most athletes is to become stronger, improve performance, and avoid injuries. It is difficult to achieve all of these goals by training in one sport alone. Cross training can add the missing link. As a new approach to on athletes workout routine, cross-training can increase power, add flexibility, build stability, and increase motivation. Friel and Long (2003). Cross Training is a widely used approach for structuring a training programme to improve competitive performance in a specific sport by training in a variety of sports. Despite numerous anecdotal reports claiming benefits for cross-training very few scientific studies have investigated this particular type of training. It appears that some transfer of training effects on maximum oxygen uptake exists from one mode to another. The nonspecific training effects seem to be more noticeable when running is performed as a cross-training mode.

Cross-training effects never exceed those induced by the sport specific training mode. The principles of specificity of training tend to have greater significance, especially for highly trained athletes. For the general population Cross-training may be highly beneficial in terms of overall fitness. Similarly, Cross-training may be an appropriate supplement during rehabilitation periods from physical injury and during periods of overtraining or psychological fatigue. (Tanaka, 1994) Exercise performed at cycle ergometer and motorized tread mill will not differ on O_2 uptake. (Mello and Denadai, 2004) Endurance training seems to differently influence pulmonary gas exchange kinetics and time to exhaustion during exercise at intensity associated with the achievement of VO_2 max on mechanical breaked cycle ergometer and treadmill (Mello and Denadai, 2003). The specific areas of human performance that are addressed in a typical cross-training program include. Cardio vascular fitness; power, through increased muscle strength; speed; agility /reflexes; the

Table 1: Analysis of covariance on tidal volume of Aerobic cross training, Aerobic training and Control groups tidal volume

	Aerobic cross training group	Aerobic training group	Control group	Source of variance	Sum of squares	df	Means square	'F' ratio
Pre-test mean	0.43	0.43	0.43	Between	0.000006	2	0.000003	0.0015
Std Dev	0.013	0.015	0.015	Within	0.006	27	0.0002	
Post-test mean	0.50	0.47	0.44	Between	0.021	2	0.011	42.46*
Std. Dev	0.019	0.014	0.014	Within	0.007	27	0.00026	
Adj. Post-test mean	0.503	0.472	0.437	Between	0.022	2	0.011	100.13*
				With in	0.003	26	0.0001	

* indicates significance of value at P=0.05 level of confidence.
(The table value required for significance at .05 level of confidence with df 2 and 27 and 2 and 26 were 3.35 and 3.37, respectively).

Table 2: Scheffe'S test for the difference between the adjusted post-test mean of tidal volume

Aerobic cross training group	Aerobic training group	Control group	Mean difference	Confidence interval at .05 level
0.503		0.437	0.066*	0.014
0.503	0.472		0.031*	0.014
	0.472	0.437	0.035*	0.014

use of all three of the body's energy systems, the aerobic system (endurance), the anaerobic lactic (intense energy demands of up to 90 seconds in duration), and the anaerobic alactic (short, very intense energy requirements); musculoskeletal flexibility; and mental acuity. In many sports, the effect of cross training is achieved through simple means (Tanaka, 1994).

These results indicate that the aerobic benefits of either run, cycle or combined run and cycle training are similar in untrained. The lactate threshold and arm ergometer heart rate data demonstrate that improvement in VO_2 max due to ten weeks of training are a result of pronounced peripheral and moderate central adaptations (Ruby *et al.*, 1996). In general lung volumes change little with training. Aerobic training increased the vital capacity and decreased residual volume. Tidal volume is unchanged at rest and during submaximal exercise, but increases during maximal exercise. The amount of air breathed in and out during normal respiration is increased. It is due to increase the vital capacity and reduced residual volume (Shah *et al.*, 1998). After Aerobic training, respiratory rate remains steady of rest, decrease slightly with sub maximal exercise, but increase with maximal exercises. Aerobic training slightly decreases the pulmonary ventilation at rest, but increases at maximal exercise due to increased in tidal volume and respiratory rate. Endurance training un altered the pulmonary diffusion at rest and during sub maximal exercise, however increases at maximal exercise because of increased in ventilation and increased in using perfusion. The result of present study also reveals that aerobic cross training and aerobic training are increased tidal volume.

Conclusion:

The results of the study reveal that there was a significant change after the Aerobic cross training and aerobic training in tidal volume, which was increased after training. The findings of this study showed that tidal volume has increased due to the varied aerobic cross training and aerobic training.

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