

Effect of Different Plyometric Training Volume on Selected Motor Fitness Components and Performance Enhancement of Soccer Players

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Abstract

The main purpose of the study was to find out the effect of Plyometric training on selected motor fitness components and playing ability of soccer players. 20 university male soccer players were selected as subject. The subjects for the study were only those players who represented inter-collegiate tournament of Anna University, Chennai. The age of the subjects was ranging from 18 to 25 years. The analysis of data collected on selected motor fitness components and playing ability of soccer players cardio-vascular endurance, agility, speed, flexibility, explosive leg strength, and kicking for distance, kicking for accuracy, juggling. One-way analysis of variance (F-test) and LSD post hoc statistical techniques were employed to determine the significant difference among the performance on after administering Plyometrics training for each selected variable. The result showed 15 minutes of Moderate volume of training was highly favorable for cardio-vascular endurance, 20min intermediate volume of training for Agility, 25 min high volume of training for explosive leg strength, kicking for distance and accuracy. Insignificant difference was found in speed, dribbling and ball juggling ability.

Keywords: plyometric, Motor components, volume of training.

Introduction

Plyometric training as a quick, powerful movement involving a system of reactive exercises and an eccentric contraction, followed immediately by an explosive concentric contraction. (1, 2) You accomplish this through any movement utilizing the Stretch-Shortening Cycle (SSC). (6, 7)

Plyometric training is often interchangeable with power training. However, as some traditionally use plyometric training to define a specific movement pattern in which three distinct phases of movement occur rapidly, not all power training is plyometric training (though all plyometric training is considered power training). Further, the movement patterns categorized in the NASM OPT Model's Phase 1 would better be classified as power patterns and not plyometric since they all involve a long pause (isometric) between the eccentric and concentric phases.

In a study concluded that 25 min. of high volume of training leads highest performance and followed by 20 min. intermediate and least performance after 15 min. of moderate training in the skill of dribbling, kicking accuracy and kicking for distance. The result also showed no significant difference due to different volume of training in the variable of juggling. (Mondal, 2012) Khan

concluded that 20 minutes of intermediate training is most effective for the optimum performance in trunk flexibility, agility and explosive leg strength of volleyball players. (Khan, 2008)

Purpose of the Study

The main purpose of the study was effect of different plyometric training volume on selected motor fitness components and performance enhancement of soccer players.

Significance of the Study

- The result of this study might be helpful to the coaches and players to know the effect of different volume of training on the performance of selected motor fitness components and playing ability of soccer players.
- The findings of this study would also help to the physical education teachers, coaches and players to determine the appropriate volume of training for the soccer players to exhibit optimum performance as well as prevent from getting injuries.

Hypotheses

On the basis of literatures and scholar's own understanding, it was hypothesized that there would be significant difference on the performance of selected motor fitness components and playing ability of soccer players due to different volumes of training.

Methodology

Twenty (20) male soccer players were selected as subjects. The subjects for the study were chosen only those soccer players who represented Anna University, Chennai. The age of the subjects was ranging from 18 to 25 years. Purposive Sampling technique was adopted for the selection of 20 subjects.

Selection of Variables

For the present study following variables were chosen: -

A. Motor Fitness Components

- i. Cardio-vascular Endurance
- ii. Agility
- iii. Speed
- iv. Flexibility
- v. Explosive Leg Strength

B. Soccer Playing Ability

- i. Dribbling
- ii. Kicking for Distance
- iii. Kicking for Accuracy
- iv. Ball Controlling

Selection of Tests and Criterion Measures

- i. Cardio-vascular Endurance was measured by administering 600-meter run and walk test and score was recorded in seconds.
- ii. Semo agility test was applied to assess agility and the score was recorded in seconds.
- iii. 50mt dash was administered to measure speed and score was noted down in seconds.
- iv. Sit and reach test was applied to measure flexibility and the score was recorded in centimeter.
- v. Explosive leg strength was measured by applying standing broad jump and the measurement was recorded in centimeter.
- vi. The Dribbling ability was measured by applying L. Heath and E.G. Rodgers test of dribbling and the score was recorded in seconds.

- vii. Kicking for distance of the soccer players was measured by using distant kicking test and the distance covered by the subject was recorded in meters.
- viii. The kicking for accuracy was measured by applying L.Heath and E.G. Rodgers test of kicking on rolling ball for accuracy and score was recorded in points.
- ix. Covac's juggling test was applied to assess the ball controlling ability and score was recorded in numbers.

Collection of Data

The data pertaining to this study were collected in three consecutive days at 4pm after different volume of training (after 15 min, after 20 min, after 25 minutes) by administering the aforesaid tests.

Tabulation of Data

All the collected data were arranged systematically in a table for further statistical treatments.

Statistical Treatment

One-way Analysis of variance (F-test) statistical technique was employed to determine the significant difference if any among the performance on after administering three different durations of warming-up performance on the selected variables. While the F-ratio was found to be significant then LSD Post Hoc test was applied to determine the paired mean difference.

Level of Significance

The level of significance to check the differential effect of three different volume of training on selected motor fitness components and playing ability obtained by F-ratio was set at 0.05, which was considered appropriate, because the research process adopted did not involve highly sophisticated equipment's.

Findings

Findings pertaining to the selected motor fitness components and playing ability of soccer players i.e., cardio-vascular endurance, agility, speed, flexibility, explosive leg strength and dribbling, kicking for distance, kicking for accuracy and juggling are presented in the table given below: -

Table 1

Variable	Source of variation	Degree of freedom	Sum of squares	Mean sum of squares	F-ratio
Cardio-vascular	Between the	K-1	2485.833	1242.9165	3.4385*
Endurance (600m)	Group	3-1=2			
Run & Walk Test)	Within theGroup	N-K 60-3=57	20603.5	361.464	
	Between the	K-1	3.969	1.984	
Agility (Semo Agility	Group	3-1=2			3.166*
Test)	Within the	N-K	35.711	0.626	
	Group	60-3=57			
	Between the	K-1	1.24175	0.6208	
Speed (50m	Group	3-1=2			3.07022@
	Dash Test)	Within the	N-K	11.53095	
	Group	60-3=57			
	Between the	K-1	31.034	15.517	
Flexibility	Group	3-1=2			0.387@
(Sit & Reach Test)	Within the	N-K	2281.95	40.034	
	Group	60-3=57			

*Significant at .05 level Tabulated F .05(2, 57) =3.162

It is evident from the above table that significant difference was found in the variables of Cardio-Vascular Endurance (F= 3.4385>3.162), Agility (F= 3.166>3.162), Explosive Leg Strength (F= 4.5756>3.162), Kicking for Distance (F= 8.667>3.162) and Kicking for accuracy (F=

42.9058>3.162). It is also observed that insignificant difference was found in the variables of speed (F= 3.07022), Flexibility (F= 0.387), dribbling (1.11795) and Juggling (F= 1.8856) at .05 level.

Table 2

Paired Mean Difference for the Data on Cardio-Vascular Endurance (600m Run & Walk Test) Performance among the Three Different volume of Training

Mean Performance on 600m Run & Walk			Mean Difference	Critical Difference
15min. Moderate training	20min. Intermediate Training	25min. High volume Training		
246.75	231		15.75*	12.043
246.75		238.25	8.5	12.043
	231	238.25	7.25	12.043

*Significant at .05 level

The findings of table-2 reveal that there is significant mean difference in the performance of cardio-vascular endurance (600m run & walk) after 15min. moderate training and 20min intermediate training (MD=15.75>12.043). The findings of above table also show that there are no significant differences in the mean

performance after 15min. moderate training and 25 high volume of training. (MD=8.5<12.043) and, after 20min intermediate training and 25 min high volume of training (MD=7.25<12.043) at .05 level.

Table 3
Paired Mean Difference for the Data on Semo Agility Test Performance among the Three Different Three volume of Training

Mean Performance on Semo Agility Test			Mean Difference	Critical Difference
15min. Moderate training	20min. Intermediate Training	25min. High volume Training		
27.7	28.4		0.7*	0.5011
27.7		29.45	1.75*	0.5011
	28.4	29.45	1.05*	0.5011

*Significant at .05 level

The findings of table-3 reveal that there is significant mean differences in the performance on Semo agility test I between 15min. moderate and 20min. intermediate (MD=0.7>.5011), 15min. moderate and 25min. high volume

(MD=1.05>.5011) and, 20min. intermediate and 25min. high volume (MD=1.05>.5011) at .05 level

Table 4
Paired Mean Difference for the Data on Explosive Leg Strength (Vertical Jump) Performance among the Three Different volume of Training

Mean Performance on Vertical Jump			Mean Difference	Critical Difference
15min. Moderate training	20min. Intermediate Training	25min. High volume Training		
10.065	10.47		0.405	0.4530
10.065		10.745	0.68*	0.4530
	10.47	10.745	0.275	0.4530

*Significant at .05 level

It is evident from the above table that there is significant mean difference in between the performance of vertical jump after 15min. moderate and 25min. high volume (MD=0.68>0.4530) and no significant difference

were found between in the mean performance after 15min. moderate and 20min. intermediate (MD=0.405) and, after 20min. intermediate and 25min. high volume (MD=0.275<0.4530) at .05 level.

Table 5
Paired Mean Difference for the Data on Kicking for Distance among the Three Different Three Different volume of Training

Mean Performance on Vertical Jump			Mean Difference	Critical Difference
15min. Moderate training	20min. Intermediate Training	25min. High volume Training		
43.6	46.6		3.40*	3.13
43.6		49.7	6.50*	3.13
	46.6	49.7	3.10	3.13

*Significant at .05 level

The findings of table reveal that there is significant mean difference in the performance of kicking for distance after 15min. moderate and 20min. intermediate (MD=3.40>3.13) and, 15min. moderate and 25min. high volume (MD=6.50>3.13) at .05 level. In significant mean

difference was found in between after 20min. intermediate and after 25min high volume as the mean difference value of 3.10 is less than that of 3.13 needed to be significant at .05 level.

Table 6
Paired Mean Difference for the Data on Kicking for Accuracy among the Three Different volume of Training

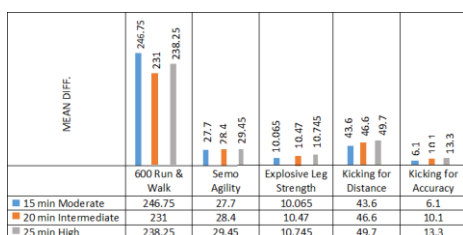
Mean Performance on Kicking for Accuracy			Mean Difference	Critical Difference
15min. Moderate training	20min. Intermediate Training	25min. High volume Training		
6.1	10.1		4.0*	1.5601
6.1		13.3	7.2*	1.5601
	10.1	13.3	3.2*	1.5601

*Significant at .05 level

The findings of table reveal that there are significant mean difference in between the performance of kicking for accuracy after 15min. moderate and 20min. intermediate (MD=4.0) and, 15min. warm-up and 25min. high volume (MD=7.2), and 20min. intermediate and 25min. high volume (MD=3.2) the mean difference value are greater than the critical difference value of 1.5601 at .05 level.

Discussion of Findings

Findings of the study revealed that the performance in cardio-vascular endurance, agility, speed, explosive leg strength, kicking for distance and kicking for accuracy had shown significant improvement in the performance after 25 min of high volume followed by 20 min of intermediate and least performance after 15 min of moderate training. It may be because as a result of 25 min high volume training the local temperature in the muscle which lead to develop muscle excitability joint mobility, rhythmic blood circulation and stable respiratory functions might have assisted for the optimum performance in the above-mentioned fitness variables and skill performance of soccer. Hence such result might have occurred in this study. The findings of this



study is in consonance with the results of Aslam and Mondal.

Conclusion

Recognizing the limitations of this study and on the basis of statistical findings the following conclusion may be drawn-

- Twenty (20) minutes of intermediate training highly favorable for the cardio-vascular endurance (600m Run/Walk) performance, it was followed by 25 min, of high volume of training and least performance after 15 min. moderate training.
- Significant difference was found in semo agility test due to three different duration of 15 minutes moderate training showed best for agility performance compared to 20 minutes & 25 minutes volume of trining, 20 minutes of intermediate training also showed significantly better than 25 minutes high volume of training.
- In significant difference was observed in 50m dash performance due to three different volumes of training.
- No significant difference was found in sit & reach performance due to three different volumes of training.
- After 25 minutes of high-volume training significantly superior of performance was shown in vertical jump test performance than after 20 minutes and 15 minutes volume of training.
- There was no significant difference in dribbling test performance due to three different volumes of training.
- After 25 minutes of high-volume training significantly superior of performance was shown in kicking for distance than after 20 minutes and 15 minutes volume of training.
- Significantly better performance was shown in kicking for accuracy after 25 min. high volume training and least after 15 min. moderate.
- There was no significant difference in juggling performance due to three different volumes of training.

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