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Effect of Plyometric and Circuit Training On Selected Physical Variables among Sprinters of Hyderabad District of Telangana State

Prof. Rajesh Kumar
Principal and Head,University College of Physical Education
Osmania University, Hyderabad-500007

Abstract
The purpose of the study was to find out the effect of plyometric and Circuit training on selected physical variables among Sprinters of Hyderabad District in Telangana State.To achieve this purpose, forty five Sprinters in the age group of 16 to 20 years those who have participated in the Hyderabad Open Sprints Athletics Championships at Gachibowli Stadium, Hyderabad for the year 2019 taken as subjects. The selected forty five subjects were divided into three equal groups of fifteen each as two experimental groups and one control group, in which group – I (n=15) underwent plyometric training for three days per week for Twelve weeks, group – II (n=15) underwent the Circuit Training for three days per week for Twelve weeks and group – III (n=15) acted as control who are not participate any training apart from their regular activities. The selected Physical variables such as abdominal strength, speed and leg explosive power were assessed before and after the training period. Sit Up Test, 50 M Dash and Standing Broad Jump are the Tests were used to conduct the pre test and post for Measuring the Physical Variables such as Abdominal Strength, Speed and explosive power of legs. The results of the study it was found that there was a significant difference of performance due to Plyometric and circuit training when compared with the control group. Key words: Sprinters, Plyometric, Circuit Training etc.

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I. Introduction:

Sports training aims at improving the performance of sports persons . Motor fitness, or motor physical fitness, refers to how an athlete can perform at his or her sport, and involves a mixture of agility, coordination, balance, power, and reaction time.Plyometric training is a specific work for the enhancement of explosive power. Exercises or drills that are combine speed and strength, it produces an explosive reactive movement.

Plyometric strength training uses burst techniques to help tone the fast-twitch response muscles, allowing for stronger and more frequent bursts of physical motion during competition.

Circuit Training is developed by the Scientist Morgan R.E. and Adamson G.T. at University of Leeds in the year 1957. This is Resistance to develop the motor abilities such as strength, Speed and endurance. Circuit training is a exercise "circuit" which consists of prescribed exercises which includes for the upper body, lower back, abdomen and Lower body. It can be done with own body Weight and using the resistance exercises such as Barbells, Medicine Balls etc. Circuit training improves all round physical fitness, as opposed to fitness for a specific sport.

II. Methodology:

To achieve this purpose, forty five Sprinters in the age group of 16 to 20 years those who have participated in the Hyderabad Open Sprints Athletics Championships for the year 2019 at Gachibowli Stadium, Hyderabad taken as subjects. The selected forty five subjects were divided into three equal groups of fifteen each as two experimental groups and one control group, in which group – I (n=15) underwent plyometric training for three days per week for Twelve weeks, group – II (n=15) underwent the Circuit Training for three days per week for six weeks and group – III (n=15) acted as control who are not participate any training apart from their regular activities. The selected Physical variables such as abdominal strength, speed and leg explosive power were assessed before and after the training period. The following Plyometric Training given for Experimental Group I for 12 weeks on alternate days.

EXPERIMENTAL GROUP: 1: PLYOMETRIC TRAINING

Table 1: Test description of Week One and Week Four Training Intensity upto 60%

Day	Name of the Exercises	Repetitions and Sets
Monday	Hopping, Bounding, Multiple Hops and Jumps	30 M x 3 reps x 3 sets
Wednesday	Depth Jumps, Box Jumps, Box Drills	10 Jumps x 3 reps x 3 sets

Friday	Standing Broad Jumps, Squat Jumps, Alternate leg Boundings	10 Jumps x 3 reps x 3 sets 30 M x 3 reps x 3 sets

Table 2: Test description of Week Five and Week Eight Training Intensity upto 80%

Day	Name of the Exercises	Repetitions and Sets
Monday	Hopping, Bounding, Multiple Hops and Jumps	40 M x 3 reps x 2 sets
Wednesday	Depth Jumps, Box Jumps, Box Drills	12 Jumps x 3 reps x 2 sets
Friday	Tuck Jump, alternate Lung Jump, Power Skipping	12 Jumps x 3 reps x 2 sets 30 M x 3 reps x 2 sets

Table 3: Test description of Week Nine and Week Twelve Training Intensity upto 100%

Day	Name of the Exercises	Repetitions and Sets
Monday	Hurdle Jumps, Hopping, Double leg jumps	40 M x 3 reps x 1 sets
Wednesday	Depth Jumps, Box Jumps, Box Drills	12 Jumps x 3 reps x 1 sets
Friday	Tuck Jump, alternate Lung Jump, Power Skipping	12 Jumps x 3 reps x 1 sets 30 M x 3 reps x 1 sets

The following Circuit Training given for Experimental Group II for 12 weeks on alternate days

EXPERIMENTAL GROUP: 2: CIRCUIT TRAINING

Table 1: Test description of Week One and Week Four Training Intensity upto 60%

Day	Name of the Exercises	Repetitions and Sets
Tuesday	10 exercises: Push Ups,Half Squats, Situps, Military press, Back Extension, High Knee action running, Wrist Curl, Good morning Ex, Shuttle Running, V-Situps	30 Sec. each exercise continous x 1 set x 3 sets
Thursday	10 exercises: Push Ups,Half Squats, Situps, Military press, Back Extension, High Knee action running, Wrist Curl, Good morning Ex, Shuttle Running, V-Situps	30 Sec. each exercise 30 Sec. Recovery x 1 set x 3 sets Interval Method
Saturday	10 exercises: Push Ups,Half Squats, Situps, Military press, Back Extension, High Knee action running, Wrist Curl, Good morning Ex, Shuttle Running, V-Situps	10 Reps x Rest 30 Sec x 1 set x 3 sets Repetition Method

Table 2: Test description of Week Five and Week Eight Training Intensity upto 80%

Day	Name of the Exercises	Repetitions and Sets
Tuesday	10 exercises: Push Ups,Half Squats, Situps, Military press, Back Extension, High Knee action running, Wrist Curl, Good morning Ex, Shuttle Running, V-Situps	30 Sec. each exercise continuous x 1 set x 2 sets
Thursday	10 exercises: Push Ups,Half Squats, Situps, Military press, Back Extension, High Knee action running, Wrist Curl, Good morning Ex, Shuttle Running, V-Situps	30 Sec. each exercise 30 Sec. Recovery x 1 set x 2 sets Interval Method
Saturday	10 exercises: Push Ups,Half Squats, Situps, Military press, Back Extension, High Knee action running, Wrist Curl, Good morning Ex, Shuttle Running, V-Situps	10 Reps x Rest 30 Sec x 1 set x 2 sets Repetition method

Table 3: Test description of Week Nine and Week Twelve Training Intensity upto 100%

Day	Name of the Exercises	Repetitions and Sets
Tuesday	8 exercises: Medicine Ball Throws, Bridge, Squats Jumps, Up right rowing, Situps, Jumping on Spot, Good morning Exercise, V Situps	30 Sec. each exercise continuous x 1 set x 1 sets
Thursday	8 exercises: Medicine Ball Throws, Bridge, Squats Jumps, Up right rowing, Situps, Jumping on Spot, Good morning Exercise, V Situps	30 Sec. each exercise 30 Sec. Recovery x 1 set x 1 sets Interval Method
Saturday	8 exercises: Medicine Ball Throws, Bridge, Squats Jumps, Up right rowing, Situps, Jumping on Spot, Good morning Exercise, V Situps	10 Reps x Rest 30 Sec x 1 set x 2 sets Repetition method

The following Tests were conducted at In Pre Test and Post Test for measuring the Physical variables.

1. Sit Ups – Abdominal Muscular Strength
2. Standing Broad Jump – Explosive Power of Legs
3. 50 M Dash – Acceleration and Speed

ANALYSIS OF DATA

The data collected prior to and after the experimental periods on abdominal strength, leg explosive power and speed plyometric training group,circuit training and control group were analyzed and presented in the following table -I.

Table-I: Analysis of covariance with Means and 'f' ratio for Sit Ups, Standing Broad Jump and 50 Meter Dash for plyometric training, circuit training and control group

Variable Name	Group Name	Control Group	Plyometric Group	Circuit Training Group	'F' Ratio
Sit Ups (in Numbers)	Pre-test Mean ± S.D	37.13 ± 1.15	37.2 ± 1.25	37.3 ± 1.21	0.001
	Post-test Mean ± S.D.	37.34 ± 1.16	39.14 ± 1.31	42.22 ± 1.36	3.935*
Standing Broad Jump (in Meters)	Pre-test Mean ± S.D	1.916 ± 0.12	1.918 ± 0.135	1.922 ± 0.13	.003
	Post-test Mean ± S.D.	1.919 ± 0.12	2.078 ± 0.22	2.141 ± 0.31	3.034*
50 M Dash (in Seconds)	Pre-test Mean ± S.D	6.90 ± 0.008	6.89 ± 0.0089	6.90 ± 0.0083	.006
	Post-test Mean ± S.D.	6.88 ± 0.0081	6.59 ± 0.0092	6.48 ± 0.0097	6.766*

* Significant at .05 level of confidence.

(The table value required for significance at .05 level of confidence with df 2 and 43 and 2 and 42 were 3.21 and 3.22 respectively).

III. Results

The results of the study also shown circuit training group has significantly improved in Situps from Pre Test Mean Score of 37.30 to 42.22 compare to the Plyometric training Group is 37.20 to 39.14 and control group is 37.13 to 37.34. Hence Circuit Training is effective for development of abdominal Strength.The results of the study also shown circuit training group has significantly improved in Standing Broad Jump from Pre Test Mean Score of 1.922 to 2.141 compare to the Plyometric training Group is 1.918 to 2.078 and control group is 1.916 to 1.919. Hence Circuit Training is effective for development of Explosive Power in the legs.The results of the study also shown circuit training group has significantly improved in 50 M Das from Pre Test Mean Score of 6.90 to 6.49 compare to the Plyometric training Group is 6.89 to 6.59 and control group is 6.90 to 6.88. Hence Circuit Training is effective for development of Speed.

IV. Conclusions

From the analysis of the data, the following conclusions were drawn.

1.There was a significant improvement due to the plyometric training and Circuit Training on abdominal strength, explosive power and speed when compared with the control group.

2. There was a significant improvement due to the Circuit Training compare to the Plyometric Training for development of abdominal strength, explosive power and speed .

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