International Journal of Advanced Trends in Engineering and Technology (IJATET)
Impact Factor: 5.965, ISSN (Online): 2456 - 4664
(www.dvpublication.com) Volume 3, Issue 2, 2018

IMPACT OF CIRCUIT WEIGHT TRAINING ON SELECTED PHYSICAL AND PHYSIOLOGICAL PARAMETERS OF VOLLEYBALL PLAYERS

Dr. M. Anbalagan
Assistant Professor, Department of Physical Education, Meenakshi Physical Education College, Thathanur, Tamilnadu

Cite This Article: Dr. M. Anbalagan, "Impact of Circuit Weight Training on Selected Physical and Physiological Parameters of Volleyball Players", International Journal of Advanced Trends in Engineering and Technology, Volume 3, Issue 2, Page Number 26-28, 2018.

Abstract:

The purpose of the study was to find out the effect of circuit weight training on selected physical and physiological parameters of volleyball players. To achieve this purpose of this study, thirty-five men volleyball specialization students from Meenatchi Physical Education College, Thathanur. Tamil Nadu, India during the year 2013-14 were selected as subjects and their age ranged between 18 to 22 years. They were divided into two equal groups of fifteen subjects in each group, in which group - I circuit weight training and group - II acted as control. The selected dependent variables such as muscular endurance, explosive power, resting pulse rate and breath holding time were tested by using standard tests and procedures. The analysis of covariance (ANCOVA) was used to analyse the significant differences among groups. The level of confidence was fixed to test the significance is .05 level. The results of the study reveals that due to the impact of circuit weight training on selected physical and physiological parameters of volleyball players have significantly altered.

Key Words: Circuit Weight Training, Physical and Physiological Parameters

Introduction:

Sportsmen and women must participate in year round conditioning programs to have the utmost efficiency, consistent improvement and balanced abilities. For that they must put their bodies under a certain amount of stress to increase physical capabilities. Physical exercise is extremely important for maintaining physical fitness including healthy weight; building and maintaining healthy bones, muscles, and joints; promoting physiological well-being; and strengthening the immune system. To improve or maintain a desired level of physical fitness, there is a need to constantly administer an adequate training intensity while exercising. Circuit weight training is one of the effective means to improve all round physical and cardiovascular fitness.

Circuit training is a form of exercise that uses a number of weight training exercise sets separated by short intervals. In the original format, 9 to 12 stations comprised the circuit. This number may vary according to the design of the program. This type of training is an excellent choice for developing general, all round physical and cardiovascular fitness. Generally, a good circuit training programme will involve each muscle group' getting worked by several different exercises. The number of exercises per muscle group depends on the training effect to be achieved, the desired volume of work to be completed during a training session, the desired intensity of effort and the structure of the programme.

Circuit training enhances both muscular strength and endurance. While resistance training targets strength, short rest periods and numerous repetitions focus on muscular endurance--your ability to perform an activity over time without becoming too tired. Usually, circuit training provides a great introduction for those with limited weightlifting experience. According to the American Council on Exercise, athletes involved in rowing, kayaking, tennis or volleyball can improve sport performance with circuit training (Zatsiorsky and Kraemer, 2006).

Methodology:

Subjects and Variables:

For the purpose of this study, thirty male volleyball specialization students of Meenatchi Physical Education College in the age group of 18 to 22 years were recruited, with their consent. All of them were healthy, nonsmoking and with a negative medical history. The selected subjects were randomly assigned to both circuit resistance training and control groups of 15 each. The selected dependent variables were assessed by using standard tests and procedures, before and after the training regimen. The instruments used for testing the dependent variables were standard and reliable as they were purchased from the reputed companies. The variables and tests used are presented in table-1.

Table 1: Dependent Variables and Test

S.No	Variables	Tests / Instruments	Unit of Measurement
1.	Explosive Power	Sargeant Vertical Jump	Centimetres
2.	Muscular Endurance	Bent Knee Sit-ups	Counts
3.	Breathe Holding Time	Manual Method	Seconds
4.	Resting Pulse Rate	Blood Pressure Monitor	Counts

Experimental Design and Statistical Procedure:

The experimental design used for the present investigation was random group design involving thirty subjects for training effect. Analysis of covariance (ANCOVA) was used as a statistical technique to determine the significant difference, if any, existing between pretest and posttest data on selected dependent variables. The level of significance was accepted at $P < 0.05$.

Training Programme:

During the training period, the experimental group underwent circuit weight training for three days per week (alternative days) for eight weeks. Every day the workout lasted for 45 to 60 minutes approximately including warming up and warming down periods. In the circuit weight training regimens, a serious of eight exercise stations were formed. The subjects moved from one station to another, by jogging. The number of repetition for each exercises varied from ten to sixteen. The number of circuits varied between two-and-three for eight weeks, with a recovery interval of five minutes was given between circuits. The number of repetition was progressively increased once in two weeks. Group-II acted as control who did not participate in any strenuous physical exercises and specific training throughout the training period. However, they performed activities as per thir curriculum.

Results:

The descriptive analysis of data collected from the experimental and control groups on selected physical and physiological variables before and after eight weeks of circuit weight training is presented in table-2.

Table 2: Computation of Mean and Standard Deviation on Selected Physical and Physiological Variables

Variables	Groups	Pretest		Posttest	
		$\bar{X}$	σ	$\bar{X}$	σ
Explosive Power	Experimental	33.07	4.99	37.26	4.60
	Control	32.73	3.17	33.02	4.09
Muscular Endurance	Experimental	20.78	3.90	24.47	2.85
	Control	21.47	3.27	21.83	2.92
Breathe Holding Time	Experimental	38.57	2.70	40.87	2.65
	Control	39.07	2.91	38.94	2.90
Resting Pulse Rate	Experimental	74.03	3.27	71.14	1.76
	Control	74.63	2.15	74.16	1.46

Analysis of covariance (ANCOVA) was used to determine the significant impact of circuit weight training on selected physical and physiological variables and it is presented in table 3.

Table 3: Analysis of Covariance on Selected Physical and Physiological Variables of Circuit Weight Training and Control Groups

Variables	Groups	Adjusted Mean	SOV	Sum of Squares	DF	Mean Square	'F' ratio
Explosive Power	Experimental	52.70	B	156.95	1	156.95	38.41*
	Control	48.11	W	110.32	27	4.09	
Muscular Endurance	Experimental	31.75	B	157.21	1	157.21	95.79*
	Control	27.11	W	44.31	27	1.64	
Breathe Holding Time	Experimental	47.35	B	20.11	1	20.11	25.51*
	Control	45.71	W	21.28	27	0.79	
Resting Pulse Rate	Experimental	62.74	B	64.03	1	64.03	31.30*
	Control	65.66	W	55.23	27	2.05	

Required table value for significance at 0.05 level of confidence for df of 1 and 27 is 4.21

* Significant at 0.05 level.

The findings of the study shows that significant difference existing between circuit weight training and control group on explosive power, muscular endurance, breathe holding time and resting pulse rate, since the obtained 'F' ratio of 38.41, 95.79, 25.51 and 31.30 respectively were greater than the required table value of 4.21 for significance at 0.05 level of confidence for df of 1 and 27. The findings of the study shows that eight weeks of circuit weight training had a influence of 13.42% on explosive power, 21.38% on muscular endurance, 5.18% on breathe holding time, and 5.23% on resting pulse rate.

Discussion:

The results of the study reveals that due to the impact of circuit weight training selected physical and physiological parameters of volleyball players have significantly altered. The results of the present study are also in line with the observation by Alcaraz and others (2008) that heavy-resistance circuit training may be an effective training strategy for the promotion of both strength and cardiovascular adaptations. Dorgo and others (2009) was observed significant improvements in muscular strength and muscular endurance of the manual resistance training and weight resistance training groups.

Kaikkonen and others(2000) observed significant improvement on cardiovascular and muscular fitness due to the effect of a 12-week low resistance circuit weight training. Gettman and others (1978) conducted a study to determine the changes elicited by circuit weight training and running (RN) programs conducted 3 days per week for 20 weeks. It was concluded that the circuit weight training program was most specific in improving strength. A reduction in heart rate from resistance training is considered favorable (Stone et al., 1991). Knicker (1997) examined the effects of external resistance on sprinting mechanics and found that even small resistance loads could result in considerable changes in kinematics and coordination of muscular activity.

It appears that regular participation in physical exercises initiate a disruption in systemic homoeostasis, which is followed by an adaptive phase results in the betterment of the performance of explosive power, muscular endurance, and breathe holding time, and a reduction in resting pulse rate, which might be due to the progressive loading of intensity.

Conclusion:

The results of the study reveals that due to the impact of circuit weight training on selected physical fitness components such as explosive power and muscular endurance and physiological parameters namely breath holding time and resting pulse rate of volleyball players have significantly altered.

References:

1. Alcaraz PE, et al., (2008), Physical performance and cardiovascular responses to an acute bout of heavy resistance circuit training versus traditional strength training, Journal of Strength and Conditioning Research, 22(3):667-71.
2. Dorgo S, et al (2009), “The effects of manual resistance training on improving muscular strength and endurance”, Journal of Strength and Conditioning Research. 23(1):293-303.
3. Gettman, L.R., et.al., (1978). “The Effect of Circuit Weight Training on Strength, Cardio Respiratory Function and Body Composition Adult Men. Med Sci Sports, 10:3 171-6.
4. Kaikkonen, H., et.al., (2000). The Effect of Heart Rate Controlled Low Resistance Circuit Weight Training and Endurance Training on Maximal Aerobic Power in Sedentary Adults. Scand Journal Med Sci Sports, 10:4, 211-5.
5. Knicker, A (1997). Neuromechanics of sprint specific training skills. In J Wilkerson, K Ludwig & W Zimmermann (Eds.), Biomechanics in Sports XV (pp.17-21). Denton, TX: Texas Woman’s University Press.
6. Stone, M. H., et al., (1991). Health and Performance Related Potential of Resistance Training. Sports Medicine, 11, 210-231.
7. Vladimir M. Zatsiorsky and William J. Kraemer; (2006) Science and Practice of Strength Training";