

Effects of 6 weeks circuit training on heart rate of badminton players

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Abstract

The objective of the study to find out the effects of 6 weeks circuit training on heart rate of badminton players. For the purpose of the present study thirty (N = 30) subjects was randomly selected from different levels of badminton players of TMU Moradabad. The age of the subjects for the study was ranged from 18-25 years. The subjects was divided into two groups, experimental group (NE = 15) and control group (NC = 15). To measure the heart rate, total number of heart beats per minute was recorded. To determine the effect of 6 weeks circuit training on heart rate of badminton players, Analysis of Co-Variance (ANCOVA) was used. The level of significance was set at 0.05. The results of the study shows that 6 weeks circuit training have significant effect on heart rate of badminton players.

Keywords: circuit training, heart rate

Introduction

The present day in Indian society, sports holds a prominent place in modern life. Millions of people participate in sport, watch and hear about them and spend billions of dollars on sports related activities and equipments. This has led to the competitive element in sports, as now sportsmen participate to win and achieve laurels for them as well as for their country.

Sports is also one of the factor solidifying national integration and developing national character, which are the most urgent needs of Competitive sports have a very high value in society, the physical educationists and coaches are trying to bring new innovations which will improve upon the attainment of top performance of sportsmen for present and future. The modern trends in preparation of sportsman are to proceed in a scientific manner and to take the help of allied sciences to achieve the top level of performance.

Badminton is a fascinating game. One moment you are striking the shuttle with all your strength, the next you are stroking it delicately with millimeter-upward accuracy. At top level, it is the most demanding of racket games, calling for a fencer's speed of reflex and a gymnast's agility. It involves challenges. To play well requires practice; a player has to give some thought to his game and do some physical work.

Traditionally, badminton is considered a predominantly aerobic activity with a relatively low functional and energy demands. In general, badminton participants are actually engaged in rallies for approximately one-third of the playing time, however recent data show that in elite badminton players the percentage of playing time may increase as high as 45 % of the total playing time.

Badminton is highly complex sport and this presents great challenges for players and coaches of all levels. An individual rally is a series demanding movements performed using a movement pattern which is unique compared with any other sport. Rally length is often short (average for elite players is around 6-8 seconds) and, consequently, performed at very high intensity. However players must also be prepared for long rallies. Rallies are interspersed with short rest periods (typical duration around 15 seconds) which allow partial

recovery from previous rally. However, competitive matches may last at least 45 minutes. So, badminton is a combination of speed (anaerobic fitness) in rallies and endurance (aerobic fitness) to allow sustained efforts and to promote recovery between rallies. Great strength, power, agility and flexibility are also required. All of these fitness components should form part of a player's fitness training. Additionally, the development of tactical and technical elements is, of course, also vital. With all of these types of training, an understanding of the principles of fitness training from a general point of view is essential.

Objective of the study

The objective of the study to find out the effects of 6 weeks circuit training on heart rate of badminton players.

Methodology

Selections of the subjects

For the purpose of the present study thirty (N = 30) subjects was randomly selected from different levels of badminton players of TMU Moradabad. The age of the subjects for the study was ranged from 18-25 years. The subjects was divided into two groups, experimental group (NE = 15) and control group (NC = 15).

Selection of Variables

On the basis of review of literature, expert's opinion, facilities and instruments availability and scholar's own understanding of the problem Heart rate were selected.

Criterion measure

Heart rate: To measure the heart rate, total number of heart beats per minute was recorded.

Statistical technique

To determine the effect of 6 weeks circuit training on heart rate of badminton players, Analysis of Co-Variance (ANCOVA) was used. The level of significance was set at 0.05. All the statistical procedure was performed to SPSS 16.0.

Findings of the study

Table 1: Descriptive Statistics of Control Group and Experimental Group in relation to heart rate

		N	Mean	Std. Deviation	Std. Error	Minimum	Maximum
Pre test	Control Group	15	74.33	5.16	1.33	68.00	87.00
	Experimental Group	15	74.46	1.92	0.49	72.00	78.00
	Total	30	74.40	3.82	0.69	68.00	87.00
Post test	Control Group	15	75.26	4.30	1.11	70.00	86.00
	Experimental Group	15	70.86	1.72	0.44	68.00	74.00
	Total	30	73.06	3.92	0.71	68.00	86.00

Table-1 clearly indicates the mean and standard deviations for heart rate of Experimental Group and Control Group. The observed mean and standard deviation for the Pre-test heart rate Experimental group was (74.46±1.92), whereas, control group (74.33±5.16). The Post test mean and standard deviation for heart rate Experimental group was (70.86±1.72), whereas

control group was respectively (75.26±4.30). The data were further analyzed with the help of analysis of variance to find out the significance difference between means of pre-test and post test of control group and experimental group in relation to heart rate. The results are presented in the table no-2.

Table 2: Analysis of Variance of Comparison of Means of one Experimental Group and one Control Group in Relation to heart rate

		Sum of Squares	df	Mean Square	F	Sig.
Pre Test	Between Groups	0.13	1	0.13	0.009	.926
	Within Groups	425.06	28	15.18		
	Total	425.20	29			
Post Test	Between Groups	145.20	1	145.20	13.522*	.001
	Within Groups	300.66	28	10.73		
	Total	445.86	29			

*Significant at .05 level, F value required to be significant at 1, 28 df = 4.20

Table 2 revealed that, the pre test obtained 'F' value of 0.009 was found to be insignificant at 0.05 level, since this value was found lower than the tabulated value 4.20 at 1, 28 df., which, clearly indicates no difference and explains the random assignment of subjects to one experimental group and one

control group was quite successful. In relation to post test, significant difference was found among experimental group and control group pertaining to heart Rate, since F value of 13.522 was found significant at 0.05 level.

Table 3: Adjusted Post Test Means of Experimental Group and Control Group in relation to heart rate

group	Mean	Std. Error
Control Group	75.31	0.334
Experimental Group	70.81	0.334

From the table number -3, it is revealed that mean of control group was 75.31 with the standard deviation of 0.334, whereas the mean of experimental group was 70.81 with the standard deviation of 0.334. The data were analyzed and the results pertaining to analysis of co-variance between experimental group and control group on physical education students in relation to heart Rate for pre test -post test respectively and the results are presented with the help of table-4.

Table 4: Analysis of Covariance of Comparison of Adjusted Post Test Means of Experimental Groups and Control Groups in Relation to heart rate

	Sum of Squares	df	Mean Square	F	Sig.
Contrast	152.05	1	152.05	91.047	.000
Error	45.09	27	1.67		

*significant at level 0.05, F value required to be significant at 1, 27 df = 4.21

Table- 4 revealed that, the obtained 'F' value of 91.04 was found significant at 0.05 levels, since this value was found higher than the tabulated value 4.21 at 1,27 df. This result

indicates that the treatment was given to subjects has decreased the heart rate of subjects at significant level. The Graphical representation of mean of control and experimental group in relation to heart rate is presented with the help of figure 1.

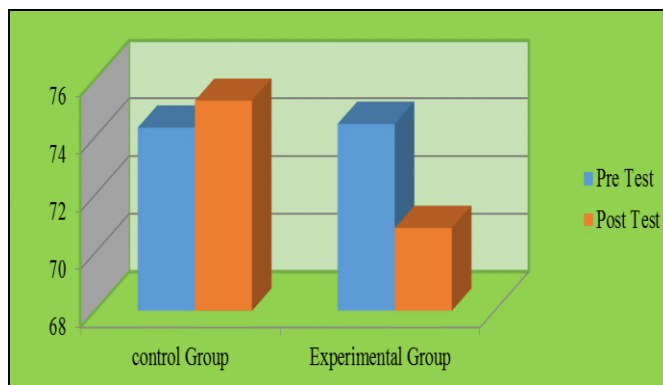


Fig 1: The Graphical representation of mean of control and experimental group in relation to heart rate

Discussion of Findings

Circuit resistance training is a form of exercise programming in which a series of exercise stations are sequentially performed—one set per station—for a prescribed number of circuits. The cardio respiratory benefits of CRT have been reported in several studies to exceed conventional resistance training protocols. The results of this study revealed that there was a significance difference between experimental and controlled group in relation to Resting Heart-rate. This may be attributed to the circuit training which involves performing several exercises back-to-back with little rest in between, each it tends to promote a greater cardiovascular response. It might be also due to the reason that the heart rate can decrease markedly as a result of endurance training. The actual mechanism responsible for this decrease is not entirely known, but training appears to increase parasympathetic activity in heart while decreasing sympathetic activity. Similar findings have also been found in heart rate and blood pressure changes with endurance training by Wilmore *et al.* (2001). The result has been also supported by Babalola (2011) ^[10].

Conclusion

It was concluded that there are significant effects of 6 weeks of circuit training on heart rate of badminton players.

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