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REVIEW ARTICLE

REVIEW ON PHYSIOLOGICAL FUNCTIONS OF *PRANA VAYU* W.S.R. TO NEUROPHYSIOLOGY OF *ANNA-PRAVESHA*

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ABSTRACT

In *Ayurveda*, *Tridosha* is a unique concept and has summarized all the bodily functions and phenomenons in three biological entities called *Vata*, *Pitta*, *Kapha*. *Doshas* are considered as forces or entities which cannot be equated with specific cell type, organ, biological system or signaling pathway. Among *Tridosha*, *Vata* is undoubtedly the most fundamental and crucial *Dosha* for survival. It is derived from the root word '*Gati'* means movement and '*Gandhaya'* means senses, knowledge perception. Among five types of *Vata*, *Prana Vata* is of utmost importance as it functions for sustainance of life (*Prana*). The general function of *Vata* as '*Tantra Yantra Dhara'* mentioned in *Charaka* can be attributed to *Prana Vata* as it is *Harshotsaaha Yoni*, helps in *Sarvendriya Udyoga* and is *Shareerasya Pravartaka.* It is written that the seats of *Prana Vayu* are *Murdha*, *Urah* which moves in *Kantha*, *Jihwa*, *Asya* and *Nasika* and supports *Buddhi* (intelligence and judgement), *Hridya* (heart) and *Chitta* (mind). Having seated in above locations they do the functions of *Drik, Stheevana, Kshavathu, Udgara, Nishvasa* and *Annapravesha* .If we compare it to modern science, *Murdha*(head) refers to the brain and brainstem which controls all these functions. *Anna Pravesha*(Deglutition) as very much needed step in *Ahara Pachan* is conducted by *Prana vayu. Acharya Charaka* in *Grahnidosha Adhayaya* mentioned that *PranaVayu* takes food from mouth to stomach that is nearer to the *Jathragni* for digestion. Control center of swallowing of medulla oblongata can be related to *Anna Pravesha* function of *PranaVayu*. In this article, an effort has been made to review physiological functions of *PranaVayu* with special reference to neurophysiology involved in *AnnaPravesha* (deglutition) for better understanding of *Ayurveda* with contemporary science which is need of the present era.

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INTRODUCTION

Vata is a physical matter with a lot of energy capable of conducting most of physiological functions in the body. It is reported to be *Shigra* (Ravi Dutt Tripathi, 2005), *Ashukari* (instanteous action), *Mahuscari* (rhythmic movement) (Kaviraja Ambikadutta Shastri, 2016). All movements in body are due to '*Vata'* and that is why it is called the *Prana* of all living beings (Acharya Vidyadhar Shukla, 2005). *Murdha* (Head) is the region where all *Pranas* (most vital entities) situated and all sensory and motor activities are controlled from. That is why 'Head' is called the 'Most important organ' among all parts of the body (Acharya Vidyadhar Shukla, 2005). *Prana Vayu* is considered as first type/*swaroopa* of *Vata*. *Prana Vata* can be compared to the Brain and Brain stem anatomically and physiologically as its main seat is *Murdha* and controls all the physiological functions by generating motor impulses after the integration of the sensory impulses from all over the body. *Prana vata* has various functions which act at different level at different structure. One of its important functions is *Anna Pravesha* that is act of swallowing which ensures the movement of food from mouth to stomach. Here in this study, effort is made by establishing the knowledge reguarding physiological function of *Prana vayu* to analyse the *Anna Pravesha Karma* of *Prana Vayu* as per *Ayurveda* and modern science and to understand neurophysiology involved in *Anna Pravesha*.

Aims and Objectives

- To study the function of *Prana vayu* as per classical texts.
- To study the *Anna Pravesha karma* of *Prana Vayu*.

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- To study the neurophysiology involved in *Anna Pravesha*.

MATERIALS AND METHODS

The *Bruhat* and *Laghu Trayi* were scrutinised regarding the references for the various *Karma* of the *Prana Vata*. Later, physiologicoanatomical aspects of the Brain and Brain Stem were studied from modern physiology books. Later, supportive correlation was done between *Ayurvedic* and modern views to build valid and reliable knowledge regarding *Anna Pravesha Karma* and Deglutition process (swallowing).

LITERATURE REVIEW

Prana vayu Sthana* and *Karma as per classical text- In opinion of *Charaka*, *Prana vayu* is located at *Murdha* (head), *Urah*(chest), *Kantha* (throat), *Aasya*(mouth) and *Nasika* (nose). It is responsible for *Stheevana* (spitting), *Kshavathu* (sneezing), *Udgara* (belching), *Shwasa* (respiratory phenomenon) & *Aahar karma* (deglutition of food) (Ravi Dutt Tripathi, 2009). *Vagbhata* has explained similar views. According to him, *Prana vayu* resides at *Murdha* and moves through chest & throat. It is responsible for noble function of *Dharana* of *Buddhi, Hridaya, Chitta & Indriya (*Bramahnand Tripathi, 2007*)*.

With a marked difference, *Sushrutacharya* believes that, *Vayu* which moves in mouth is called as *Prana vayu*. It is responsible for *Dharana* of *Deha*. *Prana* facilitates entry of food in *Aamashaya* & is also responsible for nobel function of *Avalambana* of *Prana* i.e. vital element of body (Kaviraja Ambikadutta Shastri, 2016). *Dalhana* in his commentary *Nibandha Sangrah* adds that *Murdha*, *Kantha*, *Nasika* are too site of *Prana vata*. *Dalhana* further explains that *Avalambana* of *Prana* is nothing but *Avalambana* of 12 elements quoted as *Prana* (*Agni*, *Soma, Vayu, Satwa, Raja, Tama,* five *Indriya* and *Bhutatma* to be considered as *Prana by Sushruta*) (Kaviraja Ambikadutta Shastri, 2016). *Avalambana* is empowering the same for its own physiological functioning. In view of *Vriddha* V*agbhata*, *Prana* resides at *Murdha* & moves in *Urah* & *Kantha*. It is responsible for *Dharana of Buddhi, Indriya, Hridaya, Mana, Dhamani*. Also it is responsible for *Stheevana* (spitting), *Kshavathu* (sneezing), *Udgara* (belching), *Shwasa* (respiratory phenomenon) & *Aahar karma* (deglutition of food) (Athwale Anant Damodar, 1986). *Sharangdhar* refers the location of *Prana vata* at *Nabhi*. After reaching the proximity of heart it passes outside through the throat to consume nectar like substance called *Vishnupadamrita* (oxygen) from the external atmosphere. After consuming within no time through the same route it gets back into the body. This *Prana Vayu* maintains the entire body and nourishes the *Jiva* and *Jatharagni (*Narayan Ram Acharya*)*. In all text book site of *Prana vayu* is mentioned as *Murdha*. But *Acharya Sharangdhara* has mentioned it as *Nabhi*. The term *Nabhi* in Sanskrit means a center. This has to be perceived as a center in head i.e. respiratory center. Proximity of heart means lungs. According to *Acharya Sushruta*, *Jiva* and *Rakta* are the synonyms.

Anna Pravesha* Function of *Prana Vayu: *Acharya Charaka* in *Chikitsa Sthan* states that *Annam Aadankarma tu Pranah Kostham Prakarshti* (Acharya Vidyadhar Shukla, 2009) that is when food is taken in mouth, after mastication and mixing of saliva the food loses its bond and is softened and becomes *Golakar* (bolus). Here *Prana Vayu* wishes receiving function (*Aadan Karma*) carries bolus from *Mukhguha* (oral cavity) to *Gala* (pharyx) to *Annavaha Srotas* (oesophagus) and finally via *Hardikdwar* (cardiac orifice) it enters to stomach for further digestion. This is the *Anna Pravesha karma* of *Prana Vayu* in *Ayurveda*.

Modern Prospective: Modern science explains the deglutition, in three stages-(1) a voluntary stage, which initiates the swallowing process; (2) a pharyngeal stage, which is involuntary and constitutes passage of food through the pharynx into the esophagus; and (3) an esophageal stage, another involuntary phase that transports food from the pharynx to the stomach.

Voluntary Stage of Swallowing- When the food is ready for swallowing, it is "voluntarily" squeezed or rolled posteriorly into the pharynx by pressure of the tongue upward and backward against the palate.

Pharyngeal Stage of Swallowing- As the bolus of food enters the posterior mouth and pharynx, it stimulates epithelial swallowing receptor areas all around the opening of the pharynx, especially on the tonsillar pillars, and impulses from these pass to the brain stem to initiate a series of automatic pharyngeal muscle contractions as follows:

- The soft palate is pulled upward to close the posterior nares, to prevent reflux of food into the nasal cavities.
- The palatopharyngeal folds on each side of the pharynx are pulled medially to approximate each other forming a sagittal slit through which the food must pass into the posterior pharynx. This slit performs a selective action, allowing food that has been masticated sufficiently to pass with ease. Because this stage of swallowing lasts less than 1 second, any large object is usually impeded too much to pass into the esophagus.
- The vocal cords of the larynx are strongly approximated, and the larynx is pulled upward and anteriorly by the neck muscles. These actions, combined with the presence of ligaments that prevent upward movement of the epiglottis, cause the epiglottis to swing backward over the opening of the larynx. All these effects acting together prevent passage of food into the nose and trachea.
- The upward movement of the larynx also pulls up and enlarges the opening to the esophagus. At the same time, the upper esophageal sphincter (also called the pharyngoesophageal sphincter), relaxes. Thus, food moves easily and freely from the posterior pharynx into the upper esophagus. Between swallows, this sphincter remains strongly contracted, thereby preventing air from going into the esophagus during respiration. The upward movement of the larynx also lifts the glottis out of the main stream of food flow, so the food mainly passes on each side of the epiglottis rather than over its surface; this adds still another protection against entry of food into the trachea.
- Once the larynx is raised and the pharyngoesophageal sphincter becomes relaxed, the entire muscular wall of the pharynx contracts, beginning in the superior part of the pharynx, then spreading downward over the middle and inferior pharyngeal areas, which propels the food by peristalsis into the esophagus.

Nervous Initiation of the Pharyngeal Stage of Swallowing- The most sensitive tactile areas of the posterior mouth and pharynx for initiating the pharyngeal stage of swallowing lie in a ring around the pharyngeal opening, with greatest sensitivity on the tonsillar pillars.

Impulses are transmitted from these areas through the sensory portions of the trigeminal and glossopharyngeal nerves into the medulla oblongata, either into or closely associated with the tractus solitarius, which receives essentially all sensory impulses from the mouth. The successive stages of the swallowing process are then automatically initiated in orderly sequence by neuronal areas of the reticular substance of the medulla and lower portion of the pons that is collectively known as deglutition center. The motor impulses from the swallowing center to the pharynx and upper esophagus that cause swallowing are transmitted successively by the fifth(Trigeminal), ninth(Glossopharyngeal), tenth(Vagus), and twelfth(Hypoglossal) cranial nerves and even a few of the superior cervical nerves (Hall John, 2011).

Esophageal Stage of Swallowing-The esophagus functions primarily to conduct food rapidly from the pharynx to the stomach. The esophagus normally exhibits two types of peristaltic movements-primary peristalsis and secondary peristalsis. Primary peristalsis is simply continuation of the peristaltic wave that begins in the pharynx and spreads into the esophagus during the pharyngeal stage of swallowing. This wave passes all the way from the pharynx to the stomach in about 8 to 10 seconds. If the primary peristaltic wave fails to move into the stomach all the food that has entered the esophagus, secondary peristaltic waves result from distention of the esophagus itself by the retained food; these waves continue until all the food has emptied into the stomach. The secondary peristaltic waves are initiated partly by intrinsic neural circuits in the myenteric nervous system and partly by reflexes that begin in the pharynx and are then transmitted upward through vagal afferent fibers to the medulla and back again to the esophagus through glossopharyngeal and vagal efferent nerve fibers.

The musculature of the pharyngeal wall and upper third of the esophagus is striated muscle. Therefore, the peristaltic waves in these regions are controlled by skeletal nerve impulses from the glossopharyngeal and vagus nerves. In the lower two thirds of the esophagus, the musculature is smooth muscle, but this portion of the esophagus is also strongly controlled by the vagus nerves acting through connections with the esophageal myenteric nervous system. When a peristaltic swallowing wave passes down the esophagus, there is "receptive relaxation" of the lower esophageal sphincter, transmitted through myenteric inhibitory neurons ahead of the peristaltic wave, which allows easy propulsion of the swallowed food into the stomach.

DISCUSSION

From the above literature, the main seat of *Prana Vayu* is *Murdha* (head). Head in this context is Brain and Brainstem and all the *Acharyas* has said that *Anna pravesha Karma* to be conducted by *Prana Vayu* which is way much similar to the act of swallowing conducted by the swallowing center in medulla of brain stem. *Acharaya Charaka* also supports this function of *PranaVayu* by receiving bolus as *Aadan Karma* of *Prana Vayu* and propelling bolus from *Mukhguha* (Oral cavity) to *Hardikdwar* of *Aamashya* which is the cardiac orifice of stomach. If we look at modern aspect, *Anna Pravesha* can be consists of Mastication, salivation and Deglutition (swallowing) processes, but mastication and salivation only covert the food into bolus and lubricate it for easy swallowing. These two processes only prepares the food for swallowing. So deglutition process can be related to *Anna Pravesha Karma*. Deglutition is a reflex response that is triggered by afferent impulses in the trigeminal, glossopharyngeal nerves. These impulses are integrated in the nucleus of the tractus solitarius (medulla oblongata and lower portion of pons). The efferent fibers pass to the pharyngeal musculature and upper esophagus via the by the fifth, ninth, tenth, and twelfth cranial nerves and even a few of the superior cervical nerves. Swallowing is initiated by the voluntary action of collecting the oral contents on the tongue and propelling them backward into the pharynx. This starts a wave of involuntary contraction in the pharyngeal muscles that pushes the material into the esophagus. Inhibition of respiration and glottic closure are part of the reflex response. A peristaltic ring contraction of the esophageal muscle forms behind the material, which is then swept down the esophagus. However, if any food remains in the esophagus, it is cleared by a second wave of peristalsis. So, *Prana Vayu* situated in *Murdha* gives stimulation to the muscles involved in deglutition by generating motor impulses after integration of the sensory impulses.

CONCLUSION

It is concluded that deglutition center promotes swallowing or deglutition of a mass of food that has moved from the oral cavity of the mouth into stomach. This function of brain stem (Medulla Oblongata and lower pons) can be related with the *Anna Pravesha* function of *Prana Vayu*. So, the concept of neurophysiology in terms of *Anna Pravesha Karma* is not unknown to *Ayurveda* which is highlighted here and is needed to be understand in this present era.

REFERENCES

Charak Samhita of Agnivesha; edited by Acharya Vidyadhar Shukla, Prof. Ravi Dutt Tripathi; vol. 1; Chaukhamba Sanskrit Pratishthan, Delhi; 2005; viman sthan 8/98; p-644

Susrut Samhita of Maharishi Susrut; by Kaviraja Ambikadutta Shastri; vol.1; Chaukhamba Sanskrit Sansthan, Varanasi; reprint edtion 2016; nidan sthan 1/9; p-295

Charak Samhita of Agnivesha; edited by Acharya Vidyadhar Shukla, Prof. Ravi Dutt Tripathi; vol. 1; Chaukhamba Sanskrit Pratishthan, Delhi; 2005; sutra sthan 18/118; p-272

Charak Samhita of Agnivesha; edited by Acharya Vidyadhar Shukla, Prof. Ravi Dutt Tripathi; vol. 1; Chaukhamba Sanskrit Pratishthan, Delhi; 2005; sutra sthan 17/12; p-257

Charak Samhita of Agnivesha; edited by Acharya Vidyadhar Shukla, Prof. Ravi Dutt Tripathi; vol. 2; Chaukhamba Sanskrit Pratishthan, Delhi; 2009; chikitsa sthan 28/6; p-687

Astanga Hridya of Srimadvagbhata; by Dr. Bramahnand Tripathi; Chaukhamba Sanskrit Pratishthan, Delhi; 2007; sutra sthan 12/4; p-171

Susrut Samhita of Maharishi Susrut; by Kaviraja Ambikadutta Shastri; vol.1; Chaukhamba Sanskrit Sansthan, Varanasi; reprint edtion 2016; nidan sthan 1/13; p-297

Susrut Samhita of Maharishi Susrut; by Kaviraja Ambikadutta Shastri; vol.1; Chaukhamba Sanskrit Sansthan, Varanasi; reprint edtion 2016; shareer sthan 4/3; p-37

Ashtang Samgraha; edited by Athwale Anant Damodar; Ayurvidya Mudranalaya; pune; 1980; Sutrasthana 2,3; p-146

Sharangadhara Samhita by Narayan Ram Acharya; Chaukhamba Orientalia, Varanasi; purva khanda 5/47;p-22

Charak Samhita of Agnivesha; edited by Acharya Vidyadhar Shukla, Prof. Ravi Dutt Tripathi; vol. 2; Chaukhamba Sanskrit Pratishthan, Delhi; 2009; chikitsa sthan 15/6; p-358.

John E Hall, 2011. Guyton and Hall Text of medical Physiology; 12th edition; gastrointestinal physiology; p-764-765

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