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# Impact of Submaximal and Maximal Aerobic Training on Respiratory Rate among Under 14 Years Cricketer

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## Abstract

The purpose of the study was to find out the impact of submaximal and maximal aerobic training on respiratory rate among under 14 years cricketer. Sixty under 14 years cricketer were selected randomly as subjects from YMCA, Cricket Academy at Chennai city, Tamilnadu, India. The subjects were divided in to three groups of fifteen each named as submaximal aerobic training group, maximal aerobic training group and control group. The training program is scheduled at 6.30 am to 7.30 am on alternate days. The respiratory rate measured by number of breath per minute on manual method using stop watch. The subjects were tested prior to and after the twelve weeks of experimentation. The obtained data from the experimental and control group were statistically analyzed with analysis of covariance (ANCOVA). Scheffe's post hoc test applied to examine the paired mean difference between groups if, the obtained 'f' value found significant on the selected criterion variable. Dependent 't' test also used to find out the difference between pre test and post test on each group separately. The level of confidence was fixed at 0.05. The result shows that the experimental groups had achieved significant reduction on respiratory rate when compared to control group.

**Key Words:** Sub-maximal Aerobic, Maximal Aerobic, Respiratory rate.

## 1. Introduction:

Modern-day cricket has experienced a shift towards limited over games, where the emphasis is on scoring runs at a rapid rate. Although the use of protective equipment in cricket is mandatory, players perceive that leg guards, in particular, can restrict their motion Physical demands of cricket presumably vary by both game format and performance level. Cricket is the most popular sport in India; it is played by many people in open spaces throughout the country though it is not the nation's official national sport

Human respiration rate is measured when a person is at rest and involves counting the number of breaths for one minute by counting how many times the chest rises. An optical breath rate sensor can be used for monitoring patients during a magnetic resonance imaging scan. Respiration rates may increase with fever, illness, or other medical conditions. When checking respiration, it is important to also note whether a person has any difficulty breathing.

Inaccuracies in respiratory measurement have been reported in the literature. One study compared respiratory rate counted using a 90-second count period, to a full minute, and found significant differences in the rates. Another study found that rapid respiratory rates in babies, counted using a stethoscope, were 60–80% higher than those counted from beside the cot without the aid of the stethoscope. Similar results are seen with animals when they are being handled and not being handled—the invasiveness of touch apparently is enough to make significant changes in breathing. a submaximal graded exercise test. Submaximal graded exercise is any physical activity where the intensity or workload of a particular exercise is increased at a steady rate, but only works your body up to 85 percent of your maximum heart rate. Aerobic exercise comprises innumerable forms. In general, it is performed at a moderate level of intensity over a relatively long period of time. For example, running a long distance at a moderate pace is an aerobic exercise.

Various other methods to measure respiratory rate are commonly used, including impedance pneumography and capnography which are commonly implemented in patient monitoring. In addition novel techniques for automatically monitoring respiratory rate using wearable sensors are in development, such as estimation of respiratory rate from the electrocardiogram, photoplethysmogram and accelerometry signals. **(Simoes EA, 1991).**

The term fitness is an important aspect to be developed in the minds of all the people irrespective of age and sex. Much attention has to be focused on youth physical fitness. A sound and well organized physical education program in the schools and colleges will be right solution for these problems. **(Bucher, 2002).**

## 2. Materials & Methods:

To achieve the purpose of the study, forty five under 14 years cricketer were selected randomly as subjects from YMCA, Cricket Academy at Chennai city, Tamilnadu, India. The subjects were divided in to three groups of fifteen each named as submaximal aerobic training group, maximal aerobic training group and control group. The training program is scheduled at 6.30 am to 7.30 am on alternate days. The respiratory rate measured by number of breath per minute on manual method using stop watch. The subjects were tested prior to and after the twelve weeks of experimentation. The obtained data from the experimental and control group were statistically analyzed with analysis of covariance (ANCOVA). Scheffe's post hoc test applied to examine the paired mean difference between groups if, the obtained 'f' value found significant on the selected criterion variable. Dependent't' test also used to find out the difference between pre test and post test on each group separately. The level of confidence was fixed at 0.05.

## 3. Results of the Study:

**TABLE-I**
**ANALYSIS OF COVARIANCE ON RESPIRATORY RATE MAX OF EXPERIMENTAL AND CONTROL GROUP**

| Mean | Submaximal Aerobic Training Group | Maximal Aerobic Training Group | Control Group |
|---|---|---|---|
| **Pre Test Mean** | 18.90 | 18.60 | 18.60 |
| **Post Test Mean** | 16.50 | 17.55 | 18.55 |
| **'t'- test** | **8.43*** | **2.19*** | **0.11** |

***Significant at .05 level.

(Table value required for significance at .05 level for 't'-test with df 19 is 2.09)

The above table shows that there was a significant difference between pre test and post test among sub maximal aerobic training group and maximal aerobic training group on respiratory rate. Whereas there was insignificant difference between pre test and post among control group on respiratory rate.

**TABLE-II**
**ANALYSIS OF COVARIANCE ON RESPIRATORY RATE OF EXPERIMENTAL AND CONTROL GROUP**

| Mean | Submaximal Aerobic Training Group | Maximal Aerobic Training Group | Control Group | SOV | SS | df | MS | 'F' Ratio |
|---|---|---|---|---|---|---|---|---|
| Adjusted post-test Mean | 16.31 | 17.64 | 18.64 | B | 54.04 | 2 | 84.62 | **185.85*** |
| | | | | W | 8.14 | 56 | 1.63 | |

*Significant at .05 level of confidence

The required value for significance at .05 level of confidence for 2 and 56 is 3.16.

The result of table II shows that there was a significant difference among submaximal aerobic training group, maximal aerobic training group and control group on respiratory rate. Further, the Scheffe's post hoc test applied to know the paired mean differences the same presented in table III.

**TABLE-III**

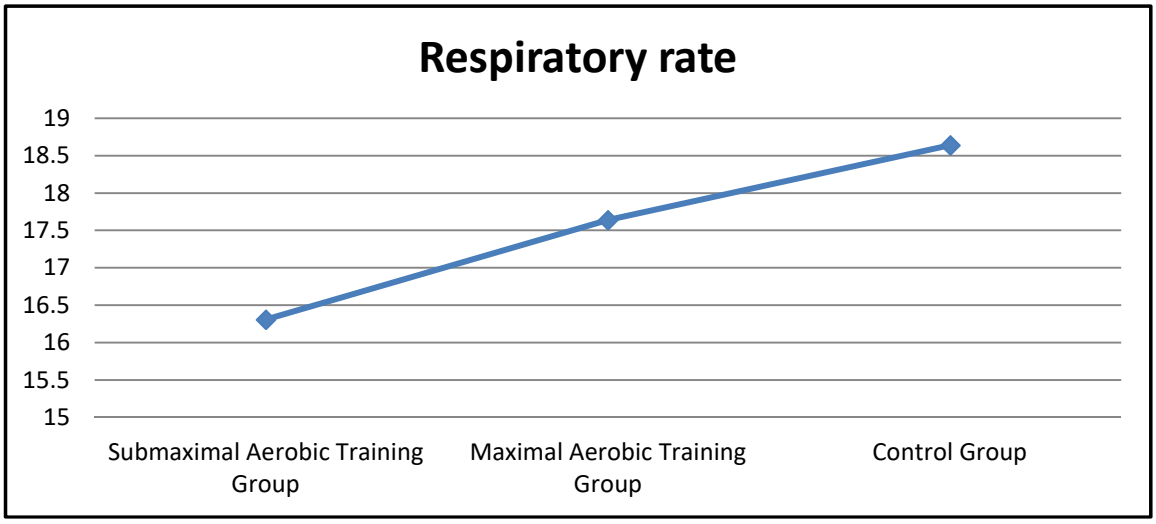
**SCHEFFE'S POST-HOC TEST FOR MEAN DIFFERENCE BETWEEN PAIRED MEANS ON RESPIRATORY RATE**

| Submaximal Aerobic Training Group | Maximal Aerobic Training Group | Control Group | Mean difference | Confidence Interval value |
|---|---|---|---|---|
| 16.31 | 17.64 | -- | **1.33*** | |
| 16.31 | -- | 18.64 | **2.33*** | **0.31** |
| -- | 17.64 | 18.64 | **1.00*** | |

*Significant at .05 level of confidence.

The Scheffe's post hoc test on respiratory rate shows that there was a significant difference between groups. Further, the maximal aerobic training shows better reduction on respiratory rate. However, the sub maximal aerobic training group also shows improvement from the baseline score on respiratory rate. The control group had never change on the initial mean. Hence, the result shows that there was a significant impact on maximal and submaximal aerobic training on respiratory rate. The maximal aerobic training has better protocol on reduction of respiratory rate.

It is inferred that the twelve weeks of submaximal aerobic training group, maximal aerobic training groups have significantly decrease the on respiratory rate as compared to the control group. The result also reveals that the decrease in on respiratory rate is significantly more for maximal aerobic training group was higher than submaximal aerobic training group.




## 4. Discussion:

The result on respiratory rate shows improvement on experimental groups. The maximal aerobic training shows better improvement on selected variable. The above results were discussed with previous results of various presentations given below. As previously reported, a significant increase of VO2 peak was observed after training at low intensity which was however more pronounced after training at high intensity (Cornelissen, 2009). The effects of improved fitness on BP, HR and HRV could, therefore, be evaluated in the current report. The present results show comparable reductions of respiratory rate at fixed absolute workloads during the maximal graded exercise test. The decrease averaged, which is in agreement with previous studies showing a decrease in exercise at fixed absolute workloads (Okazaki, 2005). An acute bout of exercise elicits a number of transient physiological responses, whereas accumulated bouts of acute exercise produce more permanent chronic adaptations that may be termed the exercise training response (Verheyden, 2006). Several of the potentially favorable changes in respiratory rate, previously considered to require long-term endurance training, are now known to have both an acute and a chronic exercise component (Pelrini, 2002). Kraul et al. were the first to observe an immediate reduction in blood pressure after a single bout of exercise. This phenomenon may have significant benefits by lowering blood pressure for certain periods of the day. However, given that most of the literature documenting this blood pressure reduction after acute exercise comes from sedentary participants. However, no control observation or non-athletes were included; hence it is difficult to interpret these results.

## 5. Conclusion:

The conclusion based on the result shows that, there was a significant reduction on respiratory rate due to submaximal and maximal aerobic training. Further, the maximal aerobic training shows better significant reduction on respiratory rate. The maximal aerobic training has better protocol on significant reduction on respiratory rate among under 14 cricketers.

## 5. Implication:

Maximal aerobic training may be used to develop better reduction on respiratory rate of school level cricketers.

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