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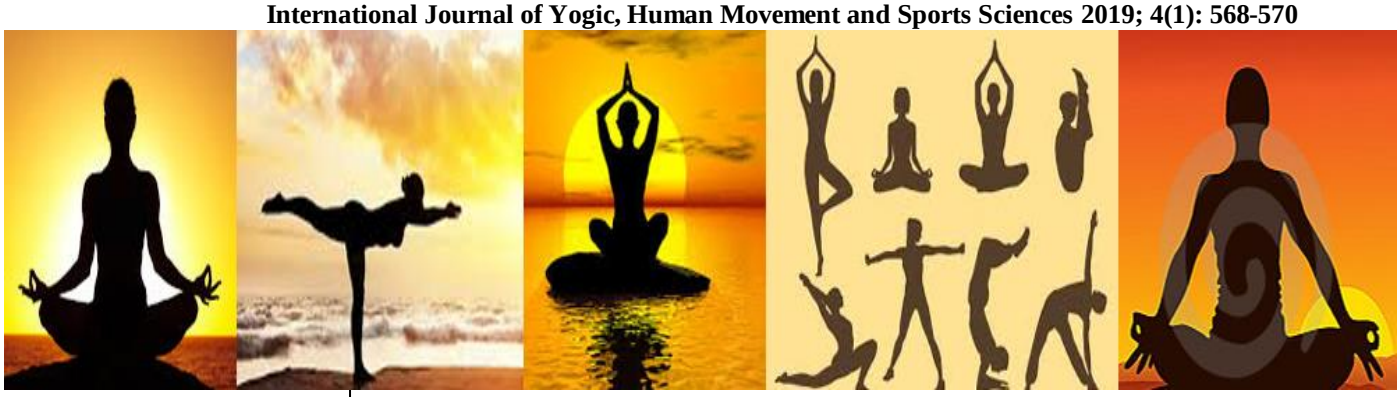

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Training methods for long distance runners

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Abstract
Long distance track events gained popularity in the 1920s by the achievements of the "Flying Finns", such as multiple Olympic champion Paavo Nurmi. The formation of group and thereby classification of endurance can be done on the basis of two criteria: nature of activity and duration of activity. A distance runner's stride' like that of any other track athlete' is composed of three phases: push-off or drive, Recovery, Supports. "An effective training program results from efficient planning, the judicious use of rest and recovery days, and gradual increase in training intensity and duration". Training Methods for Long Distance Runners 1. Continuous Method: Slow Continuous Method, Fast Continuous Method, Variable Pace Method, Fartlek Method.
2. Interval Method
3. Repetition Method
4. Resistance Training
5. Uphill Running
6. Endurance Circuit Training
7. Competition Method
The competition method in its three forms should be used quite frequently for the improvement of endurance and its components.

Keywords: Training Methods, Long Distance Runners, Fast Continuous Method

Introduction
There are three common long distance running events in track and field competitions: 3000 meters, 5000 meters and 10,000 meters. The long distance track events gained popularity in the 1920s by the achievements of the "Flying Finns", such as multiple Olympic champion Paavo Nurmi. The successes of Emil Zátopek in the 1950s promoted intense interval training methods, but Ron Clarke's world record-breaking feats established the importance of natural training and even-paced running. The components of physical fitness that have a relationship with enhanced performance in sports and motor skills. For different group of sports essentially a different type of endurance ability is required. The formation of group and thereby classification of endurance can be done on the basis of two criteria: nature of activity and duration of activity. Endurance is a motor ability which has been a subject of keen study by expert of sports physiology. As a result we have a much better insight into the factors and prerequisites which determine endurance ability that are:

1. Aerobic capacity- oxygen intake, oxygen transport, oxygen uptake, energy researves.
2. Anaerobic capacity - phosphogen stores, buffer capacity, lactic acid tolerance, aerobic capacity.
3. Movements economy
4. Psychic factors

Running Technique
A distance runner's stride' like that of any other track athlete' is composed of three phases: push-off or drive, Recovery, Supports.
During the push-off phase, the body is propelled forward via the support foot and finally the toes. The recovery is that period when the body is in the air with either foot in ground contact. The support phase is when the foot re contacts the ground. As the body's center of gravity passes over the supporting foot, the drive phase off the next stride begins.

Training

"An effective training program results from efficient planning, the judicious use of rest and recovery days, and gradual increase in training intensity and duration". Training is the acquisition of knowledge, skills, and competencies as a result of the teaching of vocational or practical skills and knowledge that relate to specific useful competencies.

Training Methods for Long Distance Runners

In long distance running economy of energy is most important consideration. All wasteful hindering movements must be excluded by the use of a rational technique. They are physically mature runners for whom training has developed the characteristics required for a race of this type namely technical and muscular efficiency, aerobic endurance, lung capacity, lactic acid resistance and speed endurance.

For the development of the all these factors some methods are used;

1. Continuous Method

1.1 Slow Continuous Method
1.2 Fast Continuous Method
1.3 Variable Pace Method
1.4 Fartlek Method
2 Interval Method
3 Repetition Method
4 Resistance Training
5 Uphill Running
6 Endurance Circuit Training
7 Competition Method

1. Continuous Method

In this method an exercise is done for long time without any break or pause because of the long duration of work the intensity is low. The continuous method has four types.

- **Slow continuous method**

In this variation the work is done at a certain speed without any pause for very long durations. Long cross country runs are typical example of slow continuous method. In method the speed or pace exercise is determined according to heart rate during the exercise should be form 140 – 160 beats per min. the volume, in terms of total duration should not less than 30 minutes.

Effect of slow continuous method is that because of relatively low intensity and very high training volume are mainly limited to the muscles.

- **Fast continuous method**

In this variation the work is done at fast but unchanging pace for duration without any break. Heart rate normally between 160 – 180 beats/min. the total volume or duration should not be not less than 20min. For trained sports person, because of higher intensity the fast continuous methods are more strenuous and exhaustive.

Fast pace method is very effective for improving the $V0_2$ max. It is significantly improve the capacity of the muscle to consume maximal amount of oxygen for long duration. There is highly significant increase in number and size of mitochondria and oxidative enzymes.

- **Variable pace method**

In this method the exercise is done continuously but with changing pace or speed the heart rate normally ranges between 140 – 180 beats/min. the total duration or volume ranges from about 15 min. to 1 hour because of change of speed, which is preplanned, this method very strenuous and can be used by trained sportsmen only. Depending on the dynamics of speed, this method can be used to improve aerobic or anaerobic capacity or at the same time.

- **Fartlek**

Fartlek is Swedish word meaning "speed play". In stricter sense it is a variation of variable pace method. In fartlek the change of pace or speed is not pre-planned. The sportsman change the speed on his own during the activity according to the training, surrounding and his feeling. Therefore, this method requires more self discipline in order to be effective. Like variable pace method in fartlek also the heart rate fluctuates between 140-180 beats/min. the total volume and duration are also similar to variable pace method. The physiological and training effects are also, therefore Fartlek running and training consists of varying the distance and intensity of the work within the overall training distance that you run. This type of training will be performed in sets of three sessions, during a one week time frame.

2. Interval Method

Interval method is perhaps the most versatile method for improving endurance of various types. In this method the exercise is done at relatively higher intensity with intervals of incomplete recovery. Interval method is based on the following principle. Work should be done with sufficient speed and duration so that the heart rates go up to 180 beats/min. After this there should be recovery period and when the heart rates come down to 120-130 beats/min. The work should be started again. Interval method by proper manipulation of five variables an be used for the improvement of any type of endurance which are:

- Speed of work
- Duration of work
- Duration of recovery
- Number of repetitions
- Nature of recovery

3. Repetition Method

The repetition method is characterized by high intensity of work with interval of complete recovery. It the best method for the improvement of speed abilities including speed endurance in endurance training the repetition method used to improve components or factors 0f specific endurance or anaerobic capacity.

4. Resistance Training

Investigators have repeatedly shown that resistance training improve HIEE. Improvements in HIEE performance are likely related to increase in muscular strength, morphological adaptations, or metabolic adaptations that increase buffer capacity.

HIEE performance is improved when training plan include resistance training with 12 and more repetitions per set. This improvement in performance is most noted as the intensity of exercise is increased. Higher repetitions per set (more than eight repetitions) performed for multiple sets appear to improve HIEE more than do lower- repetition protocols or single-set protocols. HIEE performance seems to be improved to a greater extent with high volume (volume loads) of resistance training.

5. Uphill Training

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.

Short hills

Short hills of 5 to 10 minutes duration will help improve the Adenosine Triphosphate and Phosphate-creatine (ATP+PC) energy system and hills of 15 to 30 minuts duration will help develop the ATP+PC+muscle glycogen energy system. Example of short hill sessions:

- 8 to 10 repetitions over 150 metres (middle distance athletes)
- 8 to 10 repetitions over 200 metres (long distance athletes)

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 of lactic acid. The energy source is both aerobic and anaerobic and the athlete will experience the build up in blood lactate as they go further up the hill.

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 system.

6. Endurance circuit training

For the improvement of specific endurance the repetition method is used in the form of repetitions of complete distance or part distance with purpose of improving pace judgment of competition tactics. In this training method the sprints should be done in series 3 - 4 repetitions with complete recovery in between the series. The lactic acid tolerance can be improved by exercising at maximal or near maximal intensity for about 40 – 45 sec or even little longer. This should be repeated 3 – 4 time with complete recovery in between the repetitions.

7. Competition Method

Endurance training without participation in sufficient number of competitions is incomplete. Competitions are not only essential for the improvement of specific endurance but are also important for the various psychic qualities essential for good endurance performance. These are also effective for the development of endurance tactics. The competition method is used in endurance training in three forms.

- Endurance tests and control.
- Competitions in other events, sport or specific events with minor changes in distance/duration etc.
- Competitions in the specific event.

The competition method in its three forms should be used quite frequently for the improvement of endurance and its components.

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