



Effects of Aerobic and Anaerobic Training Followed by Cessation on 800 Metres Run 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 800 metres run 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. 800 metres performance was assessed by 800 metres run test. 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 800 metres run. The control group had no significant differences on 800 metres run.

Keywords: Aerobic, Anaerobic, Cessation, Anna University.

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Introduction

Aerobics boasts millions of followers in numerous countries throughout the world. It is well accepted that aerobics confers health and fitness benefits upon those who practice it regularly. Millions of people who eagerly enroll in aerobic classes, swim or jog regularly and participate in a multitude of other activities such as already determined and that these activities are not only fun but they contribute to their mental, physical and social development. Aerobic exercise is the exercise that involves or improves oxygen consumption by the body. Aerobic means "with oxygen", and refers to the use of oxygen in the body's metabolic or energy-generating process. They are several kinds of aerobic exercise which are performed at moderate levels of intensity for extended periods of time. To obtain the best results, an aerobic exercise session involves a warming up period, followed by at least 20 minutes of moderate to intense exercise, involving large muscle groups, and a cooling down period at the end. Anaerobic exercise comprises brief, strength-based activities, such as sprinting or bodybuilding, whereas aerobic exercise is centered around endurance activities, such as marathon running or long-distance cycling. However, the early stage of all exercise is anaerobic.

Methodology

The purpose of the study was to find out the effects of aerobic and anaerobic training followed by cessation on 800 metres run 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. 800 metres performance was assessed by 800 metres run test. 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

The mean and standard deviation values on 800 Meters Run of aerobic training, anaerobic training and control group, at six different stages of tests have been analyzed and presented in the following tables.

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Table I. The Mean and Standard Deviation on 800 Meters Run 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	2.538	2.237	2.281	2.376	2.475	2.506
	SD	0.058	0.104	0.101	0.071	0.054	0.060
Anaerobic Training Group	Mean	2.625	2.401	2.392	2.467	2.540	2.633
	SD	0.067	0.110	0.099	0.085	0.075	0.064
Control Group	Mean	2.661	2.609	2.615	2.598	2.608	2.586
	SD	0.168	0.151	0.079	0.118	0.119	0.091

From Table I shows that pre test mean and standard deviation values on 800 Meters Run for Aerobic Training, Anaerobic Training and Control groups are 2.538 ± 0.058 , 2.625 ± 0.067 and 2.661 ± 0.168 respectively. The post test mean and standard deviation values on 800 Meters Run for Aerobic Training, Anaerobic Training and Control groups are 2.237 ± 0.104 , 2.401 ± 0.110 and 2.609 ± 0.151 respectively. The first cessation mean and standard deviation values on 800 Meters Run for Aerobic Training, Anaerobic Training and Control groups are 2.281 ± 0.101 , 2.392 ± 0.099 and 2.615 ± 0.079 respectively. The second cessation mean and standard deviation values on 800 Meters Run for Aerobic Training, Anaerobic Training and

Control groups are 2.376 ± 0.071 , 2.467 ± 0.085 and 2.598 ± 0.118 respectively. The third cessation mean and standard deviation values on 800 Meters Run for Aerobic Training, Anaerobic Training and Control groups are 2.475 ± 0.054 , 2.540 ± 0.075 and 2.605 ± 0.119 respectively. The fourth cessation mean and standard deviation values on 800 Meters Run for Aerobic Training, Anaerobic Training and Control groups are 2.506 ± 0.060 , 2.633 ± 0.064 and 2.586 ± 0.091 respectively. The data of 800 Meters Run 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 800 Meters Run of Aerobic Training, Anaerobic Training and Control Groups at Six Different Stages of Testing Periods

Source of Variance	Sum of Squares	Df	Mean Squares	F-ratio
A factor (Groups)	1.899	2	0.950	26.340*
Error I	1.514	42	0.036	
B factor (Tests)	1.470	5	0.294	67.799*
AB factor (Interaction) (Groups and Tests)	0.705	10	0.071	16.266*
Error II	0.911	210	0.004	

**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 26.340 for row (groups) on 800 Meters Run is greater than the required table value 3.22 for significance with df 2 and 42. It further shows that the obtained "F" ratio value 67.799 for column (tests) on 800 Meters Run is greater than the required table value 2.56 for significance with df 5 and 210. The obtained "F" ratio value of 16.266 for interaction effect (groups x tests) on 800 Meters Run 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 800 Meters Run ($P < 0.05$). The results of the study indicate that there is a significant difference in the interaction effect (between rows (Groups) and columns (Tests)) on 800 Meters Run. 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 800 Meters Run

Source of Variance	Sum of Squares	df	Mean Squares	“F” ratio
Groups Within Pre test	0.121	2	0.060	13.913*
Groups Within Post test	1.043	2	0.521	120.223*
Groups Within First Cessation	0.868	2	0.434	100.038*
Groups Within Second Cessation	0.373	2	0.187	43.063*
Groups Within Third Cessation	0.132	2	0.066	15.223*
Groups Within Fourth Cessation	0.068	2	0.034	7.860*
Tests and Aerobic Training Group	1.271	5	0.254	58.629*
Tests and Anaerobic Training Group	0.854	5	0.171	39.395*
Tests and Control Group	0.050	5	0.010	2.308*
Error II	0.911	210	0.004	--

**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 120.223, 100.038, 43.063, 15.223 and 7.860 indicating that there was a significant difference between the paired means of groups within post test on 800 Meters Run. Table III shows that F-ratio values obtained for tests within Aerobic Training Group and tests within Anaerobic Training Groups were 58.629 and 39.395 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 800 Meters Run. 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.

Table IV. The Scheffe's test for the differences between paired means of post test with different groups on 800 Meters Run

Aerobic Training Group	Anaerobic Training Group	Control Group	Mean difference	Confidence interval
2.237	2.401		0.164*	0.059
2.237		2.609	0.372*	0.059
	2.401	2.609	0.208*	0.059

**Significant at 0.05 level.*

The above table clearly indicates that the mean difference between Aerobic Training and Anaerobic Training groups, Aerobic Training and Control groups, Anaerobic Training and Control groups, are 0.164, 0.372 and 0.208 respectively. The values are greater than the confidence interval value 0.059, which shows significant difference at 0.05 level of confidence. 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, Aerobic Training and Control groups, Anaerobic Training and Control groups, on 800 Meters Run at post test period.

Table V. The Scheffe's test for the differences between paired means of groups on 800 Meters Run (First Cessation)

Aerobic Training Group	Anaerobic Training Group	Control Group	Mean Difference	Confidence Interval
2.281	2.392		0.111*	0.059
2.281		2.615	0.334*	0.059
	2.392	2.615	0.223*	0.059

** Significant at 0.05 level of confidence*

The Table V shows that the mean difference between Aerobic Training and Anaerobic Training groups, Aerobic Training and Control groups, Anaerobic Training and Control groups are 0.111, 0.334 and 0.223 respectively on 800 Meters Run after the first cessation of detraining period which are greater than the confidence interval value 0.059

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 800 Meters Run after the first cessation of detraining period.

Table VI. The Scheffe's test for the differences between paired means of groups on 800 Meters Run (Second Cessation)

Aerobic Training Group	Anaerobic Training Group	Control Group	Mean Difference	Confidence Interval
2.376	2.467		0.091*	0.059
2.376		2.598	0.222*	0.059
	2.467	2.598	0.131*	0.059

** Significant at 0.05 level of confidence*

The Table V I, shows that the mean difference between Aerobic Training and Anaerobic Training groups, Aerobic Training and Control groups, Anaerobic Training and Control groups are 0.091, 0.222 and 0.131 respectively on 800 Meters Run after the second cessation of detraining period which are greater than the confidence interval value 0.059 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 800 Meters Run after the second cessation of detraining period.

Table VII. The Scheffe's test for the differences between paired means of groups on 800 Meters Run (Third Cessation)

Aerobic Training Group	Anaerobic Training Group	Control Group	Mean Difference	Confidence Interval
2.475	2.540		0.065*	0.059
2.475		2.608	0.133*	0.059
	2.540	2.608	0.068*	0.059

** 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 0.065, 0.133 and 0.068 respectively on 800 Meters Run after the third cessation of detraining period which are greater than the confidence interval value 0.059 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 800 Meters Run after the third cessation of detraining period.

Table VIII. The Scheffe's test for the differences between paired means of groups on 800 Meters Run (Fourth Cessation)

Aerobic Training Group	Anaerobic Training Group	Control Group	Mean Difference	Confidence Interval
2.537	2.633		0.095*	0.059
2.537		2.586	0.049	0.059
	2.633	2.586	0.047	0.059

* *Significant at 0.05 level of confidence*

The Table VIII shows that the mean difference between Aerobic Training and Anaerobic Training is 0.095 on 800 Meters Run after the fourth cessation of detraining period which are greater than the confidence interval value 0.059 at 0.05 level of confidence. The mean difference between Aerobic training and Control groups, Anaerobic Training and Control are 0.049 and 0.047. The value is less than the confidence interval value 0.059, 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 800 Meters Run 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 800 Meters Run (Aerobic Training Group)

Pre Test	Post Test	First Cessation	Second Cessation	Third Cessation	Fourth Cessation	Mean difference	Confidence Interval
2.538	2.237					0.301*	0.081
2.538		2.281				0.257*	0.081
2.538			2.376			0.162*	0.081
2.538				2.475		0.063	0.081
2.538					2.537	0.001	0.081
	2.237	2.281				0.044	0.081
	2.237		2.376			0.139*	0.081
	2.237			2.475		0.239*	0.081
	2.237				2.537	0.301*	0.081
		2.281	2.376			0.095*	0.081
		2.281		2.475		0.195*	0.081
		2.281			2.537	0.257*	0.081
			2.376	2.475		0.099*	0.081
			2.376		2.537	0.161*	0.081
				2.475	2.537	0.062	0.081

* *Significance at 0.05 level of confidence*

The Table IX shows that the mean difference between pre test and post test values, pre test and first cessation values, pre test and second cessation values, 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, 0.301, 0.257, 0.162, 0.139, 0.239, 0.301, 0.095, 0.195, 0.257, 0.099 and 0.161 respectively on 800 Meters Run of Aerobic training Group which

are greater than the confidence interval value 0.081 at 0.05 level of confidence. And the mean difference between pre test and third cessation, pre test and fourth cessation values, post test and first cessation values, third cessation and fourth cessation values are 0.063, 0.001, 0.044 and 0.062 respectively on 800 Meters Run which are less than the confidence interval values 0.081 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, 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 on 800 Meters Run of Aerobic

Training Group. It was also found that there was no significant difference between pre test and third cessation, pre test and fourth cessation values, post test and first cessation values, third cessation and fourth cessation values on 800 Meters Run of Aerobic training Group.

Table X. The Scheffe's test for the differences between paired means of tests on 800 Meters Run (Anaerobic Training Group)

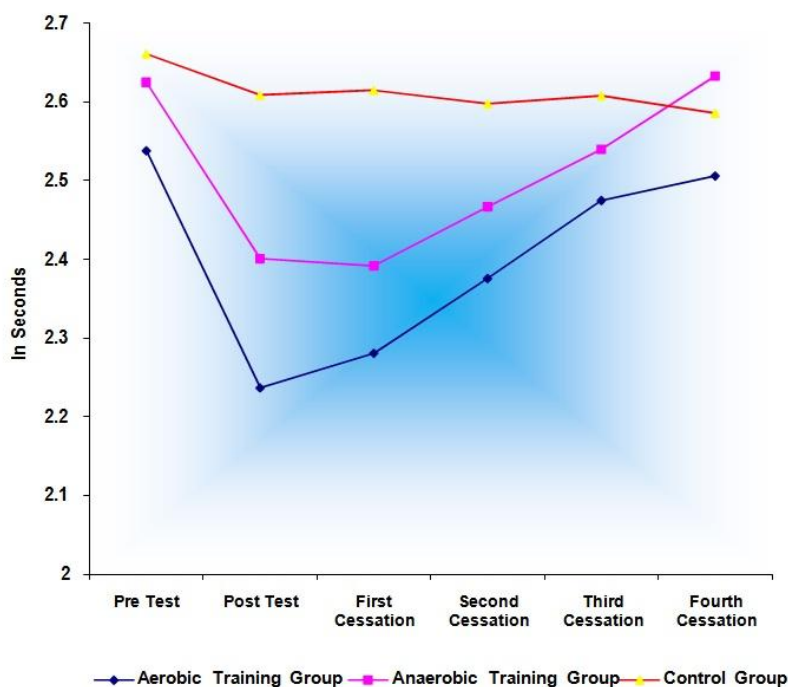
Pre Test	Post Test	First Cessation	Second Cessation	Third Cessation	Fourth Cessation	Mean difference	Confidence Interval
2.625	2.401					0.225*	0.081
2.625		2.392				0.233*	0.081
2.625			2.467			0.158*	0.081
2.625				2.540		0.085	0.081
2.625					2.633	0.007	0.081
	2.401	2.392				0.009	0.081
	2.401		2.467			0.067	0.081
	2.401			2.540		0.139*	0.081
	2.401				2.633	0.232*	0.081
		2.392	2.467			0.075	0.081
		2.392		2.540		0.148*	0.081
		2.392			2.633	0.241*	0.081
			2.467	2.540		0.073	0.081
			2.467		2.633	0.165*	0.081
				2.540	2.633	0.093*	0.081

** 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, 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 0.225, 0.233, 0.158, 0.139, 0.232, 0.148, 0.241, 0.165 and 0.093 respectively on 800 Meters Run of Anaerobic Training Group which are greater than the confidence interval value 0.081 at 0.05 level of confidence. And the mean difference between pre test and third cessation, 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 0.085, 0.007, 0.009, 0.067, 0.075 and 0.073 respectively on 800 Meters Run which are less than the confidence interval values 0.081 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, 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 800 Meters Run of Anaerobic Training Group. It was also found that there was no significant difference between pre test and third cessation, 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, on 800 Meters Run 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 800 Meters Run 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 800 Meters Run.



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 800 metres run.
2. The control group had no significant differences on 800 metres run.

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