

## “Effect of short term yoga practice on pulmonary function tests.”

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### ABSTRACT:

**Background:** Yoga is considered to be a very good exercise for maintaining proper health and also has a profound effect on the lung functions of an individual.

**Aim:** The present work was planned to find effects of short term Yoga practice on pulmonary function tests

**Material & Methods:** The present study was conducted on 60 subjects, (40 males and 20 females) who came voluntarily as subjects for the project with written consent. It was a cohort study on I M.B.B.S. students, 60 in number (40 boys and 20 girls). Their age ranged between 18 to 20 years. Various Pulmonary function tests were measured. The instrument used was Medspiror Pneumotachometer (manufactured by MED SYSTEMS PVT. LTD. CHANDIGARH).

**Results:** FVC, FEV 1%, MVV and PEFR were found to be increased in both male and female subjects.

**Conclusion:** From this study we conclude that yoga practice can be advocated to improve respiratory efficiency for healthy individuals as well as an alternative therapy or as adjunct to conventional therapy in respiratory diseases .

**Key words:** yoga, FVC, FEV 1%, MVV ,PEFR

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**INTRODUCTION:** Yoga is a science practiced in India over the thousands of years. Yoga practice mainly consist of Asana (posture- a particular position of the body which contributes to steadiness of body and mind) , Pranayama (to control the breathing in a superior and extra-ordinary way to get maximum benefits.) and meditation. It produces consistent physiological changes

and have sound scientific basis.<sup>1</sup> In recent times, medical fraternity is much attracted towards beneficial effects of Yoga.

We are well aware of the fact that any sort of exercise done regularly, is beneficial to the body. Yoga is considered to be a very good exercise for maintaining proper health and also has a profound effect on the lung functions of an individual. It is claimed that yogic practices help in prevention, control and rehabilitation of many respiratory diseases . In view of this, the present study was undertaken to see whether yoga has any effect on ventilatory lung functions, which depend on compliance of lungs and thorax, airway resistance and strength of respiratory muscles.

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With this background in consideration, the present work was planned to find effects of short term Yoga practice on pulmonary function tests

**Material and Method:** In the present study, 60 M.B.B.S. students (40 boys and 20 girls) participated voluntarily. Their age ranged between 18 to 20 years. They all were informed regarding the nature of the study and written consent was obtained. The vital data was collected which included name, age, sex, height and weight of the subject. Students were instructed not to do any other physical exercises like sports, athletics or resistance training during the present study.

**Pulmonary Function Tests:** - The instrument used Medspiror Pneumotachometer. The procedure was explained in detail and trials were given

after demonstration of forced expiratory maneuver maximum ventilatory volume maneuver. All the students were tested in sitting position. Three readings were taken, out of which maximum reading was noted.

Each student was asked to perform following two maneuvers.

### 1. Forced expiratory maneuver :-

The parameters measured by this maneuver were.

- a. FVC (L): Forced vital capacity.
- b. FEV<sub>1</sub> %: Forced expiratory volume during the 1<sup>st</sup> second.
- c. PEFR (L/Sec.): Peak expiratory flow rate.

### 2. Maximum Ventilatory Volume Maneuver-

After recording above parameters, students were trained by experts from Yoga Kendra. Then subjects performed the Yoga Practice (Asanas & Pranayama) in the evening for one hour, six days in a week, for 12 wks under expert's observation.

**DISCUSSION :** L.N. Joshi et al (1992)<sup>2</sup> observed significant improvement in FVC, FEV<sub>1</sub> and PEFR after 6 weeks Pranayama practice. Raj Kumar Yadav et al (2001)<sup>3</sup> found significant increase in FVC, FEV<sub>1</sub> and PEFR in young females after 12 wks Yoga practice which included prayer, asanas, pranayama and meditation. Ritu Soni, Manisha Gupta et al (2006)<sup>4</sup> found significant improvement in FVC, FEV<sub>1</sub>, MVV and PEFR after Pranayama practice in asthmatic patients. Chhibber R., Mondal S. et al (2006)<sup>5</sup>, found significant increase in FVC, FEV<sub>1</sub> %, and PEFR at 6<sup>th</sup> and 12<sup>th</sup> week of Pranayama practice in healthy females.

As shown in table 1 and 2 all the parameters in males and females show statistically significant improvement with regular practice of yoga.

These effects can be explained on the following basis-

- I. Yoga postures (asanas) involve isometric contraction which is known to increase skeletal muscle strength. Yoga training improves the strength of expiratory as well as inspiratory muscles.<sup>6</sup>
- II. Bhastrika Pranayama is a bellows type breathing in which one breaths forcefully and rapidly and thus, exercises inspiratory as well as expiratory muscles.<sup>6</sup>

- III. In breathing exercises like Kapalbhathi, short powerful strokes of exhalation in quick succession with contraction of abdominal and diaphragmatic muscles trains the subject to make full use of diaphragm and abdominal muscles in breathing. It also helps in removal of secretions from bronchial tree, clearing up respiratory passages and the alveoli making room for more air.<sup>7</sup>
- IV. Pranayama is characterized by slow and deep inhalation and prolonged exhalation. The stress is on more prolonged expiration and efficient use of abdominal and diaphragmatic muscles. This act trains the respiratory apparatus to get emptied and filled more completely and efficiently.<sup>7</sup>
- V. Removal of undue tension from the skeletal muscles in yogasanas help the thorax to relax better than before.<sup>7</sup>
- VI. Yoga strengthens the respiratory musculature due to which chest and lungs inflate and deflate to fullest possible extent and muscles are made to work to maximal extent.<sup>2,8</sup>
- VII. Yogic breathing raises the diaphragm at a higher level than its normal excursion. This helps in efficient movement of diaphragm.<sup>7</sup>
- VIII. Lung inflation near to total lung capacity is a major physiological stimulus for the release of lung surfactant into alveolar spaces which increases the lung compliance<sup>2</sup>. During pranayama, there is slow and prolonged inspiration as well as expiration. This stretches elastin and collagen fibres interwoven among the lung parenchyma. Hence, these fibres can elongate to a greater extent, thus, increasing the compliance of lungs.<sup>9</sup>
- IX. It is suggested that the lung inflation near to total lung capacity is also major physiological stimulus for the release of prostaglandins which decreases bronchial smooth muscle tone.<sup>2,10</sup>
- X. Yoga with its calming effect on the mind can reduce and release emotional stresses thereby withdrawing the bronchoconstrictor effect.<sup>3</sup>

Thus our study suggests that regular yoga practice improves various pulmonary function tests and is beneficial to improve respiratory efficiency for both males and females. Research on particular set of Yogic exercises like only selected asanas or pranayama is required and also further research with large sample size and for varied age groups is required for applying these results to population in general.

**CONCLUSIONS :** From the present study we may conclude that Yoga practice can be advocated to improve pulmonary function tests in healthy individuals and hence to prevent respiratory diseases in future.

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**YOGA PRACTICE:**

Sr.No.	Name	Total Duration
1	Prayer & Omkar Recitation	5 min.
2	Asanas (Naukasana, Matsyasana, Bhujangasana , Shalabhasana , Dhanurasana , Shavasana )	30 min
3	Breathing Exercises (Kapalbhati , Yogic Shwasan )	10 min.
4	Pranayama (Nadi Shuddhi, Bhastrika, Bhramari )	15 Min
	<b>Total</b>	<b>60 min</b>

After 12 wks all the parameters were recorded again and Data was analyzed statistically using ‘z’ test separately for males and females using spss softwre ,

Table 1- Mean values of various parameters in males (n = 40)

Parameter	Mean ± SD (Before)	Mean ± SD (After)	p value
FVC (L)	3.04 ± 0.82	3.69 ± 0.72	<0.001
FEV <sub>1</sub> %	88.68 ± 2.91	92.75 ± 1.35	<0.001
PEFR (L/Sec.)	4.22 ± 1.02	5.53 ± 1.15	<0.001
MVV (L/min)	101.05 ± 10.25	110.1 ± 10.43	<0.001

Table 2- Mean values of various parameters in females (n = 20)

Parameter	Mean ± SD (Before)	Mean ± SD (After)	p value
FVC (L)	2.97 ± 0.40	3.25 ± 0.42	<0.001
FEV <sub>1</sub> %	84.88 ± 1.79	86.75 ± 1.93	<0.001
PEFR (L/Sec.)	4.10 ± 0.33	5.10 ± 1.22	<0.001
MVV (L/min)	96.16 ± 22.0	107.7 ± 24.9	<0.001

Table 1 shows changes in pulmonary function tests in male subjects whereas Table 2 represents pulmonary function tests in female subjects. Both the groups show statistically significant increase in FVC, FEV 1%, MVV and PEFR.

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