

## Immediate effect of *Bhastrika Pranayama* on arterial oxygen saturation

Sonal S. Antapurkar,

Professor & HOD, Department of Swasthavritta & Yoga,

RJS Ayurved College & Research Centre, Kopargaon, Dist. Ahmadnagar.

\* Author Correspondence: [drsonalantapurkar@gmail.com](mailto:drsonalantapurkar@gmail.com)

### Abstract:

Now-a-days faulty life style, pollution, environmental changes, changing dietary habits and stress contributes to lot of respiratory disorders. Therapeutics treatment for these ailment is found to be not significantly effective and is essentially associated with some or other untoward effects. Yoga and *Pranayam* are suppose to be the best remedy to prevent such life style disorders. *Bhastrika*, which is one of the types of *Pranayama*, is found effective in increasing vital capacity of lungs. Hence this pilot study is undertaken.

### Keywords:

*Bhastrika*, Arterial oxygen saturation, lung vital capacity dead space

### INTRODUCTION:

Faulty lifestyle contributes a lot to physical and mental ill health. Yoga is supposed to offer best lifestyle in the history of human annals. That is why, Lord *Shri Krishna* advised *Arjuna* to be '*Yoga Sadhak*'<sup>[1]</sup>. *Bhastrika Pranayama* is one of the significant types of *Pranayama*.

*Bhastrika* is mainly a combination of *Kapalbhati* and *Ujjai Pranayama*. It is all about deep inhalation holding the breath and rapid exhalation just like bellows. Each set of 20 *Kumbhakas* complete one cycle and three such cycles offer a complete health day by day<sup>[2]</sup>. In order to find out relation between ventilation, oxygen saturation and *Bhastrika Pranayama* this work has been undertaken.

### AIMS:

1. To study and determine the immediate effect of *Bhastrika Pranayama* on arterial oxygen saturation.
2. To study and determine the adverse effects of *Bhastrika Pranayama*.

### CRITERIA FOR SELECTION:

#### INCLUSION CRITERIA:

1. Subject were randomly selected irrespective of their age sex and ethnicity.

2. Subjects were selected based on their willingness to participate irrespective whether they were in regular practice of Yoga and *Pranayama* or other exercise modalities.

#### EXCLUSION CRITERIA:

1. Subjects with known history of *Asthama* and other disorders under COPD were excluded from the study.
2. Subjects on drugs like steroids and NSAID were not included in the study.
3. Subjects presenting with obesity with BMI about 30 were not included.
4. Subjects with hypertension were not considered for the study.

#### MATERIALS AND METHODS:

The study was carried out on 90 healthy individuals at C.S.M.S.S. Ayurved College & Hospital, Chh. Sambhajinagar. After obtaining clearance from the institutional ethical committee, detailed physical examination was performed and all the details were taken on a specially designed case paper. Heart rate and oxygen saturation were recorded before and after performing *Bhastrika Pranayama* by using pulse oxymeter. *Bhastrika Pranayama* was performed by all the subjects as per the designed protocol based on Gherand Samhita under the supervision of Yoga teacher [3]. As per this protocol all the subjects were instructed to come with empty stomach and empty bowel in the morning hours and were asked to attain Siddhasana with eyes closed and to

perform the said *Pranayama* in order to complete three cycles of 20 repetitions of *Purak, Kumbhak and Rechak.* At the end, oxygen saturation and heart rate were again recorded. Such seven records were taken on consecutive days for a week and average values of oxygen saturation and heart rate were noted.

#### OBSERVATIONS:

1. In all 90 subjects were included in the study out of which 5 students left the study during the course.
2. Amongst 90 subjects, 33 (36.6%) participants were males and 57 (63.3%) were females.
3. It was found that 46 (51.1%) subjects were having habit of regular exercise whereas 44 (48.8%) didn't.
4. Six (6.66%) subjects were found to have addiction of smoking.
5. In all 38 (42.22%) participants were in practice of vegetarian diet and remaining 52 (57.77%) individuals had mixed type of diet in their routine.
6. No subjects reported to have regular practice of *Bhastrika Pranayama*.
7. Increase in the levels of O<sub>2</sub> saturation was reported in 68(75.5%) participants while 17 (18.88%) showed no change in the levels of oxygen saturation.

8. It was found that, 67 (74.44%) subjects reported to have increased heart rate. 6 (6.66%) individuals had decrease heart rate and 12 (13.33%) participants showed no change in heart rate after performing *Pranayama*.
9. Subjects complaint of giddiness after practicing *Bhastrika Pranayama* for first 3 to 4 days were 11 (12.94%).
10. Total 9 (10.58%) individuals complained of headache immediately after *Bhastrika Pranayama* which eventually relieved after 20 to 30 minutes.

#### DISCUSSION:

*Bhastrika Pranayama* is found effective to immediately increase oxygen saturation and heart rate. This effect found, is because of stimulation of sympathetic activity<sup>[4]</sup>. *Bhastrika Pranayama* is a psych-physiological activity that nurtures body and Mind by way of promotion of alveolar ventilation. Alveolar ventilation is the amount of air utilized for gaseous exchange every minute. Some amount of air which is trapped in the dead space and is not utilized for this gaseous exchange. *Bhastrika Pranayama* moreover affects the alveolar

ventilation. It causes forceful and sudden contraction of abdominal and respiratory muscles. Deep inhalation increases lung capacity and offers more time for oxygenation of blood. Similarly, forceful expiration exhausts all of the carbon dioxide in the lung. Dead space is the part of respiratory tract where gaseous exchange doesn't take place. Anatomical dead parts are nose, pharynx, trachea, bronchi and bronchioles. Physiological dead spaces are those alveoli which are non-functioning due to alveolar membrane disorder or those alveoli which do not receive adequate blood supply. From the said physiology *Bhastrika* may reduce the percentage of dead space air and increase O<sub>2</sub> saturation in blood<sup>[5]</sup>.

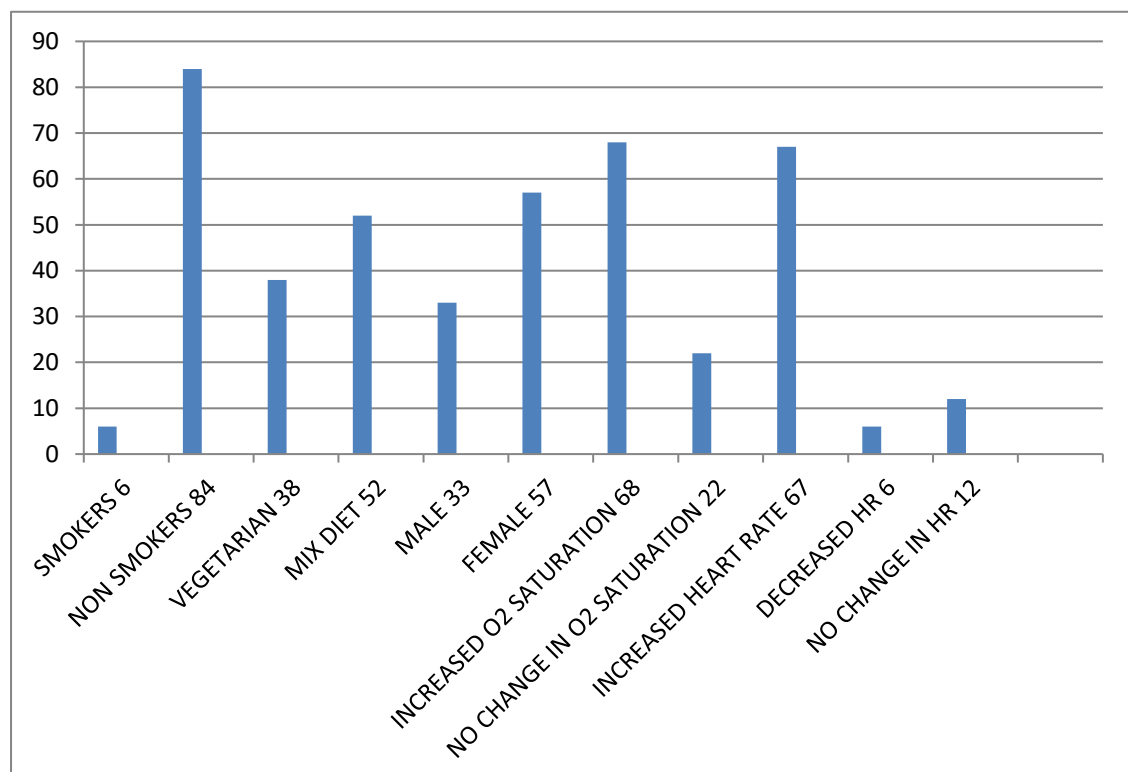
Oxygen saturation is related with the diffusing capacity of oxygen into the blood. Diffusing capacity can be defined as the volume of gas that diffuses through the respiratory membrane each minute for a pressure gradient of 1 mm of HG. Pressure gradient is the most important factor affecting the diffusing capacity. It is directly

proportionate to diffusing capacity. Pressure gradient is the difference between partial pressure of gas in the alveolar and pulmonary capillary blood [6]. Deep inhalation processes in *Bhastrika Pranayama* increases partial pressure of gas in alveoli which increases diffusing capacity and ultimately oxygen saturation.

#### CONCLUSION:

From the above study it can be concluded that, *Bhastrika Pranayama* definitely affects the heart rate and oxygen saturation. This is partial fulfillment of aims and objectives and deeper study is necessary to observe the effect of *Bhastrika Pranayama* on the functioning of lungs and gaseous diffusion in alveoli. Also it can be inferred that *Bhastrika Pranayama* may definitely have effect on vital capacity of lungs and hence can be advised for prevention of COPD and associated respiratory diseases.

#### GRAPHICAL REPRESENTATION:



#### References:

1. Krishnakripamurthy Shri Shrimad A.C. Bhaktivedanta Swami Prabhu Pad ; Shrimad Bhagwat Geeta; 1st

Ed., Mumbai; Bhaktivedanta Book Trust; 2012; 6 /12-14, 231-32.

2. Swami Digambarji; Gherand Samhita; 4th Ed. Kaivalyadham

- Lonavala; O.P. Tiwari, S.M.Y.M Samiti, Lonavala: 5/72, 167.
3. Swami Digambarji; Gherand Samhita; 4th Ed. Kaivalyadham Lonavala; O.P. Tiwari, S.M.Y.M Samiti, Lonavala: 5/70-71, 166-167.
  4. National Journal of Basic Medical Sciences; volume III; Issue 1.
  5. K. Sembulingam, Essentials of Medical Physiology;6th. Ed.: New Delhi; Jaypee Publication- 2012; 703.
  6. K. Sembulingam, Essentials of Medical Physiology;6th. Ed.: New Delhi; Jaypee Publication- 2012; 705,

**Conflict of Interest: Non**

**Source of funding: Nil**

**Cite this article:**

*Immediate Effect Of Bhastrika Pranayama On Arterial Oxygen Saturation*  
Sonal S. Antapurkar,

Ayurline: International Journal of Research In Indian Medicine 2023; 7(3):01- 05

