

EFFECT OF LYDIARD TRAINING ON SELECTED PHYSICAL FITNESS COMPONENTS AND PERFORMANCE VARIABLES AMONG MALE LONG DISTANCE RUNNERS

A. Dominic¹, P.Kamaraj², S.Rameshkumar³ & K. Mohan⁴

^{1, 2, 3} Director of Physical Education, M. Kumarasamy College of Engineering, Karur-639 113.

⁴ Ph.D. Research Scholar, Department of Physical Education, Bharathidasan University, Trichy-24, TN, India

Abstract- The purpose of the study was to find out the effect of Lydiard training on selected physical fitness components and performance variables namely endurance, maximum power, minimum power, average power, fatigue index and 5000 mts run among male long distance runners. To achieve the purpose of the study thirty male long distance runners have been randomly selected from various engineering colleges in and around Karur, Tamil Nadu, India. The age of subjects were ranged from 18 to 25 years. The subjects had past experience of at least three years in long distance and only who those represented their respective college teams were taken as subjects. A series of physical fitness components was carried out on each participant. These included endurance assessed by cooper 12min run, maximum power, minimum power, average power and fatigue index assessed by running based anaerobic sprint test (RAST) and performance assessed by 5000mts run test. The subjects were randomly assigned into two groups of fifteen each, such as control and experimental groups. The experimental group participated in the Lydiard training for 5 days a week, one session per day and for 12 weeks each session lasted 90 minutes. The control group maintained their daily routine activities and no special training was given. The subjects of the two groups were tested on selected variables prior and immediately after the training period. The collected data were analyzed statistically through analysis of covariance (ANCOVA) to find out the significance difference, if any between the groups. The 0.05 level of confidence was fixed to test the level of significance difference, if any between groups. The results of the study showed that there was significant level differences exist between Lydiard training group and control group. And also Lydiard training group showed significant improvement on endurance, maximum power, minimum power, average power, fatigue index and 5000 mts run when compared to control group.

Key words: Lydiard training, endurance, maximum power, average power, fatigue index

Introduction

Running is classical ‘athletic sport’ can be considered both simple and difficult, simple because it is and instinctive, natural skill performed at some time by all but the most unfortunate in its mechanical complexity (Dyson, 1973). Physical fitness is not a static factor as it varies from individual to individual and in the same person from time to time depending various (Clarke, 1971). The improvement of physical fitness is the application of the principles of exercise-physiology to the improvement of one’s capacity to meet successfully life’s physical challenges. Competitive sports and athletic provide the participant with a variety of physical challenges that must be must successfully if the participant is to win a satisfactory share of competitions. Successful distance running primarily requires the development of aerobic endurance. The deviation of the activity and the amount of static muscle contraction involved, the more performance in that activity will be limited by the functioning of the heart, blood vessels, blood and lungs. The degree to which circulation and respiration limit ones performance depends on many factors, chief of which is the intensity of the exercise. Distance running is a relatively low intensity, low duration activity consisting mostly of rhythmic, non static muscle contraction and is limited mainly by aerobic capacity. Arthur Leslie Lydiard was a New Zealand runner and athletics coach. He has been lauded

as one of the outstanding athletics coaches of all time and is credited with popularizing the sport of running and making it commonplace across the sporting world. His training methods are based on a strong endurance base and periodisation. Lydiard et al. (1999) opine that the Lydiard training system is based on a balanced combination of aerobic and anaerobic running. Aerobic running means running within once capacity to use oxygen. Everyone, according to his or her physical condition, is able to use a limited amount of oxygen each minute. With the right kind of exercise, one can raise once limit. The maximum limit is called the "Steady State", the level at which one working to the limit of once ability to breathe in, transport, and use the oxygen. The marathon-conditioning phase of Lydiard's system is known as base training, as it creates the foundation for all subsequent training. Lydiard's emphasis on an endurance base for his athletes, combined with introduction of periodisation in the training of distance runners, were the decisive elements in the world-beating success of the athletes he coached or influenced. Periodisation comprises emphasizing different aspects of training in successive phases as an athlete approaches an intended target race. After the base training phase, Lydiard advocated four weeks of strength work. This included hill running and springing, followed by a maximum of four weeks of anaerobic training (Lydiard found through physiological testing that four weeks was the maximum amount of anaerobic development needed—any more caused negative effects such a decrease in aerobic enzymes and increased mental stress, often referred to as burnout, due to lowered blood pH). Then followed a co-ordination phase of six weeks in which anaerobic work and volume taper off and the athlete races each week, learning from each race to fine-tune himself or herself for the target race. For Lydiard's greatest athletes the target race was invariably an Olympic final. The investigator is a long distance

runners, official, coach, administrator, selector, observer attempted to study about the physical and performance effects of the long distance runners. Lydiard training can help to improve performance in athlete. Little research had done on long distance runners. The purpose of the study was to find out the effect of Lydiard training on selected physical fitness components and performance variables endurance, maximum power, minimum power, average power, fatigue index and 5000 mts run among male long distance runners.

Methods

To achieve the purpose of the study thirty male long distance runners have been randomly selected from various engineering colleges in and around Karur, Tamil Nadu, India. The age of subjects were ranged from 18 to 25 years. The subjects had past experience of at least three years in long distance and only who those represented their respective college teams were taken as subjects. A series of physical fitness components was carried out on each participant. These included endurance assessed by cooper 12min run, maximum power, minimum power, average power and fatigue index assessed by running based anaerobic sprint test (RAST) and performance assessed by 5000mts run test. The subjects were randomly assigned into two groups of fifteen each, such as control and experimental groups. The experimental group participated in the Lydiard training for 5 days a week, one session per day and for 12 weeks each session lasted 90 minutes. The control group maintained their daily routine activities and no special training was given. The subjects of the two groups were tested on selected variables prior and immediately after the training period. The collected data were analyzed statistically through analysis of covariance (ANCOVA) to find out the significance difference, if any between the groups. The 0.05 level of confidence was fixed to test the level of significance difference, if any between groups.

TABLE-I
Criterion measures

S.No	Criterion measure	Test items	Unit of measurement
1	Endurance	Cooper 12 minutes run	In meters
2	Maximum power	Running based anaerobic sprint test	Watts
3	Minimum power		
4	Average power		
5	Fatigue index		Watts/sec
6	Performance	5000 meters run test	In second

Training flow chat



TABLE – II
Descriptive analysis of selected physiological variables among control and experimental groups

S.No	Variables	Group	Pre-Test Mean	SD (\pm)	Post -Test Mean	SD (\pm)	Adjusted Mean
1	Endurance	CG	2354.00	16.38	2474.66	110.10	2472.79
		LTG	2344.00	27.20	2587.33	29.99	2589.20
2	Maximum power	CG	631.40	23.29	627.00	23.50	627.38
		LTG	644.26	27.25	665.06	34.22	664.68
3	Minimum power	CG	364.20	30.19	365.20	31.70	367.961
		LTG	371.53	12.73	397.66	26.80	394.90
5	Average power	CG	468.86	33.50	470.26	31.59	470.27
		LTG	466.13	24.61	491.86	20.47	491.86
6	Fatigue index	CG	8.99	1.12	8.63	0.81	8.62
		LTG	8.81	0.99	8.04	0.63	8.05
7	Performance	CG	1201.66	36.67	1185.20	40.66	1185.05
		LTG	1199.46	27.66	1109.20	14.789	1109.34

CG= Control group

LTG= Lydiard training group

The tables-II the pre, post-test means, standard deviations and adjusted means on selected physical fitness components and performance variables of male long distance runners were numerical presented. The analysis of covariance on selected variables of Lydiard's training and control group is presented in table – III.

TABLE – III
Computation of analysis of covariance on selected physical fitness components and performance variables among male long distance runners

S.No	variables	Test	Sum of variance	Sum of squares	df	Mean square	F ratio
1	Endurance	Pre-test	Between groups	750.00	1	750.00	1.48
			Within groups	14120.00	28	504.28	
		Post-test	Between groups	95203.33	1	95203.33	14.62*
			Within groups	182316.66	28	6511.31	
		Adjusted means	Between sets	96501.94	1	96501.94	14.44*
			Within sets	180342.27	27	6679.34	
2	Maximum power	Pre-test	Between groups	1241.63	1	1241.63	1.93
			Within groups	17998.53	28	642.80	
		Post-test	Between groups	10868.03	1	10868.03	12.60*
			Within groups	24138.93	28	862.10	
		Adjusted means	Between sets	9758.56	1	9758.56	10.94*
			Within sets	24074.16	27	891.63	
3	Minimum power	Pre-test	Between groups	403.33	1	403.33	0.75
			Within groups	15040.13	28	537.14	
		Post-test	Between groups	7905.63	1	7905.63	9.17*
			Within groups	24135.73	28	861.99	
		Adjusted means	Between sets	5303.12	1	5303.12	9.17*
			Within sets	15609.58	27	578.13	
4	Average power	Pre-test	Between groups	56.03	1	56.03	0.06
			Within groups	24197.46	28	864.19	
		Post-test	Between groups	3499.20	1	3499.20	4.93*
			Within groups	19846.66	28	708.81	
		Adjusted means	Between sets	3486.87	1	3486.87	4.74*
			Within sets	19846.10	27	735.04	
5	Fatigue index	Pre-test	Between groups	0.22	1	0.22	0.20
			Within groups	31.43	28	1.12	
		Post-test	Between groups	2.67	1	2.67	5.03*
			Within groups	14.85	28	0.53	
		Adjusted means	Between sets	2.43	1	2.43	4.62*
			Within sets	14.22	27	0.52	
6	Performance	Pre-test	Between groups	36.30	1	36.30	0.03
			Within groups	29543.06	28	1055.11	
		Post-test	Between groups	43320.00	1	43320.00	46.28*
			Within groups	26208.80	28	936.02	
		Adjusted means	Between sets	42934.54	1	42934.54	45.12*
			Within groups	25686.91	27	951.36	

*Significant at 0.05level of confidences

(Table value for df 1 and 28 was 4. 20, Table value for df 1 and 27 was 4.21)

In the table the results of analysis of covariance on endurance, maximum power, minimum power, average power, fatigue index and 5000 mts run. The obtained 'F' ratio of 1.48, 1.93, 0.75, 0.06, 0.20 and 0.03 for pre-test means was less than the table value of 4.20 for df 1 and 28 required for significance at 0.05 level of confidence on endurance, maximum power, minimum power, average power, fatigue index and 5000 mts run. The obtained 'F' ratio 14.62, 12.60, 9.17, 4.93, 5.03 and 46.28 for post-test means was greater than the table value of 4.20 for df 1 and 28 required for significance at 0.05 level of confidence on endurance, maximum power, minimum

power, average power, fatigue index and 5000 mts run. The obtained 'F' ratio of 14.44, 10.94, 9.17, 4.74, 4.62 and 45.12 for adjusted post-test means was greater than the table value of 4.21 for df 1 and 27 required for significance at 0.05 level of confidence on endurance, maximum power, minimum power, average power, fatigue index and 5000 mts run. The result of the study indicated that there was a significant difference among the adjusted post test means of Lydiard training group and control group on endurance, maximum power, minimum power, average power, fatigue index and 5000 mts run.

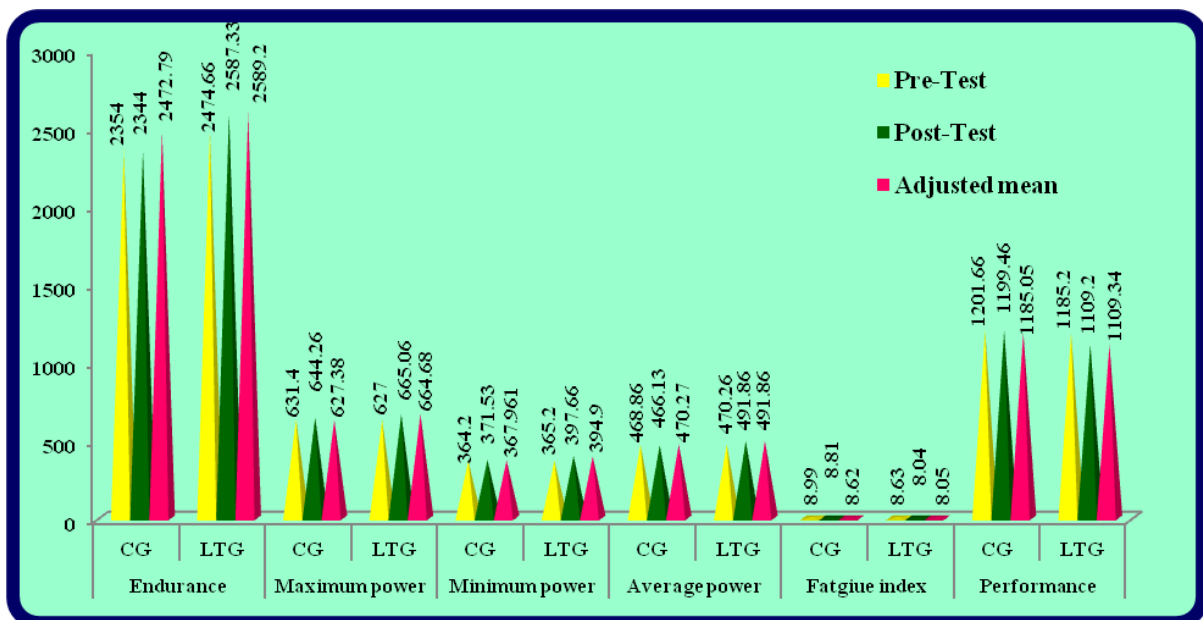


Figure-I The pre, post and adjusted mean values of endurance, maximum power, minimum power, average power, fatigue index and performance of both control and experimental groups are graphically represented in the figure-I

Discussion of findings

The results of the study indicate that the experimental group which underwent Lydiard’s training had showed significant improvement in the selected variables namely variables endurance, maximum power, minimum power, average power, fatigue index and 5000 mts run, when compared to the control group. The control group did not show significant

improvement in any of the selected variables. The past studies on selected physiological variables also reveals similar result Mohan and Kalidasan (2013) advised that significant improvement on endurance and speed due to influences of Lydiard training, Balciunasthe, et, al (2006) opined that running based anaerobic sprint test (RAST) showed significant increases in PE, with greater increases during the 5th and 6th runs due to 4 months of different training modalities.

Conclusions

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

1. The experimental group long distance runners showed significant improvement in all the selected physical fitness components and performance variables namely variables endurance, maximum power, minimum power, average power, fatigue index and 5000 mts run.
2. The control group long distance runners did not show significant improvement in any of selected variables.

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