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CONCEPT OF PACHAKA PITTA – A SHAREERA KRIYATMAKA (PHYSIOLOGICAL) UNDERSTANDING

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ABSTRACT

Dosha, Dathu, Mala together form the basis of the body. The balance of these entities represents the healthy state and imbalance will cause various diseases. In normalcy, Dosha will be performing their own functions and individual Dosha will be having their own specific site. There are five types of Pitta namely Pachaka, Ranjaka, Sadhaka, Alochaka, Brajaka. 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. The functions of Pachaka Pitta can be related to the functions of digestive enzymes, Gastro-intestinal hormones and local hormones .

Keywords: Pachaka, Pitta, Shareera, Kriya, Enzymes, Hormones.

INTRODUCTION

The individual is an epitome of the universe. All the material & spiritual phenomenon of the universe are present in the individual. Similarly all those resent in the individual are also contained in the universe. Originating in cosmic consciousness, this wisdom was intuitively received in the hearts of the ancient scholars. They perceived that consciousness was energy manifested into the five basic principles or elements. Man is microcosm of the nature and so the five basic elements present in all matter also exists within each individual. Thus out of the womb of the five elements, all matter is born. 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.[2]*Bhuta* is that which is not born out of something, but out of which something is born. It is the material cause of substances in the world. When we say *Bhuta* we mean that subtle level of existence, where as *Mahabhuta* refers to gross level of existence.[3]*Panchikarana* is the process through which invisible *Bhutas* combine with each other and form the visible *Mahabhutas* in such a way that all *Bhutas*

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are present together in each *Drisya Bhuta* in varying degrees of predominance. Thus in the physical world everything is a combination of *Pancha Mahabhutas* & we cannot see them independently. [4]

Dosha, Dathu, Mala together form the basis of the body.[5] The balance of these entities represents the healthy state and imbalance will cause various diseases.[6] In normalcy, *Dosha* will be performing their own functions and individual *Dosha* will be having their own specific site. By mentioning the various *Sthana* of the each *Dosha* the different function performed by individual *Dosha* in different sites has been emphasised. The sub-types of *Dosha,* its location and function have also been mentioned. [7] Regarding the *Sthana* of various *Dosha* authors have different opinion. Later authors have added some more *Sthana* of *Dosha*. For example, ears among the location of *Vata*; umbilicus, eyes and skin among the location of *Pitta*; *Kloma*, nose, tongue among the location of *Kapha*.[8]

There are five types of *Pitta* namely *Pachaka, Ranjaka, Sadhaka, Alochaka, Brajaka.* 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.[9]

Brief Physio- anatomical understanding of the Gastro-intestinal tract with reference to chemical and physical digestion is necessary to understand physiology of *Pachaka Pitta*.

Two groups of organs compose the digestive system the gastrointestinal (GI) tract and the accessory digestive organs. The gastrointestinal (GI) tract, or alimentary canal, is a continuous tube that extends from the mouth to the anus through the thoracic and abdominopelvic cavities. Organs of the gastrointestinal tract include the mouth, most of the pharynx, esophagus, stomach, small intestine, and large intestine. [10]

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. [11]

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 _-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. [12]

The strongly acidic fluid of the stomach kills many microbes in food. HCl partially denatures (unfolds) proteins in food and stimulates the secretion of hormones that promote the flow of bile and pancreatic juice. Enzymatic digestion of proteins also begins in the stomach. The only proteolytic (protein-digesting) enzyme in the stomach is pepsin, which is secreted by chief cells. Pepsin severs certain peptide bonds between amino acids, breaking down a protein chain of many amino acids into smaller peptide fragments. Pepsin is most effective in the very acidic environment of the stomach (pH 2); it becomes inactive at a higher pH.

First, pepsin is secreted in an inactive form called *pepsinogen;* in this form, it cannot digest the proteins in the chief cells that produce Pepsinogen is not converted into active pepsin until it comes in contact with hydrochloric acid secreted by parietal cells or active pepsin molecules. Second, the stomach epithelial cells are protected from gastric juices by a 1–3 mm thick layer of alkaline mucus secreted by surface mucous cells and mucous neck cells.

Another enzyme of the stomach is gastric lipase, which splits the short-chain triglycerides in fat molecules (such as those found in milk) into fatty acids and monoglycerides. A monoglyceride consists of a glycerol molecule that is attached to one fatty acid molecule. This enzyme, which has a limited role in the adult stomach, operates best at a pH of 5–6. More important than either lingual lipase or gastric lipase is pancreatic lipase, an enzyme secreted by the pancreas into the small intestine. Only a small amount of nutrients are absorbed in the stomach because its epithelial cells are impermeable to most materials. However, mucous cells of the stomach absorb some water, ions, and short-chain fatty acids, as well as certain drugs (especially aspirin) and alcohol. Within 2 to 4 hours after eating a meal, the stomach has emptied its contents into the duodenum. Foods rich in carbohydrate spend the least time in the stomach; high-protein foods remain somewhat longer, and

emptying is slowest after a fat-laden meal containing large amounts of triglycerides

In the mouth, salivary amylase converts starch (a polysaccharide) to maltose (a disaccharide), maltotriose (a trisaccharide) and dextrins (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.

The final stage of digestion occurs in the colon through the activity of bacteria that inhabit the lumen. Mucus is secreted by the glands of the large intestine, but no enzymes are secreted. Chyme is prepared for elimination by the action of bacteria, which ferment any remaining carbohydrates and release hydrogen, carbon dioxide, and methane gases. These gases contribute to flatus (gas) in the colon, termed *flatulence* when it is excessive.

Bacteria also convert any remaining proteins to amino acids and break down the amino acids into simpler substances: indole, skatole, hydrogen sulfide, and fatty acids. Some of the indole and skatole is eliminated in the feces and contributes to their odor; the rest is absorbed and transported to the liver, where these compounds are converted to less toxic compounds and excreted in the urine. Bacteria also decompose bilirubin to simpler pigments, including stercobilin, which gives feces their brown color. Bacterial products that are absorbed in the colon include several vitamins needed for normal metabolism, among them some B vitamins and vitamin K. 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).[13]

AIMS & OBJECTIVES: To critically analyze the *Pachaka Pitta*

MATERIALS & METHODS: The *Bruhat Trayi* were scrutinised regarding the references for the *Guna* and *Karma* of the *Pachaka Pitta*. Later, physiologico-anatomical aspects of the Gastro-intestinal tract with reference to chemical and physical digestion were studied from modern physiology books. Later, supportive correlation was done between *Ayurvedic* and modern views to build valid and reliable hypothesis regarding *Pachaka Pitta* in relation to the various anatomical and physiological aspects of the central nervous system.

DISCUSSION

Dosha, Dathu, Mala together form the basis of the body. The balance of these entities represents the healthy state and imbalance will cause various diseases. In normalcy, *Dosha* will be performing their own functions and individual *Dosha* will be having their own specific site. There are five types of *Pitta* namely *Pachaka, Ranjaka, Sadhaka, Alochaka, Brajaka.* 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**.** 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. In the mouth, salivary amylase converts starch (a polysaccharide) to maltose (a disaccharide), maltotriose (a trisaccharide) and dextrins (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. Role of local hormones plays an important role in mechanical chemical digestion. For example 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

There are five types of *Pitta* namely *Pachaka, Ranjaka, Sadhaka, Alochaka, Brajaka.* The *Visesha Sthana* of *Pachaka Pitta* is said to between Pakwashaya and Amashaya near Jatharagni. The main func-

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The functions of *Pachaka Pitta* can be related to the functions of digestive enzymes, Gastro-intestinal hormones and local hormones .

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