

## Shwasa–Prashwasa Prakriya (The Process of Respiration) in Ayurveda: A Review

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### ABSTRACT

In Sharangdharasamhita respiratory system dealt in small context in a four line shloka, this description speaks anatomical as well as physiological aspects. Sharangdharasamhita is written in 14<sup>th</sup> century and analyzing commentaries written in 16<sup>th</sup> (Deepika) and 18<sup>th</sup> (Goodartha Deepika) century AD on respiration in Ayurveda. Pranavayu located at nabhi (umbilicus) by touching the heart comes out through the throat to drink 'Vishnupadamruta' or 'Ambarpiyusha'. After assimilating 'Vishnupadamruta' or 'Ambarpiyusha', it comes back quickly into the body to nourish the entire body and nourishes 'Jatharagni'.

**Keywords** – Pranavayu, Vishnupadamruta, Ambarpiyusha, Jatharagni.

### INTRODUCTION

#### **Shwasa – prashwasprakriya:**

Meaning of 'swasa' and 'swasana' is breathing. 'Swasa-praswasaprakriya' therefore means process of breathing.

#### **1) In Ayurveda, inspiration is defined as follows:**

To inhale is 'Nishwasa'. Entry of external air in the living body is called 'Nishwasa'.

#### **2) Expiration is defined as follows:**

To expel air from living body is 'Ucchwasas'. To expel air by releasing it in upward direction is 'Ucchwasas'.

Principle organs for pranavaha srotas are heart and gastro-intestinal tract. Pranavayu when vitiated show different manifestations like ; increased rate of expiration, decreased rate of expiration, increased rate and depth in respiration, decreased rate of respiration, decreased depth of respiration, frequent

change in respiration, painful respiration and respiration with adventitious sound [1].

#### **Physiological Features of Respiration**

Normal respiration is inspiration and expiration without exhibiting above mentioned pathological manifestations. Rate of respiration is in yoga science. Number of respirations is swasanmana. Yoga Chudamani counts twenty-one thousand six hundred respirations (21,600) per day. This is 15 respirations per day.

#### **Respiration from Sharangdharasamhita**

Pranavayu located at nabhi(umbilicus) by touching the heart comes out through the throat to drink 'Vishnupadamruta' or 'Ambarpiyusha'.

After assimilating 'Vishnupadamruta' or 'Ambarpiyusha', it comes back quickly into the body to nourish the entire body and nourishes 'Jatharagni'. According to

Deepika (the commentator). *Pranapavana* is *prananila* i.e. *pranaashrithavayu* is to be considered. *Prana* is at *nabhi* along with *agni* and *soma*. *Panchmahabhautikprana* spread through the body. *Prana* at *nabhi* depends on *Anna*(*panchbhautikahara*) etc. and takes all the functions of body, same as that of spokes of wheel. The *bramharandhra* is situated at *nabhi* as a wheel present at centre supported by 24 spokes of a wheel. As that of spider web the life circulates here.

### **Role of *Brahmarandhra* in Respiration**

The *Shushumna* (spinal cord) containing *prana* and climbs up to *Bramharandhra*. The embedment of the *prana* is like the light emitted by crystal of *Spatika*. Reaching of *Prana* through *Sushumna* explains the involvement of Nervous system and the nature of nervous conduction. From *nabhi*, circulation pattern of *prana* is *aasya*, *nasika* through *hridaya*. It helps in production of sound, inhalation and exhalation. In *shwasa* and *kasa* this *prana* is detrimental. *Prananil* pass through *hrudaya* and *kamalanantaram* that is in between *hridaya* and *phuphusa*. During the process of exhalation *siras* when reaches to *kantha* produces vocal sounds which is the function of *udanvayu*. After drinking *vishnupadam*, it nourishes *brahma-randhra* –*ashrithaambarpiyusha*. The *chakra* (wheel) possessing the 1000 *patras* in *Brahma-randra* has whitishness and such *sudhasara* with holding and become cause for increasing the *deha*. The *anila* (*vata*) present in *ambara* (sky) inhaled at very fast reaches *Brahma* –*randra* and bring *karya* of *preenana* there by help in nourishing all the body part. It also nourishes *brahma-randhrasthita jatharanala* or *pachakagni*, it brings digestive system strength. When inhaled air reaches out to *jeeva*, (oxygenated blood) it nourishes body. Nourishment by *jeeva* is taken as cellular level nourishment. In *Grahani adhyaya* – according to *Acharya charaka* life span,

complexion, strength, health, enthusiasm, luster, immunity, energy and vital breath depends on *agni* (body fire). One gets ill if it is deranged, one dies if this fire is extinguished and lives long free from disorders if it functioning properly. *Agni* is the root cause.

### **AIMS AND OBJECTIVES**

- 1) To understand whole respiratory physiology described by *Sharangdhara*.
- 2) Possible correlation of process of respiration as per *ayurvedic* and modern medical science.

### **MATERIALS AND METHODS**

For this study, the basic and conceptual materials have been collected from the Ayurvedic classics. i.e. *Brihatrayee* mainly *Charak Samhita*, *Sushrut samhita* and other classics with available commentaries as well as various reference books to be reviewed.

### **DISCUSSION**

*Sharangdhara* mention that, *pranavata* going out of body from umbilicus, through the heart for taking the *vishnupadamruta* or *Ambarpiyusha* comeback to nourish the body and digestive fire.

According to previous statements, *pranavayu* is seated in chest, but it is going out from naval shows it must be referring to the fetal state. *Adhmalla* supported the *sthana* of *pranavayu* as *nabhi* because *nabhi* is the seat of *pranasiras*.

This describes the process of ayurvedic respiration uniquely found in *Sharangdhara samhita*. First two lines of *shloka* speaks on inhalation and exhalation as primary respiratory process. But in second stanza dealt with cellular metabolism.

The simplicity of the words, the ability to go to the depth and establishing complex

processes of respiratory gas exchange are clearly understood. Along with this the production of vocal sounds and exhalation is clearly explained.

*Vishnupadamrita* and *Ambarpiyusha* can be understood as word equal to the inhaled gases and diffusion of oxygen in to *nabhi-sthitha –brahma-randra*.

*Brahma-randra-sthitha-jathara-anala* is *pachak –agni*; which brings strength to the digestive mechanism. The *brahmarandhra* at *nabhi* as a wheel represent at the centre supported by 24 spokes of wheel. But the other *brahmarandhra* is situated in brain as *prana* is like the light emitted by crystal of *spatika*.

*Nabhi –sthitha – pranapavana* should never be implicated as *pranavata* in *nabhi*, it means *nabhisthitaprana* possessing *Anila* etc. *panchamahabhoota*.

*Punarayativegatha* is intended for the process of kindling the *agni* and bringing out energy for life. *Kanthebahiniryath* spells out the exhalation in process and quick inhalation of *Vishnupadamruta* and kindling of *agni* speaks by volumes of the respiration occurring at cellular level. As long as *Prana* abides, body lives. Exchange of gases between ambient air (*vishnupadamruta*) and then its supply to various tissues is also explained here. This explains all the four basic components of respiration as described in contemporary science as:

- 1) Ventillation – exchange of respiratory gases between atmosphere and lungs.
- 2) Diffusion is defined as exchange of gases between blood and lungs.
- 3) Perfusion – It is defined as circulation of blood to all the body cells.
- 4) Cellular respiration or metabolism occurs by *prinana* of *Jatharagni*.

This needs a lot of explanation. Since normal respiration is unavailable in *brihatrayee*, the *Sharangdhara's* description became popular as description of respiration.

How this verse matches with modern respiration?

According to this, umbilicus is location of *Pranavayu*. While describing five types of *vatadosha*, *Sharangdhara* mentions location of *Pranavayu* to be heart.

Dictionary meaning of “*amber*” is sky and “*piyusa*” is nectar or milk. Nectar or milk is capable to sustain a person. “Nectar coming from sky” is virtual meaning of “*ambarpiyusha*”. Hence “*ambarpiyusha*” can logically be interpreted as oxygen from environment [2].

*Nabhi* is umbilicus. In intrauterine life it is through this umbilicus that baby is attached by a chord to placenta of mother and receives food as well as oxygen supply through maternal blood. Ayurveda assumes that umbilicus is the one, where all vessels carrying different matters, origin. *Prana* is one of these matters.

The word *Nabhi* explains the diaphragm and abdominal participation of muscles in the process of ventilation. Respiratory movements noticed through movements are moving umbilicus includes thoracic as well as abdominal movements. This could be another reason why umbilicus is mentioned.

Diaphragm is also having an important role of respiratory process where it touches to *Hrutkamalantaram*. It indicates the gaseous exchange at alveoli. Inhaled air travels through trachea reaches to the lungs where gaseous exchange takes place.

A certain amount of blood is continuously being pumped out by *Hridaya*(heart) and *Phupphusa*(Lungs). This blood absorbs the *ambarpiyush* (oxygen) from the air present inside and leaves off its waste (carbon-dioxide) which is exhaled out.

Upward direction of exhalation from moving umbilicus towards neck(pharynx and nose) was observed by Ayurveda scholars and described as *Pranavayu* abiding umbilicus, touches interior of heart and passing neck(pharynx or trachea) escapes out in environment. There it attains fresh energy in form of “*ambarpiusa*”, with which it returns back fast into the body. After bringing this “*ambarpiyusa*” inside the body it freshens whole body and keeps digestive mechanism in fine condition.

This is accepted traditionally that this verse describes expiration and inspiration. However their commentators better interpret compendia

By reading commentary on *Sharangdhar samhita* it is realized that these verses are nearer to *Yoga* concepts [3].

Concepts forwarded by commentator of *Sharangdhar samhita*.

- 1) Commentator interprets umbilicus denotes entire body.
- 2) Passing neck it reaches head.
- 3) It contains necessary secretions for life. In the interior of head, *Yogic chakra* exists, named ‘*Bramharandhra*’.

This concept clarifies that this *pranavayu* since umbilicus through interior of heart passes neck, enters assimilates life sustaining matter this yogic center in head, comes back by same path and existing there.

The respiratory centers in medulla and pons are sensitive to both excitatory as well as inhibitory stimuli.

The *PranaVayu* situated at *murdha*(head) or brain control the process of inspiration by stimulating inspiratory group of neurons, by active dilatation of chest(expiration is passive recoiling) and *Udanavayu* is responsible for expiration. Thus the activity of *Prana* and *Udanavata* refers to nervous regulation of ventilation. Pure air and food (external *prana*) are taken in the direction and *Prana* activity is from nature to body (external to internal). If these inward movements get obstructed problems like *Asthama* begins [4].

“*Pransadnyakvat*” means inspiration of *Pranavayu* and expiration of *Udanvayu* which are the functions of *pranavaahasrotas*.

### **Transportation of Gases**

- 1) *Vayu* gets circulated through body.
- 2) Circulation of gases is through blood.

That is gases are absorbed at umbilical level in to blood and through vessels it is circulated throughout living body for combining with all tissues [5].

Vessels and conveying channels from starting point as umbilicus flow in entire body to push gases to reach all tissues of body. Oxygenated blood, which is responsible for strength, color, happiness of body is circulated through blood in living being [6]. These references dictate ideas of gas being pushed through vessels in whole body. Details of these facts are unavailable in ancient compendia.

### ***Swasankriyanam Niyantanam***

Basically ‘*vata dosha*’ is responsible for respiratory control. *Vata dosha* gives stimulation necessary for respiration. *Vata dosha* is supported by other two *dosha*. The basic control of breathing is governed by the activities of neurons of medulla and

Pons. The respiratory centers in the Medulla and Pons are sensitive to both excitatory and inhibitory stimuli. The Pneumotaxic center influences the activity of medullary inspiratory center [7]. The *Pranavayu* stated at *Murdha* (head) or brain control *swasa* (respiration) and other modification of it for e.g. *Ksavathu* (sneezing) etc. activities. According to *Charaksamhita* the increased and decreased no. of *swasana* (respiration) is found in the internal covering of *Vayudoshha*. Thus the *Pranavayu* seated at *murdha* (brain) controls the *swasankarma* in life [8]. Health belongs to the haemostatic interrelationship (*Dhatusamyia*) in all the systems of the body. *Pranavayu* plays very important role in its maintenance. *Aachrya Sharangdhara* has described in *Poorvakhandha* the physiological process of normal breathing as the total process of organ to the tissue and the cells. He stands with the view that it is the *Pranavayu* situated at *Nabhipradesha* (center of body) comes out of neck, touching the lotus like heart and after getting saturated with *vishnupadamruta* (O<sub>2</sub>) from atmospheric air again enters back forcefully.

## CONCLUSION

- 1) It is concluded that *pranavayu* is different from other *pranas* having *asharya* of *panchmahabhoota*.
- 2) The *brahamarandra* is at *nabhi* as a wheel represent at the centre supported by 24 spokes of wheel as it only describes role of placenta in fetal circulation. There is *brahmarandra* in the brain bring higher mental functions of *Trupti* and *Geetadi*, *Vakpravritti*.
- 3) The relation of respiration was established and structural position of *hridaya* and *phupphusa* were known.
- 4) When *vishnupadham* is taken by *brahmarandra*, the fluid present their undergoes nourishment. It clearly

indicates the component of the process of respiration has to dissolve for the nourishment.

- 5) The two words *brahamarandhrasthita-jatharanala-pachakagni* and *jeevanala* are separate and states the *mula* and *avayava* relations.
- 6) The *dehanilakarma* has taken for secondary mitochondrial respiration or cellular respiration.

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