



ISSN: 2456-0057  
IJPNPE 2018; 3(1): 190-192  
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www.journalofsports.com  
Received: 06-11-2017  
Accepted: 07-12-2017

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## Effect of yogasana on circulatory and respiratory system

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### Abstract

The impact of asanas on human body systems is expansive and eternal. The muscles, bones, nervous system, respiratory, circulatory and digestive systems of the human body are greatly benefited from regular practice of asanas. All the body systems are coordinated with each other. Circulatory and respiratory are the two main important systems. In this article the impact of yogasana on circulatory and respiratory system are been discussed briefly.

**Keywords:** Yoga, circulatory system, respiratory system

### Introduction

The circulatory system includes the heart, blood vessels and the blood. It transports the nutrients and oxygen to the tissues and removes carbon dioxide and other waste products of metabolism from the tissues. For this purpose the blood is continuously circulated in the body by rhythmic pumping action of the heart and through a complex network of the blood vessels. The blood acts as a vehicle that carries the products of digestion from the alimentary canal and the oxygen from the lungs to the tissues. While returning to the heart, the blood brings the toxic substances or the waste products back to the heart. The kidneys, lungs and the skin eliminate these substances when the blood circulates through them. The blood, thus, communicates with all the systems and organs, regulates the water level and the temperature of the body. In the practice of Yoga there are a number of precise movements coupled with correct breathing techniques that have been known to play a very important role in improving the circulatory system. As the yoga practitioner takes long deep breaths and consciously helps the body to relax and concentrate, there is a reduction in the levels of stress hormones and adrenal-cortex hormones in the circulatory system. Some specific poses of Yoga are known to directly benefit and enhance the circulation of blood and body fluids throughout the body. The different organs of the body are also positively impacted due to the effective flow circulation to the various parts. Yoga helps the body to rejuvenate its functioning of the immune system. More importantly, Yoga also encourages a healthier lifestyle and imparts teaches the body to inculcate values such as discipline and self-awareness during a practice session.

A healthy circulatory system is important for a healthy living. Yoga helps to prevent various circulatory ailments and illnesses such as high blood pressure, shallow breathing, muscle tension and coronary heart disease. In Yoga deep breathing, bodily and mental relaxation of the muscles causes the blood to reach to the different systems in the body such as the digestive, reproductive, glandular, and immune systems. This in turn paves the way for an improved blood circulation and the flow of important nutrients in the body.

Some key points on how the different poses and postures in Yoga are advantageous in influencing a healthy circulatory system in the body:

- **Standing Postures:** In standing poses, the lateral wall of the heart is exercised in such a manner that it becomes flexible and toned up. Standing poses help in improving the flow of blood along the walls of the heart thus preventing heart diseases.
- **Inverted Postures:** Inverted postures in Yoga help to prevent muscles and cell tissue degeneration due to the benefits of that the inverted poses have on the body. Inverted postures help in effective blood circulation to the brain.

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Moreover the lymph system in the legs and the muscles are properly rested in exercises involving inverted poses.

- **Horizontal Postures:** In horizontal poses, blood pressure is effectively brought under control as the performance of horizontal postures helps in resting and rejuvenating the heart and lungs.
- **Bending Postures:** In bending postures the body experiences improved blood supply to the cardiac muscles. This leads to a toning up of the myocardium or the heart muscles.

Experts believe that the yoga asanas are the best way to keep it fit naturally. The heart is an involuntary muscle that contracts and relaxes around 70 times a minute within a healthy individual. With asanas, the expansion and contraction of the heart is made even faster and thorough. However, overdoing yoga asanas is never preferred for it may cause damage to the heart. Both the halves of the heart, called the auricles and ventricles, relax after their respective periods of contraction when the whole heart is at rest. Diastole and systole are the two different movements of the heart. It is observed that diastole of the heart lasts a little longer than its systole. Hence, it is said that the heart sleeps for thirteen hours and works for eleven hours every day. These movements of the heart can also improve with the proper practice of yoga postures.

Padmasana considerably improves blood circulation. In this case, the pelvic region receives larger blood supply from the bifurcations of the abdominal aorta.

Each drop of blood travels twice, i.e., once through the pulmonary circulation and then through the systemic circulation in the body. During the systemic circulation, pure (oxygenated) blood is pumped out forcefully from the left ventricle into the aorta. It is then carried to parts of the body. Many yoga asanas e.g., Shirshasana, Sarvangasana, Viparita karni, Hahsana, Mayurasana, few pranayamas like Ujjayi and Bhastrika Pranayama as well as uddiyan, nauli, Jalandhar bandha specially influence the blood circulation. That is why you must learn them from an expert so that you can practice them safely as per your capacity and need, without taxing the circulatory system.

When the body and mind are properly relaxed, mental peace is achieved and the muscle tone is reduced. The blood vessels are also relaxed which are otherwise constricted due to tension. The heart rate is reduced as well. Blood pressure comes to the normal level. This is possible by regular practice of Shauasana. The postures of asanas render a very good help in the following manner. The contraction and relaxation of the heart cause, the circulation of blood throughout the body. The heart is made up of the strongest muscular fibres and tissues, but it can always be made healthier by means of proper Yogic exercises. For example, Uddiyana and Nauli are the Yogic asanas that raise the diaphragm so high in the thoracic cavity that they give a complete thorough massage from below to the continually working heart. In these exercises the heart is subjected to a decrease in pressure and is, in turn, able to maintain a healthier muscle. Further, it is through veins that the impure blood is brought back and there are such troubles as varicose veins, which cause obstructions in blood circulation. However, practising yoga asanas like Sirsasana, Sarvahgasana and Viparitarakani can cure such troubles. In these exercises, the body is placed in upside-down position which enables veins to drain themselves into the heart without any effort. Further, the veins get a short relief, which helps, in maintaining and recovering their health as well.

Most of the cultural asanas improve the circulatory system of the human body. The heart movement, its capillaries and arteries carry the blood much more efficiently after regular practice of yoga asanas. Surya Namaskar Pose, Shoulder Stand Pose, Rabbit Yoga Pose, Headstand Yoga Pose and Balasana are the best yoga poses to improve the circulatory system. Thus, yoga is useful for maintaining a healthy circulatory system by fighting hypertension, enabling proper blood circulation and other circulatory ailments.

### **Yoga takes the cardiac route**

A good cardio workout can be achieved through surya namaskars (sun salutations) and through continuous flow or movement between postures which is called vinyasa. Various breathing practices such as bhastrika, kapalabhati and anulom-vilom pranayama help improve lung capacity, cleanse the blood, reduce blood pressure and blood glucose levels, lower cholesterol, anxiety, and stress. All these factors along with a diet rich in vitamin C and E are important to keep the heart healthy. Reducing or eliminating alcohol and tobacco can also help lower cardiovascular risks.

Yoga nidra (a relaxation technique), chanting and various meditation techniques have also shown to help boost cardiovascular health and emotional wellbeing of a person.

Brahmari pranayama is another useful technique to lower blood pressure and heart rate as it increases parasympathetic (rest-digest drive of the nervous system) dominance in the body.

### **Impact of Yoga on Respiratory System**

Practicing yoga can increase the vital capacity significantly from 3399 ml to 3443 ml. The amount of the air breathed in one minute is known as minute ventilation. It depends on the respiration rate and the tidal volume. According to researches minute ventilation can be increased by practicing Kapalabhati. The respiration is semi-involuntary in nature. It is controlled quite independently and rhythmically without our notice. The respiratory center is situated in the medulla oblongata, which controls the inspiratory and expiratory movements rhythmically. The involuntary control depends on the reflex mechanism of chemoreceptors, baroreceptors and stretch receptors. The most important one in regulating the activity of the respiratory center is the chemoreceptors, which are sensitive to the amount of carbon dioxide in the blood. Increase in carbon dioxide and hydrogen in concentration in the blood (plasma) stimulates the inspiratory center and increases the depth and rate of respiration. This increased ventilation promotes faster elimination of carbon dioxide from the blood. Turning the head towards the right or left side as done in Brahma mudra leads to increase in the transparency of lung fields on the side towards which the head was turned when observed under fluoroscopy. It indicates the increased ventilation in that area. Similarly, in Chakrasana the ventilation of the lung especially in the apical area on the opposite side of the bend has been found to increase.

A normal breathing is involuntary in nature when one is not paying attention to it. Respiration can also be controlled to some extent voluntarily according to an individual's will. This voluntary control is done from the cerebral cortex. Impulses from the cerebral cortex travel along the descending pathways in the spinal column to the intercostals and the diaphragm. One can hold his/her breath for a few seconds or minutes. The ability to hold the breath can increase if one practises Kapalabhati. The application of Bandhas during the Kumbhaka phase has been found to increase the breath

holding time from 20.3 sec to 47.3 sec. Thus, the Bandhas seems to play an important role in the Kumbhaka phase of Pranayama.

Talking, singing, blowing the air forcefully are the voluntary respiratory acts, which can be controlled. Sneezing and coughing are involuntary protective respiratory functions carried out as reflexes through the medulla oblongata. Changes in the emotional status bring about marked alternation in the respiration, for instance, fright and fear can make the breathing rapid. Excitement can accelerate the respiration, e.g., the psychological tension and anxiety before the athletic event may increase the rate and depth of respiration. Expressions or emotions like laughing and crying require appropriate movement of air in or out of the lungs. Just as emotions and different mental conditions or moods can influence the respiration, one can also control emotions and the mental tensions by modifying the breathing pattern. This is done through the yogic way of breathing or Pranayama. Breathing in human body is related to prana (life force) on one side and the mind, on the other. Therefore, the Pranayama is like a bridge between the physical existence and the mental activity.

There is a lot of research done into the effects of yoga and pranayama (breathing exercises) on the body, including the respiratory system, and mind. Doing yoga and especially pranayama will lead to:

- Respiratory rate becomes slower. This deeper and slower breathing activates the para sympathetic nervous system, reducing stress and rejuvenating the body. As a result you feel more calm and centred and sleep better.
- Better supply of the oxygen by opening the alveoli in the lungs thus allowing the lung to absorb more oxygen.
- Stronger diaphragm.
- Removing impurities from the breathing tube.

Once the mind and body are rejuvenated by the practice of asanas, it is time to move further on the path of spiritual journey and move towards concentration, meditation and sadhana. The impact of asanas in human body systems can be used as complementary therapy in association with medicinal therapy. Asanas are postures that are quite useful in treatment of many diseases and these postures cure the root cause of disease irrespective of their symptoms. Progress in this realm of asanas requires immense faith and determination.

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