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## The effect of fartlek training and sand running on the performance of long distance runner

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### Abstract

The purpose of the study was to find out the effect of Fartlek training and Sand running on the performance of long distance runner. Forty five male athletes of the Inter College Level of Kalyani University, Nadia, West Bengal were randomly selected as subjects for the study. The age of the subjects was 18 to 25 years. Fartlek training and sand running were employed for this study. The score obtained from the cooper's 12 minutes run/walk test considered the criterion measure for the study. To find out the difference between initial and final performance and to compare the achievement of the three groups (two experimental group and one control group) the analysis of co-variance (ANCOVA) was adopted and the level of significance chosen as 0.05 level of confidence. The result showed that the two experiment methods (Fartlek training and sand running) proved to be effective in improving performance of cardio-vascular endurance. It also observed that the Fartlek training method was significantly better than the Sand running method.

**Keywords:** Fartlek training, Sand running, Long distance runner

### 1. Introduction

Human-body is one of the most beautiful as well as the most complex things nature has unique creation acts, reacts and interacts is a rare phenomenon. Over the decades the society in general has realized the need for keeping fit and healthy through organized physical activities programme. Scientific evidences from biological science has made clear that man must have to change in the organized programme of physical activity is schools and colleges. The regular and systematic use of physical exercises, however does not guarantee maximum improvement in performance. The effect of these exercises in increased or decreased by a multitude of factors. Some of these factors, if ignored lead to a drastic reduction in the efficacy of physical exercises. Most important among these are sports equipment and implements, verbal instructions means of recovery, means of assessment of performance capacity, nutrition, psychological means and so on. In order to achieve best result, all these factors or means are to be used in addition to or along with physical exercise. The physical exercises and the other means or factors are to be judiciously applied in a systematic manner. The process of preparation of a person for improving has performance, therefore should not be confined only to physical exercise.

The cardio-vascular system includes heart, arteries, capillaries & veins. They all differs in structure as well as functions. The volume of the blood in our body is limited but it has to perform un-limited amount of work continuously. This naturally leads to the conclusion that same quantity of blood must be used over again. The total amount of blood in our body carry about 1200ml of O<sub>2</sub> and this can meet the oxygen needs of the body for about 5 minutes only. So blood must be re-oxygenated and send back to the tissues at every 5 minutes, means blood must circulate continuously in a cyclical manner doing the same job repeatedly.

The resting upright stroke volume of untrained male subject's average between 70 and 90 ml per beat with maximal values ranging between 100 and 120 ml per beat. For trained men both resting and maximal volume are higher averaging about 100 and 120 ml, 150 & 170 ml / beat respectively. For the high trained athletes mentioned earlier maximal stroke volume may reach even exceed 200 ml per beat. Both the total blood volume and the total amount of hemoglobin increase with training. The increase of cardiac output with exercise is brought about through increases in stroke volume and in heart rate. The increase in stroke volume

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Which reaches maximum level during sub maximal exercise is a result of a greater emptying of the left ventricle. Heart rate increase linearly with unceasing work load and volume of O<sub>2</sub> in both trained and untrained subject.

Training has a very pronounced effect on heart rate even at Vest. For example highly trained athletes of either sex have resting heart rates may be as low as or lower than 40 beat per minutes. In contrast resting heart rate for untrained but healthy individual may be as high as 90 beat per minutes. A slow resting heart beat is a characteristics of trained individual.

**Statement of the problem**

The purpose of the study was to find out the effect of Fartlek training and Sand running on the performance of long distance runner.

**Methodology**

The objective of the study was to find out the effect of fartlek training and sand running on the performance of long distance runner. Forty five male athletes of the Inter College Level of Kalyani University, Nadia, and West Bengal were randomly selected as subjects for the study. Thwe age of the subjects was 18-25 years. Random group design was employed for the study and equal numbers of subjects were assigned at random to three groups of 15 subjects each. For the purpose of the study the experimental groups and control groups were named as group A, B & C respectively. The

group A, B & C underwent the pre-test on the cardio-vascular endurance. Then the Experimental-I (Fartlek Training) Experimental -II (Sand Running) underwent the training for a period of six weeks on alternative days, three days per week. The group - C served as the control. The score obtained from the Cooper's 12 minutes run / walk test considered the criterion measure for the study. To find out the difference between initial & final performance & to compare the achievement of the three groups (two experimental groups and one control group) the analysis of co-variance (ANCOVA) was adopted and the level of significance chosen as 0.05 level of confidence. The statistical analysis of data collected on 45 male subjects belonging to two experimental groups and control group, comprising 15 Subjects each, presented in this chapter. Group 'A' & group 'B' underwent programmes of fartlek training & sand running & group 'C' served as the control. The data were examined by applying analysis of Co-variance to find out inter group variability to allow for the comparison between pre-test and post-test scores.

**Findings**

For each of the chosen variable the results pertaining to significant difference, if any, between the pre-test and post-test means for the three groups after six weeks training period, which were submitted to analysis of co-variance, are given in Table - I to III

**Table I:** Significance Of Difference Between The Pre-Test And Post-Test Means Of Two Experimental Groups And Control Group In Cardio-Vascular Endurance

| Groups           | Pre-test mean | Post-test mean | Difference Between mean | SE <sub>MD</sub> | 't' ratio |
|------------------|---------------|----------------|-------------------------|------------------|-----------|
| Fartlek training | 2173          | 2279           | 106                     | 6.68             | 15.86*    |
| Sand running     | 2127          | 2259           | 132                     | 14.85            | 8.88*     |
| Control group    | 2052          | 2062           | 10                      | 11.82            | 0.84      |

\*Significant at 0.05 level of confidence 't' 0.05 (14 df) = 2.14

It is evident from the Table-I that the fartlek training group improved significantly showing 't' value of 15.86 & Sand running group also improved significantly than pre-test, the

't' ratio being 8.88. However no significant improvement was marked incase of the control group.

**Table II:** Analysis Of Variance And Co-Variance Of The Means Of Two Experimental Groups And The Control Group In Cardio-Vascular Endurance

| Particulars    | Groups           |              |               | Sum of square              | Df      | Mean square        | 'F' ratio |
|----------------|------------------|--------------|---------------|----------------------------|---------|--------------------|-----------|
|                | Fartlek training | Sand running | Control group |                            |         |                    |           |
| Pre-test       | 2173             | 2127         | 2052          | (B)29071<br>(W)22.0007     | 2<br>42 | .145350<br>.523826 | 0.27      |
| Post-test      | 2279             | 2259         | 2062          | (B)-4311501<br>(W)-15.2687 | 2<br>42 | .215750<br>.363540 | 0.59      |
| Adjust         | 2244.76          | 2253.05      | 2102.18       | (B)-1.45332                | 2       | .72666             | 4.39*     |
| Post Test mean |                  |              |               | (W)-6.789272               | 41      | .165592            |           |

\*Significant at 0.05 level of confidence

N= 45

B = between group variance

W= within group variance

F = Ratio needed for significance at 0.5

Level of confidence 3.22

The analysis of co-variance for cardio-vascular endurance indicated that resultant 'F' ratio were not significant in case of pretest and post-test means indicating that initial and final mean difference among the groups were not significant. The difference between the adjust final means for three groups were found significant and the obtained 'F' ratio was 4.39\* and the needed 'F' being 3.22.

As difference between the adjusted final mean for three groups, were found significant, the critical difference for adjusted means (post -hoc 't' test) was applied to find out which of the differences between the paired adjusted final mean were significant, which are shown in table -III.

**Table III:** Paired Adjusted Final Means & Difference Between The Mean For The Three Experimental Groups & Control Group In Cardio-Vascular Endurance

| Fartlek training | Sand running | Control | Difference between mean | Critical difference Statistical adjusted mean |
|------------------|--------------|---------|-------------------------|---|
| 2244.76          | 2253.05      |         | -8.29                   | 66.58   |
|                  | 2253.05      | 2102.18 | 150.87*                 | 66.58   |
| 2244.76          |              | 2102.18 | 142.58*                 | 66.58   |

\*Significant at 0.05 levels.

The table three indicates that fartlek training group was superior to sand running group and control group. Sand running group was better than control group, and through statistically not significant. It was also found that both the experimental groups were statistically superior than the control group.

### Discussion

The analysis of data indicates that the two experimental groups trained by Fartlek training method, sand running method showed significant gains the performance of the cardio-vascular endurance, when Pre-test and Post-test data were compared. The control group did not show any significant increase in the performance of cardio-vascular endurance.

With regard to performance of cardio-vascular endurance, the Fartlek training group was effective and improved significantly a compared to sand running group and control group and sand running group was superior to control group whereas no significant difference was marked between fartlek training group and sand running group.

The significant improvement in case of Fartlek training & sand running may be due to, both the training brought about specific metabolic physiologic adaption that involve subtle cellular as well as gross physiological changes. At the same time the treatment brought about both functional and dimensional changes in the cardio-vascular endurance. These include decreases in resting and sub-maximal exercise heart rate enhanced stroke volume rate and cardiac output and expanded O<sub>2</sub> differences. Other factors might be decreased in percent body fat and increased in lean body weight;

the increases in the trained muscle capacity to mobilized and oxidize fat and selective hypertrophy to different muscles fibers which enhanced cardio-vascular endurance of the subjects.

### Conclusion

On the basis of the analysis of the datas and within the limitation imposed and the experimental conditions, the following conclusions may be drawn. The two experiment methods (Fartleack training and sand running) proved to be effective in improving performance of cardio-vascular endurance. It was also observed that Fartlek training method was significantly better than the sand running method. However, no statistical significant difference was found between Fartlek training and Sand running method as measured by Cooper's 12 minutes run/walk test. The reason may be due to the training duration of six weeks was not sufficient to produce significant training effect between the Fartlek training and Sand running.

### Recommendation

On the light of the conclusion drawn the following recommendation may be made.

1. All the two methods of training undertaken in the study may be used by the teachers of physical Education and coaches for improving performance in cardio-vascular endurance.
2. The present study may be replicated with subjects of age and sex other than those employed in this study.
3. To arrive at significant finding for judging the superiority of different cardio-vascular endurance training methods employed in this study, the investigation may be carried out over a longer period than what is employed in this study.
4. The sand running may be included one of the training means for the development of aerobic capacity.
5. Further, study may be undertaken on the larger group employing other training methods.

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