ORIGINAL ARTICLE

EFFECT OF AEROBICS TRAINING ON PULMONARY FUNCTIONS IN YOUNG MALE ADULTS OF PUNJAB

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Aims & Objectives: This study was to evaluate the effect of aerobic exercise training on pulmonary function tests in healthy young male population of Amritsar. **Methods:** The present study was undertaken to study the effects of aerobics on the lung functions. Lung functions or pulmonary function tests of aerobics trainees were compared with those of controls. We evaluated pulmonary function tests in 50 healthy male subjects from a fitness club who participated in a 3 months of aerobics plan. Pulmonary function tests were recorded before the commencement and at the end of aerobic training duration and compared to the values so obtained with 50 healthy adult males who were chosen as controls. The controls were the physiotherapy students from Khalsa College Amritsar. Both were in the age group of 18–20 years. The pulmonary function tests were carried out with a computerized spirometer 'Med-Spiror'. The various data was collected, compiled, statistically analysed and valid conclusions were drawn. **Results:** The current study has shown that, there is significant positive relationship between aerobics training and pulmonary function in healthy young men. Higher lung volumes and flow rates were achieved in aerobic trainees after their training period, as compared to their own values obtained before their training period and to those of controls. **Conclusion:** Regular exercise enhances physical capabilities and physiological responses of the human body and the lungs are no exception. The cause of improved of various respiratory functions and flow rates after aerobic plan duration is increased strength and enduring power of the respiratory muscles.

Keywords: Pulmonary Function Tests, Aerobics, Exercise, Men

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INTRODUCTION

Aerobic exercise (also known as cardio) is physical exercise of relatively low intensity that depends primarily on the aerobic energy-generating process.[1] Aerobic literally means 'living in air' and refers to the use of oxygen to adequately meet energy demands during exercise via aerobic metabolism. Generally, light-to-moderate intensity activities that are sufficiently supported by aerobic metabolism can be performed for extended periods of time. Appropriate aerobic exercise training can improve lung functions by strengthening the muscles of respiration.[1] The aerobic training leads to increasing the strength and endurance of the respiratory muscles.[2,3]

Aerobic exercise as any activity that uses multiple muscles, can be maintained continuously, and is rhythmic in nature. It is a type of exercise that overloads the heart and lungs and causes them to work harder than at rest.[4] Physical activity is known to improve physical fitness and to reduce morbidity and mortality from numerous chronic ailments.[5]

Aerobic exercise is an important component of pulmonary rehabilitation for patients with chronic obstructive pulmonary disease (COPD).[6,7]

This study was carried out to investigate the relationship between aerobics training and pulmonary function in healthy young men.

MATERIAL AND METHODS

Fifty healthy male physiotherapy students aged 18–20 years were included in this study. Informed consent was obtained from all of them. Participants were non-athletes, non-smokers, non-obese and non-alcoholics. Pulmonary functions tests were done in the subjects. Both aerobic trainees and non-trainees of the same age group were selected. The study was conducted in the Department of Physiotherapy, Khalsa College, Amritsar. The subjects chosen for the study were divided into 3 groups:

Group Ia included 50 healthy aerobic trainees, at the beginning of their training period, from Oceanic Fitness Club, Amritsar, Punjab. The trainees performed aerobic exercises 5 sessions a week regularly for 3 months.

Group Ib included the same 50 healthy aerobic trainees, as in Group Ia, but after their training period of 3 month duration.

Group II included 50 healthy physiotherapy students of matching age, who did not perform regular exercise and were sedentary. Sedentary lifestyle was defined, as per Centre for Disease Control and Prevention; as no leisure time physical activity or activities done for less than 20 minutes or fewer than 3 times per week.

The parameters taken included FVC, FEV_1, FEV_1/FVC, and MVV. Smokers, history of abdominal or thoracic surgery, pulmonary, cardiac disorders and neuromuscular disorders were excluded from the study.

A moderate intensity exercise according to WHO classification was performed by the subjects. PFTs were repeated at the end of the training. The data were compiled, analysed and valid conclusions were drawn.

RESULTS

The results of the study are depicted in Tables-1–3 below.

Table-1: Respiratory parameters in swimmers (Group Ia and Ib) and controls (Group II) (Mean±SD)

Parameters	Group Ia	Group Ib	Group II
FVC (L)	3.00±0.020	3.37±0.025	3.11±0.076
FEV_1 (L)	2.86±0.039	3.15±0.027	2.95±0.034
PEFR (L/Sec)	7.88±0.023	8.41±0.053	7.56±0.021
MVV (L/min)	133.41±1.89	21.55±0.30	130.17±0.97

Table-2: Respiratory parameters between Group Ia and Group Ib (Mean±SD)

Parameters	Group Ia	Group Ib	*p*	*t*
FVC (L)	3.00±0.020	3.37±0.025	<0.0001	35.67
FEV_1 (L)	2.86±0.039	3.15±0.027	<0.0001	19.10
PEFR (L/Sec)	7.88±0.023	8.41±0.053	<0.0001	28.61
MVV (L/min)	133.41±1.89	21.55±0.30	<0.0001	184.63

Table-3: Respiratory parameters of Group Ib and Group II (Mean±SD)

Parameters	Group Ib	Group II	*p*	*t*
FVC (L)	3.37±0.025	3.11±0.076	<0.0001	31.61
FEV_1 (L)	3.15±0.027	2.95±0.034	<0.0001	14.84
PEFR (L/Sec)	8.41±0.053	7.56±0.021	<0.0001	46.62
MVV (L/min)	21.55±0.30	130.17±0.97	<0.0001	38.64

DISCUSSION

Physical inactivity is recognised as an important cause of morbidity and mortality.[8] Only a few number of studies have been made by researchers to evaluate the role of aerobics on PFTs. Exercise is widely promoted as a means of improvising the physical endurance. It is recommended not only for the healthy, but also for individuals with various disabilities and diseases.[9] It is generally accepted that people with higher levels of physical activity tend to have higher levels of fitness and that physical activity can improve cardio-respiratory fitness.[10,11]

In the present study, pulmonary functions proved to be significantly improved and have shown facilitatory effect after 12 weeks of aerobics. The positive relationship between aerobics training and pulmonary function was supported by many other studies comparing respiratory function among men and women engaged in various sports. They found that sports person have better level of pulmonary function than sedentary people. Our study result is supported by Chaitra *et al*.[6] The Study of Cheng *et al* also showed that the physical activity improved pulmonary function in healthy sedentary people.[12] Farid *et al* showed an improvement in pulmonary functions with aerobic exercise training in asthma patients.[13] Nourrey *et al* showed that aerobic exercise facilitates pulmonary function and alters exercise breathing pattern in children.[14]

It was observed in a study by Enright *et al* that high intensity inspiratory muscle training results in increased contracted diaphragm thickness. It also increases lung volumes and exercise capacity in healthy people.[15] This result was also in accordance with Richa *et al*[16] and Shashikala *et al*[17].

The results discussed above clearly indicate that there is significant improvement in the static lung values as well as flow rates after completion of aerobic tenure with in the same group and it differed from the control group which didn't perform any exercise. This confirms that regular exercise has a positive effect on the lungs. The possible explanation for this could be that regular forceful inhalation and deflation of the lungs for prolonged periods leads to strengthening of respiratory muscles and their greater endurance, accounting for increased FVC, PEFR and MVV. This is advantageous for physical work capacity in them. The flow rates have also shown to have higher values in Group Ib. These flow rates are effort dependent. The physical training that the aerobic trainees undergo must have helped in developing reduced resistance to respiration.[14,18] A study also proved that exercise improves lung function and habitual activity in even in children with cystic fibrosis.[10] In a study, cardio-respiratory fitness significantly improved and breathlessness decreased over a wide range of physical work corresponding to activities of daily living.[19] In obese and overweight children, the aerobic exercise training significantly improves ventilator efficiency.[20] Thus it decreases morbidity.

CONCLUSION

There is significant positive relationship between aerobics training and lung functions in healthy young adult men. The improvement in pulmonary function could be due to increased strength of respiratory muscles. Daily exercise schedule can benefit general population greatly. The positive role of aerobics in improving respiratory functions in healthy individuals proves that exercise can be considered as an important component of pulmonary rehabilitation for patients with lung diseases.

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