

Effect of Moving Circuit Training on Selected Strength and Power Parameters

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Abstract

The purpose of this study was to examine the effect of eight weeks of supervised moving circuit training on enhancing the quality of performance in leg strength, muscular strength, explosive power and anaerobic power. For this purpose 30 untrained male students, aged 18 to 22 years took part in the study. Subjects were randomly assigned to either moving circuit training (n=15) or control (n=15) group. The training regimen lasted for eight weeks. The selected criterion variables were assessed using standard tests and procedures, before and after the training regimen. Analysis of covariance was used to determine the significant difference existing between pre test and post test on selected criterion variables. The analysis of data revealed that eight weeks of moving circuit training had an impact of 10.63% on leg strength, 13.91% on muscular strength, 25.57% on explosive power, 6.19% on anaerobic power. These results suggest that moving circuit training has the significant influence on improving selected criterion variables.

Key words: Moving circuit training, Anaerobic power

Introduction

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. To improve or maintain a desired level of physical fitness, there is a need to constantly administer an adequate training intensity while exercising. Moving circuit training is one of the effective means to improve all round physical and cardiovascular fitness.

Moving circuit consists of a path or course equipped with obstacles or stations distributed along its length for exercising the human body to promote good health. In general, fitness trails can be natural or manmade, located in areas such as forest, transportation rights-of-way, parks, or urban settings. Equipment exists to provide specific forms of physiological exercise, and can consist of natural features including climbable rocks, trees, and river embankments, or manufactured products (stepping posts, chin-up and climbing bars) designed to provide similar physical challenges. The degree of difficulty of a course is determined by terrain slope, trail surface (dirt, grass, gravel, etc.), obstacle height (walls) or length (crawls) and other features. To know the efficacy of moving circuit training and its significant contribution to one's level of fitness, it was decided to take up this study.

Methodology

Subjects and Variables

For the purpose of this study, thirty untrained male students from the department of physical education, Annamalai University in the age group of 18 to 22 years were recruited, with their consent. The selected subjects were randomly assigned to both the moving circuit training and control groups of 15 each. The selected criterion variables were assessed using standard tests and procedures, before and after the training regimen. The variables and tests used are presented in table-I.

Table-I
Criterion Variables and Test

Sl. No.	Variables	Tests / Instruments	Unit of measurement
1.	Leg strength	Leg Dynamometer	Kilograms
2.	Muscular Strength	Bent Knee sit-ups	Numbers
3.	Explosive power	Sarjent Jump test	Centimeter
4.	Anaerobic power	Margariya Kalamana anaerobic power test	kg/m/sec

Training Protocol

The experimental group subjects underwent moving circuit training programme for three days a week for eight weeks. In the moving circuit training regimens, a series of eight exercise stations were formed in a standard 400 meters track. 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.

Experimental Design and Statistical Procedure

The experimental design used for the study was random group design involving thirty subjects, who were divided at random into two groups such moving circuit training group and control group of fifteen each. The data collected from the two groups prior to and after experimentation on leg strength, muscular strength, explosive power and anaerobic power were statistically examined for significant differences, if any, by applying the analysis of covariance (ANCOVA) with the help of SPSS package. In determining the significance of 'F' ratio the confidence interval was fixed at 0.05 level.

Results and Discussions

The descriptive analysis of data collected on selected strength and power parameters before and after eight weeks of moving circuit training is presented in table II.

Table-II
Computation of Mean and Standard Deviation on Selected Strength and Power Parameters

Variables	Groups	Pretest		Posttest	
		Mean	SD	Mean	SD
Leg strength	Experimental	92.82	4.46	102.69	4.02
	Control	93.59	4.57	93.84	3.98
Muscular Strength	Experimental	24.87	2.29	28.33	3.68
	Control	24.67	2.28	25.07	3.08
Explosive power	Experimental	45.68	2.68	57.36	3.71
	Control	46.73	2.78	48.13	2.18
Anaerobic power	Experimental	88.39	1.16	93.86	0.88
	Control	88.76	0.89	89.37	0.80

The data collected from the two groups prior to and after experimentation on leg strength, muscular strength, explosive power and anaerobic power were statistically examined for significant differences, if any, by applying the analysis of covariance (ANCOVA) with the help of SPSS package and it is presented in table-III.

Table-III
Analysis of Covariance on Selected Strength and Power Parameter of
Moving Circuit Training and Control Groups

Variables	Groups	Adjusted Mean	SOV	Sum of Squares	df	Mean Square	'F' ratio
Leg strength	Experimental	101.26	B	236.71	1	236.71	36.93 *
	Control	93.72	W	173.04	27	6.41	
Muscular Strength	Experimental	28.13	B	248.83	1	248.83	45.57*
	Control	24.93	W	147.47	27	5.46	
Explosive power	Experimental	55.42	B	332.62	1	332.62	156.16*
	Control	47.69	W	57.46	27	2.13	
Anaerobic power	Experimental	92.64	B	3.88	1	3.88	38.80*
	Control	88.95	W	2.72	27	0.10	

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 moving circuit training and control group on leg strength, muscular strength, explosive power and anaerobic power, since the obtained 'F' ratio of 36.93, 45.57, 156.16 and 38.80 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 literature thoroughly supports the evidence that a higher dose of moving circuit training produces greater increases in strength and power parameters. Studies have shown improvement in aerobic capacity from participation in circuit training (Kass & Castriotta, 1994; Peterson, Miller, Quinney, & Wenger, 1988). 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 and changing body composition and aerobic capacity.

Conclusions

The result of this study demonstrated that, moving circuit training with repeated bouts of a combination of physical exercise has significant impact on leg strength, muscular strength, explosive power and anaerobic power.

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