### **Research Paper**

**Physical Education** 



Effect of Circuit Training Program on Explosive Strength and Strength Endurance of School Going Students

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### ABSTRACT

The purpose of the study was to find out the effect of circuit training on the students' explosive strength and strength endurance. Sixty (n=60) school going students from the district of Malda of West Bengal of 13 to 14 years were selected randomly on the basis of their birth certificate as the subject for the study. Students were divided into experimental and control groups consisting 30 each. Standing broad jump and sit ups were conducted to collect the data of explosive strength and strength endurance before and after the circuit training program of three days in a week of two months. T- Test were performed for justifying significance of means at p<0.05 level of confidence. Result shows that experimental group improved these qualities significantly whereas control group did not show significant improvement.

### Keywords : Explosive strength, strength endurance, circuit training, school going students

#### INTRODUCTION

Human being is the mass of protoplasm and has an organic base that requires activity as a form of nourishment. This is true of every human being, from the cradle to the grave. All of us need strength, endurance, and the other components of physical fitness. Strength is also perhaps the most important motor ability in sports as it is a direct product of muscle contraction. All movements in sports are caused by muscle contraction and therefore, strength is a part and parcel of all motor abilities, technical skill and tactical actions. Strength and strength training, therefore, assume high importance for achieving good performance in all sports. The role of strength training for general, good posture and for prevention of injuries is usually overlooked which in the long run can prove harmful. Strength is the ability to overcome resistance or act against resistance. Strength should not be considered a product of only muscular contraction. It is, in fact, a product of voluntary muscle contractions caused by the neuro-muscular system. Strength is of three types, they are: Maximum Strength, Explosive Strength and Strength endurance.

Explosive strength is the ability to overcome a resistance with high speed and strength endurance is the ability to express force over a longer period of time. In case of sports movement all the motor fitness components are highly required. Naturally the coach has to improve all these quality significantly. But one component cannot be developed fully neglecting the other. Among all the motor fitness components explosive strength and strength endurance is very important. Mastery of skills depends upon the muscular strength. For a good conduct of movement and better result in sports for long time strength endurance is also highly required for an athlete. The researcher has tried to find out whether the circuit training has any positive effect to improve theses two qualities of the students. So the purpose of study was to find out the effect of circuit training program in explosive strength and strength endurance of school going male students.

#### METHODOLOGY

The subjects: Sixty school going male students from Malda district of West Bengal was selected randomly for the study. The subject's age ranges from 13 to14 years. Subjects were divided into two groups one experimental and the other was

control each consists of 30 students. Criterion measures: Standing broad jump: Purpose: To measure the explosive strength of the legs. Equipment: Measuring tape, copy, pen and outdoor non-slip jumping pit. Scoring: The measurement is taken from take off line to the nearest point of contact on the landing (back of the heels). The score was the best of three distances recorded in centimeters only the best trail was recorded. Sit ups: Purpose: The purpose of the test was to measure the abdominal strength and endurance. Facilities and Equipment: Cleaned surface, stopwatch, copy, and pen. Test procedure: A common method of performing a sit up fitness test is to record the maximum number of sit ups in 30 seconds. Scoring: The completion of one complete curl up (up and back) counts as one. The sit-up must be performed correctly for it to be counted. Exercise schedule: The total duration of the program was for eight weeks. The training program was consists of warm up exercise for 15 munities (jogging, slow space running, stretching exercises etc.), circuit training exercise of core and trunk and lower body only, recreational games and cool down exercises. Sit ups (lower abdominals), Stomach crunch (upper abdominals), Back extension chest raise, Squat jumps, Compass jumps, Astride jumps, Shuttle runs were selected for the main training schedule. Volume and intensity: Experimental group performed 20 to 30 seconds work on each exercise with a 20 to 30 seconds recovery. They performed 2 to 4 sets with a 2 to 3minutes recovery between each set. The training program was conducted three days in a week of two months. The training program is shown in the table -1.

Table-1: Circuit tra	ining progra	m followed	by the	experi-
mental group				

Maaka	Exercises		Circuits		
Work		Rest	Number	Rest	
1	20Sec.	20 Sec	2	2 min	
2	30 Sec	30 Sec	2	2 min	
3	40 Sec	40 Sec	2	3 min	
4	20 Sec	20 Sec	3	2 min	
5	30 Sec	30 Sec	3	2 min	
6	30 Sec	30 Sec	4	2 min	
7	40 Sec	40 Sec	3	3 min	
8	30 Sec	30 Sec	3	2 min	

The control group did not perform any exercise program. They were allowed to their regular classes. **Statistical procedure:** The data collected in the study was subjected to statistical analysis with appropriate use of SPSS package. Central tendency was judged by calculating mean and variability was assessed by standard deviation. T-test was used to find out the statistical significances of each age groups pre and post mean differences. The level of significance was set at p<0.05 level of confidence.

#### **RESULT AND DISCUSSION**

The findings of the study is shown and discussion on the parameter wise in given below.

### Table- 2: Effect of circuit training on explosive strength of control group

Parameter	group	Ν	Mean	SD	'ť'	significance
<b>F0</b>	Pre	30	1.462	0.1056	0 4422	NC
ES	Post	30	1.483	0.1117	0.4452	NO CI

#### \*Significant at 0.05 level of confidence. (NS= Not Significant.)



### Fig.1: Effect of circuit training on explosive strength of control group

The findings shown that the mean and SD of pre and post test of explosive leg strength of control group was  $1.462\pm0.1056$ and  $1.483\pm0.1117$  respectively. Though there was a difference between the pre test and post test of mean values but the difference was not statistically significant. The table clearly shows that the testing 't' value was found 0.4432 which was not greater than the table value at 0.05 level of confidence.

Table- 3: Effect of circuit training on strength endurance of control group

Parameter	group	N	Mean	Sd	'ť	significance
CT.	Pre	30	16.6	2.02	.0.0356	NS
SE	Post	30	17.7	1.93		

#### \*Significant at 0.05 level of confidence. (NS= significant.)



Fig.2: Effect of circuit training on strength endurance of control group

It is seen from the table-3 that the mean and SD of the control group was  $16.6\pm2.02$  and  $17.7\pm1.93$  in relation to strength endurance of the students. The post test mean value was better than the pre test mean value. But the calculated 'tvalue was 0.0356 which was not statistically significant at 0.05 level of confidence. So this difference of pre and post test mean value is not significant.

### Table- 4: Effect of circuit training on explosive strength of experimental group

Parameter	group	Ν	Mean	Sd	'ť'	significance
	Pre	30	1.463	0.1041		
ES	Post	30	1.572	0.0888	5.16	S

### \*Significant at 0.05 level of confidence. (S=Significant.)



## Fig.3: Effect of circuit training on explosive strength of experimental group

Table- 4 shows that the post test mean value of explosive strength was better than pre test mean value of experimental group where the scores were  $1.463\pm0.1041$  and  $1.572\pm0.0888$ . The calculated 't' value, 5.16 was greater than the table value. This indicates that the difference between pre and post test mean scores was statistically significant.

### Table- 5: Effect of circuit training on strength endurance of experimental group

Parameter	group	N	Mean	Sd	'ť'	significance
	Pre	30	16.266	2.21		
SE	Post	30	21	2.99	3.36	S

### \*Significant at 0.05 level of confidence. (S= significant.)



### Fig.4: Effect of circuit training on strength endurance of experimental group

It is noted from the table-5 that the calculated mean and SD of strength endurance of experimental group were 16.266±2.21 and 21±2.99. It shows a clear difference between the two means. The further calculation of 't' value shows that the pre and post mean difference was statistically significant where the 't' value was 3.36 which is also greater than the table value. So it may infer that the mean difference of pre and post test of strength endurance of experimental group was significant.

#### CONCLUSION:

This may conclude from the study that the effect of circuit training for the improvement of explosive strength and strength endurance is positive. So this may also conclude that explosive strength and strength endurance can be improved by circuit training. But it must be systematic, planed and scientific training for the development of these motor fitness qualities of the students.

### REFERENCES

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