

**EFFECT OF AEROBIC TRAINING, RESISTANCE TRAINING AND  
CONCURRENT TRAINING PROGRAMME ON BREATH HOLDING TIME  
AND VO<sub>2</sub> MAX AMONG UNIVERSITY BASKETBALL PLAYERS**

**Mr. Rajesh Sobti\***

Ph.D Research Scholar, Department of Physical education, CT University.

**Dr. Pravin Kumar\*\***

Professor and Head, School of Humanities and Physical education, CT  
University, Ludhiana, Punjab.

**ABSTRACT**

The purpose of the study was to find out the effect of aerobic training, resistance training and concurrent training programme on breath holding time and vo<sub>2</sub> max among university basketball players. The study will be confined with 60 women basketball players studying Affiliated Colleges of Kurukshetra University, Kurukshetra. Their age ranging between 18 to 25 years. The subjects considered are all regularly participating in the games and sports. The subjects were divided into four equal groups. Group-I (n=15) underwent aerobic training, Group-II (n=15) underwent resistance training, Group-III (n=15) underwent concurrent training for 12 weeks and Group-IV acted as control did not participate any special activities. The study was conducted on dependent variables such as breath holding time and vo<sub>2</sub> max. In the present study random group design was used. Analysis of covariance (ANCOVA) statistical technique was used to find out the adjusted mean difference among the variables. Scheffe's post hoc test was used to find out the paired adjusted mean difference when the study was significant. The results of the study proved that there was a significant difference existed between control group and aerobic training, resistance training and concurrent training groups.

**Keywords:-** *aerobic training, resistance training, concurrent training, breath holding time, vo<sub>2</sub> max and basketball*

## **Introduction**

Aerobic exercise is actual exercise that means to improve the effectiveness of the cardiovascular framework in engrossing and shipping oxygen. High-impact signifies "with oxygen" and alludes to the utilization of oxygen in the body's metabolic or energy – creating measure. Numerous sorts of activities are vigorous and by the definition are performed at moderate degrees of power for broadened timeframes that gets the heart siphoning and quickens relaxing. These activities make heart more grounded and more productive in conveying oxygen.

Resistance training is useful to develop strength. It focuses on selecting particular exercises, performing specified repetitions for each exercise, and using specific amounts of weight for each lift. Resistance training over time causes a general increase in the number, diameter, and density of collagen fibers. Elation levels increase, proportionate to the gain in muscle strength, to maintain joint integrity.

**Speck and Kraemer (2014)** recommend that strength and aerobic exercise programs with a moderate measure of volume appear to be to be viable with no harmful consequences for one or the other strength or perseverance. As the volume increments to that received by first class competitors, disservices in strength are bound to happen. It could be the overtraining wonder that is at fault instead of the inconsistency of simultaneous strength and intense exercise.

**Statement of the problem**

To achieve the purpose of the study was effect of aerobic training, resistance training and concurrent training programme on breath holding time and vo<sub>2</sub> max among university basketball players

**Methodology**

The study will be confined with 60 women basketball players studying Affiliated Colleges of Kurukshetra University, Kurukshetra. Their age ranging between 18 to 25 years. The subjects considered are all regularly participating in the games and sports. The subjects were experimentally treated with aerobic training, resistance training and concurrent training for 12 weeks. The study was conducted on dependent variables such as breath holding time and Vo<sub>2</sub> max. Breath holding time was assessed by holding breath time and Vo<sub>2</sub> max was measured by Queens college step test.

**Statistical Techniques**

In the present study random group design was used. All the four groups were randomly selected from various colleges basketball players of Kurukshetra University. Analysis of covariance (ANCOVA) statistical technique was used to find out the adjusted mean difference among the variables. Scheffe's post hoc test was used to find out the paired adjusted mean difference when the study was significant.

**Results**

The pre and post test data collected from the experimental and control groups on breath holding time and Vo<sub>2</sub> max are statistically analyzed by ANCOVA and the results are presented in table- I

Table-I: **Analysis of Covariance on Breath holding time and Vo<sub>2</sub> max. of Experimental and Control Groups**

	<b>Aerobic Training</b>	<b>Resistance Training</b>	<b>Concurrent Training</b>	<b>Control Group</b>	<b>S o v</b>	<b>SS</b>	<b>Df</b>	<b>MS</b>	<b>'F' ratio</b>
<b>Breath Holding Time</b>	60.28	58.64	63.78	52.42	B	17.76	3	5.92	17.94*
					W	18.27	55	0.33	
<b>VO<sub>2</sub> Max</b>	50.42	49.94	51.12	46.58	B	134.1	3	44.72	12.02*
					W	204.5	55	3.72	

(The required table value for significant at .05 level of confidence are of 3 and 56 and 3 and 55 are 2.70 and 2.72)

\* Significant at .05 level of confidence

The adjusted post-test means on breath holding time of aerobic, resistance, concurrent training and control groups are 60.28, 58.64, 63.78 and 52.42 respectively. The obtained 'F' ratio value of 17.94 on breath holding time were greater than the required table value of 2.72 for the degrees of freedom 3 and 55 at 0.05 level of confidence. It is observed from this finding that significant differences exist among the adjusted post-test means of experimental and control groups on breath holding time.

The adjusted post-test means on VO<sub>2</sub> max of aerobic, resistance, concurrent training and control groups are 50.42, 49.94, 51.12 and 46.58 respectively. The obtained 'F' ratio value of 12.02 on VO<sub>2</sub>max were greater than the required table value of 2.72 for the degrees of freedom 3 and 55 at 0.05 level of confidence. It is observed from this finding that significant

differences exist among the adjusted post-test means of experimental and control groups on  $VO_2$ max.

Further to determine which of the paired means has a significant improvement, Scheffé S test was applied as post-hoc test. The result of the follow-up test is presented in Table – II

*Table – II*

*Scheffé S Test for the Difference Between the Adjusted Post-Test Mean of breath holding time and  $Vo_2$  max on aerobic, resistance, concurrent training and control groups*

<b>Adjusted Post-test Mean of Breath Holding Time</b>					
<b>Aerobic Training</b>	<b>Resistance Training</b>	<b>Concurrent Training</b>	<b>Control Group</b>	<b>Mean Difference</b>	<b>CI at .05 level</b>
60.28	58.64	-	-	1.64	5.68
60.28	-	63.78	-	3.5	
60.28	-	-	52.42	7.86*	
-	58.64	63.78	-	5.14	
-	58.64	-	52.42	6.22*	
-	-	63.78	52.42	11.36*	
<b>Adjusted Post-test Mean of <math>Vo_2</math> Max</b>					
50.42	49.94	-	-	0.48	2.78
50.42	-	51.12	-	0.7	
50.42	-	-	46.58	3.84*	
-	49.94	51.12	-	1.18	
-	49.94	-	46.58	3.36*	
-	-	51.12	46.58	4.54*	

\* Significant at 0.05 level of confidence.

The result of the study shows that aerobic, resistance training and concurrent training increases breath holding time and  $Vo_2$  max when compare with control. concurrent training may have better effect to increases breath holding time and  $Vo_2$  max of university basketball players.

## **Discussion**

The findings of the study proved that there was a significant difference existed between control group and aerobic training, resistance training and

concurrent training groups. Thus, 12 weeks of experimental treatment altered in breath holding time of the women basketball players compared to control group. However there was no significant difference between experimental groups on breath holding time. The above findings are in consonance with the study conducted by **Raj Kumar (2016) and Bagavad Geetha and others (2014)**.

The results of analysis of covariance on  $VO_2$  max showed that there was a significant difference existed between control group and aerobic training, resistance training and concurrent training groups. Thus, 12 weeks of experimental treatment improve in  $VO_2$  max of the women basketball players compared to control group. The above findings are in consonance with the study conducted by **Tarasi and others (2011), Baljit Singh Sekhon and Shelvam (2019) and Alves and others (2016)**.

### **Conclusions**

From the analysis of the data, the following conclusions were drawn.

1. The result of the study shows that aerobic, resistance training and concurrent training increases breath holding time and  $VO_2$  max when compare with control group.
2. Concurrent training may have better effect to increases breath holding time and  $VO_2$  max of university basketball players.

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