

Research Article

Effects of Exercise on Pulmonary Function Test

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ABSTRACT

The present study was carried out to know the effect of long term stress in the form of exercises and sports activities, on Pulmonary Function Tests. The study was under taken to assess the effects of exercise in CPED students on respiratory system in adults in the age group of 18 to 27 years. The test group consisted of CPED students. The test group had 30 subjects – comprising of 15 girls and 15 boys. Pulmonary function tests were conducted and determined on these subjects by using Medspiror. First phase of recordings were done before starting of the exercise training, where as the second phase of recordings were done after 12 weeks of exercise training. The following parameters were recorded: Forced Vital Capacity, Forced expiratory volume at 1 second and after the 3rd second. Results showed that there was significant increase in FVC, FEV₁ FEV₃, in second phase reading. All the parameters have shown significant increase in the second phase when compared to the first phase. Our study has shown that the Pulmonary Function Tests values are higher after exercise training.

INTRODUCTION

Exercise when performed regularly has benefits on the various systems of the body. Regular exercise has a favorable influence on cardiovascular functions and also lung functions. Pulmonary function tests measure lung volumes and capacities.

MATERIALS AND METHODS

The test group consisted of CPED students. Their academic activity is for one year duration. Their sports curriculum includes regular coaching and practice for 9 months. The test group consisted of 30 subjects -- 15 girls and 15 boys.

The subjects had no history of allergic disorders, respiratory or cardiovascular disorders. Respiratory and cardiovascular disorders were ruled out by history and clinical examination. Pulmonary function tests were determined by using Medspiror.

The first phase of recordings were timed with starting of CPED curriculum, viz., before starting of exercise training, second phase of recordings after 12 weeks of exercise training. First and second phase recordings were recorded between 7 am and 8.30 am because rhythmic changes in physiological functions have been found to be associated with changes in performance (Rodahlatal 1976).

Pulmonary functions were tested using the instrument 'Medspiror' (a computerized spirometer self calibrating and fulfill the criteria for standardized lung function tests.

Parameters studied:

Forced Vital Capacity (FVC)

Forced Expiratory Volumes (FEV₁, FEV₃)

The subjects were familiarized with the set up and detailed instructions and

demonstrations were given to our satisfaction. Nose clips were not used since there was no significant difference in FVC with the use of nose clips (Anonymous 1979).

RESULTS

The study was undertaken to assess the effects of exercise performed as a part of Certificate Course of Physical Education curriculum on respiratory system. Results showed that there was significant increase in FVC, FEV₁ FEV₃, in second phase reading.

Table 1: First phase of readings of PFT. All values are mean + SD, n=30

PFT		
FVC	FEV ₁	FEV ₃
3.40±0.7	2.54±0.35	2.99±0.36

Table 2: Second phase of readings of PFT. All values are mean + SD, n=30

PFT		
FVC	FEV ₁	FEV ₃
3.80±0.06	3.11±0.70	3.62±0.70

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Table 3: Comparison of first and Second phase of readings of PFT. All values are mean ± SD, n=30

Groups	PFT		
	FVC	FEV ₁	FEV ₃
First	3.40±0.70	2.54±0.35	2.99±0.37
Second	3.81±0.69	3.11±0.70	3.63±0.70
Significance	S	S	S

There are significant differences in all the tested parameters between first and second phase of readings.

DISCUSSION

There is an increasing evidence to show that regular physical activity causes many desirable physical, physiological and psychological changes in an individual consequently raising his level of fitness.

A number of studies have been made by eminent physical education scientists namely Clarke and Stall (1970), Lefgton (1967), William (1969), Mac Intyre (1967) and Chiu (1950) to evaluate the effect of different types of physical education programmes (Chiu Edward 1950). Possible explanation for this could be regular forceful inspiration and expiration for prolonged period during training leads to strengthening of the respiratory muscles. This helps the lungs to inflate and deflate maximally. This maximum inflation and deflation is an important physiological stimulus for the release of surfactant (Hildebrean *et al.*, 1981).

A study by Douglass G, Stuart and Callings WD showed that mean VC score of athletes was higher than the non athletes. The difference in VC score of alveolar tissues, hyperplasia of alveolar tissues, formation of new alveoli and also increase in the micro circulation in the lungs which results in formation of “sport lung”. McCurdly and Larsen (1940) in their studies, working with trained subjects and untrained controls have shown that trained subjects had significantly higher vital capacity as compared to untrained. A study by Pansare MS showed one month training is sufficient to bring about increase in PFT (Pansare MS *et al.*, 1994).

Uppal AK and Dey RN demonstrated that there was increase in Vital capacity and decrease in resting pulse rate and early recovery after 8 weeks of training (Uppal AK *et al.* 1994). Physical training programme of 8 months is necessary to bring about improvement in Cardio-respiratory function (John S, Hanson Willaim 1974). The present study is in accordance with the study done by Uppal AK and Rajendra Singh states that 12 weeks of

physical education training is sufficient to bring about beneficial effects on Pulmonary function test (Uppal AK and Rajendra 1980). Our study shows that the Pulmonary Function Tests values are higher after exercise training. The cause for this could be regular forceful inspiration and expiration for prolonged period during training leading to the strengthening of respiratory muscles.

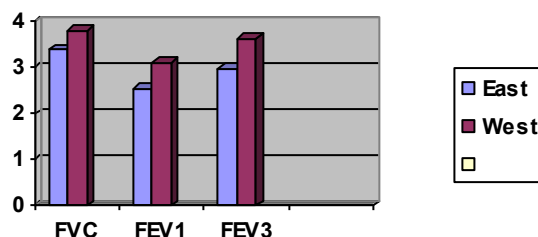


Figure 1: Comparison of first and second phase of readings of PFT

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