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Role of *Prana Vayu* in Regulation of Respiratory Functions: A Review

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ABSTRACT

Respiration is a vital physiological process responsible for maintaining life through continuous oxygen supply and carbon dioxide elimination. *Ayurveda* attributes the regulation of respiratory activity primarily to *Prana Vayu*, the chief subtype of *Vata Dosha*. Classical *Ayurvedic* texts describe *Prana Vayu* as the governing force behind respiration, swallowing, sensory perception, cognition and maintenance of vital functions. The channels responsible for transportation of *Prana* are described as *Pranavaha Srotas*, whose roots are located in *Hridaya* and *Mahasrotas*¹. Modern physiology explains respiration through respiratory centers, neural pathways, pulmonary ventilation and gaseous exchange mechanisms. Although the conceptual framework differs, remarkable similarities exist between *Ayurvedic* descriptions and contemporary scientific understanding. The present review critically examines the role of *Prana Vayu* in respiratory regulation and explores its correlation with modern respiratory physiology. Although *Prana Vayu* is extensively described in *Ayurvedic* classics, its exact physiological correlation has not yet been clearly established. Therefore, an attempt has been made to explore and understand the physiological functions of *Prana Vayu*, particularly its role in the regulation of respiration and its possible association with the nervous system.

Key Words *Prana Vayu, Respiration, Pranavaha Srotas, Vata Dosha, Respiratory Physiology, Swasa Kriya*

Received 13th June 2026 Accepted 09th July 2026 Published 10th July 2026

INTRODUCTION

Respiration is one of the most essential physiological activities required for survival. It ensures a continuous supply of oxygen for cellular metabolism and facilitates removal of carbon dioxide generated during metabolic processes. Modern physiology describes respiration as a coordinated process involving pulmonary ventilation, diffusion of gases, transport of respiratory gases and regulation by specialized neuronal centres located in the brainstem.

Ayurveda explains physiological activities through the actions of *Dosha, Dhatu* and *Mala*. Among the three *Doshas*, *Vata* is considered the principal regulator of all movements within the body. *Prana Vayu*, one of the five subdivisions of *Vata Dosha*, occupies a unique position because of its direct association with life-sustaining functions. Classical texts describe *Prana Vayu* as responsible for *Swasa* (breathing), *Annapravesha* (swallowing), *Buddhi* (intellect) and maintenance of sensory functions.

The concept of *Pranavaha Srotas* further explains the pathways through which *Prana*

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circulates within the body. Ancient *Ayurvedic* scholars emphasized that disturbances in *Prana Vayu* lead to impairment of respiratory functions and manifestation of diseases such as *Shwasa* and *Kasa*. The present review attempts to critically evaluate the role of *Prana Vayu* in respiratory physiology and correlate classical descriptions with contemporary scientific concepts.

AIM

To review the role of *Prana Vayu* in regulation of respiratory functions from *Ayurvedic* and modern physiological perspectives.

OBJECTIVES

1. To review classical *Ayurvedic* descriptions of *Prana Vayu*.
2. To analyze the role of *Prana Vayu* in respiratory physiology.
3. To correlate *Ayurvedic* concepts with contemporary respiratory science.
4. To evaluate the significance of *Prana Vayu* in maintenance of respiratory health.

MATERIALS AND METHODS

The present review is based on information collected from classical *Ayurvedic* texts, research articles and modern physiology literature. The collected data were reviewed and analyzed to explore the role of *Prana Vayu* in respiratory regulation.

Review

- ***Swarupa* and Functions of *Prana Vayu***

The *Swarupa* of *Prana Vayu* is primarily understood through its actions and physiological functions, as *Vata* cannot be perceived directly. Among the five subdivisions of *Vata*, *Prana Vayu* is considered the most important due to its role in maintaining vital functions. It plays a key role in the regulation of respiration and supports the continuity of life-sustaining activities.

- **Sites of *Prana Vayu***

स्थानं प्राणस्य मूर्ध्नः कण्ठजिह्वास्यनासिकाः ।

(Cha. Chi. 28/6)

Prana Vayu is primarily located in the head and chest. However, other classical *Ayurvedic* texts also describe its association with the throat, mouth, tongue, nose, heart, mind and intellect, highlighting its role in the regulation of various vital functions^{2,3}.

According to *Ayurvedic* literature, *Prana* is also believed to be situated in the *Nabhi* (umbilical region), which is surrounded by numerous *Siras* (vessels), similar to the spokes arranged around the hub of a wheel⁴. These *Siras* serve as pathways for the distribution of *Prana* from the heart to different parts of the body. Therefore, they are regarded as important sites involved in the circulation and maintenance of vital life force.

- **Functions of *Prana Vayu***

छीवनक्षवथूद्गारश्वासाहारादि कर्म च ॥

(Cha. Chi. 28/6)

The functions of *Prana Vayu* include salivation (*Sthivana*), sneezing (*Kshavathu*), belching (*Udgara*), respiration (*Shwasa*) and the intake of food (*Ahara Grahana*). These functions indicate

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that *Prana Vayu* plays a key role in the regulation of respiratory processes and protective reflex mechanisms, thereby contributing to the maintenance of vital physiological activities.

Prana Vayu is responsible for several vital physiological functions, including respiration, swallowing, sensory perception and cognitive activities. It works in coordination with the other four subdivisions of *Vata* to maintain normal bodily functions⁵. *Vyana Vayu* governs bodily

movements (*Praspanadanam*), *Udana Vayu* facilitates the upward movement of sensations and expression (*Udvahanam*), *Samana Vayu* is involved in digestion and separation of useful and waste products (*Vivekah*), while *Apana Vayu* regulates the retention and elimination of urine, feces and reproductive elements (*Dharanam*). Together, these five *Vayus* contribute to the maintenance of physiological balance and overall health.

Table 1 Sites & functions of *Prana Vayu* according to different *Acharya*

S.No.		<i>Charak Samhita</i> ⁶	<i>Sushruta Samhita</i> ⁷	<i>Ashtang Sangraha</i> ⁸	<i>Ashtang Hridaya</i> ⁹
1.	Sites	<i>Murdha</i> (head), <i>Urah</i> (chest), <i>Kantha</i> (throat), <i>Jihwa</i> (tongue), <i>Aasya</i> (mouth), <i>Nasika</i> (nose)	<i>Vaktra</i> (<i>Mukha-Urah-Kantha</i>) <i>Sanchran</i> .	<i>Murdha</i> , <i>Kantha</i> , <i>Urah Vichran</i> .	<i>Murdha</i> (head region), <i>Urah</i> , <i>Kantha</i> .
2.	Functions	<i>Sthivana</i> (spitting), <i>Kshavthu</i> (sneezing) <i>Udgara</i> (eructation) <i>Swasa</i> (respiration) <i>Aaharkarma</i> (deglutition)	<i>Deha Dharna</i> , <i>Anna Pravesha</i> , <i>Pran Ablamban</i>	<i>Buddhi</i> , <i>Indriya</i> , <i>Mana</i> , <i>Hridaya</i> , <i>Dhamni Dharan</i> , <i>Sthivana</i> , <i>Ksavthu</i> , <i>Udgara</i> , <i>Swas-Ucchwas</i> & <i>Anna Pravesha</i> .	<i>Buddhi</i> (intelligence), <i>Hridaya</i> (heart), <i>Indriya</i> (sense organs), <i>Chitta</i> (mind), <i>Sthivna</i> , <i>Ksavthu</i> , <i>Udgara</i> , <i>Nichwas</i> , <i>Anna Pravesha</i> .

Swasa-Praswasa Kriya –

नाभिस्थः प्राणपवनः स्पृष्ट्वा हृत्कमलान्तरम् ।

कण्ठाद्वहिर्विनिर्याति पातुं विष्णुपदामृतम् ॥

पीत्वा चाम्बरपीयूषं पुनरायाति वेगतः ।

प्रीणयन्देहमखिलं जीवयञ्जठरानलम् ॥

(Sha. Pu. 5/51)

According to *Sharangadhara*, *Prana Vayu* is situated in the *Hridaya* (heart) and *Nabhi* (umbilical region) and is closely associated with the process of *Swasa-Praswasa* (respiration), which sustains life and supports the proper functioning of *Agni*. While residing in the *Murdha* (head), *Prana Vayu* governs higher

functions such as intellect (*Buddhi*), mind (*Manas*), sensory perception and motor activities. This description suggests its vital role in coordinating various physiological functions essential for the maintenance of life.

According to *Sharangdhara's* description regarding respiration presents a very logical and attractive picture of this activity. *Samhita* describes The *Prana Vata* located near the *Nabhi* moves upward to the *Hridaya* and comes out of the throat to drink *Vishnu-padamritam* i.e. nectar of the atmosphere viz. oxygen and having partaken it moves quickly inside to enliven the entire body and increase the gastric fire (power of digestion).

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According to modern physiology, respiration is a rhythmic and involuntary process regulated by respiratory centres located in the medulla oblongata and pons¹⁰. These centers continuously control the rate and depth of breathing to maintain normal respiratory function. Sensory information from chemoreceptors and mechanoreceptors is transmitted through the vagus and glossopharyngeal nerves, helping to regulate respiratory rhythm and protect the airways. This coordinated neural control shows functional similarities with the *Ayurvedic* concept of *Prana Vayu*, which is described as governing respiration as well as protective activities such as swallowing, sneezing and other reflex functions.

In modern physiology, inspiration occurs mainly through the contraction of the diaphragm and external intercostal muscles, which expand the thoracic cavity and allow air to enter the lungs¹¹. This process can be functionally correlated with the role of *Prana Vayu* in facilitating the intake of air. Expiration is usually a passive process during normal breathing; however, during activities such as speaking, coughing or forceful breathing, it becomes active through the involvement of the abdominal and internal intercostal muscles.

Contemporary interpretations indicate that *Prana Vayu* may be related to the physiological mechanisms governing inspiratory activity under the control of the brainstem and autonomic nervous system. Similarly, *Udana Vayu* may be linked to voluntary expiratory functions and the neural control of phonation and speech¹².

Neurophysiological studies have shown that emotional and mental states can influence breathing patterns through the activity of the limbic system¹³. In a similar manner, *Ayurveda* describes *Prana Vayu* as being closely associated with the mind (*Manas*) and consciousness, highlighting the interconnected relationship between mental functions and respiration.

DISCUSSION

The present review critically evaluated the *Ayurvedic* concept of *Prana Vayu* and its possible physiological correlation with modern respiratory science. Classical *Ayurvedic* texts consistently describe *Prana Vayu* as the primary regulator of respiration, swallowing, sensory perception and cognitive functions. These descriptions indicate that *Prana Vayu* represents a broader regulatory principle rather than merely the mechanical act of breathing. Contemporary physiology similarly recognizes respiration as an integrated neuro-respiratory process involving respiratory centres, autonomic regulation, protective reflexes and higher cortical influences. The observed functional similarities suggest that *Prana Vayu* may be interpreted as a comprehensive neurophysiological regulatory mechanism responsible for maintaining vital life functions. The sites of *Prana Vayu* described in *Ayurvedic* literature, such as *Murdha*, *Urah*, *Kantha*, *Nasika*, *Hridaya* and *Nabhi*, appear to represent important functional centres involved in respiratory and neurological activities. The

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localization of *Prana Vayu* in the head is particularly significant, as modern physiology recognizes the brainstem as the primary centre for respiratory regulation. The respiratory centres situated in the medulla oblongata and pons continuously regulate the rhythm and depth of breathing, thereby maintaining normal respiratory function. This functional similarity supports the view that *Prana Vayu* may represent a physiological principle governing the initiation and regulation of respiration.

The functions attributed to *Prana Vayu*, including *Shwasa*, *Ahara Grahana*, *Kshavathu*, *Udgara* and *Sthivana*, closely resemble several protective and autonomic reflexes described in modern physiology. Activities such as swallowing, sneezing, coughing, salivation and airway protection are coordinated through complex neural pathways involving cranial nerves and brainstem centres. Thus, the *Ayurvedic* description of *Prana Vayu* extends beyond pulmonary ventilation and encompasses various reflex mechanisms necessary for survival.

The explanation of *Swasa-Praswasa Kriya* by *Sharangadhara* provides an interesting physiological perspective. The movement of *Prana* from *Nabhi* to *Hridaya* and subsequently through the respiratory passages symbolizes the continuous exchange between the body and the external environment. The description of inhaling “*Vishnupadamrita*” may be interpreted as the intake of life-supporting elements from the atmosphere, while the nourishment of the entire body and maintenance of *Jatharagni* reflects the

indispensable role of oxygen in cellular metabolism and energy production. Although expressed in classical terminology, the underlying concept demonstrates a remarkable understanding of the importance of respiration in sustaining life.

Recent neurophysiological findings provide additional support for understanding *Prana Vayu* from an integrative perspective. Breathing is now recognized as a process influenced not only by respiratory centres but also by higher neural structures involved in emotions, cognition and consciousness. The influence of the limbic system on respiratory patterns demonstrates the close relationship between mental states and breathing. *Ayurveda* similarly associates *Prana Vayu* with *Manas*, *Buddhi* and *Indriya*, indicating that respiration is intimately connected with psychological and cognitive functions. This psychosomatic perspective remains highly relevant in understanding the effects of stress, anxiety and emotional disturbances on respiratory health.

Based on the available evidence, *Prana Vayu* may be understood as a comprehensive neuro-respiratory regulatory principle that coordinates respiration, protective reflexes, sensory activities, mental functions and vital physiological processes. Although an exact anatomical equivalent cannot be established, the functional similarities between classical *Ayurvedic* descriptions and modern respiratory physiology suggest that *Prana Vayu* represents an integrated concept encompassing neural, respiratory and

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psychosomatic regulation. Further interdisciplinary research may help to clarify these correlations and provide a deeper scientific understanding of this important Ayurvedic concept.

CONCLUSION

Prana Vayu occupies a central position in *Ayurvedic* physiology and plays a vital role in the regulation of respiration and other life-sustaining functions. Classical descriptions indicate that its influence extends beyond breathing to include swallowing, protective reflexes, sensory perception, cognition and maintenance of consciousness. A critical review of *Ayurvedic* literature and modern respiratory physiology reveals several functional similarities between *Prana Vayu* and the neural mechanisms responsible for respiratory regulation. Although a direct anatomical correlation cannot be established, *Prana Vayu* may be interpreted as an integrative neuro-respiratory regulatory principle that coordinates respiratory, neurological and psychosomatic functions. Further scientific and interdisciplinary research is required to better understand its physiological significance and validate its relevance in contemporary healthcare.

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