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Impact of battle rope high intensity training on selected biochemical and physiological variables among athletes

[1] Bobu Antony, [2] Dr. Palanisamy A

[1] Ph.D Scholar (Full-time) Department of Physical Education, Bharathidasan University, Tiruchirappalli, Tamil Nadu, India
[2] Associate Professor, Department of Physical Education, Bharathidasan University, Tiruchirappalli, Tamil Nadu, India

Abstract
The purpose of the study was to find out the impact of battle rope high intensity training on selected biochemical and physiological among athletes. To achieve this purpose of the study, thirty (N=30) College men athletes were randomly selected as subjects from varies Colleges from Mahatma Gandhi University, Kerala, were selected as subjects at random and their age ranged from 18 to 24 years. They were divided into two equal groups consist of 15 each, Group I underwent Battle rope training and Group II acted as Control group. The Battle rope training group participate training for 5 days in a week, one session per day and for 8 week each session lasted 90 minutes. The control group did not participate in any special training programme apart from the regular physical activities as per the curriculum. In this study selected biochemical and physiological tests was carried out on each students. In biochemical variables, Triglycerides assessed by Friedewald Formulae and Hemoglobin assessed by Cyanmethemoglobin method. In physiological variable, respiratory rate assessed by expirograph and vital capacity assessed by wet spirometer. All the subjects of the two groups were tested on selected dependent variables at prior and immediately after the training programme except hemoglobin. The hemoglobin was tested on after 12 hrs fast and 24 hrs after the exercise for subsequent determination of hemoglobin. The analysis of covariance (ANCOVA) was used to analyze the significant difference. In all cases .05 level of confidence was fixed as the level of significance to test the 'f' ratio obtained by the analysis of covariance, which was considered as an appropriate. The results of the study indicated that systematic practice of Battle Rope Training has significantly improved the selected biochemical and physiological variables among College level Athletes.

Keywords: Battle rope, high intensity training, Vital capacity

1. Introduction
Track-and-field athletics are the oldest forms of organized sport, having developed out of the most basic human activities—running, walking, jumping, and throwing. Athletics have become the most truly international of sports, with nearly every country in the world engaging in some form of competition. Most nations send teams of men and women to the quadrennial Olympic Games and to the official World Championships of track and field. There also are several continental and intercontinental championship meets held, including the Asian, African, European, Pan-American and Commonwealth.

Sports training influence an athlete in a wide way starting with changes at molecular level and ending up with changes in functioning of different organs. Therefore, one should not concentrate only to one-two biochemical tests and make deep conclusions according to the results of these tests. Instead, a coach or a sports scientist should try to get an overview of the whole situation by using also physiological, psychological, event specific performance tests. Coach should also follow everyday training session numbers (series and reps, kilograms, meters and centimeters) and athlete's behavior during training sessions. Especially during a warm-up of a training session to better understand the condition of athlete's muscles and tendons and according to the situation more precisely choose the exercises and training load for the concrete training session.

Battle ropes sometimes called heavy ropes are one of the newest fitness trends, working with ropes is hardly a new form of fitness. Battle ropes can provide a high-intensity, whole-body workout. Battle ropes workouts are naturally non-impact and dynamic physical training, which can be used for building muscle, losing weight, and increasing strength and endurance particularly by athletes.

Statement of the Problem
The purpose of the study was to find out the Impact of battle rope high intensity training on selected biochemical and physiological variables among athletes.

Hypothesis
- It was hypothesized that there would be a significant improvement on selected biochemical variables due to battle rope high intensity training.
- It was hypothesized that there would be a significant improvement on selected physiological variables due to battle rope high intensity training.

2. Methodology
To achieve this purpose of the study, thirty (N=30) College men athletes were randomly selected as subjects from varies Colleges from Mahatma Gandhi University, Kerala, were selected as subjects at random and their age ranged from 18 to 24 years. They were divided into two equal groups consist of 15 each, Group I underwent Battle rope training and Group II acted as Control group. The Battle rope training group participate training for 5 days in a week, one session per day and for 8 week each session lasted 90 minutes. The control group did not participate in any special training programme

apart from the regular physical activities as per the curriculum. In this study selected biochemical and physiological tests was carried out on each students. In biochemical variables, Triglycerides assessed by Friedewald Formulae and Hemoglobin assessed by Cyanmethemoglobin method. In physiological variable, respiratory rate assessed by expirograph and vital capacity assessed by wet spirometer. All the subjects of the two groups were tested on selected dependent variables at prior and immediately after the training programme except hemoglobin. The hemoglobin was tested on after 12 hrs fast and 24 hrs after the exercise for subsequent determination of hemoglobin. The analysis of covariance (ANCOVA) was used to analyze the significant difference. In all cases .05 level of confidence was fixed as the level of significance to test the 'f' ratio obtained by the analysis of covariance, which was considered as an appropriate.

The analysis of covariance on Triglycerides of the pre and post test scores of Battle rope Training Group and Control Group have been analyzed and presented in table I.

Table 1: Analysis of covariance of data on Triglycerides between Pre-test, Post-test and Adjusted Post-test of Battle rope training group and control group

Variables	Test	Battle Rope group	Control group	Sum of variance	Sum of squares	Df	Mean of squares	'F' ratio
Triglycerides	Pre	159.40	162.13	Between Within	56.03 1381.33	1 28	56.03 49.33	1.13
	Post	149.33	161.40	Between Within	1092.03 1482.93	1 28	1092.03 52.96	20.61*
	Adjusted post	156.74	164.78	Between Within	279.32 198.87	1 27	279.32 7.36	37.92*

*Significant at 0.05 level of confidence.

(The table value required for significant at 0.05 level of confidence for 1 and 28 and 1 and 27 are 4.20 and 4.23 respectively).

Table I shows that the pretest means of Battle Rope Training group and control group were 159.40, 162.13 respectively. The obtained 'F' ratio of 1.13 for pre-test means was lesser than the table value of 4.20 for df 1 and 28 required for significant at 0.05 level of confidence. The post test means of Battle Rope Training group and control group were 149.33, 161.40 respectively. The obtained 'F' ratio of 20.61 for post test means was greater than the table value of 4.20 for df 1 and 28 required for significant at 0.05 level of confidence. The adjusted post test means of Battle Rope Training group and control group were 156.74, 164.78 respectively. The obtained 'F' ratio of 37.92 for adjusted post test means was greater than the table value of 4.23 for df 1and 27 required for significant at 0.05 level of confidence.

The result indicated that there was a significant difference between adjusted post test mean of Battle Rope Training group and control group on Triglycerides.

The collected data of pre and post test for Battle rope Training Group and Control Group were analyzed with covariance and presented below Table II.

Table 2: Analysis of covariance of data on Hemoglobin between Pre-test, Post Test and Adjusted Post Test of Battle Rope training group and control group

Variables	Test	Battle Rope group	Control group	Sum of variance	Sum of squares	Df	Mean of squares	'F' ratio
Hemoglobin	Pre	12.92	12.58	Between Within	0.90 22.85	1 28	0.90 0.81	1.10
	Post	14.70	12.63	Between Within	32.03 32.87	1 28	32.03 1.17	27.28*
	Adjusted post	13.35	12.15	Between Within	5.48 4.41	1 27	5.48 0.16	33.51*

*Significant at .05 level of confidence.

(The table value required for significant at .05 level of confidence for 1 and 28 and 1 and 27 are 4.20 and 4.23 respectively).

Table II shows that the pretest means of Battle Rope Training group and control group were 12.92, 12.58 respectively. The obtained 'F' ratio of 1.10 for pre-test means was lesser than the table value of 4.20 for df 1and 28 required for significant at 0.05 level of confidence. The post test means of Battle Rope Training group and control group were 14.70, 12.63 respectively. The obtained 'F' ratio of 27.28 for post test means was greater than the table value of 4.20 for df 1and 28 required for significant at 0.05 level of confidence. The adjusted post test means of Battle Rope Training group and control group were 13.35, 12.15 respectively. The obtained 'F' ratio of 33.51 for adjusted post test means was greater than the table value of 4.23 for df 1and 27 required for significant at 0.05 level of confidence.

The result indicated that there was a significant difference between adjusted post test mean of Battle Rope Training group and control group on Hemoglobin.

The collected data of pre and post test for Battle rope Training Group and Control Group were analyzed with covariance and presented below Table III.

Table 3: Analysis of covariance of data on Respiratory rate between Pre-test, Post test and Adjusted Post test of Battle rope training group and control Group

Variables	Test	Battle Rope group	Control group	Sum of variance	Sum of squares	Df	Mean of squares	'F' ratio
Respiratory Rate	Pre	14.40	13.73	Between Within	3.33 34.53	1 28	3.33 1.23	2.70
	Post	12.40	14.53	Between Within	34.13 35.33	1 28	34.13 1.26	27.04*
	Adjusted post	12.92	15.20	Between Within	19.84 14.30	1 27	19.84 0.53	37.45*

*Significant at .05 level of confidence.

(The table value required for significant at 0.05 level of confidence for 1 and 28 and 1 and 27 are 4.20 and 4.23 respectively).

Table III shows that the pretest means of Battle Rope Training group and control group were 14.40, 13.73 respectively. The obtained 'F' ratio of 2.70 for pre-test means was lesser than the table value of 4.20 for df 1and 28 required for significant at 0.05 level of confidence. The post test means of Battle Rope Training group and control group were 12.92, 15.20 respectively. The obtained 'F' ratio of 27.04 for post test means was greater than the table value of 4.20 for df 1and 28 required for significant at 0.05 level of confidence. The adjusted post test means of Battle Rope Training group and control group were 12.92, 15.20 respectively. The obtained 'F' ratio of 37.45 for post test means was greater than the table value of 4.23 for df 1and 27 required for significant at 0.05 level of confidence.

The result indicated that there was a significant difference between adjusted post test mean of Battle Rope Training and control group on respiratory rate.

The collected data of pre and post test for Battle rope Training Group and Control Group were analyzed with covariance and presented below Table IV.

Table 4: Analysis of covariance of data on Vital Capacity between Pre-test, Post test and Adjusted Post test of Battle Rope training group and control group

Variables	Test	Battle Rope group	Control group	Sum of variance	Sum of squares	Df	Mean of squares	'F' ratio
Vital Capacity	Pre	5.03	4.78	Between Within	0.45 7.29	1 28	0.47 0.26	1.73
	Post	5.67	4.82	Between Within	5.40 8.97	1 28	5.40 0.32	16.85*
	Adjusted post	5.13	4.67	Between Within	0.99 1.07	1 27	0.99 0.04	25.08*

*Significant at .05 level of confidence.

(The table value required for significant at .05 level of confidence for 1 and 28 and 1 and 27 are 4.20 and 4.23 respectively).

Table IV shows that the pretest means of Battle Rope Training group and control group were 5.03, 4.78 respectively. The obtained 'F' ratio of 1.73 for pre-test means was lesser than the table value of 4.20 for df 1and 28 required for significant at 0.05 level of confidence. The post test means of Battle Rope Training group and control group were 5.67, 4.82 respectively. The obtained 'F' ratio of 16.85 for post test means was greater than the table value of 4.20 for df1and 28 required for significant at 0.05 level of confidence. The adjusted post test means of Battle Rope Training group and control group were 5.13, 4.67 respectively. The obtained 'F' ratio of 25.08 for post test means was greater than the table value of 4.23 for df 1and 27 required for significant at 0.05 level of confidence.

The result indicated that there was a significant difference between adjusted post test mean of Battle Rope Training group and control group on vital capacity.

3. Conclusions

With the limitations of the study the following conclusions have been arrived.

1. There were significant improvements on Triglycerides in Battle rope training group when compared with control group.
2. There was significant improvement on Hemoglobin in Battle rope training group when compared with Control Group.
3. There was significant improvement on Respiratory rate in Battle rope training group when compared with control group.
4. There was significant improvement on Vital capacity in Battle rope training group when compared with control group.

4. References

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