

Effect of Interval Training Combined Interval Training with Pranayama Practices and Detraining on Cardiovascular Endurance

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Abstract

Combined interval Training with pranayama Practices and detraining on Cardiovascular Endurance. To achieve this purpose a sample of 45 boys were selected at random from Chennai City schools from the age group of 15-18 years. They were divided into three equal groups. Experimental group I is Interval training group, Experimental Group II is a combination of Interval Training with pranayama practices and the other acted as control group; pre test was conducted to all the three groups in 12 minutes run/walk test for Cardio Vascular Endurance. Interval training was given to the experimental group 1 and Combined Training and Pranayama practice was given to Experimental group II for the period of 12 weeks for five days per week. The training load was fixed based on pilot study, but the control group was not given any type of physical training. After 12 weeks of training the post test was taken from all the subjects. The experimental groups were subjected to detraining for the period of 30 days with three sessions of ten days each. Test was conducted for Cardio Vascular Endurance at the end of each session and data was recorded. Analysis of covariance was used to test significance. The results of the study reveals that the efficiency of the Cardio Vascular Endurance improved significantly ($p > 0.05$). These may be due to the influence of Experimental training programme for the period of 12 weeks. But during the detraining period the first and second cessation cardio vascular endurance performance did not decrease significantly ($p < 0.05$), but in the third session the efficiency of cardio vascular endurance decreased significantly ($p < 0.05$).

Key words: Training, Detraining, Plyometric training, Cardio vascular endurance.

Introduction

The purpose of the study was to find out the effect of Interval Training and system of physical conditioning in which the body is subjected to short but regularly repeated periods of work stress interspersed with adequate periods of relief. The concept of interval training has existed for a number of years in one form or another. Humphreys and Holman credit the famous German Coach, Woldemar Gerschler with the formalization of a structured system of interval training in the 1930's. In interval training, short to moderate periods or rest or with reduced activity.

The concept has a firm foundation in physiological principles. The interval training approach can be used in almost any sport or activity but has received its greatest application in track, cross country and swimming. Hence the interval training is an excellent system for athletes of any sports as well as for non-athletes interested in general fitness.

Pranayama is the yogic technique to bring the breathing in regularity, rhythmic and balanced. Lot of techniques is involved in pranayama. Generally, pranayama is defined as breath control. Although this interpretation may seem correct in view of the practices involved, it does not convey the full meaning of the term. The word pranayama is comprised of two

roots: Prana plus Ayama. Prana means 'vital energy' or 'life force'. It is the force, which exists in all things, whether animate or inanimate. Although closely related to the air we breathe, it is subtler than air or oxygen. Therefore, pranayama should not be considered as mere breathing exercises aimed at introducing extra oxygen into the lungs.

The breathing process is closely related to the rhythms of our physical, mental and emotional life. Knowing the principle the "When the breath is unsteady the mind is Unsteady and when the breath is calm, the mind is also calm", Yogis devised pranayama as part of the Yogic science so as to employ the breathing process to win mastery over the mind and inhibit its modifications.

Studies on Training and Detraining

Aderiran and Torila (1998) investigated the effectiveness of Continuous and interval training programs on aerobic and anaerobic capacities in school girls. For this purpose, 68 female Nigerian school girls aged 15.5 years were categorized into a control group (n=23), a continuous jogging (n=22) and an interval jogging (n=23) groups. Standardized field tests were used to measure the subjects' aerobic and anaerobic capacities within one week before and one week after the study. Continuous running involved jogging 4.8 km three times a week. For eight weeks at subjects 80 to 85% maximum heart rate (Heart Rate Maximum). Interval training consisted of jogging for 240 second sets interspersed with four minutes of relief interval three times a week for eight weeks. This amounted to a work to relief ratio of 1.1. The interval jogging was performed at about 90% of the subjects and the heart rate is maximum. In contrast to the control group, both exercise groups had comparable magnitude of significant improvements in their aerobic and anaerobic power ($P < .01$). In general, improvements in aerobic power of 1.6%, 10.2% and 11.5% as well as gains in anaerobic power of 2.4%, 13.2% and 14.6% were found in the control group, Continuous running and Interval training categories respectively. Both continuous and interval training programs are effective in altering aerobic and anaerobic power scores in sedentary female adolescents.

Purpose of the Study

The purpose of the study was to find out the effect of interval training, combined interval training with pranayama practices and detraining on cardio vascular endurance of school boys.

Methods and Materials

The sample for the present study consists of 45 boys from Chennai city schools. The subjects were selected using random sampling method. Their age ranged from 15-18 years. They were divided into three groups namely Experimental group I, Experimental Group II and control group (n=22), and 12 minutes run/walk (cardio vascular endurance) was administered to them. Experimental group I was under the practice of interval training for

the period of 12 weeks both mornings as well as evening and Experimental group II was under the practice of interval training with pranayama practices for the period of 12 weeks. The training programme was administered for forty five minutes per session. The control group did not engage in any special activities. The load was fixed based on the pilot study. The pre test and post test were taken before and after the experimental training programme. Then the Experimental group was subjected to detraining for a period of 3 cessations (30 days) each cessation consists of ten days. The test was conducted 12 minutes run/walk for cardio vascular endurance on each end of the cessations and data was recorded. Analysis of covariance was used as a test of significance.

Results

The data pertaining to the variables under the study was examined by analysis of covariance for each criterion variables separately in order to determine the differences, if any between the groups at different stages.

Table-I
Analysis of Covariance for Pre and Post Tests Data on Cardio
Vascular Endurance of Interval Training Group
Combined Interval Training with Pranayama
Practices and Control Group

Test	Interval training group	Interval training with pranayama	Control group	Source of variance	df	Sum of squares	Mean squares	F Ratio
Pre-test mean	2706.67	2813.33	2583.33	B.M	2	397444.44	198722.22	8.30
SD	166.76	166.33	127.70	W.G	42	1005000.00	23928.57	
Post-test mean	2727.33	2836.67	2582.67	B.M	2	486991.11	243495.56	10.54
SD	164.86	163.17	124.64	W.G	42	970720.00	23112.38	
Adjusted test mean	2721.93	2727.56	2697.18	B.S	2	5820.29	2910.15	5.75
				W.S	41	20745.46	505.99	

*Significant at .0.05 level

Table value required for significant at 0.05 level with df 2 and 42; and 2 and 41 are 3.22 and 3.23 respectively.

The table shows that the pre-test means of interval training combined interval training with pranayama practices and control groups were 2706.67 meters, 2813.33 meters and 2583.33 meters respectively. The obtained 'F' ratio of 8.30 for pre – test is more than the table value of 3.22 for df 2 and 42 required for significance. The post- test means of interval training combined interval training with pranayama practices and control groups were 2727.33 meters, 2836.67 meters and 2582.67 meters respectively. The obtained 'F' ratio of 10.54 for post-test is more than the table value of 3.22 for df 2 and 42 required for significance. The adjusted post test means of interval training, continuous running and the control groups were 2721.93 meters, 2727.56 meters, and 2697.18 meters respectively. The obtained 'F' ratio of 5.75 for adjusted post-test is also more than the required table value of 3.23 for df 2 and 41. The results of the study indicate that there is significant difference among the adjusted post-test means of interval training, combined interval training with pranayama practices and control groups. To determine which of the three paired means had a significant difference, Scheffe's test was applied and the results are presented.

Table-II
Scheffe's Test for the Differences between the Adjusted Post-Test Paired Means of Cardiovascular Endurance

Interval training group	Interval training with pranayama practices	Control group	Mean difference	Confidence interval
2721.93	2727.56	2727.56	24.75	20.60*

*Significant at .05 level of confidence.

The above table shows that the adjusted post-test mean difference in cardiovascular endurance between interval training and combined interval training with pranayama practices is 5.63 meters, which is statistically insignificant at 0.05 levels. Since the adjusted post test mean difference between interval running and control groups is 24.75 meters which is higher than the confidence interval 20.60. It is significant at .05 level of confidence. As the difference between adjusted post test means of level combined interval training with pranayama practice and control group is 30.38, it is also significant at .05 level of confidence. It may be concluded from the results of the study that there is no significant difference between adjusted post-test means of interval training and combined interval training with pranayama practices groups. Statistically difference exists between the interval training and the control groups and combined interval training with pranayama practices and control groups.

The analysis of covariance on the data obtained for cardiovascular endurance between post and first, second and third cessation tests of the interval training, combined interval training with pranayama practices and control groups have been presented in the table III.

Table-III
Results of Post-Test and First, Second and Third Cessation
Test on Cardiovascular Endurance

Test	Interval training group	Interval training with pranayama practices	Control group	Source of variance	df	Sum of squares	Mean squares	F Ratio
Post-test mean	2727.33	2836.67	2582.67	Post-test B.M	2	486991.11	243495.56	10.54*
S.D	164.86	163.17	124.64	W.G	42	970720.00	23112.38	
First cessation mean	2709.33	2812.67	2576.00	First Cessation B.M	2	422333.33	211166.67	8.93*
S.D	161.22	175.40	119.03	W.G	42	992946.67	23641.59	
Adjusted test mean	2697.58	2691.85	2708.57	Adjusted Test B.S	2	1448.75	724.38	1.10
				W.S	41	26927.63	656.77	
Second cessation mean	2702.00	2813.33	2573.33	Second Cessation B.M	2	432751.33	216375.56	9.23*
S.D	162.09	174.71	116.29	W.G	42	984506.67	23440.63	
Adjusted test mean	2690.31	2693.13	2705.22	Adjusted Test B.S	2	1467.21	733.60	1.06
				W.S	41	28345.00	691.34	
Third cessation mean	2697.33	2824.67	2572.67	Third Cessation B.M	2	476297.78	238148.89	10.92*
S.D	160.73	160.97	117.08	W.G	42	916360.00	21818.10	
Adjusted test mean	2686.03	2708.41	2700.23	Adjusted Test B.S	2	3743.05	1871.53	3.51*
				W.S	41	21881.15	533.69	

*Significant at .05 level, B.M – Between Means, W.G – Within Groups, B.S – Between sets W.S – Within Set.

The Table value required for significant at .05 levels with df 2 and 42; and 2 and 41 is 3.22 and 3.23 respectively.

The table III shows that the post test means of interval training combined interval training with pranayama practices and control groups were 2727.33 meters, 2836.67 and 2582.67 meters respectively. The obtained F ratio of 10.54 for post test is more than the table value 3.22 for df 2 and 42 required for significance. The first cessation means of interval training combined interval training with pranayama practices and control groups were 2709.33 meters, 2812.67 meters and 2576.00 meters.

The obtained F ratio of 8.93 for first cessation period is also more than the table value of 3.22 for df 2 and 42 required for significance. The adjusted first cessation period means of interval training and the control groups were 2697.58 meters, 2691.85 meters and 2708.57 meters respectively. The obtained 'F' ratio of 1.10 is very less than the required table value of 3.23 for df 2 and 41 and .05 level significance. Since the adjusted first cessation means in cardiovascular endurance of interval training, combined interval training with pranayama practices and control groups resulted in an insignificant 'F' ratio, post- hoc test was not applied. The insignificant 'F' ratio reveals that none of the paired adjusted means has a significant difference in cardiovascular endurance.

The second cessation means of interval training combined interval training with pranayama practices and control groups were 2702.00 meters, 2813.33 and 2573.33 meters respectively. The obtained 'F' ratio of 9.23 for second cessation period is also more than the table value of 3.22 for df 2 and 42 required for significance. The adjusted second cessation period means of interval training combined interval training with pranayama practices and control groups were 2690.31 meters, 2693.13 meters and 2705.22 meters respectively. The obtained 'F' ratio of 1.06 is very less than the required table value of 3.23 for df 2 and 41 at .05 level of significances. Since the adjusted second cessation means in cardiovascular endurance of interval training, combined interval training with pranayama practices and control groups resulted in an insignificant 'F' ratio post-hoc test was not applied. The insignificant 'F' ratio reveals that none of the paired adjusted means has a significant difference in cardiovascular endurance.

The third cessation means of interval training combined interval training with pranayama practices and control groups were 2697.33 meters, 2824.67 and 2572.67 meters respectively. The obtained 'F' ratio of 10.92 for third cessation period is also more than the table value of 3.22 for df 2 and 42 required for significance. The adjusted third cessation period means of interval training combined interval training with pranayama practices and control groups were 2686.03 meters, 2708.41 meters and 2700.23 meters respectively. The obtained 'F' ratio of 3.51 is very less than the required table value of 3.23 for df 2 and 41 at .05 level of significance. Since the adjusted third cessation means in cardiovascular endurance of interval training, combined interval training with pranayama practices and control groups resulted in an insignificant 'F' ratio post-hoc test was not applied. The insignificant 'F' ratio reveals that none of the paired adjusted means has a significant difference in cardiovascular endurance.

Table-IV
Scheffe's Test for the Difference between the Adjusted Third Cessation Test Paired Means of Cardiovascular Endurance

Interval training group	Interval training with pranayama practices	Control group	Mean difference	Confidence interval
2686.03	2708.41		22.38*	21.16
2686.03		2700.23	14.20	21.16
	2708.41	2700.23	8.18	21.16

*Significant at .05 level of confidence.

Table IV shows that the adjusted third cessation mean difference in cardiovascular endurance between interval training and combined interval training with pranayama practices groups is 22.58 meters, which is statistically significant at .05 level. Since the adjusted third cessation mean difference between interval training and the control group is 14.20 meters which is less than the confidence interval 21.16, it is significant at .05 level of confidence. As the difference between adjusted third cessation means of combined interval training with pranayama practices and the control group is 8.818, it is also insignificant at .05 level of confidence.

It may be concluded from the results of the study that there is significant difference between adjusted third cessation means of interval training and combined interval training with pranayama practices groups. Statistically insignificant difference exists between the interval training and control groups and combined interval training with pranayama practices and control groups.

Conclusions

1. Interval training and combined interval training with pranayama practices improved the efficiency of cardiovascular endurance significantly.
2. After the cessations in interval training group, the efficiency of cardiovascular endurance came down quickly when compared to the combined interval training with pranayama practices as their efficiency stands through the cessation period.
3. On the basis of the findings of the study, it may be considered that the interval training program is very useful method of training for the athletes and players to improve cardiovascular endurance within shorter duration. But it only retains for twenty to thirty days in combined interval training with pranayama practices program the improvement was slow but it could retain the efficiency for longer duration. So the combined interval training with pranayama practices program is very much useful to the athletes and players to improve aerobic endurance.

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