

The Role of Alternate Nostril Breathing (Anuloma Viloma) Technique in Regulation of Blood Pressure

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ABSTRACT

As the world population and pollution are increasing day by day we are embracing to sickness. From ancient times to till 18th century we were following the yoga and naturopathy practices in everyday life. When the industrial revolution started from 18th century we have drastically changed our lifestyle, exercise, and diet practices. We have somehow forgotten this true health treasure given by our ancestors. Recent COVID-19 pandemic situation gave us a lesson about how taking care of health is so important. In yoga and naturopathy, there are numerous practices to make ourselves healthy both internally as well as externally. One of which is the alternate breathing technique popularly known as Anuloma Viloma. It is the yoga technique based on alternate inhaling/exhaling the air via both the nostrils. Different breathing technique are being practiced which shows good benefits to our health but the alternate nostril breathing technique shows the best result in health improvement especially in controlling the blood pressure. The disorders related with breathing are managed well by basic breathing training. The Anuloma Viloma systemizes the breathing pattern and aids in the regulation of blood pressure. In this article, we will look in brief about Anuloma Viloma techniques, different methods and its health benefits. More focus is given on how the Anuloma Viloma practices help in controlling the blood pressure along with other health benefits.

Keywords: Alternate-breathing technique, Anuloma viloma, Blood pressure, Hypertension, Naturopathy, Yoga, Pranayam
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INTRODUCTION

The Anulom Vilom also known as Alternate Breathing Technique, Alternate Nostril Breathing (ANB) is an ancient Vedic technique mentioned in Haṭha Yoga. It is stated that this technique cleanses the 72000 subtle Nadis of the human body. In Anulom Vilom the "Anu" means with and "Loma" are the hairs of nostrils, "Vi" means Viruddha (opposite) since the air is inhaled and exhaled in opposite directions.^[1]

In today's scenario, ANB technique is becoming very popular due to its miraculous effect on health. The stress, anxiety, and increased palpitation leading to hypertension are general issues are seen presently due to increasing competition in every field, higher living standards, less income, and above all the COVID-19 pandemic has made the situation worsen resulting in the unhealthy human scenario. In such conditions controlling mind, blood pressure and desires are the utmost importance.

ANB is a simple breathing exercise not requiring any artificial instruments and no extra efforts. The technical definition mentioned in Haṭha Yoga is: Adopting the comfortable pose where the back can be kept erect, the practitioner should draw in breath through the left nostril and, having retained it according to his capacity, should exhale through the right nostril. Then he should again fill in the thoracic cavity by taking in breath through the right nostril and exhaling through the left nostril after retaining it according to his capacity. This is one round of ANB. One should follow the practice four times a day and gradually increase the rounds. Furthermore, it should be developed gradually otherwise will harm the aspirant. This should be done in regulated manner patiently. The right nostril is called Surya (Sun) and the left nostril as Chandra (Moon) in yogic terminology.^[2,3]

The names of the left nostril (Chandra, Ida) and right nostril (Surya, Pingla) that is the moon and the sun, we understand that the moon has cooler temperature and the sun has hotter.^[3,4] Similarly, breathing with the moon and sun nostrils has the reflection of

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the specific qualities of each and its effects on the body are also mirroring it. When breathing (inhaling) through Chandra nostril gives cooling effect on the mind (brain) and the soul (body) and breathing (inhaling) through Surya nostril gives hotter or precisely more warmth effect. Both the nostrils do not work simultaneously, sometimes we breathe through the right nostril and sometimes through the left nostril. In rare scenarios both the nostril exchange, the gases and that is the higher spiritual and balanced state of the body.^[5]

Vedic science had stated the pranayam thousands of years ago. As mentioned in ancient texts when Chandra - Ida - left nostril is dominating the breathing process then quieter, passive activities to be done. When the Surya - Pingla - right nostril dominates then to be engaged in challenging and physical activities. And to relax, to do meditation when both nasal breathing is operational (Sushumna).^[6] The nasal cycle is dependent on the limbic functions of the autonomic nervous system, the proportion of catecholamine's and neuro-hormones circulating in the blood.^[7]

Although there is a standard method to perform the ANB technique different individuals practice it in variety of ways. Some hold the nostrils with fingers, some with the thumb, but

the comfortable way to hold the nostrils is fold your index and adjacent (second) finger of right hand. It starts with pressing your right nostril with your right thumb gently inhaling through the left nostril deeply without shaking your body. Then hold your breath by pressing the left nostril with the third finger of your right hand as per your capacity without strain (now both the nostrils are closed, right with thumb and left with the third finger) and then exhale through the right nostril. Repeat inhaling through right nostril pressing gently left nostril and finally exhaling through left. This completes one cycle.^[8] In the beginning holding of breath is not important. Just inhaling and exhaling deeply is fine. But as the practice becomes regular gradually increase the inhalation and double the exhalation holding the breath for some seconds. A number of steps can be adapted to command the practice:

- 1) Just inhalation and exhalation alternately and no holding of breath.
- 2) Increase the timing of inhalation and exhalation.
- 3) Double the exhalation as per inhalation.
- 4) Start holding of breath slowly.
- 5) Follow the ratio of 1:2 in beginning, that is., 2 s inhalation and 4 s exhalation. After 6 months of practice start holding your breath. The final ratio mentioned in the yogic texts (Haṭha Yoga) is 1:4:2, that is., 2 s inhaling - 8 s holding and 4 s exhaling. However, this can be developed by continuous, regular, and long practice.^[9]

There are various health benefits of performing ANB, that is., it keeps mental disorders away, improves concentration, spiritual power, and memory, strengthens lungs and keeps it free from diseases, boost your digestive system, calms mind and relieves stress, have an antioxidant properties which kills the free radicals and increase the ratio of oxygen in cell, and most importantly the blood pressure.^[10-13] Although ANB gives health benefits to all our body parts it is most effective in controlling the blood pressure. There are various clinical studies support that the ANB techniques significantly improve blood pressure conditions and reduce the risk of heart failure/cardiac arrest. This review gives a brief summary about how ANB improves the hypertension around the globe with scientific evidence.

ROLE OF ALTERNATE BREATHING TECHNIQUE IN BLOOD PRESSURE

Hypertension (high blood pressure) is ranked third in the cause of premature death as per the WHO in South Asia. Globally, in 2010 it was estimated that 31% of world's a population has hypertension and it is continuously increasing.^[14] Hypertension is one of the top killers in the globe, resulting in stroke or heart attack claiming an estimated 6.5 million lives each year.^[15] In the COVID-19 pandemic, the individuals having hypertension were easily prone to various infections.^[16]

The flow of the blood and the resistance developed by arteries and veins is called blood pressure. In this whole process the heart, arteries veins, and lungs are involved which controls its rate with the help of the nervous system. As per vedic text, the ANB is also known as Nadi Shodhan Pranayam which means it is not only controls the breath but also purifies the Nadis (Nadis - Arteries and Veins) by increasing the concentration of oxygen.^[17] When the breath is not regular, the mind is unsteady and when it is deep and regular then the mind is in calm and steady state. Therefore one should command the breath for better life and health.

ANATOMY OF ALTERNATE BREATHING TECHNIQUE

The respiratory system is the door of providing energy to each and every cells of the body. During our life cycle, the rate of breathing is controlled and independently controlled by the nervous system.^[18] The function of breathing is to provide the appropriate amount of fresh oxygen to the cells for its metabolism and to discharge the carbon dioxide. It is a famous misconception that breathing is an automatic process and is not in our control.

In the ANB technique, the breathing starts from the diaphragmatic base on both sides of the lungs at the pelvic girdle. The diaphragm muscles present in the thoracic region and the accessory respiratory muscles of the neck are relaxed further relaxing the muscles of the face. When the facial muscles relax, they carry this effect to the organs related with perception, viz. eyes, ears, nose, tongue, and skin, by reducing the stress from the brain. When stress is reduced, the practitioner achieves concentration, steadiness of mind, and eternal bliss. All these processes are powered and managed by nerve impulses sent by respiratory centers in the brain to the related muscles. The brain initiates the process by which all mental functions are regularized.

Breathing directly affects the heart rate; if we hold the breath the heart rate lowers down and gives rest to heart muscles. If you breathe properly all your relevant organs of the body should work in coordination. Like the circuit power (nervous system), the bellows (lungs), the pump (heart), the pipe circuit (arteries and veins), the engine structures (rib cage and diaphragm) all should be in sync. For some individuals inhalation is longer than exhalation, whereas for others exhalation is longer compare to inhalation. This changes the breath flow and the blood pressure from person to person. The ANB technique aims to remove these disturbances in breath flow as well as in blood pressure. The breath coming in is absorbed by the living cells of the human body. The out-breath throws away the un-needed carbon dioxide and in-breath refreshes the system with oxygen.

Exhalation calms the nerves and the brain. The breath retention should not be misinterpreted as re-tensioning of the brain, nerves, and body to hold the breath.^[19] Retention has to be done gradually with the brain relaxed so as to rejuvenate the nervous system. When the breath is kept on hold or slow, the mind becomes calm.^[20] However, it is advised to not hold the breath unconditionally; otherwise, it will harm the body. A beginner usually faces difficulty in holding the breath but gradual practice makes it easier.

The inner nostrils are connected to the sinuses in the skull. When the flow of breath is directed toward the brain with the help of fingers alternately closing one nostril and inhaling through other, it calms down the neurons of the brain. The air also stimulates the smell centers, the olfactory nerves which in turn stimulate the limbic system in the brain which transforms perception into feeling. The inhaled air moves in the areas of mucous membranes of the nose. They may be congested by cold, infection, sinus blockages, etc. The airflow is periodically diverted from one nostril to other due to changes in the circulation of blood. Such changes alter the shape, size of the nostrils and the airway passages. The cartilaginous muscles dilate and compress the nostrils. The facial muscles connected with the lips and eyebrows which express the emotional states such as joy, anger, fear, and anxiety are also in coordination with the breathing pattern. Normally, we see that a hypertensive patient has recognizable facial expressions.

The ANB gives stability to autonomic nervous system balance, with the dominance towards parasympathetic nervous system rather than usual stress, anxiety-induced sympathetic nervous system. It decreases heart rate, breathing rate, decrease blood pressure increasing cardiovascular efficiency, elevates mood, decreases anxiety, and depression. It is observed that left nostril breathing decreases systolic, diastolic, and mean blood pressure thus reducing hypertension. The right nostril breathing causes correction of blood pressure to normal levels balancing heart rate and elevating body temperature.^[21,22]

The respiratory pathways in the brain support the primitive rhythmic breathing but the higher centers can either smoothen it or disturb it. The emotional states define the breathing pattern. Different breathing patterns can affect the autonomic nervous system and in turn effects on the body parts.^[23] Poor breathing habits increase overstimulation of the sympathetic nervous system resulting in panic attacks and anxiety. In contrast, regularize breathing habits influences parasympathetic activity slowing down the heartbeat reduce the blood pressure.^[24] The ability to control breathing gives us access to autonomic balance of the body which no other activity can give.

SIGNIFICANCE OF ANB IN REGULATING THE BLOOD PRESSURE

The respiratory sinus arrhythmia involves reflex activity from the circulatory system to the brain, which lowers heart rate more in exhalation than in inhalation. If exhalation is elongated as to inhalation especially while relaxing, the slowing down effect of exhalation is predominant.^[25]

The cardiovascular system is related with blood pressure and pulse rate monitored by the autonomic nervous system. Anulom Vilom accompanied by control of breath manages cardiac output, decreases hepatic and renal blood flow, and increases the flow of blood in peripheral blood vessels present in the cerebral region of the brain. The heart rate of an individual varies with thinking process of the mind. Right nostril breathing activates sympathetic activity and left nostril activates parasympathetic. ANB brings about balance in both.^[26]

ANB reduces the heart rate and blood pressure significantly in hypertensive patients and patients suffering from ischemic heart disorders. It decreases adrenaline-related sympathetic activity and peripheral resistance resetting the autonomous nervous system. ANB can be used as an adjuvant therapy and is suggested to be adopted in daily life for better cardiorespiratory functioning.^[27]

When we are happy our breathing is in a regular pattern and as we get angry the breathing becomes rapid and fast. The emotions are affecting on our breathing activity directly. Anger increases the blood pressure and changes the breathing pattern. ANB physiologically rhythmize the breathing bringing control of blood pressure. The flow of breath in the two nostrils is involuntary and unconscious until it is controlled by the ANB technique. When you go to sleep the left nostril starts dominating and after getting sufficient sleep in the morning the right nostril dominates as the sun rises certain hormonal reactions take place in the body.

A slight malfunctioning of the nervous system may produce discomfort and also paralyze a limb or an organ. The brain is divided into two hemispheres, the left control the right side of the body, and the right controls the left side of the body. The in and out breaths in ANB revitalize both the hemispheres of the brain as well as the front and back brain. Changing the sides of inhalation

and exhalation the energy reaches the remotest parts of the body and brain having unevenly balanced actions in all quarters of the brain thus experiencing calming effects, peace, and tranquility.^[28]

The Chandra, Surya, and Sushumna are also called "Nadis" in yogic terminology. The Nadis are the tubular structure that is the veins and arteries of the body if stated scientifically. The deep breathing improves "prana" levels in the body cleansing the body by proper channelization of wind/Vayu/air which in turn results in optimum blood circulation in the body by regulating the blood pressure.

Our body constitutes of vata-pitta-kapha doshas in different proportions and mind has sattvic-rajasik-tamasic qualities which make an individual. These factors play a great role in the regulation of blood pressure. The doshas are balanced in the ANB technique since the breathing is controlled and regulated through both the nostrils. If the doshas are Samya (in equilibrium) then the person is healthy. Similarly, if the person has more dominance of Sattvic Gunas then he is always in bliss and serenity. These all are in relation with the regulation of blood pressure in an individual.

In 2006 in England the yoga camp was conducted for 7 days (daily 3 h) during which various breathing practices of pranayama such as Kapalabhati, Bhastrika, and Anulom Vilom with other yoga postures and meditation were practiced by the volunteers. Pre and post-assessments were done on randomly chosen volunteers who had hypertension and diabetics. The data were collected from 428 volunteers who came for follow-up among which 81% (349) had hypertension. From the studied individuals, 38% normal blood pressure and 66% of decreased level of cholesterol were recorded after practicing the Anulom Vilom for 7 days in yoga camp.^[29] It is also observed that the ANB increases vagal activity during and after practice of ANB, resulted in decreased blood pressure and changing heart rate variability.^[30]

Bhavanani and Madanmohan (2012) reported that after practicing left unilateral forced nostril breathing it immediately reduce the heart rate, pulse pressure, and systolic pressure. They suggested the regular practicing ANB will help to reduce the blood pressure.^[31]

Goel *et al.*, 2016 carried out experiment on 30 individuals and suggested that the ANB significantly decreases the heart rate, pulse pressure, and systolic pressure. They also suggested that the studied individuals who practice ANB daily have relaxed mind with no stress.^[32] Jahan *et al.*, 2021 did the randomized experiment on 100 individuals ranged between 18 and 20 age group to check the effectiveness of ANB and found that the pulse rate, blood pressure, forced vital capacity, and peak expiratory flow rate was improved in these studied individuals. They recommended the practicing of ANB for better cardiorespiratory efficiency.^[27]

ANB is a systematized breathing exercise which is effective to prevent and to treat many conditions if performed properly and regularly. It is effective to control and reduce the morning as well as evening blood pressure of pre-hypertensive patient.^[33] ANB technique dominates parasympathetic control over the heart. It reduces the stress and helps in maintaining better physical and mental health.

By practicing Anulom Vilom will give benefit in reducing the hypertension but if the Anulom Vilom has practiced with Bhramari pranayama for at least 40 days then it may reduce the dose of antihypertensive drugs by normalizing the cardiovascular regulation.^[34,35] The researchers carried out the 6 week training of ANB for 15 min on 60 pre-hypertensive young males. All

cardiovascular parameters were measured before and after 6 weeks of practice. They observed decrease rate in diastolic blood pressure and suggested that the regular practice can be used as an adjuvant therapy with conventional medicines for long-lasting results. Shavasana and pranayamas produce a significant reduction in blood pressure of hypertensive patients. The ANB practice with Anulom Vilom with other yoga/pranayama is safely recommended with routine antihypertensive therapy to reduce the hypertension.^[36]

In one study 60 students were divided into three groups of 20 each. First group was made to practice Anulom Vilom, second group Kapalabhati, and third was made to do Bhastrika pranayama. The results suggested that the regular practice of meditation and pranayama is beneficial for cardiovascular.^[37] Various researchers did similar types of experiments on different age group or with different yogic practices or with different number of patients but all they concluded with the significant reduction in blood pressure if regular Anulom Vilom is practiced.^[38-40]

CONCLUSION

The pattern of alternate breathing has the impact on both physiological and psychological aspects of the whole human body, especially on the brain which has all different centers for controlling the actions and reactions of the physical body. ANB is the control-positive inhalation and exhalation process which done for the whole life which gives us command of our activities and behavior which in turn makes us to live healthy. By practicing the ANB in daily routine it will not only improve the brain activities but also reduce the heart-related issues. Various researchers all around the world proved that the ANB technique is the best method for reducing the hypertension. You should keep in mind that using the ANB method does not lower blood pressure in all conditions, you will have to do more yoga and pranayamas with ANB for better results. After practicing ANB daily, you will gradually begin to see its health benefits on your body. Following this method, you should also continue your daily medication which will benefit you even more than any other treatments. In this current COVID-19 pandemic the ANB method will definitely help people to maintain a healthy body along with mental health. Keep practicing the Anulom-Vilom and stay healthy.

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