

## **PHYSIOLOGY OF PRANAYAMAM**

Unless you know thoroughly about Pranayama, you cannot do it correctly, and ultimately you don't know where you are.

I (*Sadguru Sri Antarmukhananda*) being a doctor, who studied anatomy and physiology of the body, got the privilege of imparting all of you the knowledge about yogam, both medically and spiritually, with practice of pranayama and medical background.

Our respirations, heartbeat, digestion, excretion, tissue metabolism and mental functions are taking place mainly with help of glucose and oxygen. Externally a man is said to be living during sleep also by observing his respiratory movements of the chest. We take food for glucose and others and we take breathing for oxygen. Assuming that we can take oxygen from the atmospheric air, which is naturally available, we are concentrating only on food to maintain glucose in the blood but paradoxically we are dying out due to lack of oxygen, by gasping respirations inspite of being availability of plenty of food. As a man, who is born with discrimination power, when compared to an animal, we should make it a point that oxygen is as much important as food and it also to be maintained by making a special effort without leaving respirations to their natural course.

### **How are our respirations?**

Normally we take respirations 12 to 18 per minute, the average being 15. In every respiratory cycle, the inspiratory phase is active (difficulty in breathing) and expiratory phase is passive (easily exhaling out).

When we breathe in (inspiration) there is some resistance, which is influencing not to take air freely inwards and upwards. That resistance is the force of gravity at the umbilicus. This is called Apanam.

**“Bhooloko nabhi desasthu”**

**(Earth gravity is at the umbilicus)**

There is some dead space in the two membranes of pleural cavity (visceral & parietal) ensheathing the lungs. This dead space contains vacuum or negative pressure which is responsible for in drawing of external air in to the lungs. This is called 'Prana'. Our inspiration by "Prana" and expiration by "Apana" are the two opposite forces acting on respirations.

The negative pressure in the pleural cavity (around the lungs) is again being neutralized by two forces.

1. By drawing external air into the lungs expanding thoracic cage with the help of diaphragm and rib muscles.
2. By sucking the impure blood (venous) from the peripheries i.e. legs, hands, abdomen, head and neck. This blood first will go to the heart and then to the lungs.

The above two forces are subjected to change and inter-convertible depending upon their dominance.

For example, during death, number 1 is predominant than number 2. But in pranayama, number 2 is more predominant than number 1..

### **How our respirations would be in Pranayama?**

This negative pressure will be increased during Pranayama by 1. trapping the external air entry not to allow freely into the lungs and 2. increasing peripheral venous return to the lungs. In Pranayama during the phase of 'PURAKA', the above pressure changes will happen. Where as in 'RECHAKA', just reverse things happens i.e., increased pressure over the cardiac output but the air in the lungs will not go freely outside in to the atmosphere. So during Puraka Pranayama, there will be trapping of the external not to go freely in to the lungs thereby getting friction evolving sound. During 'Rechaka Pranayama, the air will not go out freely thereby getting friction evolving sound. So, we get sound both in inspiratory Puraka and expiratory Rechaka phases.

Simultaneously, the blood flow from the peripheral parts to the heart and lungs and from there to periphery will be very much increased. During this process, not only the speed of blood

circulation, but also the thickness (viscosity) of blood is reduced (as the solutes of the blood will be dissolved due to heat), so that every nook and corner of the body will get thorough blood supply. The respiratory rate per minute also will be reduced gradually from 15 to 2 or 3 per minute. Even for a beginner, it will be reduced to 5 or 6 during the practice of Pranayama. The life span will be increased in proportionate to the reduction of respiratory rate.

When the brain, liver, kidney and all other parts are getting enormous oxygen saturated blood, each and every cell will function perfectly, so that sound health for the bodily part and sound mind for the brain will be achieved simultaneously by Pranayama. Here churning of life force means thorough blood circulation by reducing external air entry and increasing peripheral venous return, oxygen is nothing but heat (Pranagni) which is evolved out of food and life force inside. Vital energy is the oxygen but not the external oxygen from the air. Oxygen saturation means, subtle energy derived during Pranayama. One may misunderstand that when we are reducing the external air entry, we get suffocated and we may be devoid of oxygen. This is not so in Pranayama, we get enormous heat and energy and ultimately divine light will be tangibly seen in Brumadhyam i.e. at the centre of the eye brows.

By doing up and down churning movements of respirations every minute nerve and minute blood capillary will be cleaned out, thereby washing out unnecessary fat, excess water and impurities like urea, uric acid and creatinine through kidneys. A Yogi becomes thin and energetic and his body will be full of divine light instead of being inert fleshy body made of group muscles and bones.

**“Thine eye is single, thy body is full of light. Thine eye is evil, thy body is full of darkness”.**

- **Luke 11:34**

In our body blood filtration is taking place in two places; one is kidney and the other is brain. Everybody knows that the kidney is filtering point, but in brain also it is being done.

Our brain has got three covering layers called membranes. 1.Dura mater 2.Arachnoid mater 3.Pia mater from outer to inner aspect respectively. Between the 2nd and 3rd layers, there is

sub-arachnoid space, in which, the cerebrospinal fluid from the brain is absorbed through arachnoid villi (finger like parts). In the brain, there are shells like cavities called ventricles. There are 4 ventricles i.e. first, second, third and fourth ventricles. In the ventricles, especially in 1st and 2nd, there are bunches of collective small blood vessels called choroid plexus. Through these plexuses, the blood in the brain is filtered as cerebro-spinal fluid, a watery liquid containing glucose, protein, salts and impurities etc. This cerebro-spinal fluid will be circulating in the ventricles, sub arachnoid space of both brain and spinal cord. During Pranayama, the cerebro-spinal fluid formation from blood and its absorption in the blood will take place very speedily so that the impurities will be ultimately filtered through kidneys. A yogi will throw away all his impurities from brain and getting fresh oxygenated blood into his brain.

Normally in an ordinary human being, the brain is functioning to some extent leaving alone the front portion (pre-frontal cortex) lying in a dormant mood due to scanty blood supply to this part of the brain (spiritual brain). Limited knowledge is according to limited functioning of the spiritual brain. When all the nerve cells (Betz cells) and nerves are getting enough saturated blood supply, all the cells get stimulated and that yogi gets intuitive power and he practically experiences that he is the all-pervasive supreme Brahman but not as a fleshy body made of bones and muscles. He gets liberated from the body while he is alive. He is called Jeevan mukta. He becomes Videha mukta, when every vital function ceases, burning out all seeds of the world.