

## EFFECT OF DOG BREATHING EXERCISE ON *NISHWAS UCHHWAS* KRIYA

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Published online: July, 2018

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### ABSTRACT

Ayurveda is the healing side of Yoga and Yoga is the spiritual side of Ayurveda, in reality they complement each other. Our aim of the study was to evaluate the effect of dog breathing exercise on *Nishwas Uchhwas Kriya*. Thirty young apparently healthy subjects between ages of 19 to 25 Years of either sex having their written consent were actively participated in the study. Subjects were performing dog breathing exercise 15 minutes per day for six days a week. All subjects were analysed pre and post i.e. on first day and on 30th day with Pulmonary function tests by spirometer. The findings shows, there is significant decrease in BMI (Body Mass Index) and significant increase in FVC (Forced vital capacity), FEV 1.0 (Forced expiratory volume in first second by of inhalation), FEF 25% - 75% (L/S) (Forced expiratory flow from 25 to 75% of FVC), PEF (L/S) (Peak Expiratory Flow), MVV (L)(Maximum Voluntary Ventilation), MV (L) (Expired or Minute Ventilation/RR(Respiration rate) indicating increase in VC (Vital Capacity) (Tidal Volume, Inspiratory Reserve Volume, Expiratory Reserve Volume), TLC (Vital Capacity, Residual Volume), like lung capacities. SVC (L) (Slow Vital Capacity) Height, Weight, SBP (Systolic Blood Pressure), DBP (Diastolic Blood Pressure), is not significant. Thus, limited studies made us to evaluate the effectiveness of dog breathing exercises on *Nishwas Uchhwas Kriya*.

**Keywords:** Dog breathing, *Nishwas Uchhwas Kriya*, Pulmonary function tests

### INTRODUCTION

Ayurveda and yoga are sister Vedic sciences which are sprung up from the *Vedas* and *darshanas*<sup>1</sup>. According to Ayurveda the human body is composed of *Doshas*, *Dhatus* and *Malas*. Out of *Tridosha*, *Vata* is a *Pradhandosha* which is said to be *prana*<sup>2</sup>. In Ayurveda, *Pranvahasrotas* has been described by *Charaka* and *Shushruta*. In yoga, *prana* is assumed to be life force. Ayurved and yogic science essentially, trying to convey extent of the life sustaining energy of the universe which the word *prana* represents.

The word *Pranayama* translates as the regulation or control of life-force. All *Pranayamas* are vitalizing, in the sense that they enhance the *Pranic* system. The tranquillizing *Pranayama* i.e. *Nadishodhana* (*Nadishudhi*), *Ujjayi*, *Sheetali*, *Sitkari*, *Bhramari* *Pranayama* are cooling and soothing. The vitalizing techniques such as Dog, Rabbit, and Tiger breathing are modified breathing exercises. The vitalizing techniques do so in a dynamic way, arousing body and mind, creating alertness and heat at both the physical and subtle levels. It can be used to increase the energy or to move out of introspective or dull states of mind. They may be regarded as more advanced techniques. The process of life itself depends on how we breathe. Breathing is not only an instinctive reflex to satisfy the need of the body for oxygen but it has been considered that consciously controlled breathing can be used as a technique for enhancing mental and physical powers<sup>3</sup>. It also strengthens the respiratory muscles and increases the elastic properties of lungs and chest and thereby improves some of the ventilatory functions of lungs. Improvement in respiratory parameters after practice of *Pranayama* is documented<sup>4</sup>. Deep breathing has also been documented to increase the alveolar ventilation<sup>5</sup>. The various studies show that researchers are keen to know the effect of breathing exercise in various directions. From the vitalizing techniques, less attention has been documented on pulmonary functions. As hardly any such study has been done to see the effect of dog breathing exercises on pulmonary functions. Thus, this study was undertaken to find the effect of individual Dog breathing exer-

cise on *Nishwas Uchhwas Kriya* by measuring lung functions with spirometer in healthy young subjects.

## MATERIAL AND METHODS

In this study 30 subjects were actively participated for 30 days. Clearance from ethical committee and an informed written consent of all subjects included in the study were taken. It is open Comparative, Observational study. Apparently healthy young male and female in the age group of 19 to 25 years with no major illness and who are not practicing *Pranayama* or breathing exercise were included. Subjects who are practicing yoga or history of respiratory, neurological, cardiovascular, immunosuppressive diseases and Diabetes, smokers, alcoholic were excluded. Subjects exposed to respiratory infections or any major illness, if any during the study were withdrawn.

## STUDY PROTOCOL:

The subjects were instructed regarding their role in the study. They were performing breathing exercise for 15 minutes for six days a week and were asked to perform on their own on Sundays at their residence. They were analysed pre and post i.e. on first day and on 30th day. Demonstration of Dog Breathing Exercise was carried out. They performed Dog Breathing Exercise, as per the instructions for 15 minutes.

## PROCEDURE:

### Breathing Exercise- Dog Breathing<sup>6</sup>

- *Sthithi- Vajrasana*.
- Place the palms of the hands on the ground beside the knees.
- Make the spine slightly concave and fix the gaze straight ahead.
- The mouth is opened wide; the tongue is pushed out to its maximum.
- Practice rapid, forceful inhalation and exhalation, expanding and Contracting the abdomen vigorously like a dog
- Repeat the practice for 15 minutes.
- Relax in *Shashankasana*.

Routine Investigations Height, Weight, Systolic B.P. Diastolic B.P. Pulse Rate, Respiration Rate, Body Mass Index were carried out. Three readings were

considered to calculate mean of Pulse Rate, SBP, DBP and Respiration Rate, Pulmonary Function Tests i.e. Forced (expiratory) vital capacity (FVC), Slow Vital Capacity (SVC). Expired or Minute Ventilation (MV), Maximum Voluntary Ventilation (MVV). Procedure of Pulmonary Function Test was followed as per manual of P.C. Spirometer provided by Schiller Healthcare India Pvt. Ltd<sup>7</sup>. The Effect of breathing exercises on *Nishwas Uchhwas Kriya* was assessed in terms of Anthropometric parameters (mean of three attempt) and spirometric parameters (best of three efforts). All the above parameters in pretest and posttest study were analyzed

using paired 't' test for statistical application and calculation using statistical software SPSS. Record of all subjects included in study was documented and maintained in the case record form.

## OBSERVATION AND RESULTS

Thirty participants in the study were of mean age 19.07 yrs. Gender wise 9 were male and 21 females. Diet pattern shows that 20 participants were on mixed diet and 10 on vegetarian diet.

**Table 1:** Comparative result of various parameters with pre and post Dog breathing exercise

Parameter	Pre Test (Mean ± SD)	Post Test (Mean ± SD)	Paired t test	Significance at 5% level
Weight (Kg)	53.73 ± 14.32	53.47 ± 14.04	1.490	Not Significant (P>0.05)
Height (cms)	159.03 ± 9.02	159.27 ± 8.84	1.882	Not Significant (P>0.05)
BMI {Wt(Kg)/Ht(Mt <sup>2</sup> )}	21.02 ± 3.87	20.85 ± 3.74	2.275	Significant (P<0.05)
Pulse rate (BPM)	80.83 ± 7.25	79.67 ± 6.13	1.155	Not Significant (P>0.05)
RR (MV) (Per min)	25.05 ± 7.35	22.55 ± 5.98	1.89	Not Significant (P>0.05)
SBP(mm/Hg)	109.73 ± 9.42	110.93 ± 8.56	0.783	Not Significant (P>0.05)
DBP(mm/Hg)	73.53 ± 8.43	73.33 ± 7.69	0.133	Not Significant (P>0.05)
FVC(L)	2.95 ± 1.25	3.99 ± 1.68	3.078	Significant (P<0.05)
FEV 1.0 (L)	1.73 ± 1.16	2.84 ± 1.84	3.290	Significant (P<0.05)
FEV 1.0 / FVC (%)	53.45 ± 37.37	68.58 ± 39.74	1.766	Not Significant (P>0.05)
FEF 25% - 75%(L/S)	3.08 ± 1.06	5.56 ± 1.50	9.190	Significant (P<0.05)
PEF(L/S)	4.24 ± 1.50	7.44 ± 1.72	7.869	Significant (P<0.05)
SVC(L)	4.02 ± 1.76	4.51 ± 1.77	1.499	Not Significant (P>0.05)
MVV (L)	82.04 ± 22.15	110.53 ± 26.84	6.262	Significant (P<0.05)
MV (L)	31.83 ± 12.93	42.44 ± 15.75	4.594	Significant (P<0.05)

Increase in FVC (L), FEF 25% - 75% (L/S), PEF (L/S), MVV (L), MV (L), FEV 1.0 and decrease in BMI (Wt (Kg)/Ht (mt<sup>2</sup>), are significant. However difference in Height, Weight, SBP, DBP, FEV 1.0 /FVC ratio Respiration rate per min, Pulse rate per min, SVC (L) are not significant.

## DISCUSSION

According to Hemadri, Inspiration is defined as follows: *Nishwas: swas prawas:* | (*Ashtang hrudaya sutra* 1) *Entry of external air in the living body is called Nishwasa.* Expiration is defined as follows: *Uchhwas: swas nirgam:* | (*Ashtang hrudaya sutra* 1) *To expel air from living body is Uchhwasa.* Which states that, *Shwas Pravesh* and *Shwas Nirgam Kriya* is said to be *Prana*<sup>8</sup>. As per *Sharangdhar Samhita*

*Purvakhanda* 5/48 these verses on critical analysis can be explained scientifically in relation to the physiology of respiration<sup>2</sup>.

There are various modified breathing exercises like rabbit breathing, tiger breathing, hands in and out breathing. Out of these exercises, dog breathing exercise was selected because it is fast in nature, it is comparatively easy to perform and less complicated. According to modern point of view regular inspira-

tion and expiration for prolonged period leads the lungs to inflate and deflate maximally and that it causes strengthening and increased endurance of the respiratory muscles<sup>9</sup>. According to Ayurveda the power of exercise (*Vyayamasakti*) should be examined by the capacity for work<sup>10</sup>. For the respiratory capacity respiratory exercise is must. Thus, *Pranayama* and breathing exercise are the best respiratory exercises. So, to assess the respiratory capacity pulmonary function tests (PFT) are useful.

Our study shows there is no significant effect on weight, height. Decrease in BMI (Wt (Kg)/Ht (Mt<sup>2</sup>)) are statistically highly significant at 5% level, As it may modify the autonomic status by increasing sympathetic activity ("fight-or-flight") with reduced vagal activity (Vagus nerve innervates the lungs and stomach, increases heart rate and blood pressure). Non significant decrease in pulse rate may have been brought about by increased parasympathetic and decreased sympathetic activity. Decrease in RR (MV) (Per min) of subjects is not significant. SBP and DBP (mm/Hg) shows not statistically significant change at 5% level, this may be due to short duration of study. FVC (L) is increased and statistically significant at 5% level. It shows that increase in TLC (Total lung capacity) the volume in the lungs at maximal inflation. It may be that the regular inspiration and expiration for prolonged period leads the lungs to inflate and deflate maximally. FEV 1.0 (L) increase is statistically significant at 5% level. It shows forced expiratory volume in first second; It is the most widely used parameter, for assessment of airway obstruction. It might be that, a short powerful stroke of exhalation and inhalation 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. FEV 1.0 / FVC (%) increase is statistically non significant at 5% level. This value is critically important in the diagnosis of the obstructive and restrictive disease. FEF 25% - 75% (L/S) rise is statistically highly significant at 5% level. It

shows mean Forced Expiratory Flow during middle half of FVC measured in L/Sec reflect independent expiration and the status of small airways. PEF (L/S) rise is statistically highly significant at 5%. It measures flow rate in larger airways. PEF helps to assess the degree of large airway function. It may be due to stretch of elastin and collagen fibers interwoven among the lung parenchyma. Hence, these fibers can elongate to a greater extent, thus, increasing the compliance of lungs. 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. SVC (L) rise is statistically not significant. It may be due to fast inhalation and exhalation. MVV (L) rise is statistically highly significant at 5% level. MVV is the maximum volume of air breathed in and out of lungs with maximum voluntary effort in minute. It measures the strength and endurance of respiratory muscles. It is a non-invasive method to assess respiratory muscle performance, using a short-term respiratory endurance task. It is a test for overall function of respiratory system. It is influenced by the status of respiratory muscles, the compliance of lung-thoracic system, condition of the ventilator control mechanism and the resistance offered by airways and tissues. The possible explanation for increased MVV could be that regular forced and rapidly inhalation and expiration of the lungs for prolonged periods has led to strengthening of respiratory muscles. MV (L) rise is statistically highly significant at 5% level. It shows that increase help in release of lung surfactant and prostaglandins into alveolar spaces which increase lung compliance and decrease bronchial smooth muscle tone, respectively. Appropriate yogic breathing exercises can improve pulmonary muscular strength and efficiency, which can ultimately help in the improvement of lung volumes and capacities.

Dog breathing is a bellow type breathing in which one can breathe forcefully and rapidly and thus, exercises inspiratory as well as expiratory muscles. In breathing exercise, a short powerful stroke of exhalation and inhalation in quick sequence with contrac-

tion of abdominal and diaphragmatic muscles trains the subject to make full utilize of diaphragm and abdominal muscles in breathing. It can also help in elimination of secretions from bronchial tree, clearing up respiratory passages; remove airway obstruction and the alveoli making room for more air. It might help in burning of fats and ultimately decreases the body weight which may be the cause of weight reduction. It might be result of increase oxygen consumption and therefore may be of benefit to the obese that are known to have a lowered resting metabolic rate than the non-obese. It may transform the autonomic status by increasing sympathetic activity with reduced vagal activity. Vagus nerve innervates the lungs and stomach, increases heart rate, blood pressure and BMR. Most of the studies conducted so far have generalized their results irrespective of age, duration and type of yogic practice. However studies are consistent with our results<sup>11-13</sup>.

## CONCLUSIONS

There is significant decrease in BMI Wt (Kg)/Ht (m<sup>2</sup>) and significant increase in FVC (L), FEV 1.0, FEF 25% - 75% (L/S), PEF (L/S), MVV (L), MV (L), VC (TV, IRV, ERV), TLC (VC, RV), like lung capacities. Breathing is an autonomic function that can be consciously controlled and it is the key in bringing the sympathetic and the parasympathetic nervous system into harmony. It may burn fats and ultimately decreases the body weight by increasing resting metabolic rate. However, there is a definite need for more directed scientific work to be carried out to elucidate the effects and the mechanisms of such effects of breathing exercise on the human body in health and disease.

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**Source of Support: Nil**

**Conflict Of Interest: None Declared**

How to cite this URL: Deshmukh Swati Hemkant et al: Effect Of Dog Breathing Exercise On Nishwas Uchhwas Kriya. *International Ayurvedic Medical Journal* {online} 2018 {cited July, 2018} Available from: [http://www.iamj.in/posts/images/upload/1205\\_1209.pdf](http://www.iamj.in/posts/images/upload/1205_1209.pdf)