



## Physical Education

## EFFECTS OF PLYOMETRIC AND COMPLEX TRAINING ON DROP OFF TIME AMONG RUNNERS

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## ABSTRACT

The purpose of the study was to determine the effect of plyometric training and complex training on drop off time among runners. For this purpose, forty five (N=45) boys who were participated 400meters events in the inter school competition in Kollam District, Kerala during the year 2016-2017 were selected randomly as subjects. The age of the subjects were ranged from 14 to 16 years. The subjects were divided at random into three groups of fifteen each (n=15). Group-I underwent Plyometric Training, Group-II underwent Complex Training, and Group-III acted as Control. The Training Program period was limited to five days per week for twelve weeks. The dependent variables selected for this study was Drop off Time and it was measured through 100 Meters and 400 Meters Running Test. All the subjects were tested prior to and immediately after the experimental period on the selected dependent variables. The data obtained from the experimental groups before and after the experimental period were statistically analyzed with Analysis of covariance (ANCOVA). Whenever the 'F' ratio for adjusted post test means was found to be significant, the Scheffe's Post hoc test was applied to determine the paired mean differences. The level of confidence was fixed at 0.05 level for all the cases. The experimental groups, namely plyometric training group and complex training group have shown significant decrease in selected athletic performance components namely drop off time.

**KEYWORDS :** Plyometric Training, Complex Training, Drop off Time

## Introduction

Sports represent one of the most pervasive social institutions in our society. Sports in human activities involve specific administrative organization and a historical background of rules which define the objective of a limit the pattern of human behaviour. It involves competition and challenge and a definite outcome primarily determined by physical skills.

Sports for all have become a very popular slogan all over the world today. Participation in sports and games will yield optimum physical fitness and positive health for all. Today's life mostly depends upon science and technology. In such circumstances people need more exercise to keep the body fit to execute the activity efficiently. A sport is a popular spectacle and a mass social movement of contemporary times. In the process of historical development, sports have occupied a prominent place in both the physical as well as in the moral culture of the society.

Sportsmen undergo various types of training to improve their performance and physical fitness. Training means a systematic scientific programme of conditioning exercise and physical activities designed to improve the physical fitness and skill of the players (Fox, 1984).

Sport training aims at improving the sports performance. The sports performance, as any other type of human performance is not the product of one single system or aspect of human personality. On the contrary, it is the product of the total personality of the sports person (Singh, 1991).

The actual term 'plyometric' was first coined in 1975 by Fred Wilt, the American Track and Field coach. The elements ply and metric come from Latin roots for "increase" and "measure" respectively, the combination thus means 'measurable increase' (Baechle, 1994).

Plyometrics is a type of training involving jumping; bounding and other high impact exercises that focus on maximizing the stretch reflex of the muscles. To teach the muscles to produce maximum force faster,

this enhances performance for athletes and exercisers alike (Chu, 1998).

Complex Training is a technique used by many strength and conditioning coaches to enhance both the strength and power of their athletes. Complex training is basically a superset where the athlete performs a high-intensity strength exercise and follows it with a plyometric exercise with similar biomechanical demands (i.e. the same muscle groups and/or joint angles) of the strength exercise.

Complex training as a series of several exercises performed in succession with the goal of the entire complex the improvement of one physical characteristic (Verkhoshansky, 1973).

## Methodology

For this purpose, forty five (N=45) boys who were participated 400meters events in the inter school competition in Kollam District, Kerala during the year 2016-2017 were selected randomly as subjects. The age of the subjects were ranged from 14 to 16 years. The subjects were divided at random into three groups of fifteen each (n=15). Group-I underwent Plyometric Training, Group-II underwent Complex Training, and Group-III acted as Control. The Training Program period was limited to five days per week for twelve weeks. The dependent variables selected for this study was Drop off Time and it was measured through 100 Meters and 400 Meters Running Test.

## Results and Discussion

The data collected from the experimental group and control group prior and after experimentation on selected variables were statistically examined by analysis of covariance (ANCOVA) was used to determine differences, if any among the adjusted post test means on selected criterion variables separately. The level of significance was fixed at .05 level of confidence to test the 'f' ratio obtained by analysis of covariance on selected criterion variables.

The analysis of covariance on Drop off Time of the pre, post, and adjusted test scores of Plyometric Training group, Complex Training Group and Control group have been analyzed and presented in Table – 1.

**Table – 1 Computation of Analysis of Covariance of pre test, post test and adjusted post test on drop off time of experimental groups and control group**

| Test                    | Plyometric Training Group-I | Complex Training Group-II | Control Group-III | Source of Variance | Sum of Squares | df | Mean Squares | F-ratio |
|-------------------------|-----------------------------|---------------------------|-------------------|--------------------|----------------|----|--------------|---------|
| Pre-Test Mean           | 3.76                        | 3.77                      | 3.51              | Between groups     | 0.31           | 2  | 0.15         | 0.11    |
|                         |                             |                           |                   | Within groups      | 57.28          | 42 | 1.36         |         |
| Post-Test Mean          | 2.81                        | 2.34                      | 3.59              | Between groups     | 12.011         | 2  | 6.01         | 7.44*   |
|                         |                             |                           |                   | Within Groups      | 33.92          | 42 | 0.81         |         |
| Adjusted Post-Test Mean | 2.78                        | 2.30                      | 3.66              | Between sets       | 14.18          | 2  | 7.09         | 21.17*  |
|                         |                             |                           |                   | Within Sets        | 13.73          | 41 | 0.34         |         |

*\*Significant at 0.05 level of confidence*

**Table value for df (2, 42) at 0.05 level = 3.22 Table value for df (2, 41) at 0.05 level = 3.23 (Drop off Time scores are in Seconds)**

Table-1 shows that the pre test mean values of Drop off Time for Plyometric Training, Complex Training and Control group are 3.76, 3.77 and 3.51 respectively. The obtained F-ratio value is 0.11, which is less than the required table value of 3.22 for significance with df 2 and 42 at 0.05 level of confidence.

The post test mean values of Drop off Time for Plyometric Training, Complex Training and Control group are 2.81, 3.24 and 3.59 respectively. The obtained F-ratio value is 7.44, which is more than the required table value of 3.22 for significance with df 2 and 42 at 0.05 level of confidence.

The adjusted post test mean values of Drop off Time for Plyometric Training, Complex Training and Control group are 2.78, 2.30 and 3.66 respectively. The obtained F-ratio value is 21.17, which is more than the required table value of 3.22 for significance with df 2 and 42 at 0.05 level of confidence.

The results of the study indicated that there is a significant difference between the post test means and adjusted post-test means of Plyometric Training group, Complex Training Group and Control group on Drop off Time.

Since, three groups are compared and whenever the obtained 'F' ratio for adjusted post test is found to be significant, Scheffe's test is used to find out the paired mean difference and it is presented in Table-2.

**Table – 2 Scheffe's test for the difference between paired means on Drop off time**

| Plyometric Training Group-I | Complex Training Group-II | Control Group | Mean Difference | Confident Interval Value |
|-----------------------------|---------------------------|---------------|-----------------|--------------------------|
| 2.78                        | 2.30                      | ---           | 0.48            | 0.54                     |
| 2.78                        | ---                       | 3.66          | 0.88*           |                          |
| ---                         | 2.30                      | 3.66          | 1.36*           |                          |

*\*Significant at 0.05 level of confidence.*

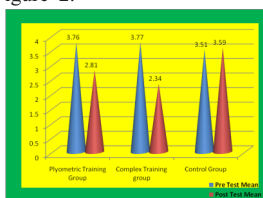
Table-2 shows that the mean difference values of Drop off Time between Plyometric Training group and Control group, Complex Training group and Control group are 0.88 and 1.36 respectively, which are greater than the confidence interval value of 0.54 on Drop off Time at 0.05 level of confidence. The results of the study showed that there was a significant difference between Plyometric Training group and Complex Training group, Plyometric Training group and Control group, Complex Training group and Control group.

Further the Table-2 shows that the mean difference values of Drop off Time between Plyometric Training group and Complex Training group, is 0.48, which is less than the confidence interval value of 0.54 on Drop off Time at 0.05 level of confidence. The results of the study showed that there was no significant difference between Plyometric Training group and Complex Training group.

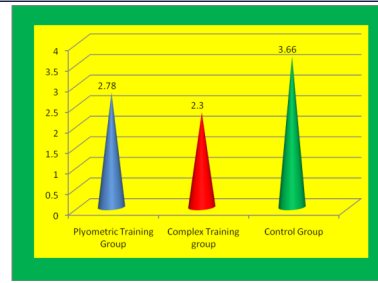
The above data also reveal that Complex Training group had shown better performance than Plyometric Training group and Control in Drop off Time.

The pre and post test mean values of Plyometric Training group, Complex Training group and Control group on Drop off Time are graphically represented in the Figure-1.

The adjusted post mean values of Plyometric Training group, Complex Training group and Control group on Drop off Time are graphically represented in the Figure -2.



**Figure: 1 The Pre and Post test Mean values of Plyometric Training group, Complex Training group and Control group on Drop off Time (Scores in Seconds)**



**Figure: 2 The Adjusted Post Test Mean values of Plyometric Training group, Complex Training group and Control group on Drop off Time(Scores in Seconds)**

### Conclusion

From the analysis of the data, Complex Training Group showed significantly decrease in the Drop off Time, when compared to the Plyometric training and control group.

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