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**Dr. S Karunanidhi**  
Physical Education Director,  
Hindusthan College of Arts &  
Science, Coimbatore,  
Tamil Nadu, India

## Influence of various strength training on body mass index and abdominal strength and endurance of school boys

**Dr. S Karunanidhi**

### Abstract

This study was totally (N=80) eighty throwers were selected as samples from the qualified athletes in Bharathiar University Inter-Collegiate athletic meet were selected. They were outstanding and average throwers (Shot put, Discus throw, Javelin, Hammer throw) in the Inter-Collegiate athletic meet, Bharathiar University, Coimbatore district, Tamil Nadu, India. The selected subjects eighty (N=80) were divided into four equal groups. Each group consists of 20 subjects. The Experimental group – I was underwent to Medicine Ball Training (MBT), Experimental group – II was underwent to Resistance Training Group (RTG), Experimental group – III was underwent to Combination of Medicine Ball and Resistance Training (CMBARTG) and group – IV acted as Control Group (CG). The ages of subjects were ranged from 19 to 25 years. The tests on selected criterion (body mass index and abdominal strength and endurance) variables were taken and recorded for all the four groups. Therefore, the 'F' ratio was found to be significant for adjusted post-test means, Scheffe's post hoc test was used to determine which of the paired mean difference was significant.

**Keywords:** Medicine ball training, resistance training, inter-collegiate athletes

### Introduction

Athletics is often used synonymously with any sporting activity, but in most cases, athletics refers primarily to track-and-field events that involve running, jumping or throwing. Those athletic events are most closely associated with the Olympics, but competition in these sports is held at the youth level, high school, college, and professional ranks all year round throughout the world. The first Olympics in ancient Greece go back at least as far as the eighth or ninth century B.C. While such sports as boxing and equestrian events were included, most of the events were those now classified under athletics or track and field. They included running, jumping, discus and the javelin. Those four, plus wrestling, made up the pentathlon. The running events included "stades," which were essentially sprints from one end of the stadium to the other, a distance of about 190 meters; two-stade races; longer-distance races of between seven and 24 stades; and a two- or four-stade race in which the competitors wore armor. Running and other athletic events have long been a part of many cultures, but in the 19th century, such activities were becoming more popular, particularly in Europe and the United States. School curricula included athletics and in 1896, the first Modern Olympics were held in Athens, Greece. Events included the 100-meters, 400 meters, 800 meters, 1,500 meters, 110-meter hurdles, pole vault, discus, shot put, javelin, long jump, triple jump and high jump. Fourteen nations were represented.

Athletics is a collection of sporting events that involve competitive running, jumping, throwing, and walking. The most common types of athletics competitions are track and field, road running, cross country running, and race walking. The results of racing events are decided by finishing position (or time, where measured), while the jumps and throws are won by the athlete that achieves the highest or furthest measurement from a series of attempts. The simplicity of the competitions, and the lack of a need for expensive equipment, makes athletics one of the most commonly competed sports in the world. Athletics is mostly an individual sport, with the exception of relay races and competitions which combine athletes' performances for a team score, such as cross country.

**Correspondence**  
**Dr. S Karunanidhi**  
Physical Education Director,  
Hindusthan College of Arts &  
Science, Coimbatore,  
Tamil Nadu, India

Organized athletics are traced back to the Ancient Olympic Games from 776 BCE. The rules and format of the modern events in athletics were defined in Western Europe and North America in the 19th and early 20th century, and were then spread to other parts of the world. Most modern top level meetings are conducted by the International Association of Athletics Federations and its member federations. The athletics meeting forms the backbone of the Summer Olympics (wiki, 2015).

**Methods**

This study, (N=80) eighty throwers (shot put, discuss, javelin, Hammer throw) were selected as samples from the qualified athletes in Bharathiar University Inter-Collegiate athletic meet were selected. They were outstanding and average throwers (Shot put, Discus throw, Javelin, Hammer throw) in the inter-collegiate athletic meet, Bharathiar University, Coimbatore district, Tamil Nadu, India. The selected subjects eighty (N=80) were divided into four equal groups. Each group consists of 20 subjects. The Experimental group – I was

underwent to Medicine Ball Training (MBT), Experimental group – II was underwent to Resistance Training Group (RTG), Experimental group – III was underwent to Combination of Medicine Ball and Resistance Training (CMBARTG) and group – IV acted as Control Group (CG). The ages of subjects were ranged from 19 to 25 years. The tests on selected criterion (body mass index- Weight/Height<sup>2</sup>- measured in percentage and abdominal strength and endurance- Bent knee sit-ups- measured in counts) variables were taken and recorded for all the four groups. All the three experimental groups were trained for three days per week for a period of 12 weeks. The data collected from the four groups and statistically analyzed to determine the significant difference, if any, applying t-ratio, analysis of covariance (ANCOVA). Eighty subjects were divided at random and assigned into four groups of twenty each. No attempt was made to equate the groups in any manner.

**Results and Findings of this study**

**Table 1:** Analysis of covariance of MBT, RTG, CMBARTG and CG on Body mass index (In percentage)

	MBT Mean	RTG Mean	CMBARTG Mean	CG Mean	Source of variance	Sum of squares	df	Mean square	F-value
Pre-test	22.67	23.87	22.83	23.31	BG	13.73	3	4.58	1.43
					WG	178.78	76	3.19	
Post-test	22.20	23.34	21.75	23.33	BG	32.92	3	10.97	3.46
					WG	177.80	76	3.17	
Adjusted Mean	22.61	22.66	22.24	23.32	BG	10.09	3	3.36	22.92
					WG	8.07	75	0.15	

\*significant level 0.05 level (3.22)

Table- 1 shows F ratio of 1.43 on body mass index is lesser than the required table value of 2.72, it is found to be insignificant at 0.05 level of confidence for 3 and 76 degrees of freedom. The post- F ratio of 3.46 on body mass index is higher than the required table value of 2.72, it is found to be significant at 0.05 level of confidence for 3 and 76 degrees of freedom. Since the obtained Adjusted Mean F ratio of 22.92

on body mass index is higher than the required table value of 2.72, it is found to be significant at 0.05 level of confidence for 3 and 76 degrees of freedom. To determine which of the paired means had a significant difference, the Scheffe’s test was used as a post-hoc test and the results are presented in table- 2.

**Table 2:** Scheffe’s test for the difference between the adjusted post-test mean on Body mass index (In percentage)

MBT Mean	RTG Mean	CMBARTG Mean	CG Mean	M.D	C.I
22.61	22.66	-	-	-0.05	0.78
22.61	-	-	-	0.37	0.78
22.61	-	-	23.32	-0.71	0.78
-	22.66	22.24	-	0.42	0.78
-	22.66	-	23.32	-0.66	0.78
-	-	22.24	23.32	-1.08	0.78

Table- 2 illustrate that it may be concluded from the results of the study, that there is higher significant differences between the adjusted post-test means of combination of medicine ball

and resistance training (CMBARTG) and Control group (CG) on body mass index.

**Table 3:** Analysis of covariance of MBT, RTG, CMBARTG and CG on abdominal strength and endurance (In counts)

	MBT Mean	RTG Mean	CMBARTG Mean	CG Mean	Source of variance	Sum of squares	df	Mean square	F-value
Pre-test	21.78	20.49	21.71	19.64	BG	62.637	3	20.87	1.64
					WG	964.350	76	12.689	
Post-test	25.92	26.01	27.59	19.54	BG	748.337	3	249.446	22.33
					WG	848.650	76	11.166	
Adjusted Mean	25.61	26.56	27.13	20.74	BG	494.07	3	164.69	48.38
					WG	255.28	75	3.40	

\*significant level 0.05 level (3.22)

Table- 1 shows F ratio of 1.64 abdominal strength and endurance is lesser than the required table value of 2.72, it is found to be insignificant at 0.05 level of confidence for 3 and 76 degrees of freedom. The post- F ratio of 22.33 on abdominal strength and endurance is higher than the required table value of 2.72, it is found to be significant at 0.05 level of confidence for 3 and 76 degrees of freedom. Since the

obtained Adjusted Mean F ratio of 48.38 on abdominal strength and endurance is higher than the required table value of 2.72, it is found to be significant at 0.05 level of confidence for 3 and 76 degrees of freedom. To determine which of the paired means had a significant difference, the Scheffe's test was used as a post-hoc test and the results are presented in table- 4.

**Table 4:** Scheffe's test for the difference between the adjusted post-test mean abdominal strength and endurance (In counts)

MBT Mean	RTG Mean	CMBARTG Mean	CG Mean	M.D	C.I
25.61	26.56	-	-	-0.95	3.72
25.61	-	27.13	-	-1.52	3.72
25.61	-	-	20.74	4.87	3.72
-	26.56	27.13	-	-0.57	3.72
-	26.56	-	20.74	5.82	3.72
-	-	27.13	20.74	6.39	3.72

Table- 4 illustrate that it may be concluded from the results of the study, that there is higher significant differences between the adjusted post-test means of combination of medicine ball and resistance training (CMBARTG) and Control group (CG) on abdominal strength and endurance.

### Conclusions

1. The results of comparative effects lead to concluded that combination of medicine ball and resistance training (CMBARTG) has higher significant improvement on body mass index of inter collegiate male throwers as compared to their performance with either medicine ball training group (MBT) or Resistance training (RTG) alone.
2. The results of comparative effects lead to concluded that medicine ball and resistance training (CMBARTG) has higher significant improvement on abdominal strength and endurance of inter collegiate male throwers as compared to their performance with either medicine ball training group (MBT) or Resistance training (RTG) alone.

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