

## LOW INTENSITY AEROBIC TRAINING FOLLOWED BY DETRAINING AND ITS EFFECT ON SERUM LIPIDS

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### Abstract

The present study was conducted to investigate the effect of aerobic training followed by detraining on serum lipids. Thirty physically active students were (N=30) randomly selected as subjects and their age ranged between 18 and 25 years. The selected subjects were randomly divided into two equal groups with fifteen subjects each as men and women groups (N=15). Both groups were underwent their training programme for three days per week for sixteen weeks and followed by five weeks of detraining and a session on each day. Triglyceride was taken as variable for this investigation. The data were statistically analysed by using dependent and independent 't' test as well as repeated measures of ANOVA. The results revealed that the aerobic training produced significant difference ( $p \leq 0.05$ ) on triglycerides of men and women groups

**Keywords:** Aerobic training, Detraining, Serum lipids

### Introduction

Aerobic means "with oxygen" and one's body's aerobic system is one's heart, lungs, blood vessels and muscles. The benefit of aerobic exercise is based on how well one's body can deliver oxygen to one's muscles and use it for energy. Regular aerobic workouts increase one's ability to take in and transport that oxygen and improve one's aerobic capacity. Aerobic means "with oxygen" and one's body's aerobic system is one's heart, lungs, blood vessels and muscles. The benefit of aerobic exercise is based on how well one's body can deliver oxygen to one's muscles and use it for energy. Regular aerobic workouts increase one's ability to take in and transport that oxygen and improve one's aerobic capacity.

Triglycerides, which are chains of high-energy fatty acids, provide much of the energy needed for cells to function. Most important effect of exercise on human body is on metabolic system specially lipids. Lipid is one of the risk factor for coronary heart disease[1]. Regular aerobic exercise helps prevent heart disease. It does this by slowing the build-up of plaque in the arteries of the heart.

Maintaining flexibility in the muscles of the legs and lower back, and strength in abdominal and back muscles, can help prevent the development of back problems that can be debilitating and very painful. [2]. Exercise helps to decrease triglycerides (TG), [3]. The implications of these changes have been linked to the prevention or slowing down of the atherosclerotic process and consequently have clear benefits to an individual's cardiovascular health. Short-term detraining (five weeks) induced significant changes in the metabolic response to exercise, with decreased fat breakdown during exercise and increased reliance on glucose. Long-term detraining produced more significant and dramatic changes, with lower fatty acid availability giving rise to an even higher reliance on glucose during exercise

### Methodology

For the present study, 15 male and 15 female participants were selected at random from Department of Physical Education and Sports Sciences, Annamalai University, Tamil Nadu, India. The age of the participants ranged between 18 and 25 years. The selected

participants were divided into two experimental groups with fifteen participants (n=15) in each group. Experimental group I (MG=15) underwent aerobic training and Group II (WG=15) underwent aerobic training. During the training period, the experimental groups underwent their respective training programme three days per week on alternate days for sixteen weeks. Experimental Group I (MG) and Group II (WG) underwent low intensity aerobic training. Before the commencement of the experimentation and at the middle of the training period (after fifth week), the investigator recorded the target heart rate for both group participants. Training volume and intensity were increased progressively on different phases. Every day the workout lasted for 50 to 60 minutes approximately. The participants underwent their respective training programme under strict supervision of the investigator. Prior to every training session, participants underwent 5-10 minutes warm-up exercises, which included jogging, stretching, striding, and

assisting exercises such as push-ups and crunches. After the training period (16 weeks), the experimental groups underwent their respective detraining programmes for five weeks. Experimental Group I (MG) and Group II (WG) underwent their regular college routine; they were not involved in any specific training programme.

**Statistical Procedure**

The data collected from experimental group I and group II prior to and after the completion of the training period were statistically analysed for significant difference if any, by applying dependent ‘t’ test. To eliminate the influence of pretest, the net mean gains of experimental groups were computed separately. The paired mean gains of experimental groups were tested for significance by applying independent ‘t’ ratio. Repeated measures of ANOVA were used to find out the detraining effect of group I and group II. All the data were analysed using computer with SPSS statistical package. The level of confidence was fixed at 0.05 levels.

**Analysis of data and Results**

**Table - I**  
**Mean, Standard Deviation and ‘t’ Ratio on Triglycerides for pre and post test of Low Intensity Aerobic Training for Men and Women**

Groups		Mean	S.D	DM	‘t’-ratio
Men group	Pre-test	120.55	8.63	15.35	8.218*
	Post-test	105.2	10.49		
Women group	Pre-test	125.35	6.30	9.92	8.345*
	Post-test	115.43	8.07		

\*Significant at 0.05 level  
 The table value required for significant for df 14 is 2.14.

Table I shows the mean value of triglycerides of men group before the commencement of aerobic training was 120.55 and after the completion of 16 weeks aerobic training the mean was 105.2. It resulted with a mean difference of 15.35. The obtained ‘t’ ratio was 8.218 and it was higher than the table value of 2.14 required for significance at 0.05 level for df 14. It was

concluded that the low intensity aerobic training decreased the triglycerides of men group. The pre test mean value of triglycerides of women group was 125.35 and the post test triglycerides was 115.43. The mean difference was 9.92. The obtained ‘t’ ratio was 8.345 and it is higher than the table value 2.14 required for significance at 0.05 level for df 14. It was inferred that the low

intensity aerobic training had caused significant reduction on triglycerides for the women group.

**Table - II**  
**Comparison of Mean Gain on Triglycerides between Paired Mean of Men and Women**

Groups	Mean	S.D	SE	t-ratio
Men	15.35	7.23	1.87	2.454*
Female	9.92	4.60	1.19	

\*Significant at 0.05 level

The table value required for significance for df 28 is 2.05

Table II shows the mean gain for men and women groups as a result of low intensity aerobic training were 15.35 and 9.92 respectively. It resulted with a 't' ratio of 2.454 and it was higher than the table value of 2.05 required for significant at 0.05 level to the df 28. It is concluded that decrease in triglycerides was significantly higher for men than women.

Therefore the results of the study indicate that low intensity aerobic training decrease

triglycerides for all the two groups namely men and women groups. It also indicated that the decrease level was greater in men than women group. The analysis of variance for 2x5 repeated measures on the last factor on triglycerides of different experimental groups of men and women data have been analyzed and presented in table III

**Table - III**  
**Summary of ANOVA for 2 X 5 Repeated Measures on the last factor of Triglycerides**

Source of Variation	SS	df	MS	F
A (Gender)	2174.977	1	2174.977	30.15*
B (Times)	3164.663	4	791.1658	10.97*
AB (Gender X Times)	122.353	4	30.58825	0.42
WSS (Error)	10099.93	140	72.14236	
Total	15561.92	149		

\*Table value required for significance at 0.05 level with df 1, 140 & 4, 140 were 3.92 and 2.44

The table III shows that the F-ratios for gender and times were 30.15 and 10.97 against 3.92 and 2.44 (df 1, 140 & 4, 140) respectively which were significant at 0.05 level on triglycerides. However, the F-ratio for interaction of gender and times was 0.42 a not significant at 0.05 level.

Since gender has only two categories, it can be directly implied that at detraining, the men groups (mean = 113.06) was lower than the women group (mean = 120.67) in triglycerides. Since the participants (men and

women) have been tested on triglycerides once in a week for the five times, the first week to

fifth week test scores of men and women were (mean scores of men =106.63, 108.03, 112.23, 117.45 and 120.95 mean scores of women = 116.21, 117.49, 120.25, 122.78 and 126.64 ) was gradually increase the triglycerides level. Besides, fifth week serum triglycerides level was almost similar to the pre test score of men and women were (mean = 120.55 and 125.35). Therefore the results of the study indicate that the five weeks of detraining programme, (after the 16 weeks low intensity aerobic training) increase the triglycerides level among the men and women groups. The mean gain value on triglycerides of men and women groups are graphically represented in Figure-I. The pre test, post-test and detraining test (five times) mean values of men on triglycerides are graphically

presented in figure II. The pre test, post-test and detraining test (five times) mean values of

women on triglycerides are graphically presented in figure III.

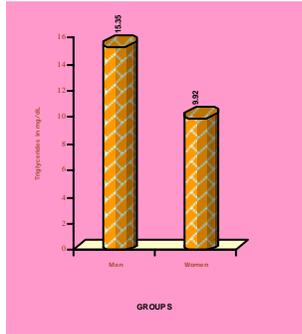


Figure I: The Mean Gain Value on Triglycerides of Men and Women Groups

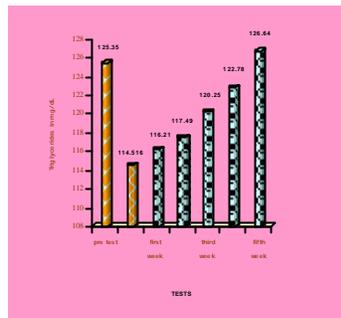


Figure II: The Mean Scores of Pre, Post and Detraining Test Values on Triglycerides of Men Group

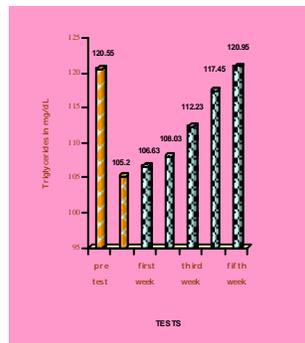


Figure III: The Mean Scores of Pre, Post and Detraining Test Values on Triglycerides of Women Group

**Discussion**

In the present study a long term exercise programme based on regular daily aerobic exercise i.e. brisk walk, hopping, stepping and

jogging leads to changes in serum lipids levels as long term low intensity aerobic exercise is capable of decreasing triglycerides [4-10]. According to Hata and Nakajima, (2000)

[7]meta-analyses are considered to indicate the extent to which abnormalities of serum lipids are caused by a distorted life-style and the extent to which they are improved by correction of the life-style and exercise. Detraining lead to increase the serum lipids level as seen from the study. Similar results were reported by Petibois, Cyril, et al., (2004), Hardman and Hudson, (1994), Motoyama, et al., (1995) and Durstine, et al., (2001) [11-13,8]. In short, the present study concluded that 16 week low intensity aerobic training decreases the triglycerides in men and women students. During the detraining the level of lipid gradually changes its level and return to the pre test level at fifth week.

### Conclusion

In summary the triglycerides, there was significant difference occurred due to aerobic training. Long term low intensity aerobic training decreases the triglycerides in men and women students. 16 weeks of low intensity aerobic training changing the serum lipids levels more in men than the women students. First three weeks of detraining there was some increase TG level in men and women student.

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