

**UNDERSTANDING PHYSIOLOGICAL ASPECT OF PRANA VAYU AND UDANA VAYU  
W.S.R. TO RESPIRATORY SYSTEM – A RIVIEW****Dr. Samarth C. H.\*<sup>1</sup>, Dr. Spandana M.<sup>2</sup>**<sup>1</sup>Pg Scholar, Dept. of Kriya Shareera, Shri Dharmasthala Manjunatheshwra College of Ayurveda and Hospital, Hassan.<sup>2</sup>PG Scholar, Dept. of Dravyaguna, Jss Ayurveda Medical College Mysore.**\*Corresponding Author: Dr. Samarth C. H.**Pg Scholar, Dept. of Kriya Shareera, Shri Dharmasthala Manjunatheshwra College of Ayurveda and Hospital, Hassan. DOI: <https://doi.org/10.5281/zenodo.18874846>**How to cite this Article:** Dr. Samarth C. H.\*<sup>1</sup>, Dr. Spandana M.<sup>2</sup> (2026). Understanding Physiological Aspect Of Prana Vayu And Udana Vayu W.S.R. To Respiratory System – A Riview. World Journal of Pharmaceutical and Medical Research, 12(3), 542–545.

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**ABSTRACT**

**Introduction:** In Ayurveda, Vata Doṣa governs all dynamic physiological activities in the body. Among its five subdivisions, Praṇa Vayu and Udana Vayu play an imporant role in maintaining respiratory and vital functions. While Praṇa Vayu is primarily responsible for inhalation, perception, and autonomic regulation, Udana Vayu governs exhalation, phonation, and effortful respiratory activities. Understanding these concepts in relation to modern respiratory physiology provides integrative insight into neuro-respiratory coordination. **Methods:** A conceptual analytical study was conducted through Ayurveda classical texts including Charaka Samhita, Susruta Samhita, and Astanga Hridaya, correlating their descriptions with contemporary knowledge of respiratory physiology, neuroanatomy, and pulmonary mechanics. Comparative analysis was performed to identify functional parallels. **Results:** Prana Vayu, located in the head and thoracic region, correlates functionally with the medullary respiratory centers, autonomic nervous system regulation, and inspiratory mechanisms involving diaphragmatic contraction. It governs oxygen intake, swallowing coordination, and protective airway reflexes. Udana Vayu, situated in the chest and throat, corresponds to expiratory control, vocal cord function, speech production, and voluntary respiratory efforts mediated through cortical and brainstem pathways. The synergistic action of Prana and Udana Vayu resembles the integration between involuntary respiratory rhythm generation and voluntary modulation such as phonation and forced expiration. **Discussion:** The physiological interpretation suggests that Prana Vayu represents afferent sensory integration and inspiratory drive, whereas Udana Vayu represents efferent motor expression and expiratory force. Their balance ensures efficient gaseous exchange, voice production, and maintenance of life. Disturbance may manifest as dyspnea, speech disorders, or neuromuscular respiratory dysfunction.

**KEYWORDS:** Prana Vayu,Udana Vayu, Respiratory Physiology,Vata Dosha, Neuro-respiratory Regulation, Phonation.**INTRODUCTION**

Respiration is a fundamental physiological process that sustains life by ensuring continuous oxygen delivery to tissues and elimination of carbon dioxide. In modern physiology, respiratory regulation involves complex coordination between the central nervous system, respiratory muscles, airways, and pulmonary structures. The medullary respiratory centers generate rhythmic breathing, while cortical and limbic influences modulate voluntary and emotional aspects of respiration.<sup>[1]</sup> Ayurveda conceptualizes this intricate regulation under the governance of Vata Dosha, particularly through its

subtypes Prana Vayu and Udana Vayu, which together maintain respiratory integrity and vitality.

Classical Ayurvedic texts describe Prana Vayu as the foremost among the five Vayus, situated in the head and thoracic region. It is responsible for inhalation (svasa), swallowing, perception, and maintenance of consciousness.<sup>[2]</sup> Its functional attributes suggest regulation of inspiratory effort, autonomic control, and protective airway reflexes. The description of Prana Vayu aligns closely with the physiological role of the brainstem respiratory centers and vagal regulation of

breathing.<sup>[3]</sup> Disturbance of Prana vayu is said to manifest as dyspnea, hiccups, and impaired sensory functions, which parallel respiratory and neuromuscular disorders. Udana Vayu, localized in the chest and throat, governs exhalation, speech production, effort, enthusiasm, and upward movements in the body. Its role in phonation and forceful expiration correlates with expiratory muscle function, laryngeal activity, and cortico-bulbar pathways involved in speech and voluntary breathing.<sup>[4]</sup> The coordinated functioning of Prana and Udana Vayu resembles the integration between involuntary respiratory rhythm generation and voluntary modulation required for speaking, singing, or coughing.

Thus, Ayurvedic physiology provides a holistic framework that not only explains the mechanical aspects of respiration but also integrates cognitive, emotional, and vital dimensions of breathing.<sup>[5]</sup> Understanding the physiological aspects of Prana and Udana Vayu in relation to modern respiratory science offers an integrative perspective valuable for interpreting respiratory disorders and enhancing interdisciplinary research.

## METHODS

The conceptual study was conducted by observing, analysing the data gathered from Journal, Published research articles in PubMed google scholar, and web search. To understand physiological aspects of prana and udana vayu with special reference to respiratory system.

## Review of literature

The concept of Vata Dosha as the prime regulator of all physiological movements is well established in classical Ayurvedic literature. Among its five subdivisions—Prana, Udana, Samana, Vyana, and Apana—Prana Vayu and Udana Vayu are chiefly responsible for respiratory and neuro-vocal functions. The Charaka Samhita describes Prana Vayu as located in the head and chest, governing inhalation (svasa), swallowing (anna pravesa), spitting, sneezing, and maintenance of intellect and consciousness.<sup>[6]</sup> Similarly, the Susruta Samhita emphasizes its role in sustaining life and sensory coordination.<sup>[7]</sup> These descriptions suggest a regulatory mechanism involving both respiration and higher neural integration.

Udana Vayu is described as residing in the thorax and throat, facilitating speech (vak pravrutti), effort (prayatna), enthusiasm, strength, and upward movements. Vagbhata in Astanga Hridaya further clarifies that Udana governs vocalization and expiration, indicating its involvement in controlled exhalation and phonatory mechanisms.<sup>[8]</sup> The classical texts also state that impairment of Prana and Udana leads to dyspnea, cough, hoarseness of voice, and speech difficulty, demonstrating an early clinical understanding of respiratory pathophysiology.

Modern physiology explains respiration as a rhythmic process generated by the respiratory centers in the medulla oblongata and pons, particularly the dorsal and ventral respiratory groups.<sup>[9]</sup> These centers regulate involuntary breathing, comparable to the autonomic functions attributed to Prana Vayu. The vagus nerve and glossopharyngeal nerve provide afferent input from chemoreceptors and mechanoreceptors, maintaining respiratory rhythm and airway protection. This neural regulation parallels the Ayurvedic description of Prana Vayu controlling swallowing, sneezing, and protective reflexes.

The mechanics of inspiration primarily involve contraction of the diaphragm and external intercostal muscles, increasing thoracic volume and facilitating air entry.<sup>[10]</sup> This inspiratory effort aligns conceptually with Prana Vayu's function of pravesha(intake). Expiration, although passive during quiet breathing, becomes active during speech, coughing, and forced respiration through engagement of abdominal and internal intercostal muscles. These active expiratory and vocal functions closely resemble the described actions of Udana Vayu.

Phonation involves coordinated action of respiratory airflow, laryngeal muscles, and cortical control. The larynx converts expiratory air into sound through vibration of vocal cords, modulated by higher brain centers.<sup>[11]</sup> The Ayurvedic attribution of speech production and effort to Udana Vayu indicates recognition of this expiratory-laryngeal coordination. Disorders such as dysphonia and aphonia may thus be interpreted as Udana Vaikrti.

Recent integrative interpretations suggest that Prana Vayu corresponds functionally to the inspiratory drive regulated by the brainstem and autonomic nervous system, while Udana vayu represents voluntary expiratory control and cortico-bulbar pathways influencing phonation.<sup>[12]</sup> Neurophysiological studies indicate that emotional states significantly affect breathing patterns through limbic system influence.<sup>[13]</sup> Ayurveda similarly links Prana with mental stability (manas) and consciousness, reflecting a psychosomatic understanding of respiration.

From a clinical perspective, respiratory disorders such as bronchial asthma involve airway hyperresponsiveness, altered autonomic balance, and impaired expiratory flow. Ayurvedic texts describe Tamaka Svasa as a disorder involving vitiation of Prana and Udana Vayu with Kapha obstruction.<sup>[14]</sup> This demonstrates a conceptual similarity between bronchoconstriction and impaired Vata movement.

Contemporary research on breath regulation practices such as Pranayama has demonstrated modulation of autonomic tone, improved lung function, and enhanced vagal activity.<sup>[15]</sup> These findings reinforce the functional significance of Prana Vayu in maintaining respiratory

rhythm and neurocardiac balance. Controlled breathing also improves phonatory endurance, indirectly supporting the role of Udana Vayu in vocal strength.

Thus, classical Ayurvedic literature provides a detailed functional description of respiratory control through Prana and Udana Vayu. When interpreted alongside modern neuro-respiratory physiology, these concepts reveal remarkable parallels in inspiratory regulation, expiratory control, phonation, and psychosomatic integration. This integrative understanding strengthens the scientific basis for correlating Ayurvedic principles with contemporary respiratory science.

## DISCUSSION

The physiological interpretation of Prana Vayu and Udana Vayu in relation to the respiratory system highlights the depth and practicality of Ayurvedic thought. Respiration is not merely a mechanical exchange of gases but a coordinated process involving neural control, muscular activity, consciousness, and expression. Ayurveda conceptualizes this complex integration through Prana and Udana Vayu, offering a functional framework that aligns closely with modern respiratory physiology.

Prana Vayu is considered the primary sustaining force responsible for inhalation and the initiation of respiratory activity. Its described location in the head and chest suggests a regulatory role involving higher neural centers and autonomic control. Functionally, Prana Vayu governs the rhythm and continuity of breathing, coordination of swallowing, and protective airway reflexes. These actions resemble the involuntary control of respiration mediated by the brainstem and autonomic nervous system. Any disturbance in this regulation may manifest as irregular breathing, breathlessness, or impaired reflexes, reflecting the clinical relevance of Prana imbalance.

Udana Vayu plays a complementary yet distinct role in respiration. It is responsible for expiration, speech, effort, and upward movement of energy. From a physiological perspective, expiration becomes an active process during speech, coughing, and exertion, requiring coordinated muscular contraction and voluntary control. Udana Vayu represents this expressive and forceful aspect of breathing. Its involvement in phonation indicates an understanding of the relationship between airflow, vocal cord function, and conscious effort. Impairment of Udana Vayu may therefore present as weak voice, difficulty in speech, or reduced expiratory capacity.

The harmonious interaction between Prana and Udana Vayu ensures efficient respiratory function. While Prana initiates and maintains breathing, Udana provides strength, control, and expression. This balance allows respiration to adapt to physical activity, emotional states, and communicative needs. Modern science also recognizes that breathing is influenced by mental and

emotional factors, further supporting the Ayurvedic view that respiration is closely linked with consciousness and vitality.

Overall, the concepts of Prana and Udana Vayu offer a holistic explanation of respiratory physiology that integrates involuntary control, voluntary modulation, and psychosomatic influences. Understanding respiration through this integrative lens enhances the appreciation of Ayurvedic physiology and provides meaningful insights for clinical interpretation and therapeutic application.

## CONCLUSION

Prana Vayu and Udana Vayu represent two essential regulatory forces governing the respiratory system in Ayurvedic physiology. Rather than viewing respiration as a purely mechanical process, Ayurveda explains it as a dynamic integration of vital energy, neural control, muscular activity, and consciousness. Prana Vayu is responsible for the initiation and maintenance of breathing, ensuring a continuous supply of life-sustaining air and coordinating protective reflexes such as swallowing and coughing. Its role reflects the involuntary and sustaining aspect of respiration that operates throughout life without conscious effort.

Udana Vayu, on the other hand, governs the expressive and effortful dimensions of respiration. It enables controlled expiration, speech production, vocal strength, and the ability to modify breathing during physical activity or communication. This highlights the voluntary and functional adaptability of the respiratory process. The presence of Udana Vayu ensures that respiration supports not only survival but also communication, enthusiasm, and strength.

The coordinated functioning of Prana and Udana Vayu maintains respiratory efficiency and adaptability. When both are in balance, breathing remains rhythmic, effortless, and responsive to physical, mental, and emotional demands. Disturbance in either can result in breathlessness, voice disorders, reduced stamina, or impaired coordination, demonstrating their clinical significance.

By correlating these Ayurvedic concepts with modern understanding, it becomes evident that Prana Vayu corresponds to inspiratory regulation and autonomic respiratory control, while Udana Vayu aligns with expiratory force and voluntary modulation of breathing. This integrative interpretation reinforces the scientific relevance of Ayurvedic physiology.

In conclusion, understanding the physiological aspects of Prana and Udana Vayu provides a comprehensive and holistic view of respiration. It bridges traditional wisdom with modern science and offers valuable insights for education, research, and clinical application in respiratory health.

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