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Outcomes of Crossfit and Resistance Training on Selected Physiological Variables among Basketball Players

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Abstract

The purpose of the study is to find out the outcomes of CrossFit and Resistance training on selected physiological variables among basketball players. The CrossFit and Resistance training will be selected as independent variables. Vital capacity and breath holding time (physiological variables) variables will be selected as dependent variables. To facilitate the study, 45 male basketball players will be randomly selected from various colleges affiliated to the University of Madras. The age group of subjects ranged from 17 to 25 years. The selected subjects are divided into three groups' namely experimental group I, experimental group II, and control group. The group I will undergo CrossFit training, group II will undergo Resistance training, and control group will not undergo any training. The training period is limited for 12 weeks per week except Sunday; per day per session is maximum 60 minutes. The selected dependent variable is measured by standardized tests. The physiological variables are Vital capacity-Wet spirometer, Breath holding time-Nose clip. The data will be collected from the experimental groups I, II and control group before and after the training period. Analysis of Co-variances (ANCOVA) will be used to find out the significant difference, if any among the groups. Scheffe's post hoc test will be used to find out the mean difference on selected dependent variable among the groups.

Keywords: Basketball, CrossFit, Resistance, Independent variables, Dependent variables.

Introduction

Sports science emphasizes on developing new techniques and training methods to train athletes or teams for enhancing performance at high level. India needs to reinforce this trend in all fields of sports and this can only be possible through scientific, systematic and planned sports training programme. Training is the total process of preparation of a sportsman, through different means and forms for better performance. Training aims at improving the fitness of persons. It is a programme of exercise designed to improve the skill and increase the energy capacities of an athlete for a particular event (Edward 1984). CrossFit itself is defined as that which optimizes fitness (constantly varied functional movements performed at relatively high intensity). CrossFit is also the community that spontaneously arises when people do these workouts together. CrossFit is the principal strength and conditioning program for Hundreds of other elite and professional athletes worldwide. (https://www.crossfit.com/what-is-crossfit). Resistance training is a form of exercise for the development of strength and size of skeletal muscles. Resistance training, also known as weight training or strength training, is for everyone. When one does it properly it can provide significant functional benefits and improvement in overall health and well-being. In one common training method the teaching involves lifting progressively increasing amount of weight and uses a variety of exercises as type of equipment to target specific muscle group (Fleck & Kraemer, 1997).

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Objectives of the Study

1. To find out the outcomes of CrossFit and Resistance training on vital capacity among basketball players.
2. To find out the outcomes of CrossFit and Resistance training on breath holding time among basketball players.

Hypothesis

1. It was hypothesized that there would be significant improvement on selected vital capacity and breath holding time due to the twelve weeks of CrossFit training and Resistance training when compared with the control group.
2. It was hypothesized that there would be significant improvement differences between the CrossFit

training and Resistance training group on selected vital capacity and breath holding time.

Methodology

Experimental Design & Statistical Technique

The purpose of the present study is to analyze the outcomes of CrossFit and Resistance training on vital capacity and breath holding time among basketball players. To achieve the purpose of the study was forty five men inter collegiate level basketball players (N = 45) were randomly selected from various colleges affiliated to the University of Madras. The age of the subject ranged from 17 to 25 years. The investigator selected the independent variables namely CrossFit training and Resistance training for the analysis. The dependent variables selected for this study physiological variable namely vital capacity and breath holding time. The pre-test and post-test random group design was used as experimental design in which forty five male basketball players were divided into three groups of fifteen subjects in each group. Group I crossfit training, Group II resistance training and Group III acted as Control Group. The subjects were tested on the selected criterion variables prior to before and after the training program. The data collected from the three groups prior to before and after the training programs on the selected criterion variables were statistically analyzed with analysis of covariance (ANCOVA). Whenever the 'F' – ratio for adjusting post test means were found to be significant, Scheffe's test was followed as a post hoc test to determine which of the paired mean differences were significant. In all the cases 0.05 level of confidence was fixed as the level of confidence to test the hypothesis (Clarke 1972).

Table I. Analysis of covariance for the pre, post and adjusted post test on vital capacity of experimental groups and control group (Scores in Milliliters)

Test	Exp Gr I	Exp Gr II	Control Gr	SV	SS	DF	MS	F
Pre test	509.41	492.16	517.16	between	5158.167	2	2579.08	1.174
				within	92265.65	42	2196.80	
Post test	633.92	586.49	533.35	between	98095.19	2	49047.59	22.637*
				within	91000.20	42	2166.67	
Adjusted	634.28	574.73	534.74	between	98891.85	2	49445.92	22.621*
				within	89617	41	2185.80	

**Significant at 0.05 level of confidence.*

The table I show that the pre-test mean values on vital capacity of crossfit training group, resistance training group and control groups are 509.41, 492.16 and 517.89 respectively. The obtained 'F' ratio 1.174 for the pre-test score was lesser than the table value 3.22 for 2 and 42 degree of freedom at 0.05 level of confidence on vital capacity. There is no significant difference between the experimental and the control groups on vital capacity. The post-test mean values on vital capacity of crossfit training group, resistance training group and control groups are 633.92, 586.49 and 533.35 respectively. The obtained 'F' ratio 22.637 for post-test scores was greater than the table value 3.22 for degree of freedom 2 and 42 required for significance at 0.05 level of confidence on vital capacity. The adjusted post-test means of on vital capacity of crossfit training group, resistance training group and control groups are 634.28, 574.73 and 534.74 respectively. The obtained 'F' ratio of 22.621 for adjusted post-test means was greater than the table value of 3.22 for degree of freedom 2 and 42 required for significance at 0.05 level of confidence on vital capacity. The results of the study indicated that there was a significant difference among the adjusted post-test means of crossfit training group, resistance training group on vital capacity. Since the obtained 'F' ratio value was significant further to find out the paired mean difference, the scheffe's test was employed and presented in table II.

Table II. Analysis of covariance for the pre, post and adjusted post test on speed of experimental groups and control group (Scores in Milliliters)

Experimental Group I (Crossfit training group)	Experimental Group II (Progressive resistance training group)	Control Group	MD	CI
634.28	574.73	-	59.55	104.23
634.28	-	534.74	99.54	
	574.73	534.74	39.99	

The table II shows that the Sheffe's post –hoc method of testing the significance for the differences between the paired means the following analysis of co-variance for crossfit training group, resistance training group and control group. The mean differences between the crossfit training group and resistance training group is 59.55 which is significant at 0.05 level of confidence interval. The mean differences between the crossfit group and control group is 99.54 which is significant at 0.05 level of confidence interval. The comparison between resistance training group and control group is 39.99 the mean difference 0.01 is significant at 0.05 level of confidence interval. This indicates that the vital capacity was significantly improved in both experimental groups than the control group. There is significant difference between crossfit training group and resistance training group, but when comparing the mean difference the crossfit training group is more effective in vital capacity.

Table III. Analysis of covariance for the pre, post and adjusted post test on breath holding time of experimental and control groups (Scores in Seconds)

Test	Exp gr I	Exp gr II	Control gr	SV	SS	Df	MS	F
Pre test	48.67	34.32	43.36	between	1579.856	2	789.928	2.56
				within	12928.498	42	307.82	
Post test	72.11	49.25	41.70	between	10049.514	2	5024.757	56.328*
				within	3746.612	42	89.205	
Adjusted	68.96	48.80	41.30	between	6386.295	2	3193.147	38.132*
				within	3433.336	41	83.740	

**Significant at 0.05 level of confidence.*

The table III show that the pre-test mean values on breath holding time of crossfit training group, resistance training group and control groups are 48.67, 34.32 and 43.36 respectively. The obtained 'F' ratio 11.329 for the pre-test score was greater than the table value 3.22 for 2 and 42 degree of freedom at 0.05 level of confidence on breath holding time. There is no significant difference between the experimental and the control groups on breath holding time. The post-test mean values on breath holding time of crossfit training group, resistance training group and control groups are 72.11, 49.25 and 41.70 respectively. The obtained 'F' ratio 56.328 for post-test scores was greater than the table value 3.22 for degree of freedom 2 and 42 required for significance at 0.05 level of confidence on vital capacity. The adjusted post-test means of on vital capacity of crossfit training group, resistance training group and control groups are 68.96, 48.80 and 41.30 respectively. The obtained 'F' ratio of 38.132 for adjusted post-test means was greater than the table value of 3.22 for degree of freedom 2 and 42 required for significance at 0.05 level of confidence on breath holding time. The results of the study indicated that there was a significant difference among the adjusted post-test means of crossfit training group, resistance training group on breath holding time. Since the obtained 'F' ratio value was significant further to find out the paired mean difference, the scheffe's test was employed and presented in table IV.

Table IV. Analysis of covariance for the pre, post and adjusted post test on breath holding time of experimental and control groups (Scores in Seconds)

Experimental Group I (Crossfit training group)	Experimental Group II (Progressive Resistance Training group)	Control Group	MD	CI
68.96	48.80	-	20.16	30.58
68.96	-	41.30	27.66	
	48.80	41.30	7.50	

The table IV shows that the Sheffe's post –hoc method of testing the significance for the differences between the paired means the following analysis of co-variance for crossfit training group, resistance training group and control group. The mean differences between the crossfit training group and resistance training group is 20.16 which is significant at 0.05 level of confidence interval. The mean differences between the crossfit group and control group is 27.66 which is significant at 0.05 level of confidence interval. The comparison between resistance training group and control group is 7.50 the mean difference 0.01 is significant at 0.05 level of confidence interval. This indicates that the breath holding time was significantly improved in both experimental groups than the control group. There is significant difference between crossfit training group and resistance training group, but when comparing the mean difference the crossfit training group is more effective in breath holding time.

Conclusion

The results of the study indicated that the experimental groups namely crossfit and resistance group had significantly influenced on the selected variables such as vital capacity and breath holding time as both experimental groups had undergone systematic training over 12 weeks duration. At the same time when the two experimental groups were compared, crossfit group showed significant improvement in vital capacity and breath holding time than the other variable. The control group had not shown significant improvement on any of the selected variables as they have not subjected to any of the specific training / conditioning similar to that of experimental groups. So, the training impact of twelve week crossfit training was much greater than that of progressive resistance training among basketball players. The same method of training may recommended for other purpose to improve the physical and psychological variables. This study will help to enhance the performance of sports, games.

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