ORIGINAL RESEARCH PAPER

Physical Education

EFFECT OF CIRCUIT TRAINING ON PHYSICAL FITNESS VARIABLES AMONG COLLEGE WOMEN KABADDI PLAYERS

KEY WORDS: Circuit Training, Leg Strength, Leg Explosive Power, Abdominal Strength Endurance

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ABSTRACT

The purpose of the study was to find out the effect of six weeks circuit training on physical fitness of inter collegiate women kabaddi players. A total of thirty (N=30) women Kabaddi Players were selected from Department of Physical Education, Bharathidasan University, Tiruchirappalli, TamilNadu. The age of the subjects ranged from 17 to 21 years. The Subjects were randomly assigned to two equal groups of fifteen each and named as Group 'A' experimental group and Group 'B'control group. Group 'A' were underwent circuit training for three days per week for a period of six weeks for Group 'B' there was no specific 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 six week of circuit 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 reviles 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 six week of circuit training improved the selected physical fitness variables of inter college women kabaddi players.

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 hypotrophy. 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 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.

Methodology

Subjects For the present study the investigator selected a total of thirty (N=30) women kabaddi players were selected from Department of Physical Education, Bharathidasan University, Tiruchirappalli, TamilNadu. The age of the subjects ranged from 17 to 21 years.The subjects were randomly assigned to two equal groups of fifteen each and named as Group 'A' and Group 'B'. Group 'A' underwent circuit training and Group 'B' there was no specific training.

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

TABLE- I SELECTION OF VARIABLES AND TEST

Sl.No	Variables	Test
1	Leg Strength	Leg Dynamometer
2	Leg Explosive Power	Standing Broad Jump
3	Abdominal Strength Endurance	Bend knee Sit-ups

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.

Treatment

The experimental group were underwent circuit training trice a week for a period six weeks. 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 programmers were conducted at physical education college 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.

The collected data from the two groups prior to and immediately after the training programme. The 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.

ANALYSIS AND INTERPRETATION

TABLE- II DESCRIPTIVE SCORES OF EXPERIMENTAL GROUP AND CONTROL GROUP ON SELECTED FITNESS VARIABLES

Sl. No	Variables	Group	Pre –Test	S.D ±	Post Test	S.D ±	Ad. Post-Test mean
1	Leg Strength	Experimental Group	96	8.68	105.37	8.86	105.20
		Control Group	94	8.03	95.17	7.58	96.01
2	Leg Explosive Power	Experimental Group	2.32	0.18	2.46	0.20	2.65
		Control Group	2.17	0.18	2.37	0.30	2.30
3	Abdominal Strength Endurance	Experimental Group	36.30	4.67	44.41	5.76	45.85
		Control Group	39.17	5.49	39.17	5.13	38.30

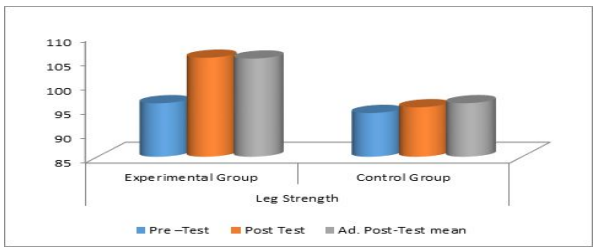
TABLE –III ANALYSIS OF COVARIANCE ON SELECTED FITNESS VARIABLE

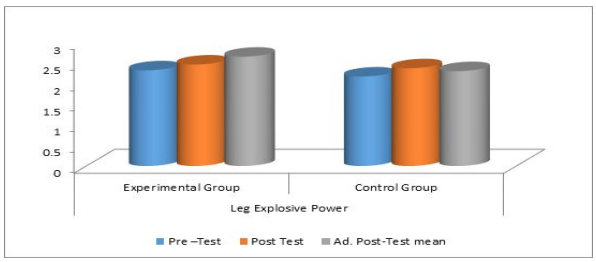
Variables	Test	Source of Variance	Sum of Squares	Df	mean Squares	F' ratio
Leg Strength	Pre Test	Between	10.88	1	10.88	0.14
		Within	2046.40	28	73.08	
	Post-Test	Between	790.58	1	790.58	11.51*
		Within	1922.68	28	68.66	
	Adjusted Post-Test	Between	624.48	1	624.48	115.05*
		Within	146.70	27	5.43	
Leg Explosive Power	Pre Test	Between	0.012	1	0.012	1.09
		Within	0.32	28	0.011	
	Post Test	Between	0.35	1	0.35	23.33*
		Within	0.42	28	0.015	
	Adjusted Post-Test	Between	0.43	1	0.43	143.33*
		Within	0.091	27	0.003	
Abdominal Strength Endurance	Pre Test	Between	64.58	1	64.58	2.38
		Within	760.28	28	27.15	
	Post Test	Between	163.33	1	163.33	5.48*
		Within	834.38	28	29.79	
	Adjusted Post-Test	Between	391.28	1	391.28	92.50*
		Within	114.28	27	4.23	

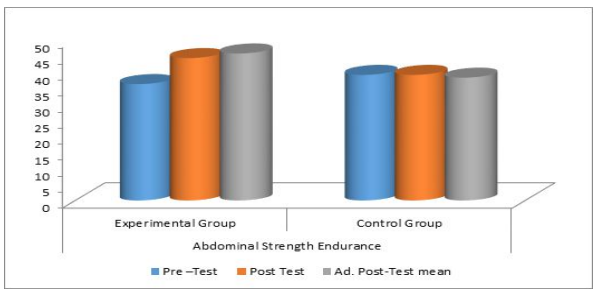
* Significant at 0.05 level of confidence

Table – II and III shows that the pre and post-test mean of leg strength between experimental group and control group were 96 + 8.68, 94+ 8.03 and 105.37+8.68, 95.17+7.58 respectively. The obtained 'F' ratio value 0.14 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 115.05 and 96 respectively. The 'F' ratio value 115.0.5 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 + 0.18, 2.46 + 0.20 and 2.17 + 0.18, 2.37 + 0.30 respectively. The obtained 'F' ratio value 1.09 for pre-test mean and 23.33 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 2.65 and 2.30 respectively. The 'F' ratio value 143.3 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 36.30 + 4.67, 44.41 + 5.76 and 39.17 + 5.49, 39.17 + 5.13 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 45.85 and 38.30 respectively. The 'F' ratio value 92.50 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.







Discussion on finding

The result of the study shows that six week circuit training resulted in the improvement of leg strength, leg explosive power and abdominal strength endurance of kabaddi 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), Ford HT (1983), McGovern and Michael B, (2004) [8] and Berryman N, et al., (2010).

Conclusion

1. Based on the results, it can be revel that the six weeks of circuit training significantly improved the leg strength, leg explosive power and abdominal strength endurance on selected women strength
2. The results of the study provided the evidence, that the circuit 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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