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Effect of circuit training and resistance training on strength endurance of young male college football players

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Abstract

The aim of this study was to find out the effect of circuit training and resistance training on strength endurance of male college students. Thirty male college students ($n = 30$) were randomly selected from the Government Degree College, Kulgam. The age was ranged between 18 and 22 years. The selected subjects were randomly assigned into three equal groups with ten subjects each ($n = 10$) as circuit training group (CTG) resistance training group (RTG) and control group (CG). The experimental groups underwent their respective experimental treatment for twelve weeks 3 days per week and session on each day. The control group (CG) did not expose any special training apart from their regular activities. The strength endurance was taken as a dependant variable for the study and it was measured by using bent knee sit-up test. Analysis of covariance (ANCOVA) was used to analyze the collected data. The result revealed that the circuit training and resistance training was made significant improvement ($p \leq 0.05$) in physical fitness of selected subjects. The level of confidence was fixed at 0.05 levels.

Keywords: Circuit training, resistance training, strength endurance, college students.

Introduction

Circuit training is a program in an athlete moves from one exercise station to another planned sequence and in the shortest possible form. In planning a circuit training programme exercise are chosen to fit the needs of the individuals each of these exercise them numbered and assigned to a certain area called station (Neal 1969).

The term circuit training describes the way a workout is structured rather than the type of exercise performed. It typically consists of a series of exercises or stations completed in succession with minimal rest in between. Circuit routines allow the athlete or coach to create an endless number of workouts and add variety to routine training programs. Through circuit training the athletes may increasing their strength and endurance by in area sing the repetitions of exercise at each station or by doing the required frequencies of exercise in a shorter length of form. If the work load is kept constant, the athletes can develop strength and endurance by gradually decreasing the time taken to go through the circuit (Morgan 1957) [8].

Circuit training is formal type of training in which an athlete goes through a series of selected exercises or activities that are performed in sequences or in a circuit. Circuits can be setup inside gymnasiums, exercise rooms, or outside on courts and fields. There are usually six to ten stations in a circuit.

Resistance training as an exercise programe where free or stationary weights are used for the purpose of increasing muscular strength, muscular endurance and power through which skills can be improved. Exercise is physical activity that is planned, structured, and repetitive for the purpose of conditioning any part of body. Resistance training is used to improve health, maintain fitness and is important as a means of physical rehabilitation. Strengthening exercises increase muscle strength and mass, bone strength, and body's metabolism (Bloomfield 1994) [1]. Resistance training can produce the changes in the body compositions, strength, muscular hypertrophy, and motor performance desired by many individuals. To produce optimal changes in these areas it is necessary to adhere to some basic principles. These principles apply regardless of resistance modality or the type of system is used (Champaign 1997) [2]. Resistance training is the most important ingredient in the process of making an athlete and

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it enhances performances along with success not only rehabilitation, but also in preventing injuries as well. Proper resistance training yields benefits for any athlete young or old. As a result, he is stronger, faster, more flexible, more enduring, and less likely to suffer from injury. Resistance training is used directly to improve maximum strength, elastic strength, strength endurance and it leads to intensive demands on muscular tendons, ligaments and joints (Donald & Mathews 1981)

Strength endurance is training for all most all types of sports activities. Endurance is a term that describes two separate but related concepts muscular endurance and cardio respiratory endurance. Each makes a unique contribution to athletic performance, so each differs in importance to different athletics. This quality is muscular endurance, the ability of a single muscle or muscle group to sustain high – intensity, repetitive or static exercise, and muscular endurance is highly related to muscular strength and anaerobic development.

Materials and Methods

The aim of this study was to find out the effect of circuit training and resistance training on strength endurance of male college students. Thirty male college students (n = 30) were randomly selected from the Government Degree College, Kulgam. The age was ranged between 18 and 22 years. The selected subjects were randomly assigned into three equal groups of ten subjects each (n=10) as circuit training group

(CTG) resistance training group (RTG) and control group (CG). The experimental groups underwent their respective experimental treatment for twelve weeks 3 days per week and session on each day. The control group (CG) did not expose any special training apart from their regular activities. Moderate intensity (60%-70%) of resistance was used in this experimentation. The strength endurance was taken as a dependant variable for the study and it was measured by using bent knee sit-ups. These exercises are used to perform this study for strength endurance of the body for football players, 1. Buttock kicks & high knee 2.Squart jump 3.Lungs 4.Step up down 5.Shuttle run 6. Carioca. The pre and post test were conducted one day before and after the experimental treatment. The pre and post test were conducted one day before and after the experimental treatment.

Data Analysis

Mean and Standard deviation were calculated for strength endurance of each training group. And the data were analyzed by using analysis of covariance (ANCOVA). If the ‘F’ value was found to be significant for adjusted posttest mean, Scheff’s post hoc test was applied to determine the significant difference between the paired mean. Statistical significance was fixed at 0.05 levels.

Results

Table 1: Analysis of Covariance on Strength Endurance of the Experimental Groups and the Control Group

Test	CTG	RTG	CG	SOV	SS	DF	MS	F
Pre test Mean	27.33	27.66	27.00	BG	0.80	2	0.4	0.21
S.D(±)	1.23	1.98	0.98	WG	53.4	27	1.99	
Post test Mean	27.29	28.5	27.02	BG	34.24	2/27	17.12	9.23*
S.D(±)	1.37	1.64	1.01	WG	0.33	2	1.85	12.28*
Adjusted Post-test Mean	27.00	27.06	27.13		0.002	26	2.17	

*significant, F = (df 2, 27) (0.05) = 3.35; (P ≤ 0.05), F= (df, 2, 26) (0.05) = 3.36; (P ≤ 0.05)

Table 1 shows that the pre test mean of experimental and control groups are 27.33, 27.66 and 27.00 respectively. The obtained ‘F’ ratio of 0.21 for the pre test mean is lower than the table value 3.35 for df 2 and 27 required for significance at 0.05 levels. The post tests mean of experimental and control groups are 27.29, 285 and 27.13 respectively. The obtained ‘F’ ratio of 9.23 for post test mean is higher than the table value 3.35 for df 2 and 27 required for significance at 0.05 levels. The adjusted post means of experimental and control groups are 27.00, 27.06 and 27.13 respectively. The obtained ‘F’ ratio of 12.28 for adjusted post test mean is higher than the required table value 3.36 for df 1 and 26 required for significant at 0.05level. The result of the study indicates that there was a significant difference between the adjusted post test mean of circuit training group, resistance training group and control group on strength endurance at 0.05 levels. Since, three groups were compared, whenever they obtained ‘F’ ratio for adjusted post test was found to be significant, the Sheffe’s test was used to find out the paired mean difference and it was presented in table II.

Table II. Scheff’s post hoc test for the difference between paired mean on strength endurance

CTG	RTG	CG	MD	CI
27.00	27.06		0.06*	0.050
27.00		27.13	0.13*	
	27.06	27.13	0.07*	

*significance at 0.05 level of confidence (p ≤ 0.05).

Table II showed that the adjusted post test mean difference on strength endurance between circuit training group and resistance training group and control group are 0.06, 0.13, and 0.07 respectively. These values are higher than the required confidence interval value of 0.050, which shows the significant difference at 0.05 level of confidence. The results of the study show that there was significant difference between circuit training group and control group, between two experimental groups and resistance training group and control group. The pre, post and adjusted post test mean values of experimental groups and control group on strength endurance were graphically represented in the figure I.

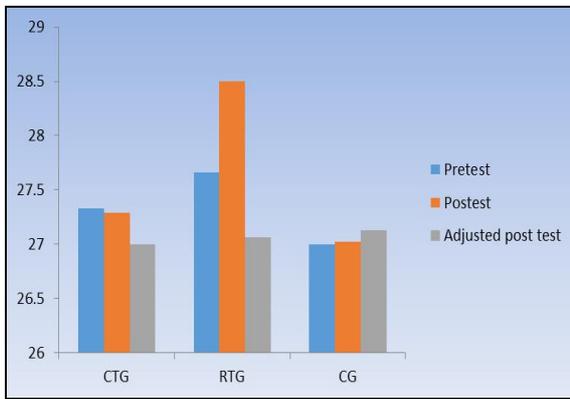


Fig 1: The pre, post and adjusted posttest mean values of experimental groups and control group on strength endurance

Discussion

The current study utilized 12-weeks training programme duration with three sessions per week and found that circuit training and resistance training elicited increase strength endurance. Circuit training and Resistance training may be the best methods to improve strength endurance. Bloomfield (1994) ^[1] and Hardiyal (1991) were conducted a study on resistance training among college level students and reached the conclusion that the resistance training is one of the best method for improving the strength endurance. Champaign (1997) ^[2] and Mathews (1981) ^[3] also reached the conclusion of positive improvement in strength endurance. Kallu (1963) and Abraham (2011) ^[4] concluded that resistance training improves the strength endurance. McNeal (1998) ^[6] & Leveritt (1991) ^[9] recommended that circuit training and resistance training is more ideal to improve strength endurance. These studies are supportive result of the present investigation and we can see the influence of resistance training and circuit training on strength endurance.

Conclusion

Circuit training and resistance training have been shown to increase factors associated with strength endurance. In summary, the strength endurance can be improved during the age between 18 and 22 years of male students and favour the prescription of moderate intensity circuit training and resistance training programme during the initial adaptation period. There was also significant difference between two experimental groups for strength endurance, in which resistance training in the top, followed by circuit training and control group. It can be concluded from the result resistance training is best method to improve strength endurance.

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