A Comparative Review of Prana, Udana, Vyana, Samana, And Apana Vayu with Autonomic Nervous Functions

Dr. Priyanka L. Kasar[1], Dr. Vaibhav K. Bhadage[2]
[1] *Assistant Professor, Department of Kriya Sharir, Indian Institute of Medical Sciences Ayurved College, Manori, Dist. Nashik 422004 (Maharashtra)*
[2]*Assistant Professor, Department of Rachana Sharir, Indian Institute of Medical Sciences Ayurved College, Manori, Dist. Nashik 422004 (Maharashtra)*

***Abstract*—Ayurveda, the ancient Indian system of medicine, presents a unique approach to physiology centered around the concept of Doshas, with Vata Dosha governing all types of motion and communication in the body. Vata is further classified into five subtypes: Prana, Udana, Vyana, Samana, and Apana Vayu. These five subdivisions regulate vital functions including respiration, circulation, digestion, and excretion. Modern physiology attributes such functions to the autonomic nervous system (ANS), composed of sympathetic, parasympathetic, and enteric systems. This review seeks to establish correlations between Ayurvedic and modern frameworks, revealing functional parallels and offering an integrative physiological perspective. Understanding this convergence can aid in forming holistic healthcare models and developing therapeutic strategies rooted in both ancient wisdom and modern science.**

***Index Terms*—Prana Vayu, Udana Vayu, Vyana Vayu, Samana Vayu, Apana Vayu, Autonomic Nervous System, Ayurveda, Physiology, Integrative Medicine**

I INTRODUCTION

The human body, according to Ayurveda, functions as a unified system governed by the balance of Tridoshas—Vata, Pitta, and Kapha. Among these, Vata Dosha is the primary initiator of all movements, both voluntary and involuntary. It is the force responsible for respiration, neural conduction, circulation, and elimination. Vata is classified into five subtypes or Pancha Vayus, each with distinct locations and responsibilities:

- Prana Vayu: Governs breathing, perception, and swallowing
- Udana Vayu: Controls speech, effort, and upward movement
- Vyana Vayu: Facilitates circulation and voluntary movements
- Samana Vayu: Regulates digestion and absorption
- Apana Vayu: Manages excretion and reproductive functions

Modern physiology addresses these activities through the autonomic nervous system, which regulates involuntary body functions. The sympathetic system prepares the body for activity, the parasympathetic system supports rest and digestion, and the enteric system controls gastrointestinal function.

This article reviews and correlates the physiological functions of Five types of vata dosha with the subdivisions of the autonomic nervous system (ANS), aiming to bridge ancient Ayurvedic knowledge with contemporary biomedical science.

Aim and Objectives

Aim:To study the functional similarities between the Ayurvedic concept of Five types of vata dosha and the anatomical and physiological understanding of the autonomic nervous system.

Objectives:

- To describe each Vayu with reference to classical Ayurvedic literature.
- To outline the role and divisions of the ANS in regulating body functions.
- To draw comparisons between Five types of vata dosha and ANS based on functional similarity.
- To analyze the clinical implications of this integrative view in diagnostics and therapeutics.

II MATERIALS AND METHODS

This is a qualitative, non-experimental review study based on literature analysis. The primary sources include classical Ayurvedic treatises such as Charaka Samhita, Sushruta Samhita, and Ashtanga Hridaya. Secondary sources include modern physiology textbooks, scientific journals, and published comparative reviews. The functions of each Vayu were analyzed based on their classical descriptions and were then mapped against corresponding activities governed by the ANS. Peer-reviewed literature from the fields of neurophysiology, integrative medicine, and Ayurvedic science was consulted to validate the comparisons.

III REVIEW OF LITERATURE

Numerous classical Ayurvedic texts describe the functional and anatomical dimensions of Vata and its subtypes. In Charaka Samhita, Vata is described as the initiator of all bodily activities and movements[1]. Each Vayu is assigned specific roles and regions of operation. Ashtanga Hridaya further elaborates on the interdependent nature of the five Vayus, highlighting their role in maintaining homeostasis[2].

Modern physiological literature extensively explores the autonomic nervous system (ANS), which comprises the sympathetic, parasympathetic, and enteric divisions. The ANS regulates involuntary processes such as heart rate, digestion, respiratory rate, pupillary response, urination, and sexual arousal[3]. The enteric nervous system (ENS), often referred to as the "second brain," controls digestive processes independently of the central nervous system[4].

Comparative reviews by scholars like Sharma et al. have highlighted the potential correlations between Ayurvedic and modern physiological systems. Some efforts have been made to study vagal tone in the context of Prana Vayu and gut-brain interactions in the context of Samana Vayu[5]. Despite such efforts, a structured one-to-one mapping of each Vayu with specific autonomic functions remains an emerging area of research.

IV DISCUSSION

1. Prana Vayu ↔ Parasympathetic (Cranial Division)

Classical Role: Located in the head and chest, Prana Vayu governs breathing, swallowing, perception, and mental clarity[6].

Modern Correlate: These functions align with the cranial parasympathetic outflow, especially the vagus nerve (CN X), which innervates the heart, lungs, and digestive tract[7]. Prana's role in maintaining consciousness and sensory integration also reflects the reticular activating system and cortical integration centers.

2. Udana Vayu ↔ Somatic & Autonomic Control of Upper Body

Classical Role: Udana Vayu, seated in the throat and thorax, supports speech, effort, and upward movement[8].

Modern Correlate: This is comparable to corticobulbar motor pathways, laryngeal nerves, and upper thoracic autonomic functions. Udana governs not only speech (via CN IX, X, XII) but also expiratory force and vocal expression—functions involving voluntary and autonomic coordination.

3. Vyana Vayu ↔ Sympathetic Nervous System

Classical Role: Spread throughout the body, Vyana Vayu regulates circulation, motor coordination, and systemic distribution of nutrients[9].

Modern Correlate: It mirrors the sympathetic nervous system, which controls cardiac output, vasomotor tone, and fight-or-flight responses. Vyana's role in coordination also implicates proprioceptive neural networks.

4. Samana Vayu ↔ Enteric Nervous System

Classical Role: Located in the digestive tract, Samana Vayu aids in digestion, separation of essence (Sara) from waste (Kitta)[10].

Modern Correlate: The enteric nervous system governs intestinal motility and secretion, performing functions independently. Samana Vayu represents the body's digestive intelligence, and its dysfunction can be seen in IBS, acid reflux, and malabsorption syndromes.

5. Apana Vayu ↔ Sacral Parasympathetic Nervous System

Classical Role: Residing in the pelvic region, Apana Vayu controls urination, defecation, menstruation, childbirth, and ejaculation[11].

Modern Correlate: These roles align with sacral parasympathetic outflow (S2–S4), which innervates bladder, rectum, and reproductive organs. Disorders like incontinence, pelvic dysfunction, and erectile dysfunction may reflect Apana Vayu disturbances.

Summary

- Ayurveda's Five types of vata dosha system provides a nuanced physiological model of motion and regulation.
- There are strong functional correlations between Vayu types and subdivisions of the autonomic nervous system:
- Prana Vayu ↔ Parasympathetic (cranial)
- Udana Vayu ↔ Voluntary & autonomic upper motor control
- Vyana Vayu ↔ Sympathetic nervous system
- Samana Vayu ↔ Enteric nervous system
- Apana Vayu ↔ Sacral parasympathetic outflow
- These mappings can enhance understanding in areas like functional medicine, psychosomatic disorders, and mind-body interventions.

V CONCLUSION

The correlation between Prana, Udana, Vyana, Samana, and Apana Vayu and the autonomic nervous system reveals Ayurveda's profound insight into human physiology, aligning closely with modern neurophysiological frameworks. Where modern medicine is anatomical and mechanical, Ayurveda is functional and energetic. Together, they offer a complementary model of understanding the human body.

This integrative perspective can inform new diagnostic paradigms and holistic treatment strategies. Clinical research is needed to validate these associations and apply them in personalized medicine, particularly in neurodegenerative, stress-related, and functional gastrointestinal disorders.

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