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## Effect of circuit training on speed, agility and endurance among Physical Education Students

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### Abstract

History shows evidence that interval training, fartlek training and repetition running were used as conditioning factors to improve speed, agility and endurance. Now-a-days circuit training was divided to improve strength and endurance used almost in all track and field events and games to improve the strength and endurance of the players. The Researcher was interested in conducting a study to find out, if there was significant effect on speed, agility and endurance among physical education students through circuit training. Forty male subjects from GDC Boys Anantnag were selected at random as the subjects for the study. During the pre-test period, the subjects were asked to do 50 yard dash, SEMO agility and 12 minute run walk and their initial performance was recorded. Then the group was administered the programmed of circuit training, for a period of six weeks. Selected exercises were regularly done in the morning, there circuits a day and thrice in a week. At the end of the experimental period of six weeks, again the subjects were asked to do 50 yard dash, SEMO agility and endurance and their final performance was recorded.

**Keywords:** Circuit Training Speed, Agility and Endurance Physical Education etc

### Introduction

Physical fitness as an important quality for every athlete to perform his task with vigor and alertness without undue fatigue. Fitness is the ability of the individual to live a full and balanced life. It involves physical, mental and emotional and spiritual factors and the capacity for their wholesome expression.

The three basic components of the physical fitness are:

1. Muscular Strength.
2. Muscular endurance.
3. Circulatory-respiratory endurance (Gide 1973).

Man's existence and effectiveness depend upon his Muscles. Muscular efficiency including strength and endurance is essential to man. Man needs vigorous exercise for growth and development. A muscle must be overloaded in order to be strengthened. If not it will become weak and degenerate. It is a biological principle that function builds structure and structure decides function.

It is true that organs and muscles that are used will develop and those that are not used will disappear.

Man now needs a stronger body than he has had, not only for specific tasks but to enable him to withstand the strain of living. Strength has become an important trait for an athlete to perform his task in the athletic field. The value of strength in athletics is not a new idea. Hooks states, "the good strong man will always beat the good weak man".

Strength is properly defined as maximal force exerted at one time.

By working the muscle near its maximal capacity against some resistance will develop the strength of the muscle. Strength is considered an important factor of speed. It is clearly stated that, increase in strength levels to increase in speed when the muscles are involved in specific movement.

An increase in strength will certainly lead to increase in the muscular endurance.

The three qualities strength, speed and endurance are the basic qualities for sporting.

Spiriting is high powered running and the man who succeed at it are in the muscular sense, high powered athletes.

“Function makes an organ”. When muscles are used they become strong, further meter strength is increased. Increased strength may increase the spiriting ability to increase the basic strength, one may use various training devices.

States that the primary object of training is to become strong. The word “strong” means everything that goes into athletic performance outside of technique, practice of the event itself is one way of getting strong but the athletes full potential may also be developed by subsidiary form of exercise, such as weight training or circuit training (Hildreth).

Circuit training is a program in an athlete moves from one exercise station to another planned sequence and in the shortest possible form.

In planning a circuit training programme exercise are chosen to fit the needs of the individuals each of these exercise them numbered and assigned to a certain area called station.

A combination of the techniques of weight lifting with the principles of “circuit training” results in a system of continuous exercise which brings about significant improvement in cardiovascular respiratory efficiency and muscular endurance. Through circuit training the athletes may increasing their strength and endurance by increasing the repetitions of exercises at each station or by doing the required frequencies of exercise in a shorter length of form. If the workload is kept constant, the athletes can develop strength and endurance by gradually decreasing the time taken to go through the circuit (Shea).

Advantages of circuit training are as following;

1. A large number of persons can be accommodated at the same time.
2. The individual works at his own rate within his capacity.
3. The goals are both immediately obtainable and easily evaluated.
4. Target time, the attempt to complete the circuit on a certain maximum time provides strong motivational factor. Since the circuit training has the primary objective of improving strength and blood circulation to the working muscles, the researcher was interested on experimenting whether there would be any effect on speed after the experimental period of circuit training (Jhonson and Stolberg).

### Objectives

To analyses the effect of circuit training on Speed, Agility and Endurance among Physical Education Students.

### Methodology

The purpose of this study was to investigate the effect of selected circuit training on speed, agility and endurance among physical education students. To fulfil this aim 40 students of GDC Boys Anantnag were selected as subjects by random sample selection.

### Selection of the subject

Total twenty control and twenty experimental students of GDC Boys Anantnag were selected as a subject for the presented studies and their age ranged from 15 to 17 years were selected.

### Selection of variables

The following variables were selected as present study.

Physical variables

- a) 50 yard dash.

- b) Semo agility.

- c) 12 Minutes Run Walk.

### Administration of the test

Considering the physical variables following test were administrated.

- 1) 50 yard dash.
- 2) Semo agility.
- 3) 12 Minutes Run Walk.

For the physical variables the AAPHER physical fitness test were used.

For the physical variables the COOPER physical fitness test were used.

1.50 yard dash:

**Purpose:** To find out the speed of the subject.

**Equipment:** Stopwatch, measuring tape.

**Procedure:** Two lines are marked on the flower 50 yard dash apart one line is used as starting line and the other as the finish line. On the signal “ready and go”. Then the subject start running at their best to reach the finish line at their earliest, the signal “go” is accomplished with the downward swipe of starters arm to give the visual signal to the inner that stands at the finish line.

**Scoring:** The interval between the starting signal and the instant subject crosses the finish line is the score of the test. The time is recorded correct up to tenth of a second.

### 2. Semo agility

**Purpose:** To measure agility ability of the subjects.

**Equipment:** Stopwatch, four plastic cones and basketball court.

**Procedure:** The tester asks the subject to stand just the marked rectangle at the starting point with his back towards the free throw line, the subject waits for the signal “ready go” at the word go the testers starts the stopwatch while the subjects starts side steeping to his fastest speed until he reaches outer corner of the second corner of the second cone from were the subject starts back pedaling. As soon as he steps outside the finish line with his both feet, the testers stops the stopwatch.

**Scoring:** Each subject is given two trails and time of each trail is noted accurate up to 0.1 second. The lesser the value of the time out of the two trails is the score of the subject.

### Minutes run walk

**Purpose:** To find out the endurance of the subject.

**Equipment:** Track and Stopwatch.

**Procedure:** The subject is asked to take a standing start. At the signal ready and go the subjects starts running the 12 minutes run walk. The test is usually performed on 8 to 10 subjects together by pairing of before the start of the event walking is permitted but the performer is to cover the 12 Minutes.

**Scoring:** The time taken to 12 Minutes Run Walk recorded in 12 Minute score of the test.

**Experimental Variable:** The group was subject to the experimental treatment. Six circuit stations were fixed with specific exercise, with specified distance or number of repetitions for each exercise, for three complete circuits of six exercises. This group was under this training for three days a week over a period of six weeks.

The exercise include in the circuit training program were originated by Don Schmidt had been slightly modified and were as follows.

1. Squat jumps	5 times
2. Burpees	5 times
3. High Knees	10 times
4. Sit ups	10 times
5. Bicycle kicks	10 times
6. Single leg kickbacks	10 times

**Squats jumps:** Stand with feet shoulder width apart trunk flexed forward slightly with back straight in a neutral position.

**Burpees:** Start in a standing position and bend your knees and place your hands on the ground.

**High knees:** Running on the spot kick your knees up to waist height and pump your arms.

**Sit ups:** Lie back into floor or bench with knees bend and hands behind head. Keep elbows back and out of sight head shoulders be in a neutral position with a space between chin and chest.

**Bicycle kicks:** Lie on your back with your knees at chest level and your arms fist on the floor.

**Single leg kickbacks:** Start in a four point position with your hands and knees on the ground. This group was further divided into six groups. Each group was asked to occupy one station and was given the number from one to six. On whistle, the subject starts doing the exercise allotted to the particular station. After doing the exercise fixed in the station, the subject was asked to move to the next station in the clockwise direction on jogging without wasting time. The circuit was considered as complete when each group had completed exercise in all the six stations. Three complete circuits were done a day. In between, repetition no interval was allowed for relaxation. Before the conduct of the experimental study all the exercises were demonstrated to the subjects and they were taught to perform the exercise correctly. A clear cut explanation about the rules regarding the circuit training was given in order to avoid to the misbehavior of the subjects.

#### Tools of the study

For the present study, modified tools were used for data collection stopwatch, measuring tape.

#### Collection of data

Data was collected on individually through 20 control and 20 experimental group subjects at university ground, the instruction of test was given in ground.

#### Analysis of data and result of the study

The result of the study present through table and figures, which are given below. Mean score, standard deviation and t-value of Experimental and Control group students with respect to 50 yard dash, Semo Agility and 12 minute Run-Walk variables.

**Table 1:** Shows statistical comparison of Speed between pre-test and post-test of experimental group is as under

Group	Mean	SD	T-Ratio
Pre-test	7.43	1.32	0.07
Post-test	7.40	1.32	

From the above table it is observed that the mean of Experimental group students in pre-test and post-test is 7.43

and 7.40 respectively. After applying “t” test it is found that the t-ratio is 0.07 which was not significant at the 0.05 level of significance. So the hypothesis was rejected.

**Table 2:** Shows statistical comparison of Speed between pre-test and post-test of control group is as under

Group	Mean	SD	T-Ratio
Pre-Test	12.78	1.20	0.51
Post-Test	12.59	1.22	

From the above table it is observed that the mean of Control Group students in pre-test and post-test is 8.45 and 8.31 respectively. After applying “t” test it is found that the t-ratio is 2.

**Table 3:** Shows statistical comparison of Agility between pre-test and post-test of experimental group is as under

Group	Mean	SD	T-Ratio
Pre-Test	12.78	1.20	0.51
Post-Test	12.59	1.22	

From the above table it is observed that it is observed that the mean of Experimental

Group students in pre-test and post-test id 12.78 and 12.59 respectively. After applying “t” test, it is found that the t-ratio is 0.51 which was not significant at the 0.05 level of significance. So the hypothesis was rejected.

**Table 4:** Shows statistical comparison of Agility between pre-test and post-test of control Group is as under

Group	Mean	SD	T-Ratio
Pre-Test	13.07	0.96	0.25
Post-Test	13.17	1.56	

From the above table it is observed that the mean of control group students in pre-test and post-test is 13.07 and 13.17 respectively. After applying “t” test it is found that the t-ratio is 0.25.

#### Conclusion

Mean, S.D. and t-ratio were utilized to compare the selected physical variable between control and experimental group among physical education students. On the basis of statistical result the following conclusions were drawn within the limitation of the study.

1. There was no significant effect of speed between control group and experimental group among physical education students.
2. There was no significant effect of agility between control group and experimental group among physical education students.
3. There was no significant effect of Endurance between control group and experimental group among physical education students.

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