



"The Central Role Of *Samana Vata* In Digestion: A Critical *Ayurvedic* Review"

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ABSTRACT:

Background: *Samana Vata* is one of the five subtypes of *Vata Dosha*. It is located near *Jatharagni* (digestive fire) and circulates throughout the *Koshta* (gastrointestinal tract). It performs several vital functions, such as stimulating *Agni* to aid in digestion and facilitating the assimilation of nutrients from ingested food. The primary functions of *Samana Vata* include *AnnaGrahana* (food intake), *Pachana* (digestion), *Vivechana* (separation of nutrients), and *Munchana* (expulsion of waste). Additionally, *Samana Vata*, with the assistance of *Prana Vata*, helps receive food, while *Apana Vata* aids in the elimination of waste. It is believed that *Samana Vata* plays a significant role in digestive physiology. Its functions can be closely correlated with the enteric nervous system, often referred to as the "second brain," along with the parasympathetic and sympathetic branches of the autonomic nervous system.

Aims and Objectives: To critically analyse the concept of *Samana Vata* and establish its correlation with modern physiological concepts.

Materials and Methods: A literature review was conducted using classical *Ayurvedic* texts, modern physiology textbooks, research articles, and databases such as Google Scholar and PubMed.

Conclusion: *Samana Vata* plays a crucial role in activating *Agni*, thereby facilitating digestion, absorption, and the separation of nutrients from waste. According to *Acharya's*, the functions of *Samana Vata* closely align with the physiological activities of the enteric nervous system. Moreover, it shares similarities with certain aspects of the autonomic nervous system.

Key words: Samana Vata, Jatharagni, Anna Grahana, Pachana, Vivechana, Munchana, Enteric nervous system, Parasympathetic, Sympathetic nervous system.

INTRODUCTION:

Ayurveda is a comprehensive science that encompasses nearly all aspects of life, offering benefits both in this life and beyond. The individual is a microcosm of the universe, embodying all material and spiritual phenomena within. Likewise, everything present within the individual is also contained within the universe.¹ To achieve life's goals, an individual must maintain good health, which requires continuous adaptation to the surrounding environment. Health is a state of balance where the *Doshas* (biological energies), *Dhatus*(tissues), *Agni* (digestive fire), *Malas* (waste products), and all physiological systems function harmoniously, while the soul, sense organs, and mind experience complete well-being². *Dosha*, *Dhatu*, and *Mala* collectively form the foundation of the human body³. The balance of these elements signifies a healthy state, while any imbalance can lead to various diseases⁴.

Ayurveda describes the concept of *Tridosha-Vata*, *Pitta*, and *Kapha* as the primary theory governing health and disease. Among them, *Vata Dosha* holds significant importance, as it regulates all types of movements and mental functions, provides compactness to the body, promotes speech and sensation, and is responsible for various other physiological processes⁵.

Vata Dosha has five types: *Prana*, *Udana*, *Samana*, *Vyana*, and *Apana*, each governing specific bodily function. *Samana Vata* controls digestion, assimilation, and *Agni* (digestive fire). When imbalanced, it weakens *Agni*, leading to digestive disorders. *Ayurveda* views *Mandagni* (weak digestion) as the root of all diseases. *Kayachikitsa*, a key *Ayurvedic* branch, focuses on restoring *Jatharagni* (digestive fire) for overall health.⁶ So *Samana vata* works in coordination with *Prana Vata*, *Vyana Vata*, and *Apana Vata*, ensuring proper cooperation during physiological activities. Therefore, it is essential to understand these functions from a modern perspective.

AIMS AND OBJECTIVES:

To critical analysis of the concept of *Samana Vata* and its correlation with modern physiological principles mainly with digestive physiology.

MATERIALS AND METHODS:

The review is based on classical *Ayurvedic* texts, including the *Brihatrayi* (*Charaka Samhita*, *Sushruta Samhita*, and *Ashtanga Hridaya*) and the *Laghutrayi* (*Bhavaprakasha*, *Sharangadhara Samhita*, and *Madhava Nidana*), as well as modern physiology text books, relevant online sources and scientific journals.

REVIEW OF LITERATURE:

The term *Samana* means “*samanthad kosthe samyak samam vaa aniti, iti samanah*” which refers to something that spreads evenly throughout the body or balances and distributes everything we consume. *Samana Vata* is located near the digestive fire (*Agni*) and plays a vital role in the process of digestion⁷. *Samana Vayu* is located in the *Kostha* (abdominal region), where it helps digest the ingested food and supports the formation of *Dhatus* (body tissues) and *Malas* (waste products). Its primary functions include balancing, transporting, and regulating the movement of food during digestion⁸.

Table:1 *Sthana* (Location) and *Karma*(functions) of *Samana vata* according to different *Acharya*'s.

Sl. No	Samhita	<i>Sthana</i> (Location)	<i>Karma</i> (Functions)
01	<i>Charaka Samhita</i> ⁹	Present in <i>Swedavaha</i> (sweat), <i>Doshavaha</i> (humors), <i>Udakavaha</i> (water) <i>Srotas</i> and lateral to the seat of <i>Jatharagni</i> (digestive fire).	It enhances digestion and vitality also regulates the pathways responsible for carrying sweat, waste, and fluids in the body.
02	<i>Sushruta Samhita</i> ¹⁰	It travels in the <i>Aamashaya</i> and <i>Pakvashaya</i> in associating with <i>Agni</i> (digestive fire).	It digests food and separates its essence and waste materials; an imbalance in its function can lead to conditions such as <i>Agnisada</i> (indigestion), <i>Gulma</i> (abdominal lumps), and <i>Atisara</i> (diarrhoea).
03	<i>Ashtanga Hridaya</i> ¹¹	Located near <i>Jatharagni</i> (digestive fire) and it travels all over the <i>Kostha</i> (Gastrointestinal tract).	<i>Anna Grahana</i> (receives food into the gastrointestinal tract), <i>Pachana</i> (Digestion of ingested food), <i>Vivechana</i> (Separation of essence and waste), <i>Munchana</i> (propels to the later part of <i>Annavaha Srotas</i>).
04	<i>Ashtanga sanghr</i> ¹²	Present near the <i>Jatharagni</i> (digestive fire), moves inside the <i>Pakwashaya</i> (large intestine), <i>Amashaya</i> (stomach) and small intestine, <i>Srotas</i> of the <i>Doshas</i> ,	It holds food in the gastro intestinal tract, aids in digestion, separates it into absorbable and non-absorbable parts, and then

		<i>Malas</i> (waste), <i>Sukra</i> (reproductive tissue of male), <i>Artava</i> (menstrual fluid), and ovum (reproductive tissue of female), and <i>Ambu</i> (body fluid).	moves it further into the lower intestines.
05	<i>Sharangdhara</i> ¹³	<i>Nabhi</i> (umbilicus) is main site	The <i>Samana Vayu</i> plays a role in the circulation of blood.
06	<i>Bhavaprakash</i> ¹⁴	<i>Kostha</i> (GIT), the <i>Nabhi</i> (navel region) associated with <i>Agni</i>	It digests food, transports it to the duodenum, and separates its components. It also assists in moving waste toward the rectum, after which the <i>Apana Vayu</i> takes over to complete the process.
07	<i>Bhela samhita</i> ¹⁵	Pervades throughout the entire body.	Maintains coordination throughout the entire body.

COLOR OF SAMANA VATA:

Acharya Yogaratnakara has explained about the colour of *Samana vata* as it in of “*goksheera sadrishakarah*” which means it has resemblance with that of colour of cow’s milk¹⁶.

MODERN PERSPECTIVE:

The primary function of *Samana Vayu* is described through four key actions: *Annam Grahanati* (ingestion), *Pachati* (digestion), *Vivechayati* (absorption and assimilation), and *Munchati* (excretion). These actions collectively illustrate the sequential events that occur in the gastrointestinal (GI) tract from the moment food is consumed until it is excreted, encompassing the entire digestive process from receptive relaxation of the stomach to the elimination of waste. Below is a detailed explanation of each phase of *Samana Vayu* and its correlation with the physiological stages of digestion.

ANNAM GRAHNATI

The stage refers to the receiving and retention of food within the gastrointestinal tract. In the digestive system, *Prana Vata* is responsible for the initial intake and holding of food, a function known as *Anna Grahana*. *Samana Vata* assists by coordinating with *Prana Vata* during the receiving phase. This physiological process, known as deglutition or swallowing, occurs in three distinct stages¹⁷.

1. Voluntary Stage: The voluntary stage of deglutition is the first phase of swallowing, controlled consciously. It involves:

- **Bolus Formation:** Food is chewed and mixed with saliva.
- **Tongue Action:** The tongue pushes the bolus against the hard palate and moves it toward the oropharynx.
- **Nerve Involvement:**
 - Trigeminal nerve (CN V): Controls mastication and sensory feedback.
 - Facial nerve (CN VII): Aids in saliva secretion.
 - Glossopharyngeal nerve (CN IX): Provides sensory input from the tongue and assists saliva secretion
 - Hypoglossal nerve (CN XII): Controls tongue movements for bolus propulsion.

2. Involuntary Pharyngeal Stage: Once the bolus reaches the oropharynx, sensory receptors trigger the involuntary pharyngeal stage of swallowing

- **Bolus Detection:** Sensory receptors in the pharynx trigger the swallowing reflex.
- **Airway Protection:**
 - Soft palate elevates → Blocks nasal cavity.
 - Epiglottis closes → Prevents food from entering the airway.
 - Vocal cords constrict → Further airway protection.
- **Bolus Propulsion:**
 - Pharyngeal muscles contract → Push bolus toward the oesophagus.
 - Upper oesophageal sphincter relaxes → Allows bolus entry into the oesophagus.
- **Nerve Involvement:**
 - Trigeminal nerve (CN V): Assists in sensory input.
 - Glossopharyngeal nerve (CN IX): Detects the bolus and triggers the reflex.
 - Vagus nerve (CN X): Controls pharyngeal and laryngeal muscles, coordinating swallowing.
 - Accessory nerve (CN XI): Aids in pharyngeal muscle contraction.

3. Oesophageal Stage: This stage is completely involuntary, ensuring smooth passage of food into the stomach

- **Bolus Entry:** The upper oesophageal sphincter (UES) relaxes, allowing the bolus to enter the oesophagus.
- **Bolus Transport:** Peristalsis (wave-like muscle contractions) moves the bolus downward. The lower oesophageal sphincter (LES) relaxes to allow food into the stomach.
- **Nerve Involvement:**
Vagus nerve (CN X): Controls oesophageal muscle contractions and sphincter relaxation.

ANNAM PACHATI

Agni, the digestive fire, is responsible for breaking down food. *Samana Vata* supports *Agni* by stimulating it for efficient digestion and metabolism. Therefore, any factor that enhances *Agni's* digestive and metabolic function is considered part of *Samana Vata's* “*Anna Pachana*” role.

The Enteric Nervous System:

The enteric nervous system (ENS) is an intricate network of nerve cells located within the walls of the gastrointestinal (GI) tract, spanning from the oesophagus to the anus¹⁸. Commonly known as the “second brain,” the enteric nervous system contains approximately 100 million neurons, exceeding the number found in the spinal cord¹⁹. The enteric nervous system (ENS) regulates various gastrointestinal functions, including movement and secretion.

The enteric nervous system (ENS) comprises the myenteric (Auerbach's) and submucosal (Meissner's) plexuses. The myenteric plexus, between muscle layers, controls GI motility, regulating muscle tone, contraction, and peristalsis. It processes excitatory and inhibitory signals, with VIP promoting sphincter relaxation. The submucosal plexus, within the submucosal layer, manages secretion, absorption, and muscle contraction. Sensory input from the intestinal epithelium reaches both plexuses and the central nervous system via the vagus nerve. While the ENS functions independently, it is modulated by the sympathetic and parasympathetic nervous systems for optimal GI regulation²⁰.

Autonomic Regulation of the Gastrointestinal Tract:

The autonomic nervous system regulates GI function through parasympathetic and sympathetic divisions. Cranial parasympathetic fibers innervate the upper GI organs, kidneys, pancreas, and proximal colon, while sacral fibers supply the descending colon, rectum, bladder, and lower ureter. GI parasympathetic postganglionic neurons, mainly in the myenteric and submucosal plexuses, enhance ENS activity²¹.

Sympathetic fibers supplying the GI tract originate from thoracic spinal cord segments T1–T11. Some preganglionic fibers synapse in the sympathetic chain, while others project to prevertebral ganglia like the celiac and mesenteric ganglia. Postganglionic fibers from these ganglia innervate the entire gut. Sympathetic activation inhibits GI activity through norepinephrine, which directly contracts intestinal smooth muscle and suppresses ENS neurons²².

ANNAM VIVECHAYATI

This describes the process of separating the essence and waste products from digested food, while absorbing the essential components like nutrients, water, and minerals. The small intestine acts as the main site for nutrient absorption. This process involves a complex interaction between passive and active transport mechanisms.

1. **Water and Electrolyte absorption:** The liquid portion of chyme, mainly composed of water and electrolytes, is absorbed through the intestinal lining by osmosis²³. Water passively diffuses along a concentration gradient, moving from the chyme (low solute concentration) to the bloodstream (high solute concentration). Sodium (Na⁺) absorption plays a key role in regulating water balance. Enterocytes (intestinal epithelial cells) actively transport Na⁺ from the intestinal lumen into the bloodstream using Na⁺/K⁺ ATPase pumps²⁴. This creates an electrochemical gradient that supports water and solute absorption. During dehydration, the adrenal cortex releases aldosterone, which boosts sodium retention in the kidneys and intestines, helping restore blood volume and electrolyte balance²⁵.
2. **Nutrient absorption:** Carbohydrate absorption mainly involves glucose, transported by sodium-glucose cotransporters (SGLTs) in enterocytes, alongside Na⁺. Similarly, amino acids are absorbed via sodium-amino acid cotransporters (SATs), utilizing the Na⁺ gradient. Calcium absorption is regulated by parathyroid hormone (PTH), which enhances calcium uptake by increasing calcium channel expression in enterocytes²⁴.
3. **Fat absorption:** Fat digestion produces insoluble triglycerides, which bile salts emulsify into micelles for better absorption. Inside enterocytes, triglycerides are reassembled and packed into chylomicrons, which transport dietary fats through the lymphatic system to the bloodstream²³.

ANNAM MUNCHATI:

Apana Vayu controls waste elimination, triggered by *Samana Vayu* to expel faeces and urine. As the stomach expands with food, it stimulates rectal contractions, prompting defecation—a response known as the gastrocolic reflex, enhanced by gastrin. *Samana Vayu* functions like the Enteric Nervous System (ENS), regulating gastrointestinal reflexes for secretion, peristalsis, and mixing contractions. These reflexes operate

within the gut, via sympathetic ganglia, or through the spinal cord and brainstem to control digestion and defecation.

The large intestine reabsorbs water, gradually transforming faecal material into a paste as it moves from the caecum to the transverse colon. The parasympathetic nervous system activates enteric nerves, aiding digestion and defecation. *Prana* unites with *Apana* to sustain life, while *Acharya Sushruta* identifies *Pakwashaya* as *Apana*'s seat for waste elimination.

Samana Vayu regulates digestion and fluid absorption, while *Apana Vayu* controls excretion. Rectal distension triggers *Samana Vayu* to initiate peristalsis, moving faeces toward the anus. The internal anal sphincter relaxes involuntarily, while *Apana Vayu* enables voluntary relaxation of the external sphincter, ensuring defecation²⁶. The weak myenteric defecation reflex is reinforced by a parasympathetic response from the sacral spinal cord for effective defecation. While *Samana Vayu* regulates *Jatharagni*, *Pitta* and *Kapha* also contribute to digestion. Neurons from the enteric (*Samana Vayu*), central (*Prana Vayu*), and autonomic (*Vyana Vayu*) nervous systems regulate GI secretion and motility by activating or inhibiting glands and smooth muscles.

DISCUSSION

Basically *Vata*, *Pitta*, and *Kapha* correspond to the nervous, endocrine, and immune systems, respectively, regulating all living beings. *Acharyas* emphasize *Vata*'s dominance among the *Tridosha*, as it acts as the body's natural pacemaker, initiating and regulating all activities. *Samana Vayu*, situated near *Jatharagni*, stimulates *Agni* for digestion.

Ayurveda describes *Samana Vata* as regulating digestion, including food intake (*Anna Grahaṇa*), digestion (*Anna Pācana*), nutrient and waste separation (*Anna Vivecana*), and waste expulsion (*Munchana*). Though its anatomical location varies in texts, its functions correspond to the interactions of the enteric nervous system (ENS), autonomic nervous system, and hormones in modern physiology. It plays a key role in food ingestion, digestive secretion, nutrient absorption, gastrointestinal motility, and waste separation and elimination through *Srotas*.

These functions are coordinated with other subtypes of *Vata* and *Pitta*:

- ***Prana Vayu***: Governs swallowing reflex, salivary secretion, and initiation of deglutition. It ensures smooth passage of food from oropharynx to oesophagus, correlating with cranial nerves (V, VII, IX, X, XII). It sets the stage for digestion by coordinating with *Samana Vayu*.
- ***Udana Vayu***: Though mainly responsible for speech and upward movements, in digestion it prevents aspiration during swallowing by coordinating with the epiglottis reflex. It also contributes to belching and regurgitation when digestion is disturbed, indicating its supporting role.

- **Vyana Vayu:** Maintains circulation and peristalsis by distributing energy derived from digested food throughout the body. It works with *Samana Vayu* to maintain rhythmic contractions of the gut and regulate nutrient transport across membranes.
- **Samana Vayu:** Central in digestion. It regulates peristalsis, mixing of food with digestive juices, separation of *sara* (nutrients) and *mala* (waste), and coordination with *Pachaka Pitta*. Modern correlation includes ENS peristalsis, gastric secretion, osmotic gradients, and hormone-mediated absorption (aldosterone, secretin, motilin, etc.).
- **Apana Vayu:** Responsible for downward movement and elimination of faeces, flatus, and urine. In digestion, it finalizes the process by ensuring proper expulsion of waste. Dysfunction of *Apana Vayu* leads to constipation, bloating, or incomplete evacuation.

Thus, digestion is not a solitary function of *Samana Vayu* but a concerted activity of all five *Vata* subtypes. *Prana* initiates intake, *Udana* protects the airway, *Samana* governs churning and separation, *Vyana* distributes nutrients, and *Apana* completes elimination.

Acharya's' descriptions of *Samana Vayu* align with the physiological roles of the 12th cranial nerve, swallowing centre, cranial nerves (5th, 9th, 10th, 12th), ENS-controlled peristalsis, digestive secretions, nutrient transporters, osmosis, absorptive hormones like aldosterone and parathormone, stretch reflexes, and the parasympathetic ANS.

This holistic understanding demonstrates that digestion is a multi-dimensional process, wherein *Samana Vayu* plays a central but interdependent role with the other *Vayu* subtypes, reflecting *Ayurveda's* systemic and integrative approach to human physiology.

CONCLUSION:

Samana Vayu, present throughout the GI tract, regulates food transformation by controlling motility, secretions, absorption, and faecal movement. It strengthens *Agni* and nourishes the body through *Palana Karma*. It holds food in different digestive organs for proper digestion. The vagus nerve controls the lower oesophagus through the myenteric nervous system, linking this function to *Samana Vayu*, while the upper part is governed by *Prana Vayu*. It also plays a role in GI reflex pathways, regulating secretions and motility in response to stimuli. *Samana Vayu* controls intestinal villi contractions, increasing surface area for absorption. It also facilitates peristalsis in the colon, pushing faeces toward the rectum. The intrinsic defecation reflex, mediated by the enteric nervous system, is also influenced by *Samana Vayu*. *Samana Vayu* influences the parasympathetic defecation reflex, while *Apana Vayu* governs the enteric role in defecation. It also stimulates hormonal regulation in the GI tract. Neurotransmitters like acetylcholine and serotonin, secreted by mucosal cells, partially function under *Samana Vayu*, affecting digestion and motility.

In conclusion, *Samana Vayu* primarily regulates the GI tract through the nervous system, reflexes, and hormonal control, including paracrine hormone activity influenced by the enteric nervous system.

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