

Special Article

Effect of pranayama

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Pranayama Is One Of The Part Of "Astang Yoga". It Is Controlled Breathing Exercise. The Script Basically Emphasize The Ancient Indian Yogic Science & Effect Of Pranayama On Various Human Body System. Basically This Is A Review Script Which Helps The Common People, Scientist & Other Person Related In This Field To Learn About The Effect Of Pranayama.

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Introduction

Pranayama is an important, yet little known part of yoga. Its techniques have been practiced for centuries by students of yoga in remote ashrams, and have been preserved for us through many generations both in practice and in hand written books. Until recently, this art and science of yogic breathing was almost completely unknown to the common man like many other ancient Indian arts. Those who knew it used to be very reluctant to share their knowledge and experience with anyone, unless a student proved by tests that he was ready

to receive it.

"Tasmin sati swas praswas yogartivich pranayama¹⁾"

Tasmin : In this,

Sati : Being,

Swas : Inhale,

Praswas : Exhale

Gati : Flow

Viccheda : utting-off

Pranayama : Breath control²⁾

This having been (accomplished) "Pranayam" which is controle of inspiration and expiration.

The inspiration of prana-vayu is swas

and expiration is praswas and the cessation of both is characteristic of Pranayama.

Pranayama, as traditionally conceived, involves much more than merely breathing for relaxation. Patanjali defines Pranayama as "The regulation of the incoming and outgoing flow of breath with retention." It is to be practiced only after perfection in asana is attained. Pranayama also denotes cosmic power, or the power of entire universe, which manifests itself as conscious living being in us through the phenomenon of breathing.

What is Pranayama?

The word Pranayama consists of two parts; prana and ayama. Ayama means stretch, extension, length, breadth, regulation, prolongation, restraint and control and describes the action of Pranayama. Prana is energy, when the self-energizing force embraces the body with extension and expansion and control; it is Pranayama.

Effect of Pranayama on various systems Nervous System:

Pranayam maintains normal body functions. It influences higher functions of the

central nervous system(C.N.S.) like perception, planning, execution of tasks, learning & memory. It improves coherence between the two cerebral hemispheres signifying synchronization of logical and intuitive function. It increases alertness, along with relaxation. Alertness decreases the reaction time of the brain. Twelve weeks of yoga is know to decrease the visual and auditory reaction times^{3,4}. Pranayama alone and Mukh Bhastrika have shown similar effects^{5,6}. Spatial tasks are enhanced during left nostril breathing and verbal tasks during right nostril breathing. Breathing through a particular nostril also improves spatial memory scores⁷. Yogic breathing exercises include right and left nostril breathing. These breathing techniques stimulate different divisions of the ANS, thus having useful implications in treating psycho physiological disorders associated with hemispheric and autonomic imbalance^{8,9}. Right nostril breathing correlates with the activity phase of the basic rest activity cycle, it activates the sympathetic nervous system as shown by an increase in the oxygen consumption and left nostril breathing decrease the sympathetic activity as manifested by an increase in the level of volar galvanic skin resistance^{10,11}. Nostril rhythm increases the theta rhythm, the mean alpha (a) and beta (b) power followed by reduction in the asymmetry in b band in the EEG^{12,13}. Pranayama exercise of Ujjayi and Bhastrika also increased the amplitude and decreased the latency of Na wave of mid-

dle latency AEP, indicating facilitation of processes of sensory signal transmission. These practices involve the use of various cortical mechanisms and corticofugal control processes that may alter the process of information processing at the level of the brain stem (Telles et al 1992). Similarly in epileptics, improvement in AEP, visual contrast sensitivity has also been observed¹⁴.

Pranayama & Hormonal Balance :

The glandular activity increased and hormonal profile is balanced through pranayama. Ujjayi with long and short kumbak effects adreno-medullary secretions¹⁵.

Pranayama & Psychiatric Disorders :

The Pranayama shows a reduction in sympathetic activity which is the basis of its use in stress management. Sudarshan Kriya yoga (One of the rhythmic breathing process) has been used in depression and melancholia¹⁶. A thirty minute session of yogic stretching and breathing exercises produced marked augmentation in perception of physical and mental energy. It increases the

falling of alertness and enthusiasm. It is more invigorating than relaxation or visualization techniques especially when practiced in a group setting¹⁷.

Pranayama & Cardiovascular Response :

The cardiovascular system is controlled by the ANS. Yoga accompanied by breath control increases cardiac output, decreases the hepatic, renal blood flow, and increases cerebral blood flow in the peripheral vessels. Heart rate alterations in various types of pranayama and in single thought and thoughtless states have been described^{18,19}. The effects of inspiratory and expiratory phases of normal quiet breathing, deep breathing, and savitri pranayama breathing on heart rate and mean ventricular QRS axis was investigated in young healthy untrained subjects. Pranayama breathing produced significant cardio acceleration and an increase in the QRS axis during the inspiratory phase compared to eupnoea. These changes were similar to the changes observed during the corresponding phase of deep breathing or savitri pranayama breathing²⁰. Right nostril breathing activates the sympathetic nervous system and increase the heart rate. Alternate nostril breathing bring about a balance in the ANS²¹. Kapalbhathi practice showed an increase in the low frequency

band and decrease in the high frequency band of the heart rate variability spectrum indicating increased sympathetic activity²²⁾. Nadishohdhana pranayama increased both components of HRV.

Pranayama & Respiratory system :

The various practices use breathing exercises (pranayama), suryanamaskar, dhyanana, devotional sessions, asanas, kriyas, and yogic chair breathing²³⁻²⁵⁾. Kapal bhati removes the residual secretions by moving the neck in all directions and forcing out secretions forcefully through the nose. Hence, by this mechanism yoga and naturopathy may be both useful in treating asthma²⁶⁾. Pranayama techniques form an important component of yoga. The types of pranayama generally used are surya bhedana, bhastrika, and nadi shodhana. The idea is to maintain a slow rhythmic pattern of breathing using both nostrils alternately. This produces a balancing effect on the ANS. Short kumbhak or breath-holding increases O₂ consumption while long kumbhak decreases O₂ consumption¹⁵⁾.

Prolongation of breath holding time with increase in Forced Vital Capacity (FVC), forced vital capacity in first second (FEV1), maximum voluntary ventilation (MVV), peak expiratory flow rate (PEFR) and lowered

respiratory rate has been reported after six weeks of training in pranayama²⁷⁾. Techniques involving focusing on a single thought resulted in regularity of respiration while in the no thought state there was reduction in the rate and regularity of respiration¹⁸⁾. Savitri type breathing had a similar effect as deep breathing on cardiovascular parameters²⁰⁾. In a study of patients practicing hatha yoga, long term manipulation of breathing by practicing slow deep breathing likely results in overstretching of pulmonary stretch receptors, chronic manipulation results in vagus blockage, thereby vagal manipulation is decreased. This also leads to a conditioning or learning of a pattern of breathing with ample tidal volume and a slow rate²⁸⁾.

Various respiratory parameters improve after yoga & pranayama. A significant increase in FVC, FEV, FEV1, PEER, increase in the vital capacity, tidal volume increase in expiratory, and inspiratory pressures, breath holding time and decrease in the respiratory rate is documented to help symptoms of weekly attacks, and scores for drug treatment, improved exercise tolerance, faster recovery after exercise, decrease in inhaler use, and improvements in bronchial provocation response has also been documented^{23,29-32)}. Pranayama is believed to decrease the anxiety element as well. Since asthma is a psychosomatic and chronic diseases, a psychosomatic imbalance with an increased vagal tone is one of its various etiopathogenesis. Yoga therapy may first bring

internal awareness, correct autonomic imbalance, control the breathing, improve the immune status, and alter physiological variables. Even one week after yoga therapy, improvements in ventilatory functions in asthmatics have been observed. This could be due to reductions in sympathetic reactivity and relaxation of voluntary inspiratory and expiratory muscles. Both transcendental meditation and Yoga have proven to be effective alternative medicines for controlling symptoms of asthma^{33,34}. Yoga is also valuable in the treatment of COPD³⁵.

Results

The effect of pranayama on various system like Cardiovascular system, Respiratory system & Nervous system etc have been given in the script in a generalized manner. Specific data are not given since it is a review script taken from various sources.

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