

Effects of Circuit Training and Battle Rope Training on Speed of School Girls

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ABSTRACT

The purpose of study was to find out the effects of circuit training and battle rope training on speed of school girls. To achieve the purpose of the study, thirty school girls with the age of 11 to 13 years from M.Deivanai Achi, Government Girls Higher Secondary School, Paganeri, Sivagangai District, Tamilnadu were selected as subjects at random. The selected 30 subjects were divided into three equal groups; each consisting of ten subjects, i.e., experimental group one, two and a control group. The experimental group-1(n=10, CT) underwent circuit training, the experimental group-2 (n=10, BRT) underwent battle rope training and group-3 served as control group (n=10, CG). The speed was considered as dependent variable; it was tested by 40 meters run and scores recorded in seconds. The training period was for five days in a week for the period of six weeks. The speed was tested before and after the training period. The collected pre and post test data was significantly evaluated with apt statistical tool of one way analysis of co-variance (ANCOVA). The Scheffe's post hoc test was used to get the superiority effect among the groups. To test the hypothesis 0.05 level of significant was fixed.

Keywords: Circuit training, Battle rope training, Speed, ANCOVA and Scheffe's Post hoc test.

1. INTRODUCTION

During the early stages of strength training, especially with entry-level athlete almost any strength training method or program will result in strength development to some degree. As the athlete develops a strength foundation, however, the coach should create a specific, periodized strength training program to maximize the athlete's natural abilities. Equally important for coaches to keep in mind is that each athlete has a unique rate of response, reaction, and adaptation to a given method, and therefore, a different rate of improvement. Strength training is a long-term proposition. Athletes do not reach their highest level after four to six weeks from the beginning of the strength training program, but rather during the competitive phase, which is months away from the anatomical adaptation phase. (Bompa and Buzzichelli, 2005) Physical training entails exposing the organism to a training load or work stress of sufficient intensity, duration and frequency to produce a noticeable or measurable training effect, that is, to improve the functions for which one is training. To achieve such a training effect, it is necessary to expose the organism to an overload (i.e., a stress) that is larger than the one regularly encountered during everyday life. (Astrand, Rodahl and Stromme, 2003)

Circuit training was first proposed by Morgan and Adamson (1959) of Leeds University as a method for developing general fitness. Their initial circuit training routine consisted of several stations arranged in a circle (hence the name circuit training) so as to work muscle groups alternately from station to station. (Bompa and Buzzichelli, 2005) Circuit training is a safe, effective and fun approach to exercising that can be enjoyed by a variety of people; it is attractive to men and women, younger and older age groups, sports people and the general population. It can be performed indoors and outdoors and in water. (Lawrence, Richard, 2015) The speed at which specific movements are performed within specific sporting activities will also need to be considered. If movement needs to be performed quickly, then some attention should be paid to performing them at the speed required when training. (Hope and Lawrence, 2014).

2. METHODS AND TOOLS

The study was formulated as pre and post test random group design, in which thirty subjects were divided into three groups. The experimental group-1(n=10, CT) underwent circuit training, the experimental group-2 (n=10, BRT) underwent battle rope training and group-3 served as control group (n=10, CG) did not undergo any specific training. The selected two training groups performed their respective activities for five days in a week for the period of six weeks. The training intervention group underwent their respective training as per the following schedule under the supervision of the researcher who provided motivation, advice and encouragement to the subjects. Every day the training was carried out only in the evening session that lasted for sixty minutes. Before and after every training session subject of experimental groups had the ten minutes of warm-up and ten minutes of warm down exercise involving jogging, stretching and mobility exercises.

2.1 Training approaches for experimental group 1-(Circuit training)

Week 1 and 2

During the period the subjects performed 8 stations of circuit training in clockwise order. Totally 3 circuits was given. They advised to perform only fifteen seconds of each station. The same time was allowed for recovery in-between the stations. The 5 minutes was allowed to take rest in-between the circuit.

Week 3 and 4

During the period the subjects performed 8 stations of circuit training in clockwise order. Totally 3 circuits was given. They advised to perform only twenty seconds of each station. The same time was allowed for recovery in-between the stations. The 5 minutes was allowed to take rest in-between the circuit.

Week 5 and 6

During the period the subjects performed 8 stations of circuit training in clockwise order. Totally 3 circuits was given. They advised to perform only twenty five seconds of each station. The same time was allowed for recovery in-between the stations. The 5 minutes was allowed to take rest in-between the circuit.

Exercise involved in each Station

- 1) Vertical jump, 2) Push up, 3) High knee action, 4) Dumbbells Bi-ceph
- 5) Back kick, 6) Upper hand medicine ball 7) Burpee and 8) Bent-knee sit-ups

Nature of training variables	
Total number of station	8 stations
Duration of each station	15 seconds
Exercise order	Clock wise
Rest in between station	15 seconds

Total number of circuit	3 circuit
Rest in between circuit	5 minutes
Duration of one circuit	2 minutes
Volume of the week	30 inutes

2.2 Training approaches for experimental group 2-(Battle rope training)

Weeks	Exercises	Rep	Duration	Sets	Rec. in. bet. sets
1 and 2	Double waves Alternate waves Low alternating waves Power slams Alternating wave lunge jump	Each 2	Each 10 sec	2	5minutes
3 and 4	Double waves Alternate waves Low alternating waves Power slams Alternating wave lunge jump	Each 3	Each 20 sec	2	5minutes
5 and 6	Double waves Alternate waves Low alternating waves Power slams Alternating wave lunge jump	Each 4	Each 30 sec	2	5minutes

Week 1 and 2

During the period the subjects performed 5 selected battle rope exercises. Each exercises the subjects performed ten seconds with two repetitions. The total number of set was 2. The recovery for in between exercise 1minute and in between set was 5 minutes.

Week 3 and 4

During the period the subjects performed 5 selected battle rope exercises. Each exercises the subjects performed twenty seconds with 3 repetitions. The total number of set was 2. The recovery for in between exercise 1minute and in between set was 5 minutes.

Week 3 and 4

During the period the subjects performed 5 selected battle rope exercises. Each exercises the subjects performed thirty seconds with 4 repetitions. The total number of set was 2. The recovery for in between exercise 1minute and in between set was 5 minutes.

3. RESULTS AND DISCUSSION

TABLE - I

The Results of Analysis of Covariance on Speed of Different Groups

(Scores in Seconds)

Test Conditions		Ex-1 CT	Ex-2 BRT	Gr-3 CG	SV	SS	Df	MS	'F' ratio
Pre test	Mean	10.25	10.24	10.24	B	0.01	2	0.001	0.09
	S.D.	0.05	0.05	0.05	W	0.07	27	0.03	
Post test	Mean	9.30	9.24	10.25	B	6.48	2	3.42	494.7*
	S.D.	0.12	0.03	0.04	W	0.17	27	0.007	
Adjusted Post test	Mean	9.3	9.24	10.25	B	6.48	2	3.24	528.82*
					W	0.15	26	0.006	

* Significant at .05 level of confidence. The required table value for test the significance was 3.35 and 3.37 with the df of 2 and 27, 2 and 26.

3.1 Results of speed

The pre test mean and standard deviation on speed scores of Group 1, Group 2 and Group 3 were 10.25 ± 0.05 , 10.24 ± 0.05 and 10.24 ± 0.05 respectively. The obtained pre test F value of 0.09 was lesser than the required table F value 3.35. Therefore the pre test means value of circuit training; battle rope training and control group on speed prior to start of the respective treatments were found to be insignificant at 0.05 level of confidence for the degrees of freedom 2 and 27. Hence, this analysis confirmed that the random assignment of subjects into three groups were successful.

The post test mean and standard deviation on speed of Group 1, Group 2 and Group 3 were 9.30 ± 0.12 , 9.24 ± 0.03 and 10.25 ± 0.04 respectively. The obtained post test F value of 494.7 was higher than the required table F value of

3.35. Therefore, the post test means value of circuit training and battle rope training on speed were found to be significant at 0.05 level of confidence for the degrees of freedom 2 and 27. The outcome proved that the chosen two training interventions circuit training and battle rope training was created significant enhancement rather than the control group of the sample populations.

The adjusted post test means on speed scores of Group 1, Group 2 and Group 3 were 9.3, 9.24 and 10.25 respectively. The obtained adjusted post test F value of 528.82 was higher than the required table F value of 3.37. Hence the adjusted post test means value of circuit training and battle rope training on speed were found to be significant at 0.05 level of confidence for the degrees of freedom 2 and 26. The outcome confirmed that the chosen two training interventions namely circuit training and battle rope training on speed were produced significant difference among the groups.

In order to get superiority effects with the treatment and control groups the Scheffe's post hoc test were administered. The results of the same are presented in the table I (a).

TABLE – I (a)

The Results of Scheffe's Post Hoc Test Mean Differences on Speed among Three Groups
(Scores in Seconds)

Ex-1 CT	Ex-2 BRT	Gr-3 CG	Mean Differences	Confidence Interval Value
9.3	9.24		0.05	0.2
9.3		10.25	0.95*	0.2
	9.24	10.25	1.01*	0.2

* Significant at .05 level of confidence.

3.2. Result of Scheffe's Post Hoc Test on speed

Table I (a) illustrates the paired mean differences of circuit training, battle rope training and control group on speed. The pair wise comparisons results as follows.

Comparison of Group 1 and 2: The paired mean differences of circuit training and battle rope training value 0.05 was lesser than the confidential interval value of 0.2. Therefore, the comparison was insignificant. The outcome of this comparison clearly proved that both training have produced similar effect on speed.

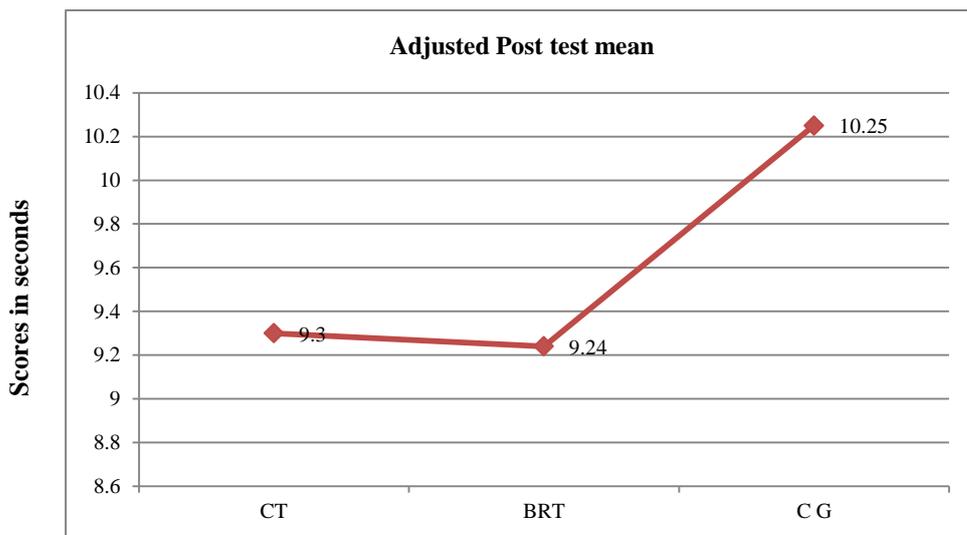
Comparison of Group 1 and 3: The paired mean differences of circuit training and control group value 0.95 was greater than the confidential interval value of 0.2. Therefore, the comparison was significant. The outcome of this comparison evidently proved that circuit training has produced significant improvements on speed, than the control group.

Comparison of Group 2 and 3: The paired mean differences of battle rope training and control group value 1.01 was greater than the confidential interval value of 0.2. Therefore, the comparison was significant. The outcome of this comparison evidently proved that battle rope training has produced significant improvements on speed, than the control group.

The adjusted post test mean values of experimental and control groups graphically represented in the figure 1.

FIGURE 1

The Adjusted Post Test Mean Values of Experimental and Control Groups on Speed



4. DISCUSSION ON FINDINGS

The results of the present study were demonstrated positive effects on the speed due to the circuit training and battle rope training. **Wei-Han Chen et. al (2018)** stated that 8 weeks of battle rope training improves multiple physical fitness dimensions and shooting accuracy in collegiate basketball players. They suggest that battle rope training effectively enhance fitness and shooting accuracy in collegiate basket ball players. **Prakash Raaj and Kaba Rosario (2017)** studied an impact of battle rope training on selected physical fitness components and performance variables among volleyball players. Their study reveals that battle rope training group showed significant improvement on physical fitness components of volleyball players. **Maniazhagu & Malathi (2016)** found that the speed is better improved in circuit training combined with SAQ drills than the circuit training combined with jump rope drills. **Kurian Abraham and Maniazhagu (2015)** established that twelve weeks of circuit resistance training and super circuit resistance training produced significant improvement on speed. **Raja Gopal and Gopi Krishna (2014)** carried out a study on effect of interval training, circuit training and combined training on selected performance variables and skill related physical fitness variables among football players. They concluded that there was the significant improvement in performance variables and skill related physical fitness variables among High School football players. **Babu and Kumar (2013)** revealed that sprinting ability was improved through the circuit training programme. They found that the circuit training program had more effective for beginners. **Taskin (2009)** suggested that circuit training, which is considered to be carried out 3 days a week during 10 weeks of training, develops sprint, agility and anaerobic endurance..

5. CONCLUSIONS

The nature of speed was improved with the responses of circuit and battle rope training. The improvement was similar in both the training groups. The control group did not show any noticeable improvement.

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