ISSN: 0975-766X
CODEN: IJPTFI
Available Online through *Research Article*
www.ijptonline.com

EFFECT OF CIRCUIT TRAINING WITH AND WITHOUT MEDICINE BALL ON SELECTED MOTOR ABILITY COMPONENTSAND PLAYING ABILITY AMONG VOLLEY BALL PLAYERS

***P.Baskaran, ****Dr.M.Baskaran**
*Physical Director, Bharath Institute of Higher Education and Research, Bharath University, Chennai, 600073.
**Director of Physical Education, SBMC&H, Bharath Institute of Higher Education and Research, Bharath University, Chennai, 600073.

Received on: 15.10.2016 *Accepted on: 22.11.2016*

Abstract

The purpose of the study was find out the effect of circuit training with and without medicine ball on selected motor ability components and playing ability among volleyball players. The selected dependent variables were explosive power, agility and volley ball playing ability. To achieve the purpose forty five tennis players in the age group 22 to 25 years were selected from Bharath University. The subjects were randomly selected and divided equally in to three groups as two experimental group and control group. The experimental group I circuit training with medicine ball (CTWM), group II circuit training without medicine ball **(**CTWOM). The experimental training was adopted for a period of six weeks on five days a week. The control group was not exposed to experimental treatment. The collected data were statistically analyzed using analysis of covariance (ANCOVA).The result of the study reveals that the circuit training with medicine ball was significantly better than circuit training without medicine ball on improving explosive power, agility and playing ability of the volley ball players.

Keywords: Circuit Training; Medicine ball; Volley ball playing ability; Explosive power; Agility.

Introduction

Circuit training is an excellent way to improve motor ability components. The circuit training comprises of 6 to 10 exercises that are completed one exercise after another. Each exercise is performed for a specified number of repetitions or for a set time before moving on to the next exercise. The exercises within each circuit are separated by a short rest period, and each circuit is separated by a longer rest period. The total number of circuits performed during a training

session may vary from two to six depending on training level such as beginner, intermediate, or advanced, the period of training such as preparation or competition and the training objective.

Medicine Ball

A medicine ball is a weighted ball, weighing between 1 and 10 kg. Medicine ball can vary size and used to made of brown leather, these days they are graded in different colors according to size and one made out soft plastic. The main principle with medicine ball training is that in order to in order to throw catch it, one has to tense many abdominal muscles this creates a solid or stable base to work from (Matt Lawrence, 2003). The medicine ball training can be used for a number different outcome. The medicine ball is an excellent tool for rotator cuff declaration training, upper body power, total body power and rotational power in the torso. Many of medicine ball drills can be viewed as multipurpose (Michael Boyle, 2004).

Motor Ability

Motor Ability is a term refers to the total dynamic physiological state of an individual. The components of motor abilities are strength cardio-vascular endurance, speed, agility, power, flexibility, balance and co-ordination (Clark, 1987).

Agility: Agility refers to the controlled ability to change position and direction rapidly and accurately. Two condition exist under which the ability of the performer should be influenced diversely (1) a reaction of a known type and in a known direction, to a stimulus that is anticipated; and (2) a reaction of an undermined type and in an unknown direction to a set of stimuli that may vary widely and hence, he somewhat unpredictable (Gupta, 2003) .

Explosive Power: Speed-strength abilities refer to the proficiency of a muscle to reach a maximum level of strength over a short period of time (Castaldi, 1993).

Playing Ability

In the present study playing ability refers to ability of the player to volley ball play during competitions and was assessed by subjective rating

Statement of the Problem

The purpose of the study was to find the effect of circuit training with and without medicine ball on selected motor ability components and playing ability among volleyball players.

Hypothesis

It was hypothesized that the circuit training with medicine ball would have greater significant influence on selected motor ability component and playing ability than the circuit training without medicine ball among volley ball players.

Review of Literature

Shafeeq V.A et al (2012) found out the effect of interval circuit training on selectee motor fitness variables and volleyball skill performance of male volleyball players. For the purpose of the study 30 male volleyball players, aged between 18 to 22 years, from the department of Physical Education, Annamalai University, were selected as subjects. They were randomly divided into two groups, viz, experimental and control group, both consisted of 15 subjects each. The motor fitness variables were explosive power, cardio-respiratory endurance and muscular strength. The volleyball skill performance of the subjects was assessed using Brady volley test and Russel Lange serving test prior to and after the experimentation. The experimental group underwent interval circuit training programme for three days per week for eight weeks.

The data was statistically treated with ANCOVA(P _ 0.05) and the results indicated that the interval circuit training significantly helped to improve the explosive power, cardio respiratory endurance and muscular strength (P _ 0.05) and also volley ball skill performance such as volleying ability and serving ability. Taşkin, H (2009) determined the effect of circuit training directed toward motion and action velocity over the sprint-agility and anaerobic endurance. A total of 32 healthy male physical education students with a mean age of 23.92 ± 1.51 years were randomly allocated into a circuit training group (CTG; n = 16) and control group (CG; n = 16). A circuit training consisting of 8 stations was applied to the subjects 3 days a week for 10 weeks. Circuit training program was executed with 75% of maximal motion numbers in each station.

The FIFA Medical Assessment and Research Centre (F-MARC) test battery, which was designed by FIFA, was used for measuring sprint-agility and anaerobic endurance. Pre- and post training testing of participants included assessments of sprint-agility and anaerobic endurance. Following training, there was a significant ($p < 0.05$) difference in sprint-agility between pre- and post testing for the CTG (pretest = 14.76 ± 0.48 seconds, posttest = 14.47 ± 0.43 seconds). Also, there was a significant ($p < 0.05$) difference in anaerobic endurance between pre- and post testing for the CG (pretest = 31.53 ± 0.48 seconds, posttest = 30.73 ± 0.50 seconds). In conclusion, circuit training, which is designed to be performed 3

days a week during 10 weeks of training, improves sprint-agility and anaerobic endurance. William J.Kraemer, et al (2000) mentioned that few data exist on the long-term adaptations to heavy resistance training in women. The purpose of this investigation was to examine the effect of volume of resistance exercise on the development of physical performance abilities in competitive, collegiate women tennis players. Twenty-four tennis players were matched for tennis ability and randomly placed into one of three groups: a no resistance exercise control group, a periodized multiple-set resistance training group, or a single-set circuit resistance training group. No significant changes in body mass were observed in any of the groups throughout the entire training period.

However, significant increases in fat-free mass and decreases in percent body fat were observed in the periodized training group after 4, 6, and 9 months of training. A significant increase in power output was observed after 9 months of training in the periodized training group only. One-repetition maximum strength for the bench press, free-weight shoulder press, and leg press increased significantly after 4, 6, and 9 months of training in the periodized training group, whereas the single-set circuit group increased only after 4 months of training. Significant increases in serve velocity were observed after 4 and 9 months of training in the periodized training group, whereas no significant changes were observed in the single-set circuit group. These data demonstrate that sport-specific resistance training using a periodized multiple-set training method is superior to low-volume single-set resistance exercise protocols in the development of physical abilities in competitive, collegiate women tennis players.

Methodology

The purpose of the study was find out the effect of circuit training with and without medicine ball on selected motor ability components and playing ability among volleyball players. The selected dependent variables were explosive power, agility and tennis playing ability. To achieve the purpose forty five tennis players in the age group 22 to 25 years were selected from Bharath University. The subjects were randomly selected and divided equally in to three groups as two experimental group and control group. The experimental group I circuit training with medicine ball (CTWM), group II circuit training without medicine ball (CTWOM). The experimental training was adopted for a period of six weeks on five days a week. The control group was not exposed to experimental treatment. The dependent variables selected for this study were such as explosive power, agility and volley ball playing ability. The above selected variable were tested through shuttle run, vertical jump-test and subjective rating with three expert respectively were collected prior and

immediately after experimental period. The collected data 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 test was applied as post hoc test to determine the paired mean difference. The level of confidence was fixed at 0.05 levels for all the cases.

Result And Discussion On Explosive Power

Table- I: Computation Of Analysis Of Covariance On Explosive Power *(Scores in Centimeters)*

Variable	Test	Circuit training with medicine ball	Circuit training without medicine ball	Control Group	S.V	S.S	df	M.S	F
Speed	Pre	55.47	52.67	51.6	B	119.64	2	59.82	2.36
					W	1062.67	42	25.30	
	Post	59.67	55.87	54.27	B	230.80	2	115.40	**4.56***
					W	1064	42	25.33	
	Adjusted Means	57.26	56.43	55.88	B	18.08	2	9.04	**8.48***
					W	43.70	41	1.07	
	Mean gain	4.2	3.20	2.67					

Table F-ratio at 0.05 level of confidence for 2 and 42 (df) =3.22, 2 and 41 (df) =3.23

Table I shows that the pre test mean scores of explosive power of circuit training with medicine ball group was 55.47centimeters, circuit training with medicine ball group was52.67 centimeters and control group was51.6centimeters. The post test means showed differences due to experimental training and mean values recorded were 59.47, 55.87 and 54.27centimeters respectively. The obtained F value on pre test scores 2.36 was less than the required F value of 3.22 to be significant at 0.05 level. This proved that there was no significant difference between the groups at initial stage and the randomization at the initial stage was equal. The post test scores analysis proved that there was significant difference between the groups, as the obtained F value 4.56 was greater than the required F value of 3.22. This proved that the differences between the post test means of the subjects were significant. Taking into consideration the pre and post test scores among the groups, adjusted mean scores were calculated and subjected to statistical treatment. The obtained F value of 8.48 was greater than the required F value of 3.23. This proved that there was a significant difference among the means due to experimental training on explosive power. Since significant improvements

were recorded, the results were subjected to post hoc analysis using Scheffe's Confidence Interval test. The results were presented in Table II

Table II: Scheffe's Confidence Interval Test Scores On Expolsive Power (Scores in Centimeters).

MEANS			**Mean Difference**	**Required C.I**
Circuit training with medicine ball	**Circuit training without medicine ball**	**Control group**		
57.49	56.43	-	1.06*****	0.96
57.49		55.88	1.61*****	0.96
	56.43	55.88	0.55	0.96

The multiple mean comparisons shown in Table II proved that there existed significant differences between the adjusted means of circuit training with medicine ball, circuit training without medicine ball and control group. There was no significant difference between circuit training without medicine ball and Control groups. When comparing both training group's circuit training with medicine ball was better in improving explosive power than the circuit training without medicine ball.

Table III: Computation Of Analysis Of Covariance On Agility*(Scores in Seconds)*.

Variable	**Test**	**Circuit training with medicine**	**Circuit training without medicine**	**Control Group**	**S.V**	**S.S**	**df**	**M.S**	**F**
Agility	Pre	12.74	12.68	13.03	**B**	1.05	2	0.52	**1.01**
					W	21.76	42	0.52	
	Post	11.56	11.93	12.44	**B**	5.83	2	2.92	**8.82***
					W	13.88	42	0.33	
	Adjusted Means	11.60	12.01	12.31	**B**	3.68	2	1.84	**12.13***
					W	6.22	41	0.15	
	Mean gain	1.18	0.75	0.59					

Table F-ratio at 0.05 level of confidence for 2 and 42 (df) =3.22, 2 and 41 (df) =3.23

Table I shows that the pre test mean scores of agility of circuit training with medicine ball group was 12.74 seconds, circuit training with medicine ball group was12.68 seconds and control group was13.03 seconds. The post test means

showed differences due to experimental training and mean values recorded were 11.56, 11.93 and 12.44seconds respectively. The obtained F value on pre test scores 1.01 was less than the required F value of 3.22 to be significant at 0.05 level. This proved that there was no significant difference between the groups at initial stage and the randomization at the initial stage was equal. The post test scores analysis proved that there was significant difference between the groups, as the obtained F value 8.82 was greater than the required F value of 3.22. This proved that the differences between the post test means of the subjects were significant. Taking into consideration the pre and post test scores among the groups, adjusted mean scores were calculated and subjected to statistical treatment. The obtained F value of 12.13 was greater than the required F value of 3.23. This proved that there was a significant difference among the means due to experimental training on agility. Since significant improvements were recorded, the results were subjected to post hoc analysis using Scheffe's Confidence Interval test. The results were presented in Table IV.

Table IV: Scheffe's confidence interval test scores on agility(scores in seconds).

MEANS			**Mean Difference**	**Required C.I**
Circuit training with medicine ball	**Circuit training without medicine ball**	**Control group**		
11.60	12.01	-	0.40*	0.36
11.60	-	12.31	0.71*	0.36
	12.01	12.31	0.30	0.36

The multiple mean comparisons shown in Table IV proved that there existed significant differences between the adjusted means of circuit training with medicine ball, circuit training without medicine ball and control group. There was no significant difference between circuit training without medicine ball and control group. When comparing circuit training with medicine ball was better in improving agility than the without medicine ball and control groups.

Table V: Computation of analysis of covariance on playing ability(scores in marks)

Variable	**Test**	**Circuit training with medicine ball**	**Circuit training without medicine ball**	**Control Group**	**S.V**	**S.S**	**df**	**M.S**	**F**
Playing ability	Pre	69.07	70.02	67.34	**B**	55.33	2	27.67	**1.10**
					W	1053.71	42	25.09	
	Post	75.12	72.27	66.36	**B**	598.92	2	299.46	**14.46***
					W	869.69	42	20.71	

	Adjusted Means	74.99	71.64	67.12	**B**	456.58	2	228.29	**15.89 ***
					W	589.18	41	14.37	
	Mean gain	6.05	2.25	0.98					

Table F-ratio at 0.05 level of confidence for 2 and 42 (df) =3.22, 2 and 41 (df) =3.23

Table I shows that the pre test mean scores of agility of circuit training with medicine ball group was 69.07 marks, circuit training with medicine ball group was70.02 marks and control group was67.34 marks. The post test means showed differences due to experimental training and mean values recorded were 75.12, 72.27 and 66.36marks respectively. The obtained F value on pre test scores 1.10 was less than the required F value of 3.22 to be significant at 0.05 level. This proved that there was no significant difference between the groups at initial stage and the randomization at the initial stage was equal. The post test scores analysis proved that there was significant difference between the groups, as the obtained F value 14.46 was greater than the required F value of 3.22. This proved that the differences between the post test means of the subjects were significant. Taking into consideration the pre and post test scores among the groups, adjusted mean scores were calculated and subjected to statistical treatment. The obtained F value of 15.89 was greater than the required F value of 3.23. This proved that there was a significant difference among the means due to experimental training on playing ability. Since significant improvements were recorded, the results were subjected to post hoc analysis using Scheffe's Confidence Interval test. The results were presented in Table VI

Table VI: Scheffe's Confidence Interval Test Scores On Playing Ability (Scores in Marks).

MEANS			**Mean Difference**	**Required C.I**
Circuit training with medicine	**Circuit training without medicine**	**Control group**		
74.99	71.64	-	3.35	3.52
74.99	-	67.12	7.87*	3.52
-	71.64	67.12	4.52*	3.52

The multiple mean comparisons shown in Table VI proved that there existed significant differences between the adjusted means of circuit training with medicine ball, circuit training without medicine ball and control group. There was no significant difference between circuit training with medicine ball and circuit training without medicine ball groups.

When comparing both training group's circuit training with and without medicine ball was better in improving playing ability than the control groups.

Conclusions

1. Two forms circuit training significantly improved the explosive power of volley ball players. There circuit training with medicine ball was significantly better than circuit training without medicine ball.
2. Two forms circuit training significantly improved the agility of volley ball players. There circuit training with medicine ball was significantly better than circuit training without medicine ball.
3. Two forms of circuit trainings significantly improved volley ball playing ability. There was no significant difference between circuit training with medicine ball and circuit training without medicine ball.

References

1. Cosmo R Castaldi and Patrick J.Bishop, (1993), "Safety in Ice Hockey – Volume 2"Revised for volume: 2, American Society for Testing and Materials, Philadelphia, p.61.
2. Gupta A.K. (2003), Test and Measurement in Physical Education, Sports Publications, Ashok Vihar, Delhi, pp. 156,162
3. Matt Lawrence (2003) " Core stability" A&C Black Publishers LTD 38,Shoho square, London WID 3HB ,pp 129
4. Michael Boyle (2004) "Functional Training for Sports" Human kinetics-United States, P.O. Box 5076, Champaign, I-61825-5076, 80074-4457, Printed in the United States of America, Page: 120.
5. Taşkin, H 2009 "Effect of circuit training on the sprint-agility and anaerobic endurance" Journal of Strength & Conditioning Research: - Volume 23 - Issue 6 - pp 1803-1810.
6. V.A Shafeeq, Abdussalam Kanniyan, Hassan M.A and Shine Singh J.P (2012) "The effect of interval circuit training on selectee motor fitness variables and volleyball skill performance of male volleyball players" International journal of health ,physical education and computer science in sports , Volume:5, Issues:1,pp:52-54.
7. William J. Kraemer, Nicholas Ratamess, Andrew C. Fry, Travis Triplett-McBride(2000) " Influence of Resistanc Training Volume and Periodization on Physiological and Performance Adaptations in Collegiate Women Tennis Players" American Journal of Sports Medicine,Volume:28,Issue:5, pp.626-633.