Effect of Circuit Training with and Without Weight on Selected Motor Ability Components and Performance in Tennis Players

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Abstract

The purpose of the study was find out the effect of circuit training with and without weights on selected motor ability components and performance in tennis players . The selected motor ability components were speed and agility and tennis playing ability as performance variable. . To achieve the purpose sixty tennis players in the age group 18 to 24 years were selected from Chennai city clubs. 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 without weight (CTWOW), group II circuit training with weight (CTWW). 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). Circuit training with weight was significantly better than circuit training without weight on improving speed of tennis players. Circuit training without weight was significantly better than circuit training with weight on improving agility of tennis player. There was no significantly difference between circuit training without weigh and circuit training with weight on playing ability of the tennis players.

Keywords: Circuit Training, Playing Ability, Tennis players.

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.

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)

Speed

Speed is the ability to execute motor actions, under given conditions in minimum possible time. (Uppal, 2001)

Speed ability primarily signifies the ability to execute motor movements with high speed, the movements should be cyclic in nature (Hardyal Sing h,1991)

Agility

Agility is the ability to change direction of the body and its parts rapidly. Agility is a combination of several athletic trails including strength, reaction time, and speed of movement, power and co-ordination. Agility is very important in all activities involving quick changes in direction are fundamental to foot performance in practically all court games such as basket ball, tennis, badminton, volley ball and in many field games such as hand ball soccer, speed ball and basket ball. These games require running agility. Agility either general or specific can be improved by increasing the athletic components. (Phillip, 2001)

Playing Ability

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

Statement of the Problem

The purpose of the study was to find effect of circuit training with and without weight on selected motor ability components and performance in tennis players

Review of Literature

Ta°kin, H (2009). The purpose of this study was to determine 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). 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 to find out the effect of circuit training with and without weights on selected motor ability components and performance in tennis players. To achieve this purpose of the study, sixty men tennis players from different clubs in Chennai were selected as subjects at random. The age of subjects were ranged from 18 to 24 years. The selected subjects were divided into three equal groups of twenty subjects each such as circuit training without weight (CTWOW) & circuit training with weight (CTWW) and control group. Group-I underwent circuit training without weight, Group II underwent circuit training with weight. The practice period was limited to one hour per day for six weeks where as the control group did not involve in any experimental training during the experimental period. The dependent variables selected for this study were motor ability components such as Speed and Agility and playing ability as performance variable. The above selected variable were tested through 50m run,4x10m shuttle run 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) when ever 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 Speed

Table- I
Computation of Analysis of Covariance on Speed
(Scores in Seconds)

S No	Variables	Test	Circuit training without weight	Circuit training with weight	Control Group	S.V	S.S	df	M.S	F
1	Speed	Pre	6.99	7.18	6.95	B	0.63	2	0.31	2.39
						W	7.45	57	0.13	
		Post	6.94	6.43	6.91	B	3.34	2	1.67	**18.89***
						W	5.04	57	0.09	
		Adjusted Means	6.96	6.37	6.94	B	4.13	2	2.06	**28.64***
						W	4.03	56	0.07	
		Mean gain	0.05	0.76	0.04					

Table F-ratio at 0.05 level of confidence for 2 and 57 (df) =3.16, 2 and 56 (df) =3.16
*Significant

Table I shows that the pre test mean scores of speed of circuit training without weight group was 6.99 seconds, circuit training with weight group was 7.18 seconds and control group was 6.95 seconds. The post test means showed differences due to experimental training and mean values recorded were 6.94, 6.43 and 6.91 seconds respectively.

The obtained F value on pre test scores 2.39 was less than the required F value of 3.16 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 18.89 was greater than the required F value of 3.16. 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 28.64 was greater than the required F value of 3.16. This proved that there was a significant difference among the means due to

experimental training on speed. 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 Speed (Scores in Meters)

Means			Mean Difference	Required C.I
Circuit training without weight	Circuit training with weight	Control group		
6.96	6.37		0.59*	0.21
6.96		6.94	0.01	0.21
	6.37	6.94	0.57*	0.21

* Significant

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

Table-III

Computation of Analysis of Covariance on Agility (Scores in Seconds)

S No	Variables	Test	Circuit training without weight	Circuit training with weight	Control Group	S.V	S.S	df	M.S	F
2	Agility	Pre	10.55	10.97	10.55	B	2.39	2	1.19	2.42
						W	28.09	57	0.49	
		Post	10.32	11.03	10.64	B	5.05	2	2.52	**4.61 ***
						W	31.20	57	0.55	
		Adjusted Means	10.45	10.79	10.76	B	1.41	2	0.71	**3.90 ***
						W	10.15	56	0.18	
		Mean gain	0.22	0.06	0.09					

Table F-ratio at 0.05 level of confidence for 2 and 57 (df) =3.16, 2 and 56 (df) =3.16

*Significant

Table III shows that the pre test mean scores of agility of circuit training without weight group was 10.55 seconds, circuit training with weight group was 10.97 seconds and control group was 10.55 seconds. The post test means showed differences due to experimental training and mean values recorded were 10.32,11.30, and 10.64 seconds respectively.

The obtained F value on pre test scores 2.42 was less than the required F value of 3.16 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 4.61 was greater than the required F value of 3.16. 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 3.90 was greater than the required F value of 3.16. 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 meters)

Means			Mean Difference	Required C I
Circuit training without weight	Circuit training with weight	Control group		
10.45	10.80		**0.35***	0.34
10.45		10.76	0.31	0.34
	10.80	10.76	0.04	0.34

* Significant

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

Table-V
Computation of Analysis of Covariance on Tennis Playing Ability
(Scores in Seconds)

S No	Variables	Test	Circuit training without weight	Circuit training with weight	Control Group	S.V	S.S	df	M.S	F
3	Tennis playing ability	Pre	34.50	35.15	33.05	B	46.23	2	23.12	1.27
						W	1038.50	57	18.22	
		Post	35.70	38.30	34.05	B	183.63	2	91.82	**6.84***
						W	765.35	57	13.43	
		Adjusted Means	35.60	37.94	34.51	B	118.29	2	59.15	**5.47***
						W	605.02	56	10.80	
		Mean gain	1.20	3.15	1.00					

Table F-ratio at 0.05 level of confidence for 2 and 57 (df) =3.16, 2 and 56 (df) =3.16
*Significant

Table V shows that the pre test mean scores of tennis playing ability of circuit training without weight group was 34.50score, circuit training with weight group was 35.15 score and control group was 33.05score. The post test means showed differences due to experimental training and mean values recorded were 35.70,38.30. and 34.50, scores respectively.

The obtained F value on pre test scores 1.27 was less than the required F value of 3.16 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 6.84 was greater than the required F value of 3.16. 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 5.47 was greater than the required F value of 3.16. This proved that there was significant differences among the means due to experimental training on tennis 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 IV.

Table-VI
Scheffe's Confidence Interval Test Scores on Tennis Playing Ability
(Scores in meters)

Means			Mean Difference	Required C I
Circuit training without weight	Circuit training with weight	Control group		
35.60	37.94		2.34	2.62
35.60		34.51	1.08	2.62
	37.94	34.51	3.42*	2.62

* Significant

The multiple mean comparisons shown in Table VI proved that there existed significant differences between the adjusted means of circuit training without weight, circuit training with weight and control group. There was no significant difference between circuit training with weight and circuit training without weight and circuit training without weight, control group. When comparing both training group circuit training with weight was better improving tennis playing ability than the circuit training without weight.

Conclusions

1. Two forms of Circuit Trainings significantly improved the speed of tennis players. Further the Circuit training with weight was significantly better than Circuit training without weight in improving the speed of tennis players.
2. Two forms of Circuit Trainings significantly improved the agility of tennis players. Further the Circuit training with out weight was significantly better than Circuit training with weight in improving agility of tennis players.
3. Two forms of Circuit Trainings significantly improved tennis playing ability. There was no significant difference between Circuit training with weight and Circuit training without weight.

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