



EFFECT OF SPRINT AND CIRCUIT TRAINING ON THE DEVELOPMENT OF MUSCULAR STRENGTH ENDURANCE AND EXPLOSIVE POWER OF THE INTER COLLEGIATE MALE ATHLETE

REVANNA.C¹ & Dr. S. SUTHAKAR²

¹Research Scholar, Department of Physical Education, Karpagam academy of Higher Education, Karpagam University, Coimbatore, Tamilnadu, India.
²Head i/c, Department of Physical Education, Karpagam academy of Higher Education, Karpagam University, Coimbatore, Tamilnadu, India.

Abstract

The purpose of the study is to find out the Effects of combination of Sprint Training and Circuit Training on the development of Muscular Strength Endurance and Explosive Power of the Inter Collegiate Level Male Athletes. Sixty athletes from the various colleges in Karnataka are selected as subjects and their age ranged from 18 to 22 years. The subjects are divided into three equal groups. The first group undergoes Sprint Training (n=20), the second group undergoes Circuit Training alone (n=20) and the third group act as the Control Group. They do not practice any specific training. The selected variables are assessed by muscular strength endurance (modified sit ups test) and explosive power (standing board jump) conducted before and after the 12 weeks of training regimen. The data are analyzed by 't' test, co-variance and it is significant so the scheffee's post hoc test is applied. The sprint training group shows significantly greater improvement in the agility and flexibility than the other two groups of the circuit training group and the control group.

Keywords: Agility, Flexibility, STG- Sprint Training Group, CTG-Circuit Training Group, CG (Control Group).

INTRODUCTION

The goal of Sprint Training is to maximize the utilization of the stored energy in producing a stronger and faster contraction. It is done by training the transition between the concentric and eccentric contraction. It is possible to train the body to make the most use of the stretch shortening cycle. In the vertical jumping the athlete is instructed to perform the landing for the take-off position as fast as possible. Other examples include rope jumping, triple jumping, box jumping (variations of jumping on and off "plyo boxes"), and hurdle jumping. According to Dr. Judith Flohr from Jamej Madison University (Zoll), muscular strength and endurance improves posture and prevent injurious. It will increase the strength of the abdominal muscles, and thereby reduces the risk of the back injury for the volleyball players. The progressive Sprint Training program used in the study is based on the findings from the previous investigations as well as observations from the conditioning coaches and sports medicine professionals (Chu et al., 2006; Hewett et al., 1999; Myer et al., 2005). The components of the program included preparatory Movement Training and Sprint Training. Prior to the performance of the Sprint Exercises, the subjects perform one or two sets of six to ten repetitions for two or three preparatory exercises (e.g., push-up, body weight squat) which prepare them for the demands of more advanced training. The inclusion of these exercises are especially important for subjects in the study who has no experience in participating in a progressive Sprint Program. The purpose for these movements is to become 'automatic' so the skill learned could be 'tapped' so that

when the subjects perform more advanced Sprint Exercises. Flexibility is required for both injury prevention and to enhance the effects of the stretch shortening cycle. In fact, some advanced training methods are combined in the Sprints and Intensive Stretching in order to protect the joint and make it more receptive to the Sprint benefits (Marc De Bremaeker (2013). *Plyo-Flex*. Suthakar (2016) Sprint Exercises evoke the elastic properties of the muscle fibers and connective tissue and allow the muscle to store the energy during the deceleration phase and release that energy during the acceleration period (Asmussen, 1974; Bosco, et.al., 1982; Kaneko, et.al., 1983; Stone, and O'Bryant, 1986).

METHODOLOGY

The study was formulated as Pre and Post Test random group design, in which sixty athletes from the various colleges in Karnataka were selected as subjects and their age ranged from 18 to 22 years. The subjects were divided into three equal groups. The first group undergoes Sprint Training (n=20), the second group undergoes Circuit Training alone (n=20) and the third group acted as the Control Group. They do not practice any specific training. The selected variables are assessed by Muscular Strength Endurance (modified sit ups test) and Explosive Power (standing board jump) conducted before and after the 12 weeks of training regimen.

ANALYSIS OF THE DATA AND RESULTS OF THE STUDY

A paired sample of student's t-test was used to

determine the significance of the mean differences between the Pre test and Post test values of a variable in the same group. Analysis of variance (ANOVA) was

used to know the significant differences among the group. Statistical significance was accepted as $p \leq 0.05$ level of confidence.

TABLE-A
SPRINT TRAINING PRE AND POST TEST MEAN VALUES INTER COLLEGIATE LEVEL ATHLETES

Variables	Test	Mean	S.D	M.D	S.E.M	't' ratio
Muscular Strength Endurance	Pre-Test	42.5500	4.90045	3.06	0.36	8.49*
	Post Test	45.6167	5.14565			
Explosive Power	Pre-Test	1.8560	.22520	0.14	0.018	7.71*
	Post-Test	1.9997	.25894			

0.05 level of Significance (2.09)

Table 'a' shows the pre and post test mean values and standard deviation and 't' ratio of Sprint Training. The obtained 't' ratio of Muscular Strength

Endurance (8.49) and Explosive Power (7.71) are higher than the table values of 2.09. It shows a significant improvement from the pre test to post test.

TABLE-B
CIRCUIT TRAINING PRE AND POST TEST MEAN VALUES INTER COLLEGIATE LEVEL ATHLETES

Variables	Test	Mean	S.D	M.D	S.E.M	't' ratio
Agility	Pre-Test	42.0000	5.11962	2.90	0.35	8.17*
	Post Test	44.9000	5.50502			
Flexibility	Pre-Test	1.8580	.23393	0.12	0.23	5.28*
	Post-Test	1.9790	.27975			

0.05 level of Significance (2.09)

Table 'b' shows the pre and post test mean values and standard deviation and 't' ratio of the Sprint Training. The obtained 't' ratio of the Muscular Strength

Endurance (8.17) and Explosive Power (5.28) are higher than the table values of 2.09. It shows a significant improvement from the pre test to post test.

TABLE-C
CONTROL GROUP PRE AND POST TEST MEAN VALUES INTER COLLEGIATE LEVEL ATHLETES

Variables	Test	Mean	S.D	M.D	S.E.M	't' ratio
Agility	Pre-Test	42.9000	3.97227	0.30	0.14	2.04
	Post Test	43.2000	3.81962			
Flexibility	Pre-Test	1.8910	.24296	0.004	0.004	1.14
	Post-Test	1.8950	.24384			

0.05 level of Significance (2.09)

Table 'c' shows the pre and post test mean values and standard deviation and 't' ratio of the Sprint Training. The obtained 't' ratio Muscular Strength

Endurance (2.04), Explosive Power (1.14) are not higher than the table values of 2.09. It does not show a significant improvement from the pre test to post test.

TABLE-D
ANALYSIS OF VARIANCE OF PRE TEST AND POST TEST MEAN AMONG THE STG, CTG AND CG OF INTER COLLEGIATE ATHLETES

ANOVA						
Variables	Source of Variance	Sum of Squares	df	Mean Square	F	Sig.
Muscular Strength Endurance PRE TEST	B.G	9.300	2	4.650	.188	0.829
	W.G.	1407.550	57	24.694		
	Total	1416.850	59			
Muscular Strength Endurance POST TEST	B.G	323.433	2	161.717	7.44*	.001
	W.G.	1238.750	57	21.732		
	Total	1562.183	59			
Explosive Power PRE TEST	B.G	.052	2	.026	.504	0.067
	W.G.	2.940	57	.052		
	Total	2.992	59			
Explosive Power POST TEST	B.G	.542	2	.271	4.52*	.015
	W.G.	3.414	57	.060		
	Total	3.956	59			

0.05 level of Significance (3.16)

Table 'd' indicates that the obtained 'F' value pre test for the STG, CTG and CG on Muscular Strength Endurance (0.188) and Explosive power (0.50). It is found that the obtained 'F' values are lower than the table values of 3.16 and show statistically insignificant on the pre test mean among the groups. So the treatment is successful. Table 'd' indicates that the

obtained 'F' value post test for the STG, CTG and CG on muscular strength endurance (7.44) and Explosive Power (4.52). It is found that the obtained 'F' values are higher than the table values of 3.16 and show statistically significant on the pre test mean among the groups.

TABLE-E
ANALYSIS OF COVARIANCE OF ADJUSTED POST TEST MEAN AMONG THE STG, CTG AND CG OF THE INTER COLLEGIATE ATHLETES

Variables	Source of Variance	Sum of Squares	df	Mean Square	F	Sig.
Muscular Strength Endurance	Between Groups	324.570	2	162.285	76.05*	.000
	Within Groups	119.499	56	2.134		
Explosive Power	Between Groups	.924	2	.462	87.09*	.000
	Within Groups	.297	56	.005		

0.05 level of Significance (3.16)

Table 'e' indicates that the obtained 'F' value of adjusted post test for the STG, CTG and CG on muscular strength endurance (76.05) and Explosive Power (87.09).

It is found that the obtained 'F' values are higher than the table values of 3.16 and show statistically significant on the adjusted post test mean among the groups.

TABLE-F
THE SCHEFFEE'S POST HOC TEST MEAN VALUES STG, CTG AND CG OF THE INTER COLLEGIATE ATHLETES ON MUSCULAR STRENGTH ENDURANCE

STG	CTG	CG	M.D	C.I
48.57	45.39	-	3.18	1.309
48.57	-	42.88	5.69	1.309
	45.39	42.88	2.51	1.309

Table 'f' shows the adjusted post hoc test mean values of STG, CTG and CG. The mean difference require for the confidential interval to be significant at 1.30. In Comparing the STG group and CTG group, the mean differences between the two groups are 3.18. In Comparing the STG group and CG group, the mean

differences between the two groups are 5.69. In Comparing the CTG group and CG group, the mean differences between the two groups are 2.51. Hence STG group shows better improvement on Muscular Strength Endurance than the CTG and CG groups.

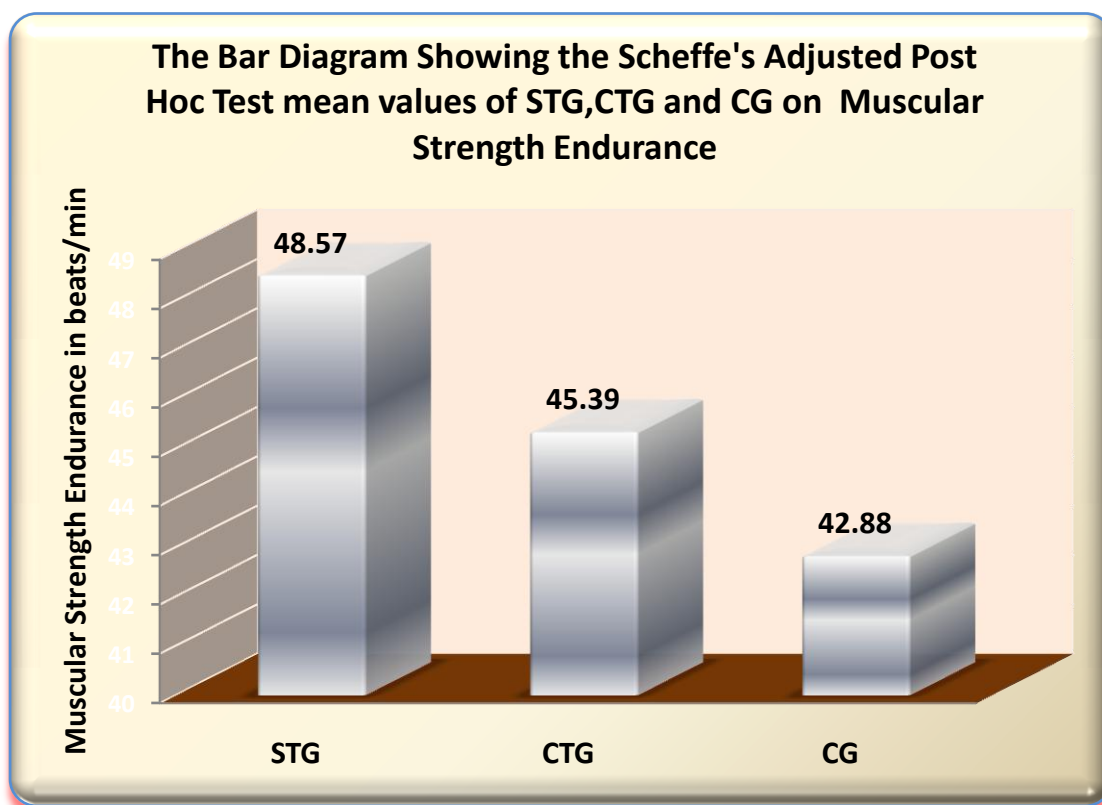
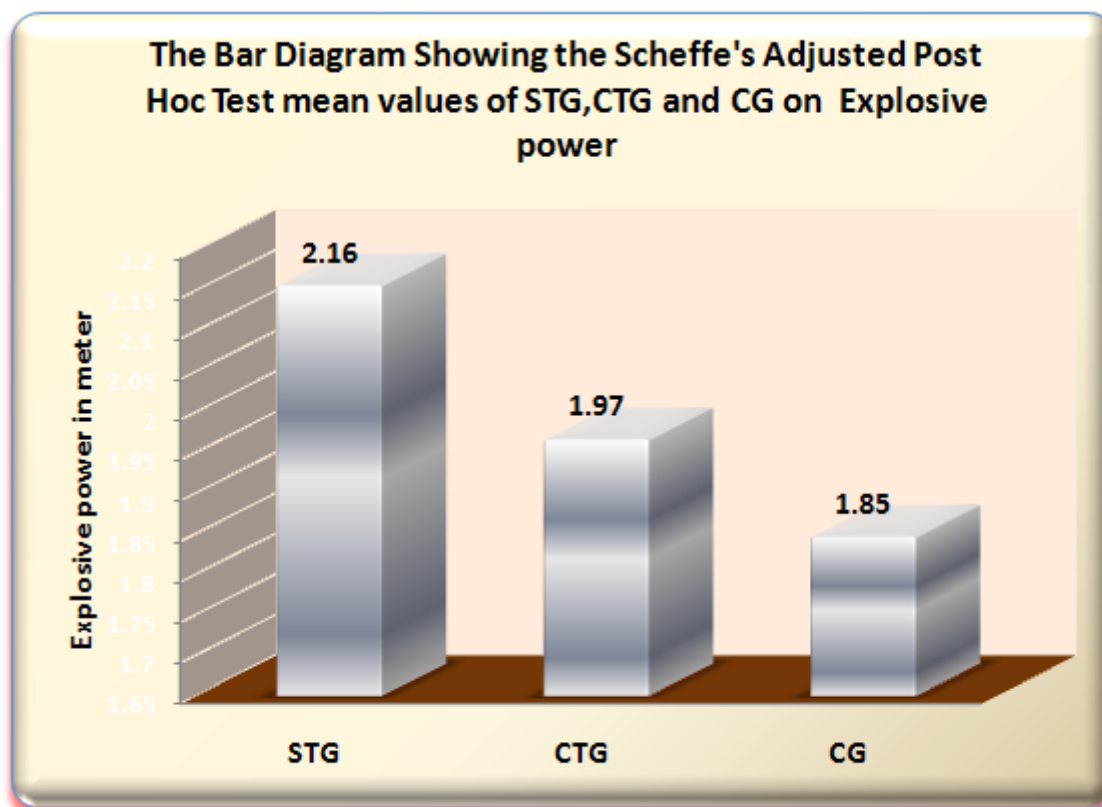


TABLE-G
THE SCHEFFEE'S POST HOC TEST MEAN VALUES STG, CTG AND CG OF THE INTER COLLEGIATE ATHLETES ON EXPLOSIVE POWER

STG	CTG	CG	M.D	C.I
2.16	1.97	-	0.19*	0.066
2.16	-	1.85	0.31*	0.066
	1.97	1.85	0.12*	0.066

Table 'g' shows the adjusted post hoc test mean values of STG, CTG and CG. The mean difference require for the confidential interval to be significant is 0.066. In Comparing the STG group and CTG group, the mean differences between the two groups are 0.19. In Comparing the STG group and CG group, the mean

differences between the two groups are 0.31. In Comparing the CTG group and CG group, the mean differences between the two groups are 0.12. Hence STG group are shows better improvement on Explosive Power than the CTG and CG groups.



RESULT

1. The result of the study showed that the Sprint Training significantly improved the Muscular Strength Endurance and Explosive Power of the Inter-Collegiate level Athletes
2. The result of the study showed that the Circuit Training significantly improved the Muscular Strength Endurance and Explosive Power of the Inter-Collegiate level Athletes
3. The result of the study showed that the Sprint Training significantly improved the Muscular Strength Endurance and Explosive Power better than the Circuit Training and Control Group of the Inter-Collegiate level Athletes.
4. The result of the study showed that the Circuit Training significantly improved the Muscular Strength Endurance and Explosive Power better

than the Control Group of the Inter-Collegiate level Athletes.

CONCLUSION

1. It was concluded that the Sprint Training was the best training to develop the Muscular Strength Endurance and Explosive Power of the Inter Collegiate athletes.
2. It was concluded that Sprint Training significantly improved the Muscular Strength Endurance and Explosive Power of the Inter-Collegiate level Athletes.
3. It was concluded that Circuit Training significantly improved the Muscular Strength Endurance and explosive power of the inter Collegiate level Athletes.
4. It was concluded that Sprint Training significantly improved the Muscular Strength Endurance and Explosive Power better than the Circuit Training and Control Group of the Inter-Collegiate level Athletes.
5. It was concluded that Circuit Training significantly improved the Muscular Strength Endurance and Explosive Power better than the Control Group of the Inter-Collegiate level Athletes.

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