



**A PHYSIOLOGICAL STUDY OF PACHAKA PITTA: A REVIEW**

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**ABSTRACT**

*Ayurveda* is a *Upaveda* of *Atharvaveda* and an ancient medical science, which helps in the maintaining health of healthy individual as well as eradication of disease. The entire corpus of *Ayurveda* theory and practice revolves around the knowledge of *Tridosha*. *Dosha*, *Dhatu* and *Mala* together form the basis of the body. The balance of these entities represent the healthy state and imbalance will cause various disease. *Pachaka Pitta* is one of the five subtype of *Pitta*. The *vishesha sthana* of *Pachaka Pitta* is between *Pakwashaya* and *Amashaya* near *Jatharagni*. Being fiery in nature, this *pitta* is devoid of liquid component (the water component of this *Pitta* is less in comparison to the water component of other *Pitta* sub-types). It not only digests the food but also converts complex food substances which can be absorbed and assimilated. When these simple substances of food go into circulation they reach the tissues. The function of *Pachaka Pitta* is correlated with the function of gastric enzymes and gastric hormones.

**KEYWORDS:** *Ayurveda*, *Tridosha*, *Pachaka Pitta*, Gastric enzyme, Gastric hormone.

**INTRODUCTION**

*Ayurveda* is a science of life expounded by *Trisutras* consisting of *Hetu*, *Linga* and *Aushadha*. *Hetu* refers to causative factor and *Tridosha* are considered as *Nija Hetu*. *Tridosha* is considered as most imperative among basic concepts of *Ayurveda*. The word *Pitta* means illumination often associated with the brilliance, which radiates from fire.

The five basic elements exist in all matter. Water provides the classic example: - the solids of iced water are manifestation of the *Prithvi Mahabhuta* (earth principle). Latent heat in the ice (*Agni*) liquefies it, manifesting into *Jala Mahabhuta* (water principle). And then eventually it turns into steam expressing the *Vayu Mahabhuta* (air principle) the steam disappears into *Akasha* or space.<sup>[1]</sup>

When we say *Bhuta* we mean that subtle level of existence, where as *Mahabhuta* refers to gross level of existence.<sup>[2]</sup> *Dosha*, *Dathu*, *Mala* together form the basis of the body.<sup>[3]</sup> The balance of these entities represents the healthy state and imbalance will cause various diseases.<sup>[4]</sup>

There are five types of *Pitta* namely *Pachaka*, *Ranjaka*, *Sadhaka*, *Alochaka*, *Bhrajaka*. The *Visesha Sthana* of

*Pachaka Pitta* is said to between *Pakwashaya* and *Amashaya* near *Jatharagni*. The main function of *Pachaka Pitta* is said to be digestion of the ingested food.<sup>[5]</sup>

Brief Physio- anatomical understanding of the Gastro-intestinal tract with reference to chemical and physical digestion is necessary to understand physiology of *Pachaka Pitta*. The food after ingestion through oral cavity passes along the various parts of the digestive tract, where it is converted into simple absorbable constituents.<sup>[6]</sup> The digestive tract or alimentary canal as it is also called consists of the mouth, the pharynx, the oesophagous, the stomach and the intestine. The human alimentary canal, from lips to anus, is from 30 to 32 feet long. Throughout most of its length, the work of the alimentary canal is directed toward the splitting of the molecules of the food into simpler compounds that being absorbed into blood are carried to the tissues. Here they are oxidized to furnish energy, stored as fat or starch or built into living tissue.<sup>[7]</sup>

Overall, the digestive system performs six basic processes: Ingestion: This process involves taking foods and liquids into the mouth (eating). Secretion: Each day, cells within the walls of the GI tract and accessory digestive organs secrete a total of about 7 liters of water,

acid, buffers, and enzymes into the lumen (interior space) of the tract. Mixing and propulsion: Alternating contractions and relaxations of smooth muscle in the walls of the GI tract mix food and secretions and propel them toward the anus. This capability of the GI tract to mix and move material along its length is called motility. Digestion: Mechanical and chemical processes break down ingested food into small molecules. In mechanical digestion the teeth cut and grind food before it is swallowed, and then smooth muscles of the stomach and small intestine churn the food. As a result, food molecules become dissolved and thoroughly mixed with digestive enzymes. In chemical digestion the large carbohydrate, lipid, protein, and nucleic acid molecules in food are split into smaller molecules by hydrolysis. Absorption: The entrance of ingested and secreted fluids, ions, and the products of digestion into the epithelial cells lining the lumen of the GI tract is called absorption. The absorbed substances pass into blood or lymph and circulate to cells throughout the body. Defecation: Wastes, indigestible substances, bacteria, cells sloughed from the lining of the GI tract, and digested materials that were not absorbed in their journey through the digestive tract leave the body through the anus in a process called defecation. The eliminated material is termed feces.<sup>[8]</sup>

Two enzymes, salivary amylase and lingual lipase, contribute to chemical digestion in the mouth. Salivary amylase, which is secreted by the salivary glands, initiates the breakdown of starch. Dietary carbohydrates are either monosaccharide and disaccharide sugars or complex polysaccharides such as starches. Most of the carbohydrates we eat are starches, but only monosaccharides can be absorbed into the bloodstream. Thus, ingested disaccharides and starches must be broken down into monosaccharides. The function of salivary amylase is to begin starch digestion by breaking down starch into smaller molecules such as the disaccharide maltose, the trisaccharide maltotriose, and short-chain glucose polymers called  $\alpha$ -dextrins. Even though food is usually swallowed too quickly for all the starches to be broken down in the mouth, salivary amylase in the swallowed food continues to act on the starches for about another hour, at which time stomach acids inactivate it. Saliva also contains lingual lipase, which is secreted by lingual glands in the tongue. This enzyme becomes activated in the acidic environment of the stomach and thus starts to work after food is swallowed. It breaks down dietary triglycerides into fatty acids and diglycerides. A diglyceride consists of a glycerol molecule that is attached to two fatty acids.<sup>[9]</sup>

Role of local hormones plays an important role in mechanical chemical digestion. Gastrin: Stimulates gastric glands to secrete gastric juice with more pepsin and hydrochloric acid; Accelerates gastric motility; Promotes growth of gastric mucosa; Stimulates secretion of pancreatic juice, which is rich in enzymes; Stimulates islets of Langerhans in pancreas to release pancreatic

hormones. Secretin: Inhibits secretion of gastric juice; Inhibits motility of stomach; Causes constriction of pyloric sphincter; Increases the potency of action of cholecystokinin on pancreatic secretion. Cholecystokinin: Accelerates the activity of secretin to produce alkaline pancreatic juice, with large amount of bicarbonate ions; Increases the secretion of enterokinase; Inhibits the gastric motility; Increases the motility of intestine; Augments contraction of pyloric sphincter; Plays an important role in satiety by suppressing hunger; Induces drug tolerance to opioids. Gastric inhibitory peptide (GIP): Stimulates the beta cells in the islets of Langerhans in pancreas to release insulin. It causes insulin secretion, whenever chime with glucose enters the small intestine. Hence it is called glucose-dependent insulinotropic hormone; Inhibits the secretion of gastric juice; Inhibits gastric motility. Somatostatin: Inhibits the secretion of growth hormone (GH) and thyroid-stimulating hormone (TSH) from anterior pituitary; Inhibits gastric secretion and motility; Inhibits secretion of pancreatic juice; Inhibits secretion of GI hormones such as: Gastrin, Cholecystokinin (CCK), Vasoactive intestinal polypeptide (VIP), Gastric inhibitory peptide (GIP).<sup>[10]</sup>

#### AIM AND OBJECTIVE

Aim of this article to elaborate the concept of Pachaka Pitta and establish the relation between gastric enzymes and hormones also.

#### DISCUSSION

*Ayurveda* has described digestion and metabolism on the basis of its basic principles *Dosha* and *Agni*. Among the three *Doshas Vata, Pitta* and *Kapha*; *Pitta Dosha* is responsible for the conversion of food into heat, tissues and waste materials. It governs digestion and metabolism from the cellular level to the tissue level, to that of the body as a whole. If we observe the specific function mentioned to the types of *Pitta*; the digestion and metabolism of the food, is refers to the sub-types of *Pitta*, that is *Pachaka Pitta*.

Very little of our food, whether carbohydrate, fat or protein is capable in its unaltered form of nourishing the body. It must undergo certain chemical changes. The large molecules of proteins, carbohydrates and fats are much too large to be absorbed into the blood through the mucous membrane of the stomach and intestine. Even should they pass through, they would be too large for use by the cells of the tissues. The large molecules of the food and split them up into smaller ones that can pass through the intestinal wall and be carried to the tissue cells, where they are disposed of.<sup>[11]</sup>

*Pachaka Pitta* from *Grahani*, gives stimulation, support and strength to other types of *Pitta*. In short if primary digestion in the abdomen is normal all the other metabolic processes in the body can remain normal. *Pachaka Pitta*, at some time is also called as *Pachaka-agni* or *Kosthagni* or *Jatharagni*. Digestion due to

Pachaka Pitta is primary digestion. If this digestion is not proper, then incomplete digested material which are toxic to the body can affect other types of fire i.e. tissue fire. Hence it is said that subtle parts of this central fire exists in all other types of fire.<sup>[12]</sup>

In the mouth, salivary amylase converts starch (a polysaccharide) to maltose (a disaccharide), maltotriose (a trisaccharide) and dextrans (short-chain, branched fragments of starch with 5–10 glucose units). In the stomach, pepsin converts proteins to peptides (small fragments of proteins), and lingual and gastric lipases convert some triglycerides into fatty acids, diglycerides, and monoglycerides. Thus, chyme entering the small intestine contains partially digested carbohydrates, proteins, and lipids. The completion of the digestion of carbohydrates, proteins, and lipids is a collective effort of pancreatic juice, bile, and intestinal juice in the small intestine. Gastrin stimulates gastric glands to secrete gastric juice with more pepsin and hydrochloric acid; Accelerates gastric motility; Promotes growth of gastric mucosa; stimulates secretion of pancreatic juice, which is rich in enzymes; Stimulates islets of Langerhans in pancreas to release pancreatic hormones. Secretin inhibits secretion of gastric juice; Inhibits motility of stomach; Causes constriction of pyloric sphincter; Increases the potency of action of cholecystokinin on pancreatic secretion.

## CONCLUSION

After a detailed discussion of *Pachaka Pitta*, it has been observed that, all the theory regarding *Pachaka Pitta* has its own important and it is very difficult to conclude on a single point. In mechanical digestion the teeth cut and grind food before it is swallowed, and then smooth muscles of the stomach and small intestine churn the food. As a result, food molecules become dissolved and thoroughly mixed with digestive enzymes. In chemical digestion the large carbohydrate, lipid, protein, and nucleic acid molecules in food are split into smaller molecules by hydrolysis. The functions of *Pachaka Pitta* can be related to the functions of digestive enzymes as well as Gastro-intestinal hormones. *Sthana* of *Pachaka Pitta* is *Pakva-amashaya Madhya* and *Grahani* is correlate with the duodenum (it is the part of small intestine).

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