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Effect of Strength Aerobic and Concurrent Training on Selected Physiological Variables among College Men Students

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Abstract

The purpose of the study was to find out the effect of strength, endurance and concurrent training on selected physiological variables among college men students. 60 men students were selected and aged between 18-24 years. The selected subjects were divided into Group I (Strength Training), Group II (Endurance Training), Group III (Concurrent Training) and control group. The group I, group II and group III named as experimental groups underwent training program for 12 weeks as well as control group did not underwent any specific training program. The selected dependent variable such as resting pulse rate and VO_2 Max was measured before and after the training period. The collected data was analyzed by using (ANCOVA) analysis of covariance. The findings of the present study have shown that there was no significant improvement between the experimental and control groups after the 12 weeks of training.

Keywords: Strength Training, Aerobic Training, Concurrent Training, Resting Pulse Rate And Vo2 Max.

Introduction

Strength is the ability to generate a force or protect against a load; power is the ability to do that quickly; endurance is the ability to do that over extended periods. Muscle balance allows maximum joint protection and smooth motion of joints. Muscles may develop alterations due to lack of conditioning, wrong emphasis in training, fatigue or injury. All the games and sports as well as Track and field also puts demands on the anaerobic and aerobic abilities, which necessitates the simultaneous incorporation of training strategies designed to develop both systems.

Concurrent training is one method that many coaches employ as it consists of training multiple qualities at equal amounts of focus within the same training phase and often within the same workout. The biggest issue that can arise from this sort of programming is that often times the two or three qualities one is looking to enhance end up competing with each other for adaptation. All types of training, whether it is strength training or long distance running, will produce specific responses from the body which trigger gene expression and molecular changes that in turn cause the body to adapt to the training stimulus in order to make us more prepared to tackle this stressor should we need to face it again (our next workout or competition). One of the arguments against concurrent training is that the adaptations that the body's internal environment under goes in response to the differing training stimuli brought on by the multiple qualities being trained in the training day or training phase are on different ends of the spectrum thus confusing the body as to how it should respond and leading to less than favorable adaptations. This is referred to as the Interference Phenomenon.

Oxygen uptake (VO2) at maximal exercise is considered the best index of aerobic capacity and cardiorespiratory function. VO2Maximal is defined as the point at which no further increase in measured VO2 occurs and a plateau is reached, despite an increase in work rate during graded exercise testing. Strength and endurance training regimes represent and induce distinctly different adaptive responses when performed individually. Typically, strength-training programs involve large muscle group activation of high-resistance, low-repetition exercises to increase the force output ability of skeletal muscle (Sale et al., 1990). In contrast, endurance-training programs utilize low-resistance, high-repetition exercises, such as running or cycling, to increase maximum O2 uptake (VO2 max). Accordingly, the adaptive responses in skeletal muscle to strength and endurance training are different and sometimes opposite (Tanaka and Swensen, 1998). Therefore, the purpose of this investigation was to examine the effect of strength, endurance and concurrent training on selected physiological variables among college men students.

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Objective of the study

The main objective of the study was to investigate the effect of strength, endurance and concurrent training on selected physiological variables among college men students.

Methodology

The purpose of the study was to find out the effect of strength, endurance and concurrent training on selected physiological variables among college men students. It is hypothesis that there would be a significant difference among strength training, aerobic training, concurrent training and control groups on selected physiological variables. 60 men students were randomly selected and aged between 18-24 years. The selected subjects were divided into Group I (Strength Training), Group II (Aerobic Training), Group III (Concurrent Training) and control group. The group I, group II and group III named as experimental group underwent training program for three days per week for 12 weeks of training period as well as the control group did not underwent any training program. The number of exercises, intensity, repetition, and set were manipulated every four weeks as the training progressed. The selected dependent variable such as resting pulse rate and VO_2 Max was measured before and after the training period. The collected data was analyzed by using (ANCOVA) analysis of covariance.

Analysis of the Data and Results of the Study

Table I. Analysis of covariance for resting pulse rate of strength training, aerobic training, concurrent training and control groups

	Strength Training	**Aerobic Training**	**Concurrent Training**	**Control group**	**SOV**	**Sum of squares**	***df***	**Mean square**	***F* ratio**
Pre-test mean	68.27	69.33	68.00	70.07	B	41.38	3	13.79	1.16
SD	3.20	3.27	3.27	3.59	W	655.20	56	11.88	
Post-test mean	67.93	68.80	67.60	70.07	B	55.53	3	18.51	1.65
SD	3.01	3.07	3.54	3.59	W	603.20	56	10.77	
Adjusted post-mean	68.55	68.41	68.67	68.99	B	2.94	3	0.98	2.60
					W	20.72	55	0.37	

*Significant at 0.05 level.

The required table value at 0.05 level of significance for 3 & 56, 3 & 55 degrees of freedom is 2.77.

The above table shows that the pre-test means of the strength training, aerobic training, concurrent training and control groups are 68.27, 69.33, 68.00 and 70.07 respectively. The obtained *F* ratio 1.16 is lesser than the required table value 2.77 for 3 & 56 degrees of freedom at 0.05 level of significance. This result shows that there is no significant change in resting pulse rate between the control and experimental groups before the training program.

The post-test means of the strength training, aerobic training, concurrent training and control groups are 67.93, 68.80, 67.60 and 70.07 respectively. The obtained *F* ratio 1.65 is lesser than the required table 2.77 for 3 & 56 degrees of freedom at 0.05 level of significance. This result reveals that there is no significant change between the experimental and control groups after the training program.

The adjusted post-test means of the strength training, aerobic training, concurrent training and control groups are 68.55, 68.41, 68.67 and 68.99 respectively. The obtained *F* ratio 2.60 is lesser than the required table value of 2.77 for 3 & 55 degrees of freedom at 0.05 level of significance. This result reveals that there is no significant change between the experimental and control groups after the training program**.**

Line diagram I. showing the mean values of resting pulse rate of the strength training, aerobic training, concurrent training and control groups

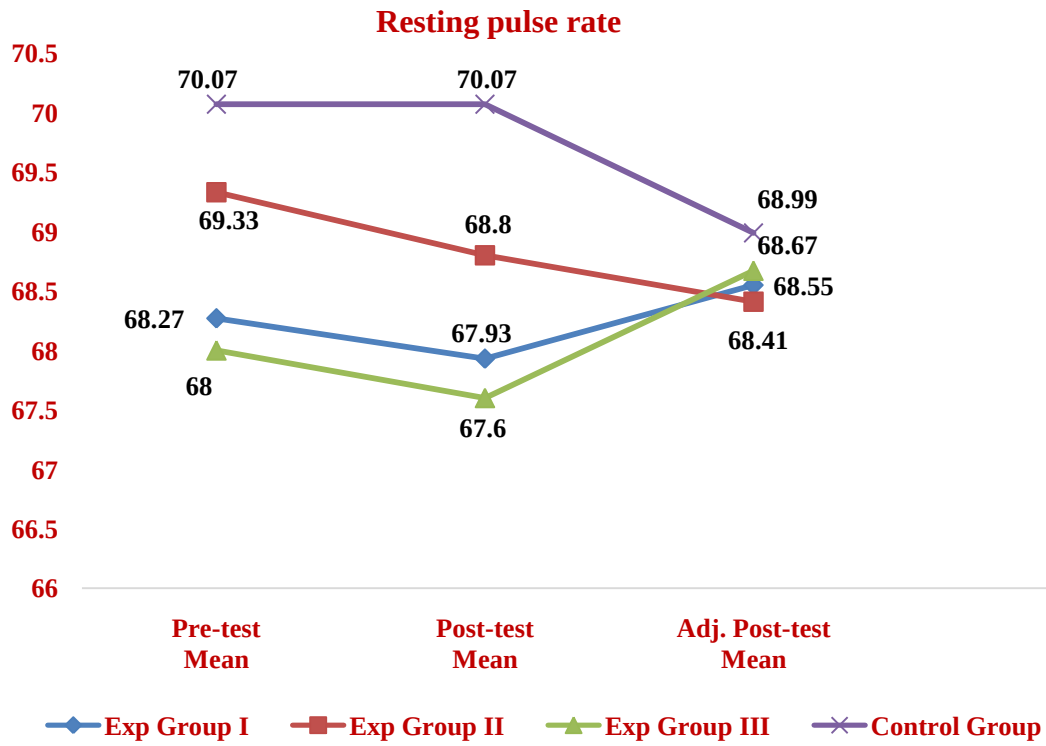


Table II. Analysis of covariance for VO_2 Max of strength training, aerobic training, concurrent training and control groups

	Strength Training	Aerobic Training	Concurrent Training	Control group	SOV	Sum of squares	*df*	Mean square	*F* ratio
Pre-test mean	33.43	34.03	34.80	33.58	B	17.07	3	5.69	0.51
SD	2.28	4.00	4.44	1.87	W	621.14	56	11.09	
Post-test mean	67.93	68.80	67.60	70.07	B	55.53	3	19.80	1.30
SD	3.01	3.07	3.54	3.59	W	603.20	56	15.26	
Adjusted post-mean	35.93	34.80	35.04	33.56	B	43.04	3	14.35	2.44
					W	323.06	55	5.87	

*Significant at 0.05 level.

The required table value at 0.05 level of significance for 3 & 56, 3 & 55 degrees of freedom is 2.77.

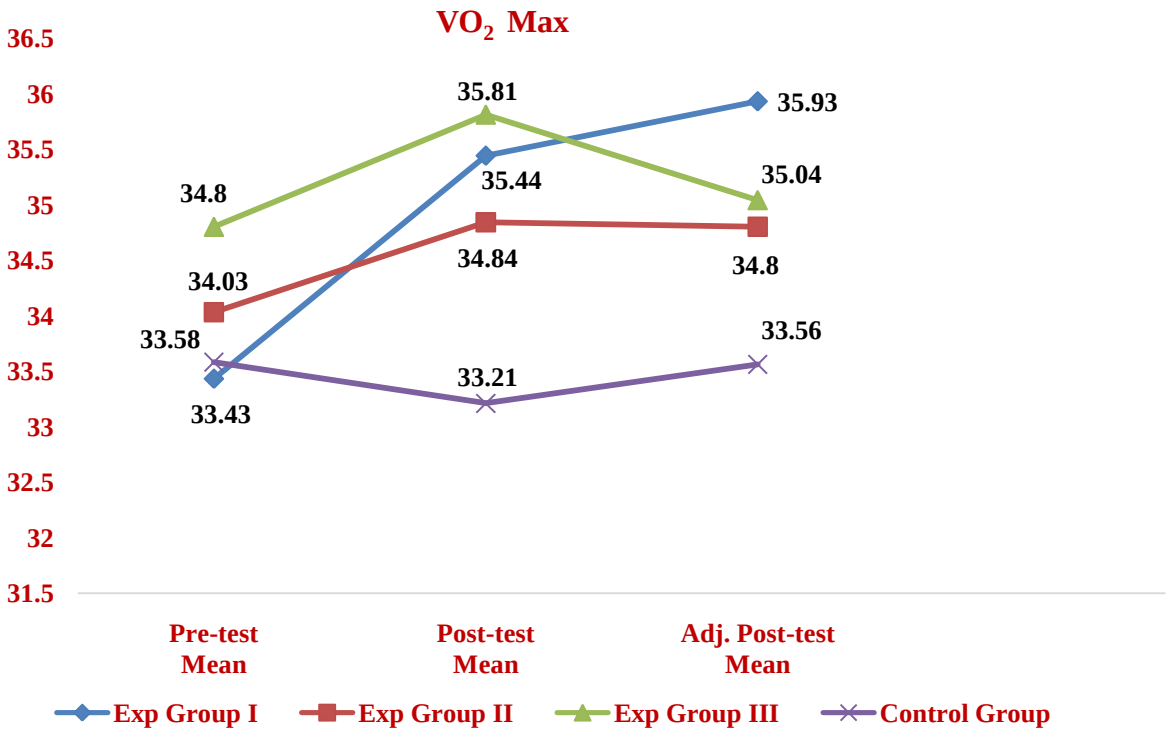
The above table shows that the pre-test means of the strength training, aerobic training, concurrent training and control groups are 33.43, 34.03, 34.80 and 33.58 respectively. The obtained *F* ratio 0.51 is lesser than the required table value 2.77 for 3 & 56 degrees of freedom at 0.05 level of significance. This result shows that there is no significant change between the control and experimental groups before the training program.

The post-test means of the strength training, aerobic training, concurrent training and control groups are 35.44, 34.84, 35.81 and 33.21respectively. The obtained *F* ratio 1.30 is lesser than the required table 2.77 for 3 & 56 degrees of freedom at 0.05 level of significance. This result reveals that there is no significant change between the experimental and control groups after the training program.

The adjusted post-test means of the strength training, aerobic training, concurrent training and control groups are 35.93, 34.80, 35.04 and 33.56 respectively. The obtained *F* ratio 2.44 is lesser than the required table value of 2.77 for 3 & 55 degrees of freedom at 0.05 level of significance. This result reveals that there is no

significant change between the experimental and control groups after the training program.

Line diagram II. Showing the mean values of VO_2 Max of the strength training, aerobic training, concurrent training and control groups



Discussion

The results of the study clearly indicates that the experimental groups and control group has no significant improvement on the selected physiological variables namely resting pulse rate and VO2 max. This may be due to the duration of the training program. In the present study the training was given only for the period of 12 weeks. Physiological system requires longer duration of continuous training to achieve proper adaptation and this may be one of the reasons that the dependent variables such as resting pulse rate and VO2 max has not shown any significant improvement. Further if the training was given for a longer duration there may be possibility in improvement of the selected physiological variables.

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