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Effects of Aerobic and Anaerobic Training Followed by Cessation on Diastolic Blood Pressure of Anna University Men Players

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Abstract

The purpose of the study was to find out the effects of aerobic and anaerobic training followed by cessation on diastolic blood pressure of Anna university men players. To achieve this purpose of the study, forty five men students who were studying in various affiliated engineering colleges of Anna university zone VII and who were participated in intercollegiate tournaments during the year 2012-13 were randomly selected as subjects. They were divided into three equal groups of each fifteen subjects. The group I underwent aerobic training, group II underwent anaerobic training group and group III acted as control group for three days per week for twelve weeks. Diastolic blood pressure was assessed by sphygmomanometer and scores in mmhg. All the subjects of three groups were tested on systolic blood pressure at prior to and immediately after the training programme as pre and post test. Analysis of covariance (ANCOVA) was used to find out the significant difference if any, among the groups on each selected criterion variables separately. In all the cases 0.05 level of confidence was fixed to test the significance, which was considered as appropriate. The results of the study indicated that the experimental groups namely aerobic training and anaerobic training group had significantly influenced on the performance of the diastolic blood pressure. The control group had no significant differences on diastolic blood pressure.

Keywords: Aerobic, Anaerobic, Anna University, Cessation, Diastolic Blood Pressure.

Introduction

Aerobics is a good way to decrease our percentage of body fat and to attain the other metabolic benefits of fitness. Aerobics is also a very good way to develop musculo skeletal fitness while building strength, flexibility, coordination. Aerobics is a progressive physical conditioning programme that stimulates cardio respiratory activity for a time period sufficiently long to produce beneficial changes in the body. To do any work we need energy and even while at rest some physiological functions have to be carried within our body and for that purpose some calories of energy will be burnt. As the intensity and duration of work increases the demand for the fuel in the working muscles also increases. The organs which supply the needful should cope with the demand. Aerobic activities include walking, jogging, bicycling, dancing and swimming etc. anything that involves the large muscle groups, which sustains for thirty minutes or longer, is considered aerobic. It should be done a minimum of five days a week for at least thirty minutes each session. Anaerobic exercise is an exercise intense enough to trigger lactate formation. It is used by athletes in non-endurance sports to promote strength, speed and power and by body builders to build muscle mass. Muscle energy systems trained using anaerobic exercise develop differently compared to aerobic exercise, leading to greater performance in short duration, high intensity activities, which last from mere seconds to up to about 2 minutes. Any activity lasting longer than about two minutes has a large aerobic metabolic component.

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Methodology

The purpose of the study was to find out the effects of aerobic and anaerobic training followed by cessation on diastolic blood pressure of Anna university men players. To achieve this purpose of the study, forty five men students who were studying in various affiliated engineering colleges of Anna university zone VII and who were participated in intercollegiate tournaments during the year 2012-13 were randomly selected as subjects. They were divided into three equal groups of each fifteen subjects. The group I underwent aerobic training, group II underwent anaerobic training group and group III acted as control group for three days per week for twelve weeks. Diastolic blood pressure was assessed by sphygmomanometer and scores in mmhg. All the subjects of three groups were tested on systolic blood pressure at prior to and immediately after the training programme as pre and post test. Analysis of covariance (ANCOVA) was used to find out the significant difference if any, among the groups on each

selected criterion variables separately. In all the cases 0.05 level of confidence was fixed to test the significance, which was considered as appropriate.

Results

Table I. The Mean and Standard Deviation on Diastolic Blood Pressure of Pre Test, Post Test and Four Cessations Data of Experimental Groups

Groups		Pre Test	Post Test	First Cessation	Second Cessation	Third Cessation	Fourth Cessation
Aerobic Training Group	Mean	84.133	80.067	80.267	81.267	82.267	84.860
	SD	0.646	0.594	0.594	0.594	0.594	0.704
Anaerobic Training Group	Mean	84.467	82.400	82.467	82.736	83.260	84.336
	SD	0.640	0.632	0.640	0.704	0.941	0.816
Control Group	Mean	80.067	80.133	80.467	80.200	80.400	80.533
	SD	0.594	0.640	0.743	0.775	0.986	0.834

From Table I shows that pre test mean and standard deviation values on Diastolic Blood Pressure for Aerobic Training, Anaerobic Training and Control groups are 84.133±0.646, 84.467±0.640 and 80.067 ± 0.594 respectively. The post test mean and stand deviation values on Diastolic Blood Pressure for Aerobic Training, Anaerobic Training and Control groups are 80.067 ± 0.594, 82.400 ± 0.632 and 80.133 ± 0.640 respectively. The first cessation mean and standard deviation values on Diastolic Blood Pressure for Aerobic Training, Anaerobic Training and Control groups are 80.267±0.0.594, 82.467 ±0.640 and 80.467 ±0.743 respectively. The second cessation mean and standard deviation values on Diastolic Blood Pressure for Aerobic Training, Anaerobic Training and Control groups are 81.267 ±0.594, 82.736 ±0.704 and 80.200±0.775 respectively. The third cessation mean and standard deviation values on Diastolic Blood Pressure for Aerobic Training, Anaerobic Training and Control groups are 82.267 ± 0.594, 83.260 ± 0.594 and 80.400 ± 0.986 respectively. The fourth cessation mean and standard deviation values on Diastolic Blood Pressure for Aerobic Training, Anaerobic Training and Control groups are 84.860 ±0.704, 84.336 ±0.816 and 80.533 ± 0.834 respectively. The data of Diastolic Blood Pressure have been analyzed by two way Analysis of Variance (ANOVA) (3x6) with repeated measures on last factor and the obtained results are presented in Table II.

Table II. The Two Way Analysis of Variance on Diastolic Blood Pressure of Aerobic Training, Anaerobic Training and Control Groups at Six Different Stages of Testing Periods

Source of Variance	Sum of Square	Df	Mean Square	F-ratio
A factor (Groups)	400.141	2	200.070	98.678*
Error I	85.156	42	2.028	
B factor (Tests)	193.396	5	38.679	188.412*
AB factor (Interaction) (Groups and Tests)	128.659	10	12.866	62.672*
Error II	43.111	210	0.205	

Significant at 0.05 level

(The table values required for being significant at 0.05 level of confidence with df 2 and 42, 5 and 210 & 10 and 210 were 3.22, 2.56 and 1.87 respectively)

Table II shows that the obtained 'F' ratio value 98.678 for row (groups) on Diastolic Blood Pressure is greater than the required table vale 3.22 for significance with df 2 and 42. It further shows that the obtained "F" ratio value 188.412 for column (tests) on Diastolic Blood Pressure is greater than the required table value 2.56 for significance with df 5 and 210. The obtained "F" ratio value of 62.672 for interaction effect (groups x tests) on Diastolic Blood Pressure is also greater than the required table value 1.87 for significance with df 10 and 210. From the table II the obtained F value of Interaction A x B (Groups x Different stages of Tests)

shows that there is significant difference existing among the paired means of interaction A x B on Diastolic Blood Pressure($P < 0.05$). The results of the study indicate that there is a significant difference in the interaction effect (between rows (Groups) and columns (Tests)) on Diastolic Blood Pressure. Since, the interaction effect was significant, the simple effect test was applied as follow up test and they are presented in Table III.

Table III. The Simple Effect Scores of Groups (Rows) at Three Different Stages of Tests (Columns) on Diastolic Blood Pressure

Source of Variance	Sum of Square	df	Mean Squares	"F" ratio
Groups Within Pre test	180.044	2	90.022	438.510*
Groups Within Post test	52.933	2	26.467	128.923*
Groups Within First Cessation	44.400	2	22.200	108.139*
Groups Within Second Cessation	48.533	2	24.267	118.206*
Groups Within Third Cessation	60.978	2	30.489	148.515*
Groups Within Fourth Cessation	141.911	2	70.956	345.634*
Tests and Aerobic Training Group	255.422	5	51.084	248.839*
Tests and Anaerobic Training Group	63.867	5	12.773	62.221*
Tests and Control Group	2.377	5	0.475	2.315
Error II	43.111	210	0.205	

Significant at 0.05 level
(The table values required for being significant at 0.05 level of confidence with df 2 and 10, 5 and 10 were 3.04 and 2.26 respectively)

Table III shows that the obtained F-ratio for Groups within post test, first cessation, second cessation, third cessation and fourth cessation were 128.923, 108.139, 118.206, 148.515 and 345.634 indicating that there was a significant difference between the paired means of groups within post test on Diastolic Blood Pressure. Table III shows that F-ratio values obtained for tests within Aerobic Training Group and tests within Anaerobic Training Groups were 248.839 and 62.221 indicating that there was a significant difference exists among the paired means of tests within Aerobic Training Group and tests within Anaerobic Training Group on Diastolic Blood Pressure. Rest of the pairs is not significant. Since, three groups and six different stages of tests were compared, whenever the obtained F-ratio value was found to be significant in the simple effect, the Scheffe's test was applied as post hoc test to find out the paired mean difference, if any.

Table IV. The Scheffe's test for the differences between paired means of post test with different groups on Diastolic Blood Pressure

Aerobic Training Group	Anaerobic Training Group	Control Group	Mean difference	Confidence interval
80.067	82.400		2.333*	0.408
80.067		80.133	0.067	0.408
	82.400	80.133	2.267*	0.408

Significant at 0.05 level.

The above table clearly indicates that the mean difference between Aerobic Training and Anaerobic Training groups, Anaerobic Training and Control groups, are 2.333 and 2.267 respectively. The values are greater than the confidence interval value 0.408, which shows significant difference at 0.05 level of confidence. The mean value between Aerobic Training and Control groups is 0.067, which is lesser than the confidence interval value 0.408. It showed insignificant differences. It may be concluded from the results of the study that there is a significant difference between the post test means of Aerobic Training and Anaerobic Training groups, Anaerobic Training and Control groups, on Diastolic Blood Pressure at post test period. The mean difference between Aerobic Training and Control groups showed

insignificant differences.

Table V. The Scheffe's test for the differences between paired means of groups on Diastolic Blood Pressure (First Cessation)

Aerobic Training Gro	Anaerobic Training Gr	Control Group	Mean Differenc	Confidence Inter
80.267	82.467		2.200*	0.408
80.267		80.467	0.200	0.408
	82.467	80.467	2.000*	0.408

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

The Table V shows that the mean difference between Aerobic Training and Anaerobic Training groups, Anaerobic Training and Control groups are 2.200 and 2.000 respectively on Diastolic Blood Pressure after the first cessation of detraining period which are greater than the confidence interval value 0.408 at 0.05 level of confidence. The values between Aerobic Training and Control groups is 0.200, it is lesser than the confidence interval value 0.408 at 0.05 level of confidence, so it showed insignificant differences. The results of the study showed that there was a significant difference between Aerobic Training and Anaerobic Training groups, Anaerobic Training and Control groups on Diastolic Blood Pressure after the first cessation of detraining period. The value between Aerobic Training and Control groups is insignificant.

Table VI. The Scheffe's test for the differences between paired means of groups on Diastolic Blood Pressure (Second Cessation)

Aerobic Training Group	Anaerobic Training Group	Control Group	Mean Difference	Confidence Interval
81.267	82.733		1.467*	0.408
81.267		80.200	1.067*	0.408
	82.733	80.200	2.533*	0.408

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

The Table VI shows that the mean difference between Aerobic Training and Anaerobic Training groups, Aerobic Training and Control groups, Anaerobic Training and Control groups are 1.467, 1.067 and 2.533 respectively on Diastolic Blood Pressure after the second cessation of detraining period which are greater than the confidence interval value 0.408 at 0.05 level of confidence. The results of the study showed that there was a significant difference between Aerobic Training and Anaerobic Training groups, Aerobic Training and Control groups, Anaerobic Training and Control groups on Diastolic Blood Pressure after the second cessation of detraining period.

Table VII. The Scheffe's test for the differences between paired means of groups on Diastolic Blood Pressure (Third Cessation)

Aerobic Training Group	Anaerobic Training Group	Control Group	Mean Difference	Confidence Interval
82.267	83.200		0.933*	0.408
82.267		80.400	1.867*	0.408
	83.200	80.400	2.800*	0.408

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

The Table VII shows that the mean difference between Aerobic Training and Anaerobic Training groups, Aerobic Training and Control groups, Anaerobic Training and Control are 0.933, 1.867 and 2.800 respectively on Diastolic Blood Pressure after the third cessation of detraining period which are greater than the confidence interval value 0.408 at 0.05 level of confidence. The results of the study showed that there was a significant difference between Aerobic Training and

Anaerobic Training groups, Aerobic Training and Control groups, Anaerobic Training and Control groups on Diastolic Blood Pressure after the third cessation of detraining period.

Table VIII. The Scheffe's test for the differences between paired means of groups on Diastolic Blood Pressure (Fourth Cessation)

Aerobic Training Group	Anaerobic Training Group	Control Group	Mean Difference	Confidence Interval
84.267	84.333		0.067	0.408
84.267		80.533	3.733*	0.408
	84.333	80.533	3.800*	0.408

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

The Table VIII shows that the mean difference between Aerobic Training and Control groups, Anaerobic Training and Control are 3.733 and 3.800 respectively on Diastolic Blood Pressure after the fourth cessation of detraining period which are greater than the confidence interval value 0.408 at 0.05 level of confidence. The mean difference between Aerobic training and Anaerobic Training is 0.067. The value is less than the confidence interval value 0.408, which shows insignificant difference at 0.05 level of confidence. The results of the study showed that there was a significant difference between Aerobic Training and Control groups, Anaerobic Training and Control groups on Diastolic Blood Pressure after the fourth cessation of detraining period. The fourth cessation value of Aerobic Training and Anaerobic Training groups shows insignificant difference.

Table IX. The Scheffe's test for the differences between paired means of tests on Diastolic Blood Pressure (Aerobic Training Group)

Pre Test	Post Test	First Cessation	Second Cessation	Third Cessation	Fourth Cessation	Mean difference	Confidence Interval
84.133	80.067					4.067*	0.556
84.133		80.267				3.867*	0.556
84.133			81.267			2.867*	0.556
84.133				82.267		1.867*	0.556
84.133					84.267	0.133	0.556
	80.067	80.267				0.200	0.556
	80.067		81.267			1.200*	0.556
	80.067			82.267		2.200*	0.556
	80.067				84.267	4.200*	0.556
		80.267	81.267			1.000*	0.556
		80.267		82.267		2.000*	0.556
		80.267			84.267	4.000*	0.556
			81.267	82.267		1.000*	0.556
			81.267		84.267	3.000*	0.556
				82.267	84.267	2.000*	0.556

**** Significance at 0.05 level of confidence***

The Table I X shows that the mean difference between pre test and post test values, pre test and first cessation values, pre test and second cessation values, pre test and third cessation, post test and second cessation, post test and third cessation values, post test and fourth cessation values, first cessation and second cessation values, first cessation and third cessation values, first cessation and fourth cessation values, second cessation and third cessation values, second cessation and fourth cessation values, third cessation and fourth cessation values 4.067, 3.867, 2.867, 1.867, 1.200, 2.200, 4.200, 1.000, 2.000, 4.000, 1.000, 3.000 and 2.000 respectively on Diastolic Blood Pressure of

Aerobic training Group which are greater than the confidence interval value 0.556 at 0.05 level of confidence. And the mean difference between pre test and fourth cessation values, post test and first cessation values, are 0.133 and 0.200 respectively on Diastolic Blood Pressure which are less than the confidence interval values 0.556 at 0.05 level of confidence. Hence, the results of the study showed that there was a significant difference between pre test and post test values, pre test and first cessation values, pre test and second cessation values, pre test and third cessation, post test and second cessation, post test and third cessation values, post test and fourth cessation values, first cessation and second cessation values, first cessation and third cessation values, first cessation and fourth cessation values, second cessation and third cessation values, second cessation and fourth cessation values, third cessation and fourth cessation values on Diastolic Blood Pressure of Aerobic Training Group. It was also found that there was no significant difference between pre test and fourth cessation values, post test and first cessation values on Diastolic Blood Pressure of Aerobic training Group.

Table X. The Scheffe's test for the differences between paired means of tests on Diastolic Blood Pressure (Anaerobic Training Group)

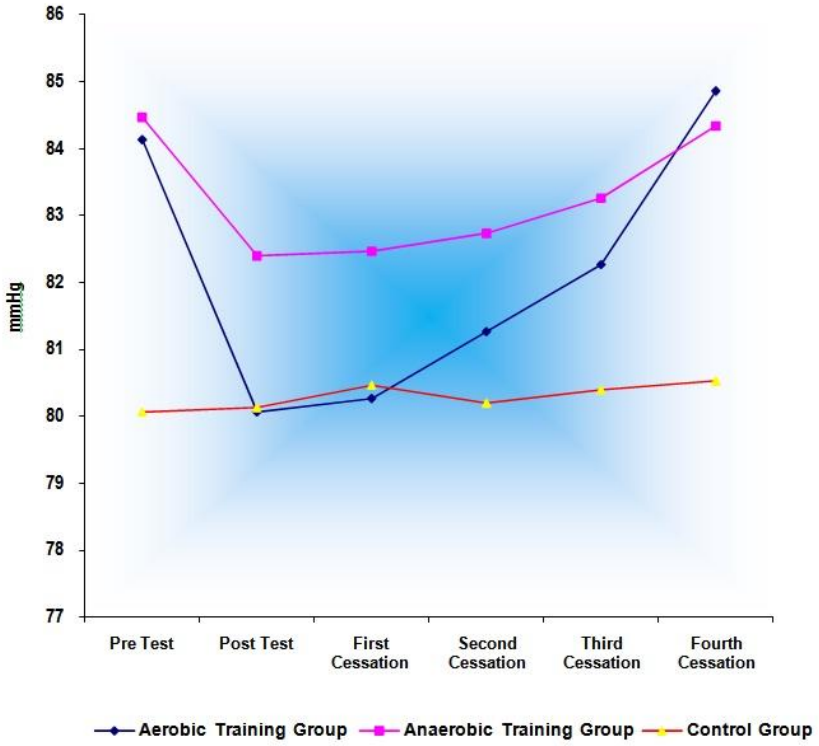
Pre Test	Post Test	First Cessation	Second Cessation	Third Cessation	Fourth Cessation	Mean difference	Confidence Interval
84.467	82.400					2.067*	0.556
84.467		82.467				2.000*	0.556
84.467			82.733			1.733*	0.556
84.467				83.200		1.267*	0.556
84.467					84.333	0.133	0.556
	82.400	82.467				0.067	0.556
	82.400		82.733			0.333	0.556
	82.400			83.200		0.800*	0.556
	82.400				84.333	1.933*	0.556
		82.467	82.733			0.267	0.556
		82.467		83.200		0.733*	0.556
		82.467			84.333	1.867*	0.556
			82.733	83.200		0.467	0.556
			82.733		84.333	1.600*	0.556
				83.200	84.333	1.133*	0.556

**** Significance at 0.05 level of confidence***

The Table X shows that the mean difference between pre test and post test values, pre test and first cessation values, pre test and second cessation values, pre test and third cessation, post test and third cessation values, post test and fourth cessation values, first cessation and third cessation values, first cessation and fourth cessation values, second cessation and fourth cessation values, third cessation and fourth cessation values 2.067, 2.000, 1.733, 1.267, 0.800, 1.933, 0.733, 1.867, 1.600 and 1.133 respectively on Diastolic Blood Pressure of Anaerobic Training Group which are greater than the confidence interval value 0.556 at 0.05 level of confidence. And the mean difference between pre test and fourth cessation values, post test and first cessation values, post test and second

cessation, first cessation and second cessation values, second cessation and third cessation values, are 0.133, 0.067, 0.333, 0.267 and 0.467 respectively on Diastolic Blood Pressure which are less than the confidence interval values 0.556 at 0.05 level of confidence. Hence, the results of the study showed that there was a significant difference between pre test and post test values, pre test and first cessation values, pre test and second cessation values, pre test and third cessation, post test and third cessation values, post test and fourth cessation values, first cessation and third cessation values, first cessation and fourth cessation values, second cessation and fourth cessation values, third cessation and fourth cessation values on Diastolic Blood Pressure of Anaerobic Training Group. It was also found that there was no significant difference between pre test and fourth cessation values, post test and first cessation values, post test and second cessation, first cessation and second cessation values, second cessation and third cessation values of Anaerobic Training Group. The pre and post tests, first, second, third, and fourth cessations mean values of Aerobic training, Anaerobic training, and Control group, on Diastolic Blood Pressure are graphically represented in the Figure I.

Figure I. Mean scores of pre test, post test and four cessations among Aerobic Training, Anaerobic Training and control groups on Diastolic Blood Pressure.



Conclusion

Based on the limitation and delimitation of the present research study, it was concluded that:

1. The results of the study indicated that the experimental groups namely aerobic training and anaerobic training group had significantly influenced on the performance of the diastolic blood pressure.
2. The control group had no significant differences on diastolic blood pressure.

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