Effects of Aerobic Cross Training and Aerobic Training on Inspiratory And Expiratory Reserve Volume

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Abstract

The purpose of the study was to find out the Effects of aerobic cross training and aerobic training on inspiratory and expiratory reserve volume. For this purpose thirty subjects studying bachelor degree in the age group of 19-21 years were selected. They subjects divide into three equal groups, each groups consisted of ten subjects, in which experimental group –I underwent aerobic cross training, experimental group-II underwent aerobic training and group – III acted as the control group who did not participate in any special training. The training period for this study was there days in a week for twelve weeks. Prior to and after the training period the subjects were tested for inspiratory reserve volume and expiratory reserve volume. The analysis of covariance (ANCOVA) was used to find out the significant difference if any, among the exponential groups and control group on selected criterion variables separately in all the case, 05 level of confidence was fixed to test the significance. Wherever significant difference and scheffic post hoc test was used in this study. It was concluded that the aerobic cross training and aerobic training, have significant increased the level of inspiratory reserve volume and expiratory reserve volume.

Key words: Aerobic cross training, Aerobic training, Inspiratory reserve volume, Expiratory reserve volume.

Introduction

Fitness has been defined as how well a person is adapted to and capable of living a certain lifestyle. The athlete obviously has greater fitness than the non athlete because of his training for chosen event or events. The goal of most athletes is to become stronger, improve, and avoid injuries. It is difficult to achieve all of these goals by training in one sport alone.

Training is a programme of exercises designed to improve the skill and to increase the energy capacity of an athlete for a particular event, therefore training is essential for development of physical components (William and Sperry, 1976).

Physical training brings about changes in the muscular, improved neuromuscular co-ordination activities and a series of more cardio-respiratory. Such as O_2 diffusion, O_2 uptake and respiratory volume (Lang K.andersion , 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 bodies metabolic or energy generation process. Many types of exercise period of time. To obtain the best results, an aerobics exercises 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. (WWW.Wikipedia)

Aerobic refers to a “variety of exercise that stimulates heart and lung activity for a time period sufficiently long to produce beneficial changes in the body”. Aerobics or endurance exercises are those in which large muscular groups are used in rhythmic repetitive fashion for prolonged of time.

The concept of cross training is a relatively recent athletic application, in which a training regime includes the use of one diction athletic discipline to build skills of fitness in another. 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 aerobics benefits will be obtained as running for 5 miles. (Eyestone Ed 2008)

Numerous anecdotal reports claiming benefits for cross training, very few scientific studies have investigated this particular type of training. It appearance that some transfer of training effects on maximum oxygen take (VO_2 Max) exists from one mode o another. The nonspecific training effects seems to be noticeable when running is performed as a training mode.

Review of Related Literature

F. Haas et al, (1987) contacted study on Effect of aerobic training on forced expiratory airflow in exercising asthmatic humans Pulmonary function after exercise was evaluated in 22 asthmatic subjects before and after a 36-session training sequence of aerobic exercise. Training did not change pulmonary function values, except for a small increase in maximal voluntary ventilation (P less than 0.02), which was attributed to respiratory muscle training. After aerobic training, both external work at a given heart rate and peak O2 consumption increased by 30 and 15%, respectively. At the same minute ventilation (VE), immediate post exercise forced expiratory airflow was higher after training (P less than 0.02), and reduction in forced expiratory airflow during the first 9 min post exercise was less after training (P less than 0.01). The post training airflow response to the pre training work load was, as expected, less than the pre training response (P less than 0.02). Although the difference in maximal-to-minimal airflow at the same VE was similar before and after training, the airflow increase accounted for 50% of the response after training compared with 16% of the pre training response. Furthermore the strong negative correlation (P less than 0.01) between maximal and minimal airflow both pre- and post training indicates that exercise-induced bronchospasm (EIB) severity is, in part, determined by the degree of exercise-induced bronchodilation. We conclude that aerobic training significantly increases exercise-induced bronchodilation and diminishes EIB.

Lanza FCWandalsen et al, (2011) investigated prolonged slow expiration technique in infants: effects on tidal volume, peak expiratory flow, and expiratory reserve volume. Prolonged slow expiration (PSE) is a physiotherapy technique often applied in infants to reduce pulmonary obstruction and clear secretions, but there have been few studies of PSE’s effects on the respiratory system.We conducted a cross-sectional study with 18 infants who had histories of recurrent wheezing. The infants were sedated for lung-function testing, which was followed by PSE. The PSE consisted of 3 sequences of prolonged manual thoraco-abdominal compressions during the expiratory phase. We measured peak expiratory flow (PEF), tidal volume (V(T)), and the frequency of sighs during and immediately

after PSE. We described the exhaled volume during PSE as a fraction of expiratory reserve volume (%ERV). We quantified ERV with the raised-volume rapid-thoracic-compression technique.The cohort's mean age was 32.2 weeks, and they had an average of 4.8 previous wheezing episodes. During PSE there was significant V(T) reduction (80 ± 17 mL vs 49 ± 11 mL, P < .001), no significant change in PEF (149 ± 32 mL/s vs 150 ± 32 mL/s, P = .54), and more frequent sighs (40% vs 5%, P = .03), compared to immediately after PSE. The exhaled volume increased in each PSE sequence (32 ± 18% of ERV, 41 ± 24% of ERV, and 53 ± 20% of ERV, P = .03).It was possible to confirm and quantify that PSE deflates the lung to ERV. PSE caused no changes in PEF, induced sigh breaths, and decreased V(T), which is probably the main mechanical feature for mucus clearance.

Methods

To achieve the purpose, thirty college student were selected as subjects their age range between 19 to 21 years (mean age = 20 years ± 0.8 month) and they were divided into there equal groups of ten subjects each, out of which experimental group – I (n=10) underwent aerobics cross training, experimental group-II underwent aerobics training (n=10) and group-III (n=10) remained as control group. Data on inspiratory reserve volume and expiatory reserve volume were collected by wetspirometer. The data were collected one day prior to the commencement of training and one day after training.

The experimental groups underwent aerobics cross training (swimming, cycling) and aerobics training (running) for three days per week for twelve weeks. For both experimental groups, training load was fixed by karvonen method

60% THR= [0.60x HRR] +RHR.

Where, HRR = HR Max – HR rest

(Heart rate reserve) (Maximal heart rate) (Resting heart rate)

RHR = resting heart rate

However overload principles was also adopted

Weeks	Aerobic cross Training (%)	Aerobic training (%)
1,2,3	65	65
4,5,6,	70	70
7,8,9,	75	75
10,11,12	80	80

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, 0.05 levels of confidence were fixed to test the significance. Wherever significant difference is found schefes post hoc test was used.

The following tabled illustrate the statistical results of the Effect of aerobic cross training and aerobic training on inspiratory and expiratory reserve volume and ordered adjusted means and the difference between the means of the groups under study.

Table–II
Adjusted Post Test and F Value of Selected Variables

Variables	Aerobics cross training group	Aerobic training group	Control group	Source of variables	Sun of squares	df	Means squares	'F' Ratio
Inspiratory Reserve Volume	2.70	2.68	2.63	Between	0.021	2	0.010	137.98*
					0.002	26	0.000076	
Expiratory Reserve Volume	2.745	2.689	2.581	Between	1.140	2	0.070	331.45*
					0.005	26	0.000185	

*significant at .o5 level of confidence. (The table value required for significant at .o5 level confidence with 2 and 26 was 3.37).

This result indicated that the effect of aerobic cross training aerobic training had significantly increased the inspiratory and expiratory reserve volume level. When compared with the control group in terms of mean gains. Inspiratory reserve volume has increased the inspiratory reserve volume among the Experimental group I.

Analysis of covariance of inspiratory reserve volume carried out with the inclusion of aerobic cross training and aerobic training and the result indicate the aerobic cross training group and aerobic training group were significantly influenced on inspiratory reserve volume.

Further findings of the study showed that the aerobic cross training and aerobic training increased inspiratory reserve volume among the aerobic cross training group and aerobic training group because of the training is influenced and utilized inspiratory reserve volume shows that there was a vast significant difference in pre and post test among the bachelor degree college students.

Table-III
Schefe's Test for the Difference between the Adjusted Post- tests Mean of Selected Criterion Variables

Variables	Aerobics cross Vs Aerobics training	Aerobics cross Vs Control	Aerobics training Vs Control	Confidence interval at .o5 level
Inspiratory Reserve Volume	0.02*	0.07*	0.05*	0.012
Expiratory Reserve Volume	0.056*	0.164*	0.108*	0.019

Table-III shows that there was significant difference between aerobic cross training and aerobic training and aerobic cross training and control group.

Figure -1
The Adjusted Post Test Mean Values of Aerobics Cross Training Aerobics Training and Control Groups on Inspiratory Reserve Volume

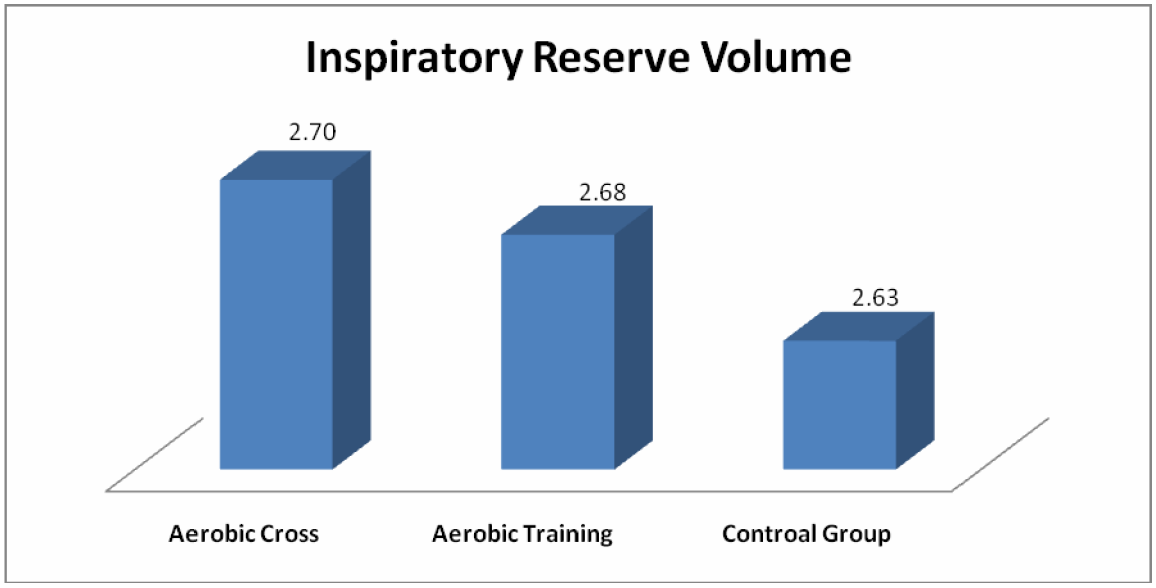
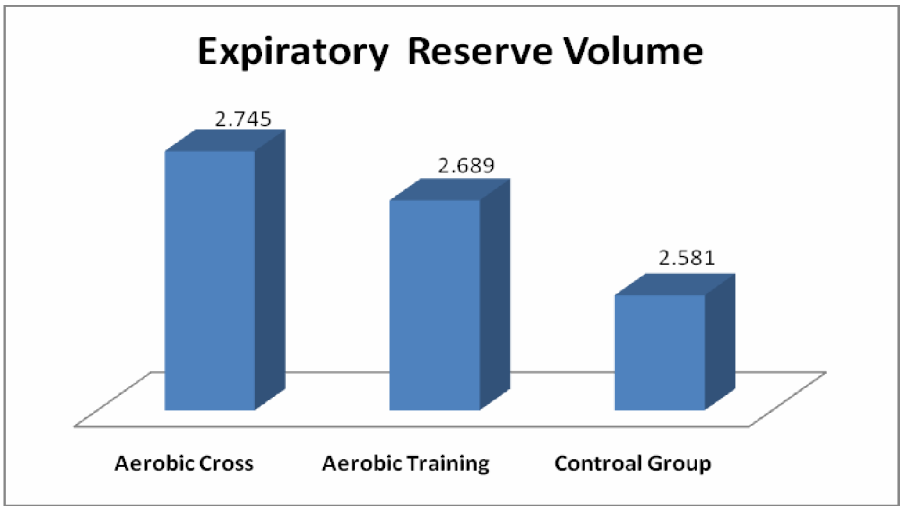


Figure-2
The Adjusted Post Test Mean Values of Aerobics Cross Training Aerobics Training and Control Groups on Expiratory Reserve Volume



Result of Research

The results of the study reveal that there was a significant improvement due to aerobics cross training and aerobics training in inspiratory reserve (F.E has, 1987; Fabio Espostion, et al 2010). The results of the study reveal that there was a significant improvement aerobics cross training and aerobic training in expiratory reserve volume (Nicholas S. Hill, Cynthia Jacoby and Harison W. Farder, 1991). The finding of this study showed that the inspiratory reserve volume and expiratory reserve volume has increased due to the aerobics cross training and aerobics training.

Conclusion

From the result the study. It was concluded that aerobics cross training and aerobics training will be given to improve inspiratory reserve volume and expiratory reserve volume. However aerobics cross training will be the best methods to improve inspiratory reserves volume and expiratory reserves volume.

References

Eyestone, Ed “Training workout” Runner’s world. March 2008.

Fabio Esposito et al, “Effects of respiratory muscles training on maximum aerobics power in normoxia and hypoxia”, respiratory physiology and neurobiology 170:3 (2010) p.268-272

Hass F.E. et al, “effects of aerobics training on forced expiratory airflow in exercising asthmatic humans”, J Appl Physiol, 63:3, (1987), 1230-1235.

Lange K.Anderson, fundamental of exercises testing, (Geneva: world health organization, 1971), p.251.

Nicholas S. Hill, Cynthia jacoby and Harrison W. farber, “effects of an endurance triathlon on pulmonary function”, Medicine and science in sports and Exercise, 23:11, (1991), 1260-1264.

Uli A. Wylegala, david R. pendergast, et al, European journal of applied physiology, 2007, volume 99, number 4, P.393-404.

William J.C.P and sperryn P.N (1976), sports medicine, London; eward Arnold published Ltd., P-8.

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