Understanding Samaana Vaata in relation to the physiology of digestion

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INTRODUCTION

In the science of Ayurveda, Desha is told of two types, Bhumi Desha and Deha Desha. Implies, both the universe and the human body are governed by similar principles, macroscopically and microscopically respectively.[1]

Just as Soma, Surya and Anila support the body of world by functions like Visarga, Aadana and Vikshepa respectively, Kapha, Pitta and Anila support this human body.[2]

Vaata in its normalcy sustains all organs, assists mental activities, coordinates the sense organs, brings compactness in tissues, brings togetherness in body, and promotes speech, root cause of auditory and tactile sense faculties. Causes happiness and courage. Stimulates digestive fire and absorbs Dosha, throws out Dosha and Mala. Creates Sthula and Anu Srotas. Molds shape of the embryo. And promotes quality of life.[3]

In that, Samaana Vaata proximal to Agni, travels all around the Koshta, does functions as Grahana (taking), Pachana (digestion), Vivechana (differentiates into

ABSTRACT

Ayurveda is a way of life governed by the principle that whatever there is in the universe is there in the body also. The concept of Tridosha is one such theory which decides the well-being and the diseased condition of a human being. That is, when in equilibrium leads to health and when vitiated, leads to disease. Vaata being one of the Tridosha leads the other two Dosha, Mala, Dhatus as the wind carries the clouds in the sky. There are five types of Vaata, i.e., Prana, Udana, Samana, Vyan and Apana. Samaana, is situated near Jatharagni and moves all over the Koshta. The function of Samaana Vaata can be corelated with functions such as Grahana, Pachana, Vivechana, Munchana. The myenteric plexus, or plexus of Auerbach, is located between the longitudinal and circular smooth muscle layers of the muscularis in gastrointestinal tract. The motor neurons of these plexus mostly control GI tract motility (movement), particularly the frequency and strength of contraction of the muscularis. This can be co-related to Karma of Samana Vata like Grahana, Munchana. The submucosal plexus, also known as Meissner’s plexus, is a network of autonomic motor nerve fibres located in the submucosa of the gastrointestinal tract. The motor neurons of the submucosal plexus supply the secretory cells of the mucosal epithelium, controlling the secretions and absorption of the organs of the gastrointestinal tract. This can be co-related to Karma of Samana Vaata like Pachana, Vivechana. Hence this article is aimed at further exploration of these anatomical and physiological aspects.

Key words: Samaana, Vaata, Enteric nervous system, Agni.

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Sara and Kitta), *Munchana* (forward movement) of the ingested food.[4]

The digestive system consists of the gastrointestinal (GI) tract and the accessory digestive organs. The GI tract is a continuous tube that extends from the mouth to the anus through the thoracic and abdominopelvic cavities. The organs of the GI tract are mouth, most of the pharynx, oesophagus, stomach, small intestine, and large intestine.[5]

The processes of digestion are as follows,

1. Ingestion: Consumption of food and liquids through the oral cavity
2. Secretion: The wall of the GIT and accessory digestive organs secrete water, acid, buffer and enzymes into the GIT.
3. Mixing and Propulsion: The contraction and relaxation of the GIT mix the food and secretions. It also moves and stabilizes the digesting food particles into further organs of digestion as needed.
4. Digestion: Break down of ingested food into smaller molecules.
   a. Mechanically: By teeth, cutting and grinding of food into smaller pieces. Peristaltics of intestines churn the food.
   b. Chemically: Digestion of macro carbohydrate, lipid, protein and nucleic acid molecules into smaller molecules.
5. Absorption: The intake of digested material through the epithelial cells lining the GIT and passing it into blood and lymph and distribute throughout the body. The undigested remnants of consumed food undergo further physiological processes.
6. Defecation: The essence less ruminants of ingested food are eliminated from the body through anal canal in the form of feces.[6]

**AIM**

To explore the co-relation between *Samana Vaayu* and Enteric nervous system.

**MATERIALS AND METHODS**

Various classical texts, contemporary medical textbooks and previously done work.

**REVIEW OF LITERATURE**

The term *Samana* means “*Samanthad Kosthe Samyak Samam Vaa Aniti, Iti Samanah*”, which denotes prevalent all around or which equals into one whatever we eat.[7]

Sthaana and Karma of the Samana Vaata according to different authors are as follows,

<table>
<thead>
<tr>
<th>Classical reference</th>
<th>Sthana (situation)</th>
<th>Karma (function)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Charaka Samhita[8]</td>
<td>Near Swedavaha, Doshavaha and Jalavaha Srotas</td>
<td>Assisting and giving strength to the Antaragni</td>
</tr>
<tr>
<td>Sushrutha Samhitha[9]</td>
<td>Moves in between Aamashaya and Pakvashaya, resides with Agni</td>
<td>Does digestion and segregation of Aahara</td>
</tr>
<tr>
<td>Ashtanga Hrudaya[10]</td>
<td>Near Agni (digestive fire), moves all over the Koshta</td>
<td>Does Grahana (taking), Pachana (digestion), Vivechana (differentiates into Sara and Kitta), Munchana (forward movement) of the ingested food</td>
</tr>
<tr>
<td>Astanga Samgrah[11]</td>
<td>Kostha, near the Agni circulates Dosh, Mala, Shukra and Artava Vahi Srotas</td>
<td>Holds food in the GI tract, digestion of food, separate into absorbable and non-absorbable portion and sends it further in the lower part of the intestine.</td>
</tr>
<tr>
<td>Sharangdhar a[12]</td>
<td>Naabhi (Umbilical region)</td>
<td>Assists blood circulation</td>
</tr>
<tr>
<td>Bhavaprakas ha[13]</td>
<td>Koshta, Naabhi, beside Agni</td>
<td>Digests and transports the food to the duodenum and separates its products.</td>
</tr>
</tbody>
</table>
The tongue is supplied by the hypoglossal nerve. Pharynx is supplied by trigeminal and glossopharyngeal nerve, vagus nerve, and hypoglossal nerve.[14]

The enteric nervous system also known as the “Gut Brain” is composed of,

1. Myenteric plexus or Auerbach’s plexus-
   - This outer plexus lies in between longitudinal and circular muscle layers.
   - Mainly controls gastrointestinal movements.
2. Submucosal plexus or Meissner’s plexus-
   - This inner plexus lies in the submucosa.
   - Controls gastrointestinal secretion and local blood flow.[15]
3. Parasympathetic nervous system-
   - Supplies few fibers to mouth and Pharyngeal regions
   - Most fibers are entirely in vagus nerve - has extensive innervations to the esophagus, stomach, first half of intestine.
   - Both Increases the activity of the enteric nervous system.
4. Sympathetic nervous system
   - Innervates essentially all over the GIT.
   - Inhibits intestinal activity.

The two plexuses are interconnected with each other. The sensory nerve ending that originate in the gastrointestinal epithelium send afferent fibers to both plexus as well as to,

- Prevertebral ganglia of the sympathetic nervous system
- Spinal cord
- In the vagus nerves all the way to the brain stem.[16]

**DISCUSSION**

The four *Karma of Samaana Vaayu* is similar to the six steps of digestive physiology.

**Aahara Grahana**

Once the food is ingested through oral cavity, the voluntary and involuntary swallowing phases of food through pharynx and esophagus is done, this is can be understood as being the function of 5th, 9th, 10th, 12th cranial nerve. The *Samana Vayu* brings the food near to *Agni* and also helps in the further process like digestion and assimilation. The various movements in the gastrointestinal tract viz. peristalsis, segmentation, and mixing movements of food to carry forward and secretion of gastric juices and enzymes which assist the digestion are done by *Samana Vayu*. Myenteric plexus or Auerbach’s plexus of the enteric nervous system promotes and inhibits the movement of the GIT.

**Aahara Pachana**

*Samana Vayu* stimulates *Pachak Pitta* hence both act as *Agni*. There are different juices and enzymes in our digestive system which helps in the digestion process for example pepsin enzyme which helps to digest protein, gastric juice main function is to inactivate swallowed microorganisms. Pancreatic juice Digestion of protein, carbohydrate and fat. Secretin enzyme that Stimulates pepsin secretion, pancreatic bicarbonate secretion, biliary bicarbonate secretion and inhibits gastric acid secretion. Pepsinogen enzyme that converts into pepsin for protein digestion etc. Which is controlled by Submucosal plexus or Meissner’s plexus meanwhile Sympathetic and parasympathetic nervous system promotes and inhibits its activity.

**Aahara Vivechana**

Once the food is digested, its transfer to various organs of the body is initiated. The gut wall absorbs the minute essence of food in the form of vitamins, minerals, and smaller absorbable units of lipids, proteins and complex carbohydrates. This is done into the local blood flow of the intestines. The watery component of the chyme is absorbed through the osmosis mechanism. All these Physiology is controlled by the Meissner’s plexus. According to *Ayurveda* this is done by *Samana Vaayu* and the *Karma* is called as *Vivechana*. 
Aahara Munchana

After the physiology of absorption, the undigested essence less food is processed further into the proximal part of the large intestine surpassing the ileocecal junction for further steps of digestion. This accounts for the peristalsis of the colon. This motility is brought about by the Myenteric plexus, sympathetic and parasympathetic nervous system. According to Ayurveda this Karma is known as Munchana and is done by Samaana Vaatha.

CONCLUSION

Though it is hard to pinpoint anatomical structures of the GIT to be the Ayurvedic equivalent of Samaana Vaata, the physiological aspect as well as the anatomy told in both the science can be corelated. The presence of structural component of Enteric nervous system in the GIT as well as the various aspects it controls in the process of digestion and the Sthaana, Agni Sameepa and Karma of Grahana, Pachana, Vivechana, Munchana are similar. In this way, we can say that the neurotransmitter activity in the gastrointestinal tract can be considered as the functions of Samaana Vaata.

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