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Effect of circuit weight training on physical fitness variables of Pondicherry university cricket players

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Abstract

The purpose of the study was to find out the effect of eight week circuit weight training on physical fitness variables of Pondicherry university cricket players. A total of thirty (N=30) men Cricket players were selected from Pondicherry Engineering College and Pondicherry University Campus. The age of the subjects ranged from 18 to 24 years and fifteen (N=15) players from each college. The Engineering College players were acted as control group and Pondicherry University Campus players acted as experimental group. Total duration was for eight weeks with three days per week. Control group was not involved in any training. All the subjects were tested on the selected physical fitness variables such as leg strength, leg explosive power and abdominal strength endurance before and after eight week of circuit weight training. The data pertaining to the physical fitness variables were statistically analyzed with analysis of covariance (ANCOVA). In all cases 0.05 level of confidence was fixed as a level of confidence to test the hypothesis. The finding of the study reveals that the experimental group had made a significant difference in all the selected physical fitness variables such as leg strength, leg explosive power and abdominal strength endurance when compared to control group. Hence it was concluded that eight week of circuit weight training improved the selected physical fitness variables of Pondicherry university men cricket players.

Keywords: Circuit weight training, leg strength, leg explosive power, abdominal strength endurance

1. Introduction

Circuit training is a form of conditioning combining resistance training and high-intensity aerobics. It is designed to be easy to follow and target strength building as well as muscular endurance. An exercise "circuit" is one completion of all prescribed exercises in the program. When one circuit is complete, one begins the first exercise again for another circuit. Traditionally, the time between exercises in circuit training is short, often with rapid movement to the next exercise.

Circuit training is an excellent way to improve mobility, strength and stamina. The circuit training comprises of 6 to 10 strength 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 your training level (beginner, intermediate, or advanced), your period of training (preparation or competition) and your training objective.

Circuit training is an evolving training exercise program that was developed by R.E. Morgan and G.T. Anderson in 1953 at the University of Leeds in England.

Weight training is the best means for improving strength and endurance. All type of weight training does not produce equal amount of muscle hypertrophy. Weight training with a certain type of load leads to best results. The organization of strength training basically comprises of two things. (a) Methods of arrangements of strength exercises and (b) Loading procedure during strength exercise.

Weight training is taking fitness enthusiasts by storm, and it has even become attractive to thousands who once called themselves couch potatoes. Weight training is an activity that you can accomplish in short period, yet it can make dramatic changes in how your body looks and feels.

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Many who weight train will tell you that having a firm body not only feels great but also positively affects how they to others. Weight training can increasing the energy level and improves the productivity at work and everyday activities.

Weight training helps maintain muscle strength, muscular endurance, neuromuscular coordination and bone density. The latest research suggests that weight training contributes significantly to quality of life, whatever one’s gender or age. In fact interest in weight training has increased considerably among seniors and children.

The amount of weight to be used should be based on a percentage of the maximum amount of weight that can be lifted one time, generally referred to as one repetition maximum (1RM). For maximum results, athletes should train according to their genetic predisposition. An athlete with a greater proportion of fast twitch muscles would benefit from sprint training and a muscular strength program using fewer repetitions of a heavier weight. The number of repetitions performed to fatigue is an important consideration in designing a strength training program. One set of 4-6 RM performed 3 days a week is a typical strength training program. In a number of studies comparing multiple set programs to produce greater strength gains than a single set, the majority of studies indicate that there is not a significant difference. Handling heavy weights in the pursuit of strength will require a recovery of 3-5 minutes between sets. The majority of athletic events are fast and dynamic, and therefore this quality must be reflected in the athlete's strength work.

Physical fitness is a matter of fundamental importance to the well-being of every individual in the field of sport. Physical fitness components and specific training schedule of skill ability are very important factors for cricket players. These components of training schedule of skill ability are very important factors for cricket players. This component of training schedule and development of skill ability are more important to cricket players in game situation. Physical fitness is one's richest possession; it cannot be purchased; it has to be earned through a daily routine of physical exercise.

The purpose of the study was to find out the effect of eight week circuit weight training on selected physical fitness variables of men cricket players of Pondicherry University.

2. Methodology

2.1 Subjects

For the present study the investigator selected a total of total of thirty (N=30) men Cricket players were selected from Pondicherry Engineering College and Pondicherry University Campus. The age of the subjects ranged from 18 to 24 years and fifteen (N=15) players from each college. The Engineering College players were acted as control group and Pondicherry University Campus players acted as experimental group.

2.2 Orientation of the Subjects

Prior to the administration of tests and training, the investigator held a series of meetings with the subjects, who

were made clear about the objectives and purpose of the study. The testing procedure was explained to them in detail. They were requested to co-operate and participate actively in the same. Demonstration of all exercises was after done, so that the subjects would be clear about what they need to do. A written permission from the principal of the colleges was taken by the investigator in order to conduct the training programme.

2.3 Selection of variables Tests

The variables were selected by reviewing and studying related literature in detail and the following physical fitness variables were selected.

Table I: Selection of Tests

Variables	Test
Leg Strength	Leg Dynamometer
Leg explosive power	Standing Broad Jump
Abdominal strength endurance	Bend knee sit-ups

2.4 Experimental design

The pre and post-test random group design was used as experimental design in which thirty men subjects were divided into two groups one experimental group and one control group of fifteen subjects each. The experimental group underwent circuit weight training and control group acted as the control. The subjects tested on selected criterion variables were leg strength, abdominal strength endurance and leg explosive power prior to and immediately after the training programme.

2.5 Treatment

Total duration was for eight weeks and the subject was undergoing training trice a week. Move from exercise to exercise with no more than 30 seconds of rest in between. When they complete one circuit, rest for 1 – 2 minutes, and then complete the second circuit and the training tempo was 2 counts for the concentric action and 3 counts for eccentric action. Each work out was for a duration of 45 - 60 minutes (excluding warm ups and cool down).

The training programmes were conducted at Pondicherry University campus cricket ground. Exercise prescribed below was continuous throughout the duration but, intensity had changed after every week. The first session began with 60% of the 1RM test. The weight training exercises were includes bench press, good morning exercise, hamstring curl and calf raise etc.

3. Results and Discussion

The collected data from the two groups prior to and immediately after the training programme on selected physical fitness variables were statistically analyzed with analysis of covariance (ANCOVA). In all cases 0.05 level of confidence was fixed as a level of confidence to test the hypothesis.

Table II: Descriptive Scores of Experimental Group and control group on selected variable

Variables	Experimental group					Control group				
	Pre-test mean	S.D	Post-test mean	S.D	Ad. Post-test mean	Pre-test mean	S.D	Post-test mean	S.D	Ad. Post-test mean
Leg Strength	96	8.94	105.73	8.68	105.17	94	8.13	95.47	7.87	96.03
Leg Explosive Power	2.32	0.11	2.60	0.17	2.61	2.36	0.16	2.39	0.14	2.37
Abdominal Strength Endurance	36.33	4.92	44.40	5.62	45.83	39.27	5.48	39.73	5.30	38.31

Table III: Analysis of covariance on selected variable

Variables		Source of variance	Sum of squares	df	mean squares	F' ratio
Leg Strength	Pre test	Between	10.80	1	10.80	0.15
		Within	2046.4	28	73.09	
	Post-test	Between	790.53	1	790.53	11.51*
		Within	1922.67	28	68.67	
	Adjusted Post-test	Between	624.45	1	624.45	114.94*
		Within	146.69	27	5.43	
Leg Explosive Power	Pre test	Between	0.012	1	0.012	0.72
		Within	0.47	28	0.017	
	Post-test	Between	0.32	1	0.32	21.56*
		Within	0.42	28	0.015	
	Adjusted Post-test	Between	0.43	1	0.43	129.39*
		Within	0.091	27	0.0033	
Abdominal Strength Endurance	Pre test	Between	64.53	1	64.53	2.38
		Within	760.27	28	27.15	
	Post-test	Between	163.33	1	163.33	5.48*
		Within	834.53	28	29.48	
	Adjusted Post-test	Between	391.16	1	391.16	92.54*
		Within	114.13	27	4.23	

* Significant at 0.05 level of confidence

Table – II and III shows that the pre and post-test mean of leg strength between experimental group and control group were 96.0 ± 8.94 , 1 ± 8.13 and 105.17 ± 8.68 , 95.47 ± 7.87 respectively. The obtained 'F' ratio value 0.15 for pre-test mean and 11.51 for post-test on leg strength. The required table value is 4.20 for significant at 0.05 level of confidence with df 1 and 28. It indicated that the pre-test was insignificant and post-test was significant at 0.05 level of confidence. The adjusted post-test mean of leg strength between the experimental group and control group were 105.17 and 96.03 respectively. The 'F' ratio value 114.94 for adjusted post-test mean is higher than the required table value 4.21 for significant at 0.05 level of confidence with df 1 and 27. The result of the study indicated that there was significant difference between the adjusted post-test mean of experimental group and control group.

The pre and post-test mean of leg explosive power between experimental group and control group were 2.32 ± 0.11 , 2.36 ± 0.16 and 2.60 ± 0.17 , 2.39 ± 0.14 respectively. The obtained 'F' ratio value 0.72 for pre-test mean and 21.56 for post-test on leg strength. The required table value is 4.20 for significant at 0.05 level of confidence with df 1 and 28. It indicated that the pre-test was insignificant and post-test was significant at 0.05 level of confidence. The adjusted post-test mean of leg explosive power between the experimental group and control group were 2.61 and 2.37 respectively. The 'F' ratio value 129.39 for adjusted post-test mean is higher than the required table value 4.21 for significant at 0.05 level of confidence with df 1 and 27. The result of the study indicated that there was significant difference between the adjusted post-test mean of experimental group and control group.

The pre and post-test mean of abdominal strength endurance between experimental group and control group were 36.33 ± 4.92 , 39.27 ± 5.48 and 44.40 ± 5.62 , 39.73 ± 5.30 respectively. The obtained 'F' ratio value 2.38 for pre-test mean and 5.48 for post-test on leg strength. The required table value is 4.20 for significant at 0.05 level of confidence with df 1 and 28. It indicated that the pre-test was insignificant and post-test was significant at 0.05 level of confidence. The adjusted post-test mean of leg explosive power between the experimental group and control group were 45.83 and 38.31 respectively. The 'F' ratio value 92.54 for adjusted post-test mean is higher than the required table value 4.21 for significant at 0.05 level of confidence with df 1 and 27. The

result of the study indicated that there was significant difference between the adjusted post-test mean of experimental group and control group.

The result of the study shows that eight week circuit weight training resulted in the improvement of leg strength, leg explosive power and abdominal strength endurance of cricket players. The increase in the abdominal strength and endurance may be due to the fact that the abdomen exercises were done both in the training and cool down session. Increase in the leg strength and leg explosive power may be due to the circuit weight training exercise intensity and their movement speed and explosiveness. The findings of the present study regarding these variables are in agreement with the finding of Masamoto, *et al.*, (2003) [7], Ford HT (1983) [3], MCGovern and Michael B, (2004) [8] and Berryman N, *et al.*, (2010) [2].

4. Conclusion

Eight weeks of circuit weight training programme improved the leg strength, leg **explosive** power and abdominal strength endurance of Pondicherry university cricket players. The results of the study provided the evidence, that the circuit weight training is an effective method for developing the physical fitness variables such as leg strength, leg explosive power and abdominal strength endurance.

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