



Effect of Aerobic and Pranayama training on Forced Expiratory Volume in One Second and Peak Expiratory Flow Rate of Prepuberty Boys

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Abstract

The purpose of the study to find out the Effect of aerobic and Pranayama training on Forced Expiratory Volume in one second and Peak Expiratory Flow Rate of prepuperty boys. To achieve this purpose of the study has selected 30 school boys on random sampling technique. The selected subjects were divided into three groups namely experimental group I & II, control group III. The training programme was included pre test and post test session over a period of 12 weeks which was considered to be adequate time for the change among selected variables. The training was given for six days in a week. The subjects of yoga, aerobic training and control group were tested on Forced Expiratory Volume in one second and Peak Expiratory Flow Rate with wet spirometer. The date were collected from the three groups before and after the experimental period and analysed by the analysis of variance (ANOVA) and analysis of covariance (ANCOVA) to find out the significant difference. The level of significance was fixed at 0.05 levels. If the "F" value for the final test is significant, scheffe's post hoc test was used to find out the significant mean difference between the groups. The experimental groups showed significant improvement Forced Expiratory Volume in one second and Peak Expiratory Flow Rate than the control group. The aerobic exercise group showed better improvement on Forced Expiratory Volume in one second and Peak Expiratory Flow Rate than the yoga group.

Keywords: Pranayama, Aerobic Exercise, Forced Expiratory Volume in one second and Peak Expiratory Flow.

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Introduction

Aerobic exercises require heart and lungs adapt, leading to increases in heart rate as well as breathing rate and depth. During exercise, the lungs must work harder to supply the increased oxygen required by the working muscles as well as exhale increased carbon dioxide. This is accomplished by increasing both the rate and depth of breathing. The tidal volume increases substantially during strenuous exercise from the resting volume of 1/2 liter to as high as 3 liters. This means that each breath in and out moves approximately six times as much air during exercise as during the resting state. It is decreased fatigue and potentially increases in vital capacity, or the maximal amount of air can exhale from the total lung capacity. In yoga, the slower breathe, can longer live. This is more efficient in respiratory rate and we have the more energy. It helps in increasing the Physiological level. The purpose of the study was to find out the effect of pranayama and aerobic exercise on tidal volume and vital capacity of school boys. The researches show the yoga group had significant improvement in lung volume and increased exhalation force, along with improved

posture. Their chest wall expansion had increased 38 percent in the upper chest, 19 percent in the mid-chest and 15 percent in the lower chest.

Methodology

To achieve this purpose the investigator has selected 30 school boys on random sampling technique from the School. The selected subjects were divided into three groups namely experimental group I & II and control group III. The training programme including pre test and post test session over a period of 12 weeks which was considered to be adequate time for the changes among selected variable. The training was given for six days in a week. The subjects of Pranayama, aerobic training group and control group were tested on vital capacity and forced vital capacity with wet spirometer. The data were collected from the three groups before and after the experimental period and analysed by the analyses of variance (ANOVA) and analyses of covariance (ANCOVA) to find out the significant difference. The level of significance was fixed at 0.05 levels. If the "F" value for the final test is significant, scheffe's post hoc test was used to find out the significant mean difference between the groups. The subjects of Pranayama, aerobic training group and control group were tested for Forced Expiratory Volume in one second and Peak Expiratory Flow Rate with the

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help of wet Spiro meter at Pondicherry Institute of medical Sciences, Kalapet.

Results and Discussion

Table 1

Computation of ANOVA of Experimental group and Control group of Forced Expiratory Volume in one Second and Peak Expiratory Flow Rate

		Source	Sum of Square	DF	Mean Square	F
Forced Expiratory Volume in One Second	Initial	Between Group	29780.000	2	14890.00	0.178N.S
		Within G group	2260570.000	27	83726.815	
	Final	Between Group	1472660.00	2	736330.00	12.239**
		Within Group	1624370.00	27	60161.852	
Peak Expiratory Flow Rate	Initial	Between Group	0.369	2	0.184	1.570N.S
		Within Group	3.170	27	0.117	
	Final	Between Group	2.579	2	1.289	8.509**
		Within Group	4.091	27	0.152	

From the table 1, it can be seen that the computed “f” ratio of 0.178 Forced Expiratory Volume in one second (FEV1) and 1.570 Peak Expiratory Flow Rate (PEFR) for the initial test means among the experimental group and control group were insignificant ($P > 0.05$) at 0.05 level of confidence with the degrees of freedom being 1, 27; it clearly indicated that the random assignment of groups were quite successful. Further. It revealed that the calculated “f” ratio of 12.239 (FEV1) and 8.509 (PEFR) for the test means among the experimental groups and the control groups were significant ($P > 0.05$) at 0.05 level of confidence with the degrees of freedom being 1, 27. This showed that the

treatment of Pranayama and aerobic practice have made the significant difference in the mean values among the groups. Hence the ANCOVA technique was employed to find out the difference between the adjusted post test means was significant or not. Subramanian (2001) conducted that there is a significant improvement in aerobic capacity as a result of practice of asanas and practice of asanas along with pranayama and meditation. However, improvement in aerobic as a result of the combined practice asanas, pranayama and meditations is significantly higher than the practice of asanas alone. This may be due to the effect of pranayama and meditations.

Table 2

Computation of ANCOVA of Experimental group and control group of Forced Vital Capacity in one Second and Peak Expiratory Flow Rate

	Source of Variance	Sum of Square	DF	Mean Square	F ratio
Forced Expiratory Volume in one second	Between Group	121582.285	2	607926.146	25.890**
	Within Group	610513.667	26	610513.667	
Peak Expiratory flow Rate	Between Group	0.869	2	0.435	27.855**
	Within Group	0.406	26	0.016	

As the primary aim of analysis of covariance, the adjusting the initial means with final means and testing there adjusted means was done. “F” ratio obtained from testing the adjusted means of 25.890 (FEV1) and 27.855 (PEFR) were high in compare with

the required table f ratio of 5.49 at 0.05 level of confidence with the degrees of freedom being 1,27. Hence the chosen variables for the study is well significant at ($p < 0.05$) at 0.05 level.

Table 3

Scheffe's Post Hoc Test for Mean Difference between Group on Forced Expiratory Volume in one second and Peak Expiratory Flow Rate

Forced Expiratory Volume in one second			Mean Difference	Peak Expiratory Flow Rate			Mean Difference
Control Group	Pranayama Group	Aerobic Group		Control Group	Pranayama Group	Aerobic Group	
1471.221	1468.991	-	2.23	2.973	2.952	-	
1471.221	-	1040.788	430.433	2.973	-	2.585	
-	1468.991	1040.788	428.203	-	2.952	2.585	

This test shows that the ordered weighted mean difference of scheffe's Post hoc test values of Forced Expiratory volume in one second and Peak expiratory flow rate of the pranayama, aerobic and control group. The above table indicates that there is significant difference between that aerobic and control group. It is also seen that significant changes in the pranayama and control group.

Discussions and Finding

The result of the study supported to the pulmonary function variables in favor of Pranayama and aerobic exercise training groups. Yoga is the practice of asana and pranayama with scientific three phases namely puraka (inhalation), Kumbhaka (holding the air in the lungs) and rechaka (exhalation) in a progressive manner works on the breathing mechanism centrally and the effect spread to the periphery too. Mainly the Lungs, Intercostals muscles, diaphragm and ribs are highly exercised during the Yoga and aerobic exercise. Thus it enhances the Vital Forced Expiratory Volume in one second and Peak Expiratory Flow Rate among the

prepuberty boys significantly. This finding are supported the result of the Birkel D A and Edgren L (2000),Yadav RK and Das S (2001), Joshi L N, Joshi VD and Gokhale L V (1992).

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