

Physiology of Pranayama

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Abstract: Life has become very busy the changed life style pattern is not allowing people take a deep breath also, which is further leading to rapid progress of different respiratory disease. The science of pranayama deals with control and enrichment of this vital force which results in rhythmic respiration calm and alert state of the mind. Pranayama is an art of controlling the life force of breath. It produces many systemic psychophysical effects in the body, besides its specific effects on the respiratory functions. Yogic breathing would form a very good exercise in one's daily routine, if one does not find much time to be devoted to physical exercise. Respiratory rate, rhythm of respiration, lung volume and capacities, breath holding time will get significantly and positively influenced with practice of pranayama. Certain pranayama exercise like Anulom-Vilom (alternate nostril breathing technique), Bhastrika (Bellows Breath), kapalbhati (frontal lobe cleansing technique), and Ujjayi (Hissing Breath), Shitali Pranayama (cooling breath) are carried out for good results. It can improve respiratory system. The purpose of this article to present a comprehensive review of the literature regarding the impact of Pranayama to bring balance and health to the physical, mental, emotional and spiritual dimensions of the individual & Pranayama has been shown to have immediate physiological and psychological beneficial effect of body.

KEYWORDS: pranayama, Bhastrika, Shitali Pranayama, kapalbhati.



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INTRODUCTION

Yoga is a psychosomatic spiritual discipline for achieving union & harmony between our mind, body and soul. Yoga is mind body technique which involves relaxation, meditation and a set of physical exercises performed in sync with breathing. Yogic breathing is fundamental practice in the study of yoga. As one of the limbs of patanjali's eight limbed path yogic breathing or pranayama, is defined as the "control of life force" and is aimed at increasing vital energy in the body and mind. Pranayama means control of "prana", prana in Indian philosophy refer to all forms of energy in the universe. Life force in an individual is symbolized by breathing. Breath is a dynamic bridge between the body and mind. Regular practice of pranayama is found to improve the lung volumes and capacities there by helping in prevention and management of different respiratory diseases. Different types of pranayama along with asana produce different physiological responses in normal person individuals.

MEANING OF PRANAYAMA

Pranayama is the practice of breath regulation. It's a main component of yoga, an exercise for physical and mental wellness. In Sanskrit, "prana" means life energy and "yama" means control. The practice of pranayama involves breathing exercises and patterns. You purposely inhale, exhale, and hold your breath in a specific sequence. In yoga, pranayama is used with other practices like physical postures (asana) and meditation (dhyana). Together, these practices are responsible for the many benefits of yoga. But pranayama has benefits of its own. These advantages are due to the therapeutic effects of breathing exercises and mindfulness.

Pranayama uses deliberate control of the breath in order to extend and expand vital life force energy. Not only does pranayama have the potential to steady the mind, but the practice has far-reaching physiological benefits such as increased heart rate variability, improved oxygen saturation and overall re-balancing of the nervous system.

Objective of Pranayama:

Pranayama is vital life force that exists in the body to stimulate, communicate, regulate and control our body.

How Pranayama Works?

Yoga practitioners have been using pranayama for thousands of years to guide them through their yoga and meditation practices. Deliberated breathing helps quiet the mind during meditation, and brings fresh oxygen into the body to support it during difficult or challenging yoga poses. Assured pranayama techniques are also thought to help the body release toxins.

Pranayama can quiet the mind is what makes it useful during the times of intense stress, emotional upset, anxiety, or trauma. Anyone can gain from practicing pranayama any place, at any time.

Effects of Pranayama:

Pranayama has three components Puraka, Kumbhaka and Rechaka.

Puraka (Inspiration): During inspiration the heart rate is slowed, with slower rate the resting period of the heart, the diastole is prolonged heart muscles receive more rest but the cavities of heart are filled with blood. During next contraction (systole), more blood is pushed into circulation with a better force, thus improve general circulation.

Kumbhaka (breath retention): During kumbhaka fresh air does not enter circulation, leading to lowered oxygen tension in blood. Thus some of the dormant capillaries a lying in collapsed state open up. The cerebral anoxia leads to cerebral vasodilatation and circulation improves. Kumbhaka stops vital body rhythms and affects the brain waves control of the brain waves is the key to controlling all brain rhythms It also affects the body physiologically by causing the mental process to stop because of vacuum created inside the body.

Rechaka (Expiration): During Rechaka the slow expiration involves conscious effort with the help of cerebral cortex of brain. These inhibitory impulses from cortex overflow the adjoining area of hypothalamus is concerned with emotions, and quieten this area. Thus producing soothing effect.

The effects of different type of pranayama are follows:-

Surya Bhedana Pranayama: There pranayama aerates the lungs, removes phlegm, enhances lung compliance. There was significant increase in oxygen consumption (17%) systolic blood pressure (mean increase 9.4

mmHg) and significant decrease in digit pulse volume (45.7%).

Ujjayi pranayama (Hissing breath): Ujjayi or psychic breath increases the pressure of air in the lungs and expands the effective use of lungs. It increases oxygen transfer in lungs enhances blood flow throughout the body while the body is in a relaxed state. The contraction of throat caused by ujjayi affects the carotid sinuses which regulate blood pressure in arteries. Ujjayi exerts a slight pressure on the carotid sinuses which over time lowers the blood pressure which leads to reduced tension and slows the thought processes of the mind. This type of technique can open the alveoli in lungs thus allowing the lungs to absorb more oxygen. It improves the lung capacities, removes the excess of kapha & soothes the nerves.

Sitkari Pranayama: The proper practice of Sitkari pranayama makes one beautiful like Kamadeva. Practice destroys appetite thirst, sleep, laziness. It enhances body strength & destroys all complications.

Shitali Pranayama (Cooling breath): This breathing technique provides a cooling effect in the body.

Bhastrika Pranayama (Bellows breath): It is type of pranayama where in fast breathing is employed. This pranayama can also improve the lung capacity and can make the respiratory system strong and efficient. In Bhastrika, diaphragm the principle respiratory muscle is exercised which renews the residual air in the lungs. It is a process of hyperventilation, thus produce slight alkalosis leading to soothing effect in respiratory center. Rapid exchanges of gases at cellular level remove accumulated toxins and re energies the cells. It helps to expel the excess mucous.

Bhramari Pranayama: Regular Practice of this pranayama relieves stress, tensions, anxiety and blood pressure. It is also beneficial for voice throat ailments.

Murcha Pranayama: This pranayama beneficial excellent preparation for meditation helps to in draw the mind. It alleviates anxiety, tension, anger, neurosis and raises the level of prana.

Kapalbhati (Frontal lobe cleansing technique) : In Kapalbhati, the nostrils get flared up and the air is expelled get pushed through the nose. The constant pushes can improve the efficiency of the muscles that are involved in breathing. It can also remove the impurities from breathing tube. It increases the breath

control, stretching it to the unit and dramatically affects the CO₂, chemical, acid and alkalis in the blood.

DISCUSSION

Pranayama involves manipulation of breath movement and the breath is a dynamic bridge between body and mind. The psychosomatic effects of different pranayama are believed to derive from difference in duration of phases of the breathing cycle, tidal volume and other factors including the use of mouth, nostrils and constriction of the laryngeal muscles and position of the glottis. In all the pranayama procedure will reduce is the rate of respiration but lung volumes and capacities will increase depending on the regularity of practice. Regular practice of pranayama improve muscle strength & flexibility due to work hypertrophy. It increases thoracic- pulmonary compliances by more efficient use of diaphragmatic and abdominal muscles. Pranayama cleansing of air way secretions thereby decreasing the resistance to the air flow which will aid in full & free utility of alveoli. Pranayama act as a major physiological stimulus for the secretion of lung surfactant and prostaglandins. Lung surfactant increases lung compliance & prostaglandins reduce bronchiolar smooth muscle tonicity there by allowing more and more air enter into lungs which leads to increase of lungs volumes and capacities. Stimulation of stretch receptors due to maximum inflation of the lungs relaxes smooth muscles of larynx and tracheo-bronchial tree which modulates the caliber of airways and reduces airway resistance. Regular practice of pranayama increases maximum expiratory pressure & flow rate. A regular practice of pranayama decreased rate of respiration & extended expiratory period. It is due to dorsal group of neurons may be inhibited by Apneustic & Pneuotaxic centers leading to extended expiratory period. Pranayama increases in the voluntary breath holding time. This may be due to acclimatization of chemoreceptor of lungs to hyper apnea and hypoxia or decreased responsiveness of respiratory centre or increased development of respiratory musculature leading to increased muscles endurance and delayed fatigue. Pranayama along with meditation has calming effect on mind and reduces emotional stress.

CONCLUSION:

Pranayama helps in bringing conscious awareness to breathing and the reshaping of breathing habits and patterns. The essence of the pranayama practice is slow and deep breathing which is economical as it reduces dead space ventilation. It also refreshes air throughout the lungs in contrast with shallow breathing that fresh air only at the base of lungs. The regular practice of pranayama integrates the mind and the body. Pranayama thus acts directly on the various physiological function of body and affords benefits in a positive way. Regular practice of different types of pranayama leads to strengthening of the respiratory muscles. Pranayama improvement in the expiratory power and decreases the resistance to the air flow in the lungs. Pranayama training causes an increases in the voluntary breath holding time. This may be due to acclimatization of the chemoreceptor to hyper apnea. Different type of pranayama helps to detoxify lungs and respiratory tracts, boosts and supply of oxygen and purifies blood. Pranayama is a type of yogic breathing exercise. This resultant effect of pranayama beneficial for the lungs strengthening, improvement of lung volumes and capacities in healthy person and some stage control other physiological functions and finally control manifestation of prana even outside the body.

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