

**THE INFLUENCE OF BREATHING EXERCISE TOWARD FEV 1 AND  
KVP AMONG THE JUNIOR HIGH SCHOOL STUDENTS IN  
YOGYAKARTA**

**By**

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**ABSTRACT**

*This paper aims to reveal the influence of respiratory exercise on the forced one second volume (FEV<sub>1</sub>) and lung vital capacity (KVP) of the female student in MTs Mu'alimat Yogyakarta. This breathing exercise was carried out for 8 weeks, the frequency of this exercise is three times a week. The model used in breathing exercises is a model "I-T-E" (Inspiration-Hold-Expiratory breath). The samples of this research are 40 female students of MTs Mu'alimat Yogyakarta. The Measure used is "rotary spirometer". After further analyzed, the data obtained by test t. The results showed that the forced one second volume of 1501.25 ± pretest and post 563,129 ± 625,22o tests 1847.75. There is an increasing in FEV<sub>1</sub> (posttest-pretest) of 346.5 cc. In lung vital capacity data obtained pretest 2339.25 ± 379,523 and 348,501 ± posttest 2520.75. From the data (posttest-pretest) increase 181.5 cc. T count results (FEV<sub>1</sub>) -4162 with p: 0000. (p <0.05), then forced a second volume before and after exercise there is a real difference. T test analysis (KVP), obtained t count with p - 4265: 0000. Because of p <0.05, so there is difference in the vital lung capacity. In addition, it also obtained a 0730 correlation can thus be concluded that the strength of the correlation indicates the high suitability of a given training program. FEV<sub>1</sub> percentage from KVP increase to 9:58%, it means that after respiratory training FEV<sub>1</sub> percentage increase. Forms of breathing exercise as provided in this study can be used as an alternative to increase the magnitude of FEV<sub>1</sub> in lung vital capacity. The increase occurred because of breathing exercise stressor to the alveoli and respiratory devices, and the muscles of respiration. Stressor exercise has provided a significant stimulus that spurred the Respiratory physiological adaptation.*

**Keywords:** *Influence, Sports, Breathing, FEV<sub>1</sub>, KVP*

## INTRODUCTION

The human body has the ability to adapt to the stimulating stressor. Stressor varies all its forms and can be derived from the psychological aspects, physiological and physical activity. Sports breathing is one of the stimuli in the form of physical activity. Judging from physical activity based on the use of oxygen, this time popping up a lot of variety of sports so-called breathing exercise.

In Indonesia, there are hundreds of martial arts and breathing management, but the use of respiratory exercise therapy for maintenance have not fully implemented. Sports breathing can improve physical fitness and improve the body's immune (Suparto H., 2001). Sports breathing consists of the stance, breathing and concentration, are an exercise to develop a stress reduction efforts. Berger (1982: 102) says that the respiratory activity is required to meet the needs of metabolism, increasing the lung ventilation to meet the needs oxygen and remove carbon dioxide. Pulmonary ventilation was determined by respiratory frequency and tidal volume. The average one-minute ventilation was 5000 ml / min. At the heavier work, respiration rate increased between 40-45 times / minute, and tidal volume increased by approximately 2500 ml. increase in tidal volume resulting from the volume of reserves of inspiration and the expiratory volume of 50-55%.

Some of the changes in respiration system as a result of the exercise is (1). Forced one second volume, (2). tidal volume, (3). respiratory frequency and (4). The efficiency of ventilation is needed, so the body's oxygen consumption increases. The uptake of oxygen in the lungs by the blood during labor requires oxygen 20 times from normal. Air volume can be increased greater than the normal standard by using breathing exercises, so that the breathing exercises can widen blood vessels or *alveoli*, *the alveoli are cardiorespiration* system. Those will give an effect on the expiration ability and maximal inspiration during the breathing management. The inspiratory maximal ability and expiratory are force to the alveoli directly, the alveoli of the lungs to expand so that the air can hold more.

Breathing exercises can be used to improve lung vital capacity. The exercise is to give regular physical pressure, systematic, and sustainable, thus increasing the capability in conducting regular work and will enhance significantly the physical ability, but it does not happen so the implementation is not programmed ( Fox, 1993: 68). Factors that are important in breathing exercises are: a). Setting body. In the practice of respiratory muscle relaxation is necessary for the success of breathing exercises. Breathing exercises can be done by sitting, lying down, standing, and, walking, b). Setting the mind (meditation). In this breathing exercise participants can concentrate attention on the movement of breath or calculate the movement of breath, c). Settings breathing pattern. In this breathing exercise breathing patterns typically become more deep, abdominal breathing is more dominant, and there are times to hold your breath. Diaphragm movement can fall down 3-4 times compared with normal breathing, protruding abdominal wall during inspiration, the opposite movement occurs when expiratory (Hubin, 1983). Based on the above issues, it will be formulated as follows: there is a big increase in vital capacity (KVP) and the forced one second volume (FEV1) as a result of breathing exercises.

## **RESEARCH METHOD**

Design in this study using *the one-group pretest - posttest designs*. The samples used are 40 female students of Mu'alimat MTs Yogyakarta.

The measurement used is "*rotary spirometer*" the result given by cc. Respiratory model used in this study, is a model of breathing exercises "I-T-E" (Inspiration-Hold-expiratory breath.) Conducted training for 8 weeks with a frequency of 3 times / week. There are three phases of pattern in this exercise, the first phase is "I" (inspiration) of air sucked or inhaled with a vengeance and "T" (hold breath) which is being held in the belly breath and final stage is "e" (expiration) of exhaled air, those are done continuously in a few minutes according to a prescribed program. When the total exercise 60-90 minutes / session. The tests is conducted by t test with a significance level of 5%.

## RESEARCH RESULTS AND DISCUSSION

Based on the results of measurements conducted in this study, the obtained of the results are as follows:

Table 1: Average and Standard deviation (FEV<sub>1</sub> AND KVP) research results

	FEV <sub>1</sub>		KVP	
	Pre test	Post test	Pre test	Post test
<b>X*</b>	<b>1501.25</b>	<b>1847.75</b>	<b>2339.25</b>	<b>2520.75</b>
<b>SD</b>	<b>563,129</b>	<b>625,220</b>	<b>379,523</b>	<b>348,501</b>

Based on the table above, it can be concluded that the forced one second volume increased (post test-pre test) of 346.5 cc, and there is also an increasing in lung vital capacity (pre-test post test) of 181.5 cc. This increase occurred because of breathing exercise stressor of alveoli and respiratory devices, and the muscles of respiration. Stressor exercise has provided a significant stimulus that spurred the Respiratory physiological adaptation. The process of holding my breath in this treatment to stimulate various physiological and biological changes.

Data obtained from the field, then analyzed by t test The analysis results can be seen in the following table:

Table 2: Results of t test analysis

	N	Correlation	t	Sign
<b>FEV<sub>1</sub></b>	<b>40</b>	<b>0,612</b>	<b>-4,162</b>	<b>0,000</b>
<b>KVP</b>	<b>40</b>	<b>0,730</b>	<b>-4,265</b>	<b>0,000</b>

From table 2 above, the results obtained t count (FEV<sub>1</sub>) -4162 with p: 0000. Because p: 0000 <0:05, then forced a second volume before and after exercise there is a real difference. So that there is a significant improvement in FEV<sub>1</sub> before exercise and after exercise. Thus, this form of exercise can be used to improve FEV<sub>1</sub> especially in the female teen students. In addition, the analysis of the results are also showed a strong correlation (0612) in FEV<sub>1</sub> before and after exercise. This could be mean that this breathing exercise is a good exercise program and can be measured simultaneously as well.

In lung vital capacity, based on t test analysis, obtained t count with p - 4265: 0000. Because p <0.05, the KVP before and after this breathing exercise is

a real difference. Lung vital capacity before and after the treatment of respiratory exercise which means that there is an increase. Respiratory form of exercise as provided in this research is suitable for vital lung capacity. In addition, it is also obtained a good correlation in the amount of 0.730. It can be concluded that the strength of the correlation indicates the high suitability of training programs given to the objectives that will be achieved.

### Contribute To Respiratory Improvement Sports Percentage of FEV<sub>1</sub>

The physical activity done by regular doses wrote, directed, programmed and measured, will have a positive effect on changes fisiobiologis. Sports have the specs *treatment* of respiratory *stress* on the muscles of respiration. Large percentage increase in FEV<sub>1</sub> from KVP can be seen in the table below.

**Table 3: Results of the percentage increase in FEV<sub>1</sub>**

	FEV <sub>1</sub>	KVP	FEV <sub>1</sub>	KVP	Percentage Increase
	Pre test	Pre test	Post test	Post test	
Average	1501.25	2339.25	1847.75	2520.75	
Percentage	64.05%		73.60%		9:58%

**Table 4: Results of t test analysis**

	N	Correlation	t	Sign
Percentage	40	0,466	-2,657	0,002

Percentage increase in FEV<sub>1</sub> from KVP an increase of 9:58%, meaning that after a respiratory training percentage increase in FEV<sub>1</sub>. At FEV<sub>1</sub> percentage of the amount of lung vital capacity, based on t test analysis, obtained t count probability -2657 by 0002. Because p <0.05, the percentage of FEV<sub>1</sub> before and after the KVP practice this breathing exercise is a real difference. The amount of increase in FEV<sub>1</sub> percentage of vital lung capacity before and after treatment of respiratory exercise which means that there is an increase. Respiratory form of exercise as provided in this research is suitable to increase the size of FEV<sub>1</sub> lung vital capacity. In addition it also obtained a good correlation.

## Breathing exercises Exercise Dose and Response

The exercise is to provide regular physical pressure, systematic, and sustainable, thus increasing the capability in conducting regular work and will enhance significantly the physical ability, but it will not happen if the implementation is not programmed (Fox, 1993: 68).

Breathing exercise is like breath exercise management done in the body parts of a given with the aim to improve kardiorespirasi functions in the body by using a particular method. The method used is adjusted with the objective that will be achieved. The important factor in breathing exercises are (1) setting the body, (2) setting the mind (meditation), (3) setting the pattern of breathing. The stages in the process of breathing exercises by Maryanto (1991: 11) is divided into three phases: Phase (1) Warming up, with sitting position with a view to developing a vital capacity of the lung, (2) Breathing to collect energy throughout the body, (3) Breathing regularly used as a cover. Programing exercises can stimulate the fisiobiologis adaptation. KVP and FEV<sub>1</sub> increase in line with the principle of adaptation is expressed by Bompa (1994), which at the beginning by giving a weight training will occur *fatigue*, but it will eventually happen superkompensasi to increase various aspects, and if left unchecked exercise doses or combined with the disproportionate will decline. This can be seen in figure 1 below.

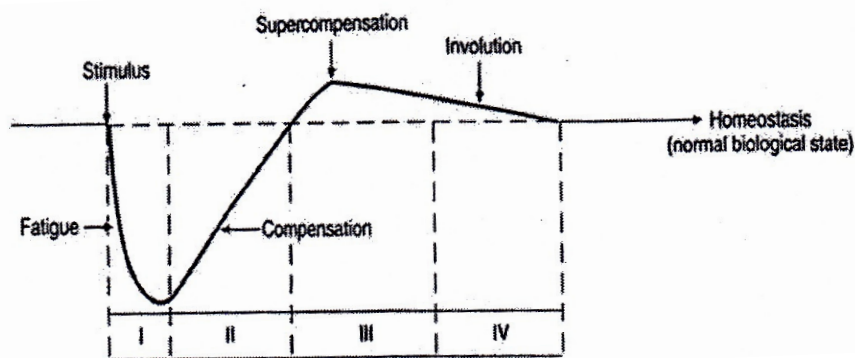


Figure 1: Adaptation Training (Bompa, 1994)

Physical exercise with the determination of very excessive doses will cause bad effects on the body. Physical exercise causes large changes in the circulatory and respiratory systems, but both held together and integrated as part of the homeostatic response (WF Ganong, 1999).

In this study the frequency of exercises performed 3 times / week, in theory the frequency and duration of exercise Fox, 1993 can be seen in the figure 2 below:

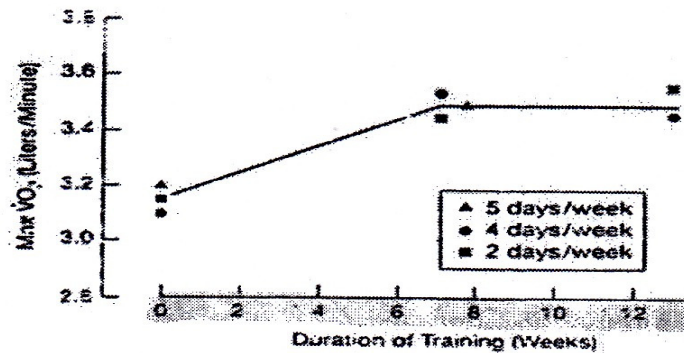


Figure 2: Adaptation of the duration and frequency of exercise (Fox, 1993) Practice twice a week adaptation phase will be relatively more slowly in the process of adaptation increased compared with the frequency of 3 times a week. Adaptation exercises will occur at the peak ranged from 6 to 8 weeks. Exercise with the number of frequencies varying in each week, it will result in different adaptations. Frequency of exercise 2 times, 4 times, 5 times a week and will give your body adaptation *response* different (Fox, 1993). The frequency and duration of exercise that will be various affect KVP and FEV<sub>i</sub> improvement. The factors that affecting the increase in KVP and FEV<sub>i</sub> are possible because of the elasticity of the alveoli, increased levels of hemoglobin, the respiratory muscle strain and more.

## CONCLUSION

Sports respiratory conducted for 8 weeks with a frequency of 3 times / week can improve lung vital capacity of 181.5cc, and increase FEV<sub>1</sub> of 346.5cc. This increase occurred because of the stressor were a regular breathing, guided, programmed and measured, and thus have a positive contribution to the change fisiobiologis. The sample used was the female students ranges from 12-15 years of age. The improvement is happening also in line with the growth phase on the try, based on the principle of adaptation, the body will quickly respond to existing stressor. KVP and FEV<sub>1</sub> improvement are possible due to the elasticity of the alveoli, respiratory muscles, increased levels of hemoglobin and other factors.

## REFERENCES

- Berger A. (1982). *Applied Exercise Physiology*. Philadelphia: Lea And Fibiger, PP. 205. 22.
- Bompa. TO (1994). *Theory and Methodology of Training*. Dubuque: Kendal / Hunt Publishing.
- Corbin, Charles. B., (1980). *A Text Book of Motor Development*. California: Wm: C. Brown Publishing Company.
- Fox. EL, & Richard W. Bowers, Male L. Foss. (1993). *The Physiological Basis For Exercise And Sport*. USA: Brown and Bench Mark.
- Hubin. (1989). *A Brief Introduction To The Science Of Breathing Exercise*: Hi Peng, Publishing Company.
- Jos Usin. (1999). *Breathing For Health*. Jakarta: Elex Media Komputindo.
- Maryanto. (1991). *Practical Martial Arts and Power Engineering In*. Pekalongan: Mount Gold.
- Suparto H., 2001, *Art Respiratory SAML4 NUSANTARA a study of the health aspect*, Publisher LSP Satria Nusantara pp 5-6 Jogjakarta Center, 34 to 35