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GAVIN PUBLISHERS

Journal of Yoga, Physical Therapy and Rehabilitation

Research Article

Kumar R. Yoga Phys Ther Rehabil: YPTR-158.

DOI: 10.29011/ 2577-0756. 000058

Effect of Hill Training and Fartlek Training for development of Aerobic Fitness among Middle and Long-Distance Runners of Hyderabad District in India

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Citation: Kumar R (2018) Effect of Hill Training and Fartlek Training for development of Aerobic Fitness among Middle and Long-Distance Runners of Hyderabad District in India. Yoga Phys Ther Rehabil: YPTR-158. DOI: 10.29011/ 2577-0756. 000058

Received Date: 04 June, 2018; **Accepted Date:** 06 July, 2018; **Published Date:** 16 July, 2018

Abstract

Introduction: Aerobic Fitness is vital for middle and long-distance runners. Aerobic fitness is of special importance at the beginning of the preparatory period. The Objective of this study is to determine the effects of Hill Training and Fartlek Training for development of Aerobic fitness among the Middle and long-distance Runners [1].

Methods: The sample for the study consists of 45 Middle and long-distance runners between the age group of 18 to 20 Years those who have participated in many middle and long-distance events since last 3 Years. The selected subjects were randomly divided into three equal groups of 15 each. Group I is Experimental Hill Training Group, Group II is Experimental Fartlek Training Group and Group III is Control Group. The Experimental Groups were given Training Alternate days for 12 Weeks in addition to their normal practice on other days. The Control Group were given routine training. The Data were collected in Pre-Test and Post Test for all groups using the 12 Min Run Cooper Test. The collected data were analyzed statistically by using Ancova.

Results: The Results of the Study shows that due to Hill Training and Fartlek Training there is a significant development of Aerobic fitness among Experimental Groups.

Conclusions: It is concluded that Hill Running and Fartlek Running is beneficial to middle and long-distance runners to stronger the lower body muscles, resistance to fatigue etc. It helps for development of Aerobic Fitness [2].

Keywords: Aerobic Fitness; Fartlek Training; Hill Training

Introduction

Aerobic fitness is a measure of your body's ability to take oxygen from the atmosphere and use it to produce energy for your muscle cells. Many factors influence aerobic fitness, including your lung efficiency, cardiac function, gender, age and genetic makeup. Understanding the various components of aerobic fitness will help you train smarter to achieve optimal performance.

heart and lungs play a central role in aerobic fitness, with your heart being the prime limiting factor. While your lungs must function efficiently in order to transfer oxygen from the atmosphere to your bloodstream, they take a backseat to your heart, which must contract forcefully to inject oxygenated blood into your system to reach your cells. Aerobic exercise training increases your total blood volume, heart muscle size and contractility, resulting in a greater volume of blood being injected per heart beat. Increased stroke volume means your heart does not have to beat as frequently at rest, resulting in a lower resting heart rate.

Hill running has a strengthening effect as well as boosting your athlete's power and is ideal for those athletes who depend on high running speeds - football, rugby, basketball, cricket players and even runners. To reduce the possibility of injury hill training should be conducted once the athlete has a good solid base of strength and endurance [3-5].

Hill training offers the following benefits:

- Helps develop power and muscle elasticity

- Improves stride frequency and length
- Develops co-ordination, encouraging the proper use of arm action during the driving phase and feet in the support phase
- Develops control and stabilization as well as improved speed (downhill running)
- Promotes strength endurance
- Develops maximum speed and strength (short hills)
- Improves lactate tolerance (mixed hills)
- The benefits of short, medium and long hills are quite different, and can be used at different times of the year.

Short Hills

A short hill is one which takes no more that 30 seconds to run up and has an inclination between 5 and 15 degrees gradient. The athlete's energy source on short hills is entirely anaerobic. The athlete should focus on a running technique which has vigorous arm drive and high knee lift, with the hips kept high, so that they are 'running tall', not leaning forwards.

The session is anaerobic, so the recovery time can be long, a walk back down the hill, or a slow jog of 60 to 90 seconds. The total volume will depend on the fitness of the athlete and the reason for doing it. A sprinter looking for strength might do 10 repetitions of 15 second duration up a steep slope with a long recovery where as a distance runner who is trying to improve sprinting speed might do 30 repetitions of 15 seconds duration. Short hills of 5 to 10 second duration will help improve the Adenosine Triphosphate and Phosphate-creatine (ATP+PC) energy system and hills of 15 to 30 second duration will help develop the ATP+PC+muscle glycogen energy system.

Medium hills

A medium hill is one that takes between 30 to 90 seconds to run up. This is the length of hill is a good distance for the middle-distance runner, because it combines the benefits of the short hills with the stresses on local muscular endurance and tolerance oflactic acid. Use a hill as steep of one in six to one in ten, so that you can run at something near race pace. The energy source is both aerobic and anaerobic and the athlete will experience the buildup in blood lactate as they go further up the hill. Although the session will usually be quite fast and competitive, it is important that style is emphasized.

Long Hills

A long hill is one which takes from 90 seconds to three minutes plus. Here most of the energy comes from aerobic sources, but if parts of the hill are steep and they are running them hard, there will still be an accumulation of blood lactate. There will be local muscular fatigue in the leg muscles, and possibly in the abdominal muscles too, but the main limiting factor will be the athlete's cardiovascular.

These hills can be used in two ways:

- As a hard-aerobic training session during the pre-competition season
- As a hard time-trial session in the early part of the competition period

As these hill sessions are aerobic, the athlete will not use as much power per stride as the shorter hills, and so perhaps would not be used by middle-distance runners, except for one or two time-trial runs. They are particularly good for the cross country or road runner who is running distances of 10,000m and upwards. A session of, say eight three minutes, with a run back of four or five minutes will make a good hard work out.

Mixed Hill Running

The attraction of mixed hill training is that it can be fitted in with the terrain the athlete is running on and can, therefore, be interesting and full of variety. If they do a fartlek session round a hilly course, they will be able to fit in a number of different runs. Two advantages can come from this type of hill training:

Fartlek, which means "Speed play" in Swedish, is a training method that blends continuous training with interval training. Fartlek runs are a very simple form of a long-distance run. Fartlek training "is simply defined as periods of fast running intermixed with periods of slower running. For some people, this could be a mix of jogging and sprinting, but for beginners it could be walking with jogging sections added in when possible. A simple example of what a runner would do during a fartlek run is "sprint all out from one light pole to the next, jog to the corner, give a medium effort for a couple of blocks, jog between four light poles and sprint to a stop sign, and so on, for a set total time or distance. The variable intensity and continuous nature of the exercise places stress on both the aerobic and anaerobic systems. It differs from traditional interval training in that it is unstructured; intensity and/or speed varies, as the athlete wishes. Fartlek training is generally associated with running, but can include almost any kind of exercise. It is useful for speed endurance, race tactics, mental strength, spurt in races etc.

Review of Related Literature

Pardeep Kumar 2015 The purpose of the present study was to effect of fartlek training for developing endurance ability among athletes. 30 athletes between the age group of 18 to 24 years (15 Experimental Group and 15 Control Group) were selected for the study. The six weeks endurance training program for experimental group were specific to experimental group which contains more sand training on alternate days and controlled group was given

general training of athletics. The Pre-Test and Post Test were proficient through Cooper Test for both group to estimation the effects of sand running. This study explains that the sand training has increased the endurance between the Experimental groups along with Physiological capacity of the athletes. It is optional that sand training is fine for the endurance development of athletes.

Methods

The sample for the study consists of 45 Middle and long-distance runners between the age group of 18 to 20 Years those who have participated in many middle and long-distance events since last 3 Years. The selected subjects were randomly divided into three equal groups of 15 each. Group I is Experimental Hill Training Group, Group II is Experimental Fartlek Training Group and Group III is Control Group. The Experimental Groups were given Training Alternate days for 12 Weeks in addition to their normal practice on other days. The Control Group were given routine training. The Data were collected in Pre-Test and Post Test for all groups using the 12 Min Run Cooper Test. The collected data were analyzed statistically by using Ancova.

Results

	Control Group	Hill Training Group	Fartlek Training Group	SOV	Sum of Squares	df	Mean Square	F Ratio
Pre-Test Mean SD	2098.7	2108	2101.3	B: W:	693.33	2	346.7	0.02
	152.26	71.13	89.91		508586.67	42	12109.21	
Post Test Men	2095.3	2258	2198.7	B: W:	203293.33	2	101646.67	
	152.26	71.13	89.91		508586.67	42	12109.21	10.06*
Adjusted Post Mean	2099	2253	2200	B: W:	184893.99	2	92446.99	71.02*
					53368.2	41	1301.66	
*Significant at 0.05 Level Required Table Value at 0.05 Level of Significance for 2 and 42 degrees of freedom =3.22								

Table 1: Analysis of Covariance for Pre-Test and Post Test Data on Aerobic Fitness of Control Group, Hill Training Group and Fartlek Training Group.

Table 1 showing that Pre-Test Means of Control Group is 2098.7, Hill Training Group 2108.00, Fartlek Training Group 2101.30. Since the obtained 'F' Ratio is 0.02 is lesser than the Table Value of 3.22 there is no significant difference among Pre-Test Means at 0.05 Level of Confidence with 2 and 42 degree of freedom. It is evident that there is no significant difference between Control Group and Experimental groups i.e. Hill Training Group, Fartlek Training Group on Aerobic Fitness initially before the commencement of training Program. The Post Test Means of Control Group is 2095.3, Hill Training Group 2258.0, Fartlek Training Group 2198.7. Since the obtained 'F' Ratio is 10.06 is higher than the Table Value of 3.22 there which reveals there is a significant difference among all the groups on the post test means at 0.05 level of confidence with 42 degrees of freedom. The Adjusted Post Test Means of Control Group is 2099.00, Hill Training Group 2253.00, Fartlek Training Group 2200.00. Since the obtained 'F' Ratio is 71.02 is much higher than the Table Value of 3.22 there which reveals there is a significant difference among all the groups on the adjusted post test means at 0.05 level of confidence with 41 degrees of freedom.

Conclusions

It is concluded that Hill Running and Fartlek Running is beneficial to middle and long-distance runners to stronger the lower body muscles, resistance to fatigue etc. It helps for development of Aerobic Fitness. It is evident that there is no significant difference between Control Group and Experimental groups i.e. Hill Training Group, Fartlek Training Group on Aerobic Fitness initially before the commencement of training Program. The Post Test Means of Control Group is 2095.3, Hill Training Group 2258.0, Fartlek Training Group 2198.7. The Hill Training group is having the better results in Fartlek Training Group. It is also concluded that Hill Training is more suitable than Fartlek Training for development of Aerobic Fitness among Middle and long-distance Runners.

Recommendations: The Hill Running and Fartlek Running is recommended to all Coaches to include in there training regiment to develop the Aerobic Fitness which is essential for middle and long-distance runners.

Acknowledgements: I am thankful to Mr. A. Xavier, Athletics Coach of Osmania University for his help in accomplishment in the study.

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