ISSN: 2349 - 4891

International
Journal of Recent Research and Applied Studies
(Multidisciplinary Open Access Refereed e-Journal)

Effect of Plyometric and Functional Core Training on Selected Physical Fitness Components among Basketball Players

Siby Lukose[1] & Dr.P.K.Senthilkumar[2]

[1]*Ph.D Scholar (Part Time), Department of Physical Education, Tamilnadu Physical Education and Sports University, Chennai, Tamil Nadu, India.*
[2]*Assistant Professor, Department of Exercise Physiology, Tamilnadu Physical Education and Sports University, Chennai, Tamil Nadu, India.*

Received 1st August 2015, Accepted 10th October 2015

Abstract

The purpose of the study was to find out the effect of plyometric and functional core training on selected physical fitness components among basketball players. To achieve the purpose of the present study, forty five men basketball players from Ernakulam district, Kerala state, India were selected as subjects at random and their ages ranged from 18 to 25 years. The subjects (N=45) were randomly assigned to three equal groups of fifteen subjects each. Pre test was conducted for all the subjects on selected physical fitness components. This initial test scores formed as pre test scores of the subjects. The groups were assigned as Experimental Group I, Experimental Group II and Control Group in an equivalent manner. Experimental Group I was exposed to plyometric training, Experimental Group II was exposed to functional core training and Control Group was not exposed to any experimental training other than their regular daily activities. The duration of experimental period was 12 weeks. After the experimental treatment, all the forty five subjects were tested on their physical fitness components variables. This final test scores formed as post test scores of the subjects. The pre test and post test scores were subjected to statistical analysis using Analysis of Covariance (ANCOVA) to find out the significance among the mean differences, whenever the 'F' ratio for adjusted test was found to be significant, Scheffe's post hoc test was used. In all cases 0.05 level of significance was fixed to test hypotheses. The plyometric training had shown better performance on explosive strength than the other groups. The functional core training had showed better performance on muscular endurance than the other groups.

Keywords: Plyometric, Core Training, Explosive Strength, muscular Strength, Basketball.

Introduction

Basketball is a very demanding and physically challenging game. The ability of today's athletes has far exceeded the limits of the game put on it by the original inventors. The skills required of today's players are incredibly different than those of yesterday. Basketball now allows for individual athletes to exhibit physical aptitude within the context of an offense or defense. The attributes of speed, change of direction and power rule the game as we know it today. Nowadays there are several training methods that have been developed and adopted to increase the demands of the sports. Sport training is a physical, technical, moral and intellectual participation of an athlete with the help of physical exercises. It is a planned process for the participation of athlete and players to achieve top level performance (Mindaugas et al. 2006).

Plyometric training is an excellent way to train for the demands of basketball. Plyometric drills should be progressive in nature and extend through the preparatory and preseason cycles of training. In season plyometric training is often too much for players who are maintaining a full schedule of two to four games per week (Chu, 1992). The importance of core stabilization system in creating stability and power system during sport activities has an important consideration. It is believed that a strong core allows an athlete the full transfer of forces generated with the lower extremities, through the torso, and to the upper extremities (Willardson, 2007)

Correspondence
Siby Lukose,
E-mail: siby.lukose@live.in, Ph: +9199955 55644

Methodology

The purpose of the study was to find out the effect of plyometric and functional core training on selected physical fitness components among basketball players. To achieve the purpose of the present study, forty five men basketball players from Ernakulam district, Kerala state, India were selected as subjects at random and their ages ranged from 18 to 25 years. The subjects (N=45) were randomly assigned to three equal groups of fifteen subjects each. Pre test was conducted for all the subjects on selected physical fitness components. This initial test scores formed as pre test scores of the subjects. The groups were assigned as Experimental Group I, Experimental Group II and Control Group in an equivalent manner. Experimental

Group I was exposed to plyometric training, Experimental Group II was exposed to functional core training and Control Group was not exposed to any experimental training other than their regular daily activities. The duration of experimental period was 12 weeks. After the experimental treatment, all the forty five subjects were tested on their physical fitness components. This final test scores formed as post test scores of the subjects. The pre test and post test scores were subjected to statistical analysis using Analysis of Covariance (ANCOVA) to find out the significance among the mean differences, whenever the 'F' ratio for adjusted test was found to be significant, Scheffe's post hoc test was used. In all cases 0.05 level of significance was fixed to test hypotheses.

Results and Discussion

The detailed procedure of analysis of data and interpretation were given below,

Table I. Computation of analysis of covariance of mean of plyometric and functional core training and control groups on explosive strength

	Plyometric Training	Functional Core Training	Control Group	Source of Variance	Sum of Squares	df	Means Squares	F-ratio
Pre-Test Means	27.80	28.06	27.26	**BG**	4.97	2	2.48	1.04
				WG	100.26	42	2.38	
Post-Test Means	40.46	36.46	27.33	**BG**	1359.51	2	679.75	38.96*
				WG	732.80	42	17.44	
Adjusted Post-Test Means	40.45	36.40	27.41	**BG**	1294.59	2	647.29	36.38*
				WG	729.35	41	17.78	

An examination of table - I indicated that the pre test means of plyometric, functional core training and control groups were 27.80, 28.06 and 27.26 respectively. The obtained F-ratio for the pre-test was 1.04 and the table F-ratio was 3.22. Hence the pre-test mean F-ratio was insignificant at 0.05 level of confidence for the degree of freedom 2 and 42. This proved that there were no significant difference between the experimental and control groups indicating that the process of randomization of the groups was perfect while assigning the subjects to groups. The post-test means of plyometric, functional core training and control groups were 40.46, 36.36 and 27.33 respectively. The obtained F-ratio for the post-test was 38.96 and the table F-ratio was 3.22. Hence the post-test mean F-ratio was significant at 0.05 level of confidence for the degree of freedom 2 and 42. This proved that the differences between the post test means of the subjects were significant.

The adjusted post-test means of plyometric, functional core training and control groups were 40.45, 36.40 and 27.41 respectively. The obtained F-ratio for the adjusted post-test means was 36.38 and the table F-ratio was 3.23. Hence the adjusted post-test mean F-ratio was significant at 0.05 level of confidence for the degree of freedom 2 and 41. This proved that there was a significant difference among the means due to the experimental trainings on explosive strength. Since significant differences were recorded, the results were subjected to post hoc analysis using Scheffe's post hoc test. The results were presented in Table-II.

Table II. The scheffe's test for the differences between the adjusted post test paired means on explosive strength

Adjusted Post-test means			Mean Difference	Required CI
Plyometric Training	**Functional Core Training**	**Control Group**		
40.45	36.40	---	4.05*	3.90*
40.45	---	27.41	13.04*	
---	36.40	27.41	8.99*	

**** Significant at 0.05 level of confidence***

The multiple comparisons showed in Table II proved that there existed significant differences between the adjusted means of plyometric training and functional core training group (4.05), plyometric training and control group (13.04), functional core training and control group (8.99) at 0.05 level of confidence with the confidence interval value of 3.90. The pre, post and adjusted means on explosive strength were presented through bar diagram for better understanding of the results of this study in Figure-I.

Figure I. Pre post and adjusted post test differences of the, plyometric training, functional core training and control groups on explosive strength

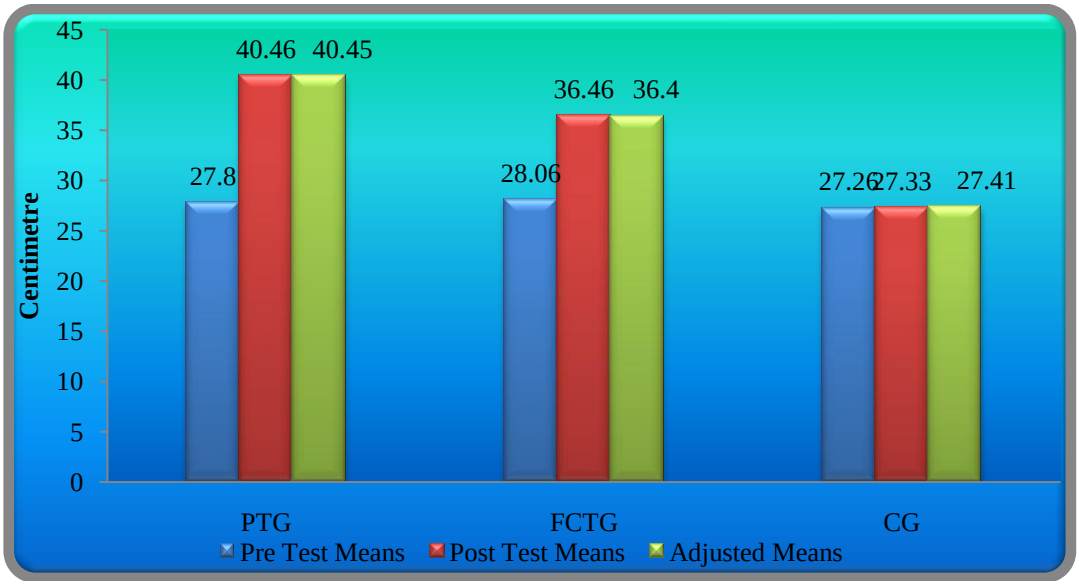


Table III. Computation of analysis of covariance of mean of plyometric and functional core training and control groups on muscular endurance

	Plyometric Training	Functional Core Training	Control Group	Source of Variance	Sum of Squares	df	Means Squares	F-ratio
Pre-Test Means	35.40	35.26	34.66	**BG**	4.57	2	2.28	1.09
				WG	87.86	42	2.09	
Post-Test Means	39.86	42.66	34.86	**BG**	468.40	2	234.20	53.22*
				WG	184.80	42	4.40	
Adjusted Post-Test Means	39.85	42.66	34.88	**BG**	448.22	2	224.11	49.75*
				WG	184.66	41	4.50	

An examination of table - III indicated that the pre test means of plyometric, functional core training and control groups were 35.40, 35.26 and 34.66 respectively. The obtained F-ratio for the pre-test was 1.09 and the table F-ratio was 3.22. Hence the pre-test mean F-ratio was insignificant at 0.05 level of confidence for the degree of freedom 2 and 42. This proved that there were no significant difference between the experimental and control groups indicating that the process of randomization of the groups was perfect while assigning the subjects to groups. The post-test means of plyometric, functional core training and control groups were 39.86, 42.66 and 34.86 respectively. The obtained F-ratio for the post-test was 53.22 and the table F-ratio was 3.22. Hence the post-test mean F-ratio was significant at 0.05 level of confidence for the degree of freedom 2 and 42. This proved that the differences between the post test means of the subjects were significant. The adjusted post-test means of plyometric, functional core training and control groups were 39.85, 42.66 and 34.88 respectively. The obtained F-ratio for the adjusted post-test means was 49.75 and the table F-ratio was 3.23. Hence the adjusted post-test mean F-ratio was significant at 0.05 level of confidence for the degree of freedom 2 and 41. This proved that there was a significant difference among the means due to the experimental trainings on muscular endurance. Since significant differences were recorded, the results were subjected to post hoc analysis using Scheffe's post hoc test. The results were presented in Table III.

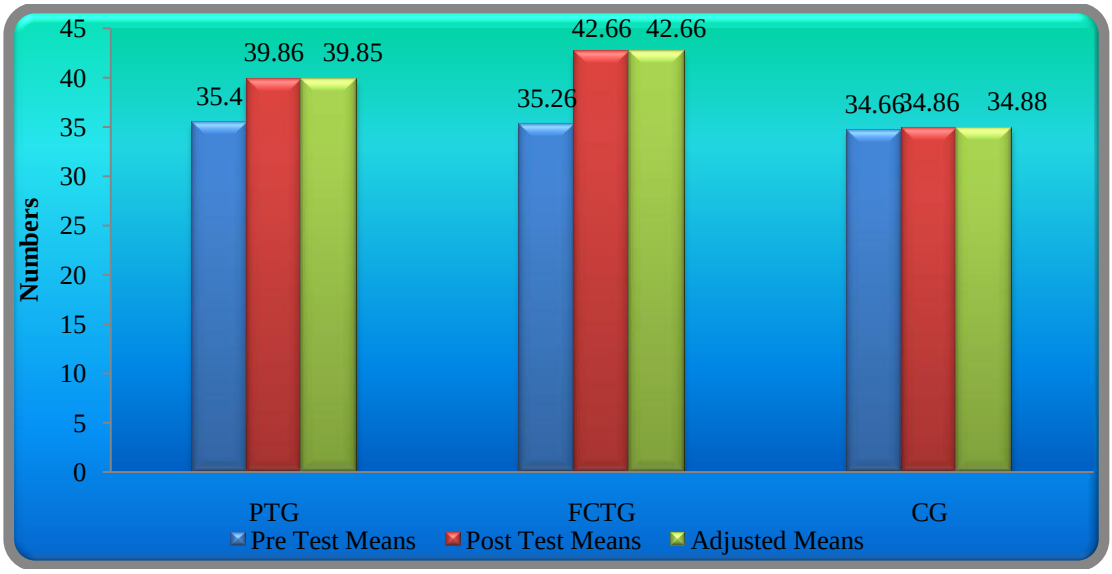
Table III. The scheffe's test for the differences between the adjusted post test paired means on muscular endurance

Adjusted Post-test means			Mean Difference	Required CI
Plyometric Training	Functional Core Training	Control Group		
39.85	42.66	---	2.81*	1.96
39.85	---	34.88	4.97*	
---	42.66	34.88	7.78*	

**** Significant at 0.05 level of confidence***

The multiple comparisons showed in Table III proved that there existed significant differences between the adjusted means of plyometric training and functional core training group (2.81), plyometric training and control group (4.97), functional core training and control group (7.78) at 0.05 level of confidence with the confidence interval value of 1.96. The pre, post and adjusted means on muscular endurance were presented through bar diagram for better understanding of the results of this study in Figure-II.

Figure II. Pre post and adjusted post test differences of the, plyometric training, functional core training and control groups on muscular endurance



Conclusions

In the light of the study undertaken with certain limitations imposed by the experimental conditions, the following conclusions were drawn.

1. The plyometric training had shown better performance on explosive strength than the other groups.
2. The functional core training had showed better performance on muscular endurance than the other groups.

References

1. Ahmed, T. (2013). The effect of upper extremity fatigue on grip strength and passing accuracy in junior basketball players. *J Hum Kinet.* 5;37:71-9.
2. Alejandro, V., Santiago, S., Gerardo, V.J., Carlos, M.J. & Vicente, G.T. (2015). Anthropometric Characteristics of Spanish Professional Basketball Players. *J Hum Kinet.* 10;46:99-106.
3. Arias, J.L. (2012). Performance as a function of shooting style in basketball players under 11 years of age. *Percept Mot Skills.* 114(2):446-56.
4. Barrow, H. M. & McGee, R. M. (1979). *A Practical Approach to Measurement in Physical Education*, Philadelphia: Lea and Febiger, p. 1.
5. Bompa, Tudor O. (1999). *Periodization: Theory and Methodology of Training*, (4th ed.), Champaign, Illinois: Human Kinetics Publishers, p. 24.
6. Chu, D. (1992). *Jumping into Plyometrics*. Champaign, IL: Human Kinetics.
7. Donald, A. C. (1998). *Jumping Into Plyometrics*. California: Human Kinetic Publisher.
8. Mindaugas Balciunas, Stanislovas Stonkus, Catarina Abrantes & Jaime Sampaio. (2006). Long term effects of different training modalities on power, speed, skill and anaerobic capacity in young male basketball players. *Journal of Sports Science and Medicine* 5, 163-170.

9. Singh, H. (1991). *Science of Sports Training*. New Delhi: D.V.S. Publications.
10. Stephenson, J and Swank, AM. Core training: Designing a program for anyone. *Strength Cond J*. 26 34–37, 2004.
11. Willardson, JM. Core stability training: Applications to sports conditioning programs. *J Strength Cond Res*. 21: 979–985, 2007.