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Effect of High Intensity Interval Training and Circuit Resistance Training on Selected Physiological Variables among College Level Football Players

J.Senthilkumar[1] & Dr.D.Gokulakrishnan[2]

[1]*Ph.D., Research Scholar, Research and Development Centre, Bharathiar University, Coimbatore, Tamilnadu, India.*
[2]*Physical Director, SSM Polytechnic College, Komarapalayam, Tamilnadu, India.*

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Abstract

The purpose of the study was to find out the effect of high intensity interval training and circuit resistance training on selected physiological variables among football players. To achieve the purpose of the study forty five football players from Renugambal College of Physical Education, Thiruvannamalai, Tamilnadu, were randomly selected and their age ranged between 18 to 25 years. The subjects (N=45) were randomly assigned to three equal groups of fifteen football players each. The requirement of the experiment procedures, testing as well as exercise schedule was explained to the subjects so as to get full co-operation of the effort required on their part and prior to the administration of the study. Pre test was conducted for all the subjects on selected physiological variables. This initial test scores formed as pre test scores of the subjects. The groups were assigned as Experimental Group I, Experimental Group II and Experimental Group I and Control Group in an equivalent manner. Experimental Group I was exposed to high intensity interval training, Experimental Group II was exposed to high intensity interval training and circuit resistance training and Control Group was not participated in any training. The duration of experimental period was 12 weeks. After the experimental treatment, all the forty five subjects were tested on their physiological variables. This final test scores formed as post test scores of the subjects. The pre test and post test scores were subjected to statistical analysis using dependant 't' test and Analysis of Covariance (ANCOVA) to find out the significance among the mean differences, whenever the 'F' ratio for adjusted test was found to be significant, scheffe's post hoc test was used. In all cases 0.05 level of significance was fixed to test hypotheses. The high intensity interval training and circuit resistance training better than the high intensity interval training on the improvement of the physiological variables among the college level football players.

Keywords: High Intensity Interval Training, Circuit resistance Training.

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Introduction

High-intensity interval training (HIIT), also called high-intensity intermittent exercise (HIIE) or sprint interval training (SIT), is a form of interval training, a cardiovascular exercise strategy alternating short periods of intense anaerobic exercise with less intense recovery periods. HIIT is the concept where one performs a short burst of high-intensity (or max-intensity) exercise followed by a brief low-intensity activity, repeatedly, until too exhausted to continue. Though there is no universal HIIT session duration, these intense workouts typically last under 30 minutes, with times varying based on a participant's current fitness level. Circuit resistance training is a method of dynamic resistance training designed to increase strength, muscular endurance and cardiovascular endurance (German & Pollock, 1981).

Correspondence
D.Gokulakrishnan
E-mail: gogulakrishnan1@yahoo.co.in, Ph. +9197900 83100

Methodology

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training and Control Group was not participated in any training. The duration of experimental period was 12 weeks. After the experimental treatment, all the forty five subjects were tested on their physiological variables. This final test scores formed as post test scores of the subjects. The pre test and post test scores were subjected to statistical analysis using dependant 't' test and Analysis of Covariance (ANCOVA) to find out the significance among the mean differences, whenever the 'F' ratio for adjusted test was found to be significant, scheffe's post hoc test was used. In all cases 0.05 level of significance was fixed to test hypotheses.

Results and discussion

Table 1

Computation of analysis of covariance of mean of high intensity interval training, high intensity interval training and circuit resistance training and control group on anaerobic power

	HIITG	HIITCRTG	CG	Source of Variance	Sum of Squares	df	Means Squares	F-ratio
Pre-Test Means	1233.66	1243.60	1236.06	**BG**	805.91	2	402.95	1.08
				WG	15619.86	42	371.90	
Post-Test Means	1371.93	1428.60	1233.73	**BG**	301416.84	2	150708.42	932.01*
				WG	6791.46	42	161.70	
Adjusted Post-Test Means	1372.50	1427.79	1233.96	**BG**	294809.17	2	147404.59	930.56*
				WG	6494.55	41	158.40	

An examination of table - 1 indicated that the pre test means of high intensity interval training, high intensity interval training and circuit resistance training and control group were 1233.66, 1243.60 and 1236.06 respectively. The obtained F-ratio for the pre-test was 1.08 and the table F-ratio was 3.22. Hence the pre-test mean F-ratio was insignificant at 0.05 level of confidence for the degree of freedom 2 and 42. This proved that there were no significant difference between the experimental and control group indicating that the process of randomization of the groups was perfect while assigning the subjects to groups. The post-test means of the high intensity interval training, high intensity interval training and circuit resistance training and control group were 1371.93, 1428.60 and 1233.73 respectively. The obtained F-ratio for the post-test was 932.01 and the table F-ratio was 3.22. Hence post-test mean F-ratio was significant at 0.05 level of confidence for the degree of freedom 2 and 42. This proved that the differences between the post test means of the subjects were significant. The adjusted post-test means of the high intensity interval training, high intensity interval training and circuit resistance training and control group were 1372.50, 1427.79 and 1233.96 respectively. The obtained F-ratio for the adjusted post-test means was 930.56 and the table F-ratio was 3.23. Hence the adjusted post-test mean F-ratio was significant at 0.05 level of confidence for the degree of freedom 2 and 41. This proved that there was a significant difference among the means due to the experimental trainings on Anaerobic power. Since significant differences were recorded, the results were subjected to post hoc analysis using Scheffe's post hoc test. The results were presented in Table-II.

Table 2
The scheffe's test for the differences between the adjusted post test paired means on anaerobic power

Adjusted Post-test means			Mean Difference	Required CI
HIITG	HIITCRTG	CG		
1372.50	1427.79	---	55.29*	11.64
1372.50	---	1233.96	138.54*	
---	1427.79	1233.96	193.80*	

**** Significant at 0.05 level of confidence***

The multiple comparisons showed in Table 2 proved that there existed significant differences between the adjusted means of high intensity interval training and circuit resistance training and high intensity interval training group (55.29), high intensity interval training and circuit resistance training with control group (138.54), high intensity interval training with control group (193.80) at 0.05 level of confidence with the confidence interval value of 11.64. The pre, post and adjusted means on Anaerobic power were presented through bar diagram for better understanding of the results of this study in Figure I.

Figure I
Pre post and adjusted post test differences of the, high intensity interval training, high intensity interval training and circuit resistance training and control group on anaerobic power

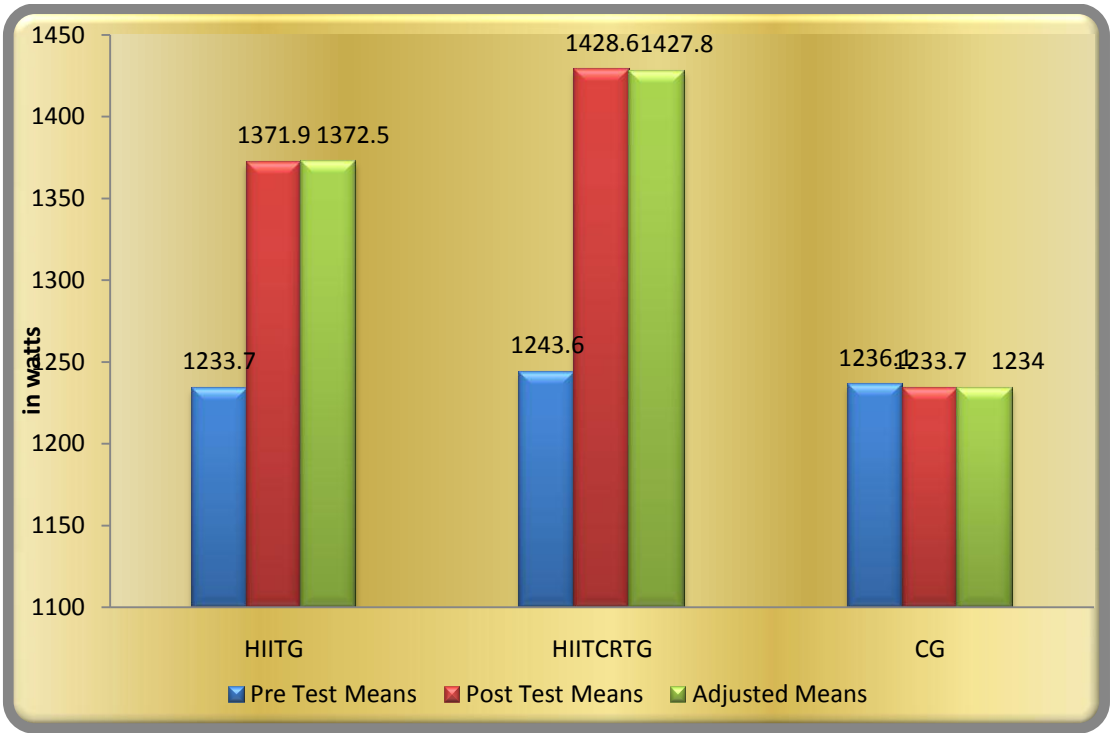


Table 3
Computation of analysis of covariance of mean of high intensity interval training, high intensity interval training and circuit resistance training and control group on breath holding time

	HIITG	HIITCRTG	CG	Source of Variance	Sum of Squares	df	Means Squares	F-ratio
Pre-Test Means	36.24	36.55	34.68	**BG**	30.22	2	15.11	0.70
				WG	899.77	42	21.42	
Post-Test Means	40.67	44.19	36.42	**BG**	454.79	2	227.39	124.00*
				WG	77.02	42	1.83	
Adjusted Post-Test Means	40.70	44.24	36.34	**BG**	455.20	2	227.60	127.12*
				WG	73.40	41	1.79	

An examination of table - 3 indicated that the pre test means of high intensity interval training, high intensity interval training and circuit resistance training and control group were 36.24, 36.55 and 34.68 respectively. The obtained F-ratio for the pre-test was 0.70 and the table F-ratio was 3.22. Hence the pre-test mean F-ratio was insignificant at 0.05 level of confidence for the degree of freedom 2 and 42. This proved that there were no significant difference between the experimental and control group indicating that the process of randomization of the groups was perfect while assigning the subjects to groups. The post-test means of the high intensity interval training, high intensity interval training and circuit resistance training and control group were 40.67, 44.19 and 36.42 respectively. The obtained F-ratio for the post-test was 124.00 and the table F-ratio was 3.22. Hence the post-test mean F-ratio was significant at 0.05 level of confidence for the degree of freedom 2 and 42. This proved that the differences between the post test means of the subjects were significant. The adjusted post-test means of the high intensity interval training, high intensity interval training and circuit resistance training and control group were 40.70, 44.24 and 36.34 respectively. The obtained F-ratio for the adjusted post-test means was 127.12 and the table F-ratio was 3.23. Hence the adjusted post-test mean F-ratio was significant at 0.05 level of confidence for the degree of freedom 2 and 41. This proved that there was a significant difference among the means due to the experimental trainings on breath holding time. Since significant differences were recorded, the results were subjected to post hoc analysis using Scheffe's post hoc test. The results were presented in Table-IV.

Table 4
The scheffe's test for the differences between the adjusted post test paired means on breath holding time

Adjusted Post-test means			Mean Difference	Required CI
HIITG	**HIITCRTG**	**CG**		
40.70	44.24	---	3.54*	1.23
40.70	---	36.34	4.36*	
---	44.24	36.34	7.90*	

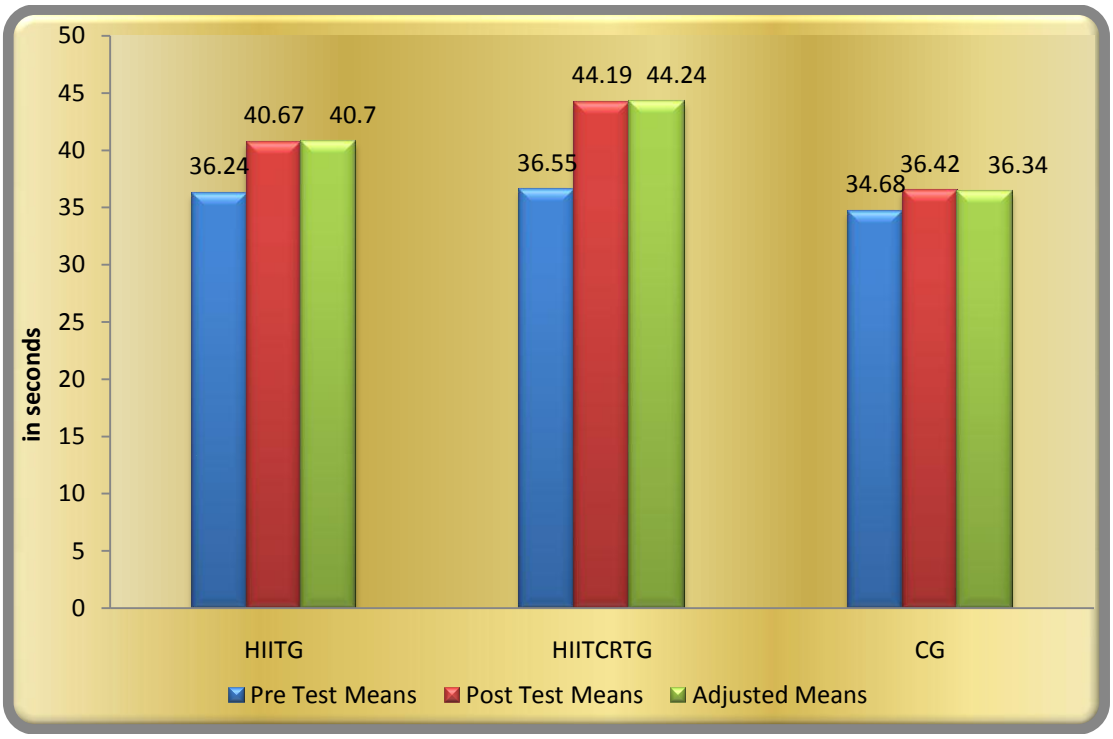
**** Significant at 0.05 level of confidence***

The multiple comparisons showed in table 4 proved that there existed significant differences between the adjusted means of high intensity interval training and circuit resistance training and high intensity interval training group (3.54), high intensity interval training and circuit resistance training with control group (4.36), high

intensity interval training with control group (7.90) at 0.05 level of confidence with the confidence interval value of 1.23. The pre, post and adjusted means on breath holding time were presented through bar diagram for better understanding of the results of this study in Figure II.

Figure II

Pre post and adjusted post test differences of the, high intensity interval training, high intensity interval training and circuit resistance training and control group on breath holding time



Conclusions

From the analysis of the data, the following conclusions were drawn:

1. The high intensity interval training improved the physiological variables among the college level football players.
2. The high intensity interval training and circuit resistance training improved the physiological variables among the college level football players.
3. The high intensity interval training and circuit resistance training better than the high intensity interval training on the improvement of the physiological variables among the college level football players.

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