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# Effect of 6 weeks circuit training on breath hold time of badminton players

**Dr. Raj Kumar**

Assistant Professor, MATS School of Physical Education, MATS University, Raipur, Chhattisgarh, India

**Abstract**
The objective of the study to find out the effect of 6 weeks circuit training on breath hold time of badminton players. For the purpose of this study, thirty (N = 30) subjects was randomly selected from different levels of badminton players of Teerthanker Mahaveer University, Moradabad. The mean age of the subjects for the study was 22±0.57. The subjects was divided into two groups, experimental group (NE = 15) and control group (NC = 15). To measure the Breath hold time, manual method was used and scores was recorded in seconds. To determine the effect of 6 weeks circuit training on breath hold time of badminton players, Analysis of Co-Variance (ANCOVA) was used. The level of significance was set at 0.05. The results of the study shows that 6 weeks circuit training have significant effect on breath hold time of badminton players.

**Keywords:** Circuit training, breath hold time

## 1. Introduction
Badminton is highly complex sport and this presents great challenges for players and coaches of all levels. An individual rally is a series demanding movements performed using a movement pattern which is unique compared with any other sport. Rally length is often short (average for elite players is around 6-8 seconds) and, consequently, performed at very high intensity. However players must also be prepared for long rallies. Rallies are interspersed with short rest periods (typical duration around 15 seconds) which allow partial recovery from previous rally. However, competitive matches may last at least 45 minutes. So, badminton is a combination of speed (anaerobic fitness) in rallies and endurance (aerobic fitness) to allow sustained efforts and to promote recovery between rallies. Great strength, power, agility and flexibility are also required. All of these fitness components should form part of a player's fitness training. Additionally, the development of tactical and technical elements is, of course, also vital. With all of these types of training, an understanding of the principles of fitness training from a general point of view is essential.

Circuit resistance training (CRT) consists of resistance exercises performed in series, with one set executed per exercise. A prescribed number of circuits are then completed for each training session.

Circuit training is a general term used that describes training where different exercises are performed at high intensity for quite short periods, followed by quite short rest periods. Circuit training is excellent for badminton fitness as it can be used to increase muscle strength, endurance and aerobic fitness. Circuit training can be performed using weight training exercises or by using one's own body weight to create a resistance. Additionally, movement drills (sprints, shadow play etc.) could be adapted to form a part or the whole of a circuit training session. Typical work duration would be 30 seconds, with an intervening rest period of 30 seconds. With a range of exercises (jumps, sprints, court drills, weights, sit-ups, press-ups) many different activities can be performed one after the other to form a whole circuit training session which could last around 20 minutes or more. It is an efficient and challenging form of conditioning. It works well for developing strength, endurance (both aerobic and anaerobic), flexibility and coordination.

Circuit training is based on the premise that the athlete must do the same amount of work in a shorter period of time or must do considerably more work within the limits of an assigned training period.

## 2. Methodology
### 2.1 Selections of the subjects
For the purpose of this study, thirty (N = 30) subjects was randomly selected from different levels of badminton players of Teerthanker Mahaveer University Moradabad. The mean age of the subjects for the study was 22±0.57. The subjects was divided into two groups, experimental group (NE = 15) and control group (NC = 15).

### 2.2 Selection of Variables
On the basis of review of literature, expert's opinion, facilities and instruments availability and scholar's own understanding, breath hold time was selected as a independent variable.

### 2.3 Criterion measure
Breath Holding Capacity: To measure the breath holding capacity, nose clip and stopwatch were used and scores was recorded in seconds.

### 2.4 Statistical technique
To determine the effect of 6 weeks circuit training on breath holding capacity of badminton players, Analysis of Co-Variance (ANCOVA) was used. The level of significance was set at 0.05. All the statistical procedure was performed to SPSS 16.0.

## 3. Results & Findings

**Table 1:** Descriptive Statistics of Control Group and Experimental Group in relation to breath hold time

| | | N | Mean | Std. Deviation | Std. Error | Minimum | Maximum |
|---|---|---|---|---|---|---|---|
| Pre Test | Control Group | 15 | 75.80 | 4.53 | 1.17 | 70.00 | 88.00 |
| | Experimental Group | 15 | 77.93 | 6.47 | 1.67 | 69.00 | 89.00 |
| | Total | 30 | 76.86 | 5.60 | 1.02 | 69.00 | 89.00 |
| Post test | Control Group | 15 | 74.93 | 4.008 | 1.03 | 70.00 | 87.00 |
| | Experimental Group | 15 | 82.06 | 5.98 | 1.54 | 74.00 | 93.00 |
| | Total | 30 | 78.50 | 6.17 | 1.12 | 70.00 | 93.00 |

Table-1 clearly indicates the mean and standard deviations for Breath Hold time of Experimental Group and Control Group. The observed mean and standard deviation for the Pre-test, Breath Hold time of Experimental group was (77.93+6.47), whereas, control group (75.80+4.53). The Post test mean for Breath Hold time of Experimental group was (82.06+5.98), whereas control group was respectively (74.92+4.008).

The data were further analyzed with the help of analysis of variance to find out the significance difference between means of pre-test and post test of control group in relation to Breath Hold time. The results are presented in the table no 2.

**Table 2:** Analysis of Variance of Comparison of Means of one Experimental Group and one Control Group in Relation to Breath hold time

| | | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| Pre Test | Between Groups | 34.13 | 1 | 34.13 | 1.092 | .305 |
| | Within Groups | 875.33 | 28 | 31.26 | | |
| | Total | 909.46 | 29 | | | |
| Post Test | Between Groups | 381.63 | 1 | 381.63 | 14.721* | .001 |
| | Within Groups | 725.86 | 28 | 25.92 | | |
| | Total | 1107.50 | 29 | | | |

Table 2 revealed that, the pre test obtained 'F' value of 1.092 was found to be insignificant at 0.05 level, which, clearly indicates no difference and explains the random assignment of subjects to experimental group and control group was quite successful. In relation to post test, significant difference was found among experimental group and control group pertaining to Breath Hold time.

**Table 3:** Adjusted Post Test Means of Experimental Group and Control Group in relation to Breath hold time

| Group | Mean | Std. Error |
|---|---|---|
| Control Group | 75.86 | 0.403 |
| Experimental Group | 81.13 | 0.403 |

From the table number -3, it is revealed that mean of control group was 75.86 with the standard deviation of 0.403, whereas the mean of experimental group was 81.13 with the standard deviation of 0.403. The data were analyzed and the results pertaining to analysis of co-variance between experimental group and control group on badminton players in relation to Breath Hold time for pre test -post test respectively and the results are presented with the help of table-4.

**Table 4:** Analysis of Covariance of Comparison of Adjusted Post Test Means of Experimental Groups and Control Groups in Relation to breath hold time

| | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|
| Contrast | 201.16 | 1 | 201.16 | 84.210 | .000 |
| Error | 64.49 | 27 | 2.38 | | |

Table- 4 revealed that, the obtained 'F' value of 84.210 was found significant at 0.05 level. This result indicates that the treatment was given to subjects has increase the Breath Hold time of subjects at significant level.

The Graphical representation of mean of control and experimental group in relation to Breath Hold time is presented with the help of figure.

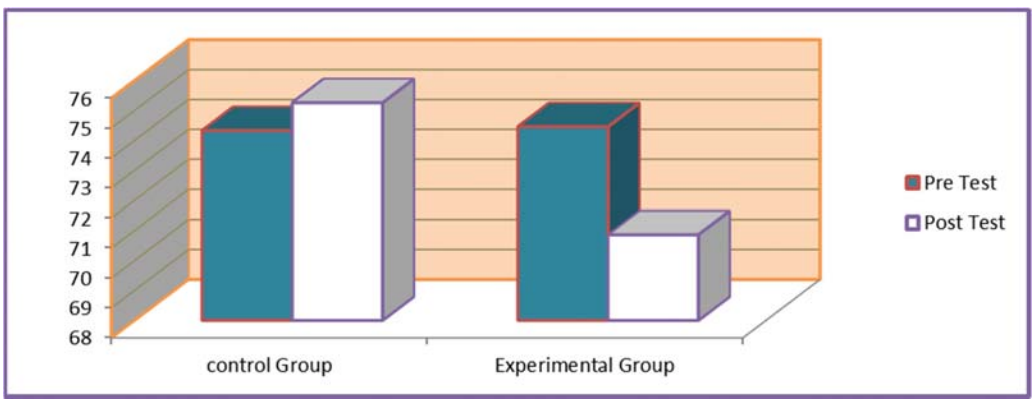


**Fig 1:** The Graphical representation of mean of control and experimental group in relation to breath hold time

## 4. Discussion of findings

The results of this study revealed that there was a significance difference between experimental and control group in relation to breath hold time of badminton players, which might be due to the participating in rigorous cardiovascular activity in the form of Circuit Training. As it has been accepted by several studies, that exercising is a great way to increase lung capacities, which also include the Breath Hold time. P. Senthilkumar (2015) [10] also concluded that due to the effect of high intensity circuit resistance training the selected strength (back strength and muscular strength), and physiological parameters (vo2max, resting pulse rate and breathe holding time) have significantly altered. During voluntary breath holding, tissues continue to utilize oxygen and liberate carbon dioxide. Therefore during breath holding arterial pO2 falls and pCO2 rises. Since both these factors are powerful respiratory stimulants, a point is reached where the respiratory drive becomes so strong that the person cannot hold the breath any longer. The point at which breathing can no longer be voluntarily inhibited is called the breaking point.

## 5. Conclusion

It was concluded that there are significant effects of 6 weeks of circuit training on breath hold time of badminton players.

## 6. Reference


1. Astrand, Per-olof, Rodahl Kaare. Textbook of Work Physiology, Physiological Bases of Exercise. McGraw Hill Book Company: New York, 1970.
2. Jain D. Badminton skils and rules. Khel Sahitya Kendra, New Delhi, 2003.
3. Jain. Anu. Badminton coaching manual. Sports Publications, New Delhi, 2005.
4. Sharma PD. Sports Promoting Agencies and Some Suggestions for the Promotion of Sports and Physical Education in India. Modern Perspective in Physical Education and Sports Sciences. New Delhi: Harnam Publication, 1986.
5. Reilly T, Secher N, Snell P, Williams C. Physiology of Sports. New York, E. and F.N. Spon, 1990.
6. Serio Gaccio Ramirez. Characteristics Violence in Sports Governed by Criminal Low. Olympic Review 1976; 99(100):44.
7. Annie Brown. The Effect of Circuit Training Training on the Physical Fitness of Grade V Girls. Completed research in health, Physical education and Recreation. 1962; 4:29.
8. Babalola JF. Effects of 8-weeks Circuit Training Programme on Physiological and Performance Characteristics of University Racket Game Players. Journal of Asian Scientific Research. 2011, 1 (retrieved on 29/08/2012), http://ideas.repec.org.
9. Leith DE, Bradley M. Ventilatory Muscle Strength and Endurance Training. Journal of Applied Physiology. 1976; 41(4):508-516.
10. Senthilkumar P. Effect of High Intensity Circuit Resistance Training on Selected Strength and Physiological Parameters. International Journal of Recent Research and Applied Studies. 2015; 2(8):(1).
11. Bijlani RL. Pulmonary function tests. In: Understanding Medical Physiology. A Textbook for medical students. 4 ed. Jitendar P Vij, Jaypee brother medical publishers (P) Ltd; 2011, 259-260.