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THE COMPARATIVE STUDY OF AEROBIC CAPACITY IN TRAINED AND UNTRAINED SUBJECTS

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ABSTRACT

Aim: To evaluate aerobic capacity in trained and untrained subjects by measuring Vo_2max.

Methods and Materials: In the present study 40 healthy subjects were selected between the age group 20-30 years. One group is not having any regular specific physical exercise and the second group which includes subjects, who regularly do the cycling in gym since more than two years. Resting pulse rate was recorded with E.C.G. The subjects were asked to peddle the bicycle ergo metre first with a resistance of 2 kg for 5 minutes next with a resistance of 4 kg for 3 minutes there after resistance is increased by 0.5 kg for every 3 minutes until the subject is exhausted. Immediately after the exercise heart rate was recorded with E.C.G.

Vo_2max =55.23-(0.09xheart rate/min).

Results: P-value of Vo_2 max is 0.005 which is highly significant.

Conclusion: The Vo_2 max is higher in trained subjects than in untrained subjects. This is due to cardiac output and total skeletal muscle mass are more in trained subjects.

Keywords: Bicycle ergo meter (Martin); E.C.G.;Vo_2 max

1. INTRODUCTION

In our country, man's life style is radically changed with advances in science and technology for the past two decades. All sections of the people are affected with more of sedentary work. So several sports programmes are being prescribed for the people. This is also includes regular cycling. The energy expenditure increases with the degree and type of exercise and work. Energy production requires increased blood flow to the muscle, lungs etc, and this is achieved by increase in the heart rate and cardiac output. All these systems are coordinated by both neural and endocrinal regulation. The work of usual everyday activity is aerobic. Type of exercise and duration of exercise determines the aerobic capacity.

1.1AIMS & OBJECTIVES

To evaluate vo_2 max in trained and untrained individuals.

2. MATERIALS & METHODS

Bicycle Ergo meter (Martin)[1], which is having a bicycle frame that is supported by a wooden stand, from the front of which two uprights ascend and carry a desk and cross piece and they provide for the attachment of the tension balance and other piece of apparatus. It is also having a cost iron wheel with circumference 158cm or 1.58 m. It is also having spring balance which can adjust the resistance. It is also having adjustable record counter which can record the number of revolution of the wheel per minute. Subjects; the present study was carried in physiology department of Sri Venkateshwara institute of medical sciences, thirupathi after permission from medical ethical committee of the institute. 40 healthy volunteers were selected between the age group of 20-30 years. One group includes 20 subjects who were students of BPT course in the institute not doing any exercise. Second group includes 20 subjects who were doing daily cycling for 30 to 60 minutes since more than 2 years. Exclusion criteria; alcoholics, smoking, diabetes, handicapped, cardiovascular and pulmonary diseases.

2.1 PROCEDURE: The subjects were attended the physiology lab at morning hours between 8-10 AM. Prior to the study each subject was informed in detail about the objectives of the study. The subjects are instructed about procedure and test. Height and weight were measured without shoes and with minimal clothes to the nearest 0.5cm and 0.1kg respectively before the test. The subjects were asked to pedal bicycle ergo meter against

the fixed load and asked to report immediately if they feel discomfort like dyspnoea, dizziness, nausea, vomiting and fatigue etc. Initially all the subjects first performed a sub maximal exercise at 2kg intensity for a duration of 5 minutes. After performing sub maximal exercise immediately intensity increased, first 4kg and thereafter 0.5kg every 3 minutes until the subject stopped due to exhaustion. Immediately after exercise heat rate recorded with E.C.G. Heart rate is calculated by using the formula, H.R=1500/R-R interval.

Vo_2 max (ml/kg/min) = 55.23-(0.09XH.R/min)[2].

2.2 STATISTICS : Obtained data was analysed statistically by ANOVA method. The P value less than 0.05 are considered significant.

3. RESULTS

The p value is 0.005 which is highly significant.

Table -01

The Mean values of Vo_2 max Un-trained & Trained Subjects

Variables	Number	Un-trained	Trained
Mean	20	42.1080	43.1074
Std. Deviation	20	1.42291	1.21863
Std. Error Mean	20	0.91817	0.27249

P=0.005

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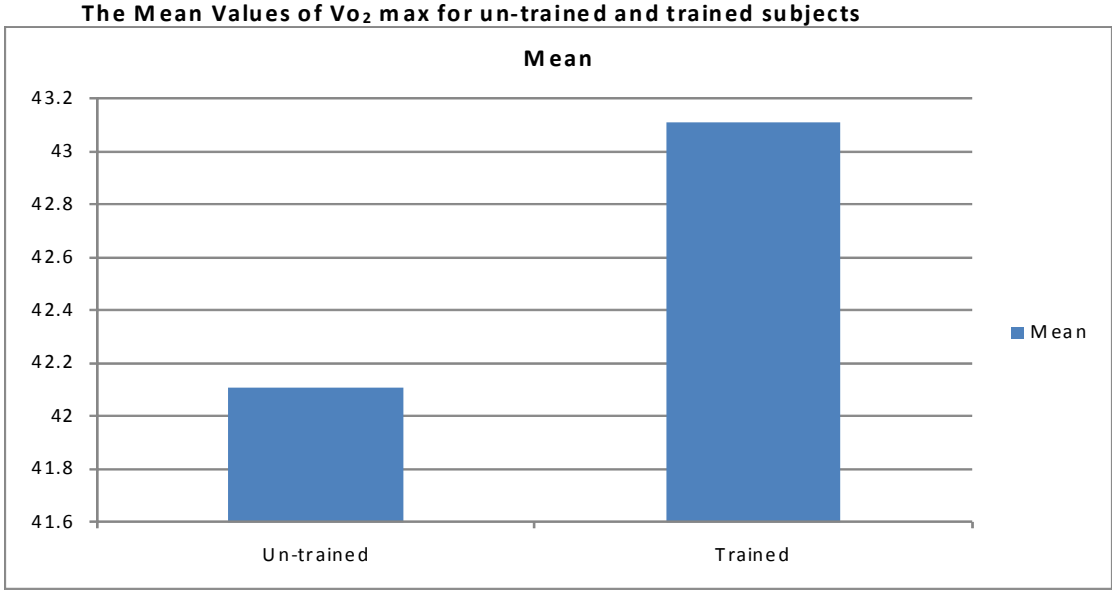
Graph - 01

The Mean Values of Vo_2 max for un-trained and trained subjects



4. DISCUSSION & CONCLUSION

Trained subjects peddled bicycle ergo meter with high resistance for longer duration than that of untrained subjects[7]. And this is because, trained subjects are having more skeletal muscle mass[3] and more left ventricular muscle mass compared to the untrained subjects. The physical limitations that restrict the rate at which energy can be

released aerobically are dependent up on the chemical ability of the muscle and cellular tissue systems to use oxygen in braking down fuels and the combined ability of cardio-vascular and pulmonary system to transport oxygen to the muscle. In aerobic system mitochondria oxidises glucose, fatty acids and amino acids to release AMP & ADP and later to convert them in to ATP[6]. Aerobic capacity is referred to maximum oxygen uptake and it is the maximum value of oxygen consumed by the body each minute. Cycling is a rhythmic and aerobic in nature. By doing regular cycling there will be hypertrophy of the muscle that is involved in the cycling[5]. These hypertrophied muscles will have more working capacity and this is why aerobic capacity of trained subject's is more than that of the untrained subject's[4]. The regular physical cycling exercise improves circulation of the whole system and decreases the cholesterol and harmful substance levels in the body. Regular cycling have very positive outcome in some diseases like hypertension, diabetes, osteoarthritis, chronic heart diseases etc. These diseases are more likely to be seen in sedentary persons than in those who are doing regular exercise. Daily cycling will keep good health. This is also cost effective comparative to the economic burden taking medicine for the above mentioned diseases. So we openly request to do daily cycling.

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