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ANATOMY OF THE DIGESTIVE SYSTEM ORGANS

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Abstract: This scientific article includes detailed information about the anatomical structure of the digestive system organs, their location, and physiological significance. The article describes the anatomical structure and physiological characteristics of the oral cavity, esophagus, stomach, intestines, liver, pancreas, and gallbladder. Information about the structure and location of each organ, the physiological processes that occur within them, and their interrelationships is presented. Knowledge of the anatomy of the digestive system organs is crucial for medical professionals in diagnosing and treating diseases. This article serves as a valuable source of information for medical professionals, students, and those interested in the anatomy of the digestive system.

INTRODUCTION

The digestive system is one of the important systems of the organism, providing the processes of food intake, processing, digestion, and absorption. This system consists of several organs that work in cooperation with each other. Studying the anatomy of the digestive system organs is important for medical professionals, as this knowledge helps in diagnosing and treating diseases.

MAIN PART

Oral Cavity (Cavum oris)

The oral cavity is considered the beginning of the digestive system. It is bordered by the lips and consists of the following parts:

Lips (Labia oris) – border the oral cavity from the front. They are covered with skin on the outer side and mucous membrane on the inner side. The opening between the lips is called the oral opening (rima oris).

Palate (Palatum) – forms the upper part of the oral cavity and is divided into two parts:

- Hard palate (Palatum durum) – the anterior part, has a bony base
- Soft palate (Palatum molle) – the posterior part, composed of muscles

Tongue (Lingua) – a muscular organ located at the floor of the oral cavity. The tongue mainly consists of three parts:

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- Tip of the tongue (Apex linguae)
- Body of the tongue (Corpus linguae)
- Root of the tongue (Radix linguae)

Teeth (Dentes) – serve to grind food. A normal adult has thirty-two teeth:

- Incisors (Dentes incisivi) – eight
- Canines (Dentes canini) – four
- Premolars (Dentes premolares) – eight
- Molars (Dentes molares) – twelve

Salivary glands (Glandulae salivariae) – produce saliva and consist of the following three pairs of glands:

- Parotid gland (Glandula parotidea) – the largest salivary gland, located in front of the ear
- Sublingual gland (Glandula sublingualis) – located at the floor of the oral cavity
- Submandibular gland (Glandula submandibularis) – located under the lower jaw

The oral cavity is considered the beginning of the digestive process. Here, food is mechanically broken down and mixed with saliva produced by the salivary glands. The amylase enzyme in saliva breaks down starch into disaccharides.

Esophagus (Esophagus)

The esophagus is a tubular organ located between the pharynx and the stomach, with a length of approximately twenty-five centimeters. Its main function is to transport food from the pharynx to the stomach. The esophagus consists of the following parts:

Cervical part (Pars cervicalis) – located in the neck region, behind the trachea. Thoracic part (Pars thoracica) – located in the chest cavity, in the mediastinum, in front of the vertebral column. Abdominal part (Pars abdominalis) – passes through the diaphragm, continues for a short distance in the abdominal cavity, and transitions into the stomach.

The muscular layer of the esophagus consists of striated muscles in the upper part, mixed muscles in the middle part, and smooth muscles in the lower part. These muscles direct food to the stomach through peristaltic movements.

Stomach (Ventriculus, Gaster)

The stomach is the most expanded part of the digestive system, located in the upper part of the abdominal cavity, mainly in the left hypochondriac region. The stomach is pear-shaped and consists of the following parts:

The stomach wall consists of four layers:

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- Mucous layer (Tunica mucosa) – forms numerous folds and contains glands that produce gastric juice
- Submucous layer (Tela submucosa)
- Muscular layer (Tunica muscularis) – consists of three layers of smooth muscles: longitudinal, circular, and oblique
- Serous layer (Tunica serosa)

The processes of food storage, mixing, and partial digestion occur in the stomach. Gastric juice contains hydrochloric acid and pepsin enzyme, which break down proteins. Food passes into the duodenum due to contractions of the muscular layer of the stomach.

Duodenum (Duodenum)

The duodenum is the first part of the small intestine, located after the stomach. It is called so because its length is approximately equal to the width of twelve fingers (twenty-five centimeters).

An important part of food digestion takes place in the duodenum. Enzymes in the pancreatic juice break down fats, proteins, and carbohydrates, while bile helps in the emulsification of fats.

Small Intestine (Intestinum tenue)

The small intestine is the longest part of the digestive system, with a length of approximately five to seven meters. Duodenum (Duodenum) – described above.

Jejunum (Jejunum) – the middle part of the small intestine, located in the upper left part of the abdominal cavity, with a length of two to two and a half meters. Ileum (Ileum) – the final part of the small intestine, located in the lower right part of the abdominal cavity, with a length of three to three and a half meters.

The processes of digestion and absorption actively occur in the small intestine. Digested nutrients are absorbed through blood vessels and lymphatic capillaries in the intestinal villi. The mucous layer of the intestine has villi and microvilli to increase the absorption surface.

Large Intestine (Intestinum crassum)

The large intestine is the final part of the digestive system, with a length of approximately one and a half to two meters. It consists of the following parts:

Cecum (Caecum) – the first, expanded part of the large intestine, located in the right iliac fossa. The appendix extends from the cecum. Vermiform appendix (Appendix vermiformis) – a thin tubular process with a length of seven to ten centimeters, containing numerous lymphoid tissue. Colon (Colon) – the middle part of the large intestine, consisting of four parts:

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- Ascending colon (Colon ascendens) – rises upward along the right side of the abdominal cavity
- Transverse colon (Colon transversum) – passes horizontally from right to left
- Descending colon (Colon descendens) – descends along the left side of the abdominal cavity
- Sigmoid colon (Colon sigmoideum) – S-shaped part connecting the descending colon with the rectum

Rectum (Rectum) – the final part of the large intestine, located in front of the sacrum. Anal canal (Canalis analis) – ends with the anal opening.

The absorption of water and electrolytes mainly occurs in the large intestine, as well as the processes of fecal formation and excretion. Normal microflora exists in the large intestine, which synthesizes vitamin K and other biological substances.

Liver (Hepar)

The liver is the largest gland of the digestive system, located in the upper part of the abdominal cavity, in the right hypochondriac region. The liver consists of the following parts:

Right lobe (Lobus dexter) – the largest lobe. Left lobe (Lobus sinister) – smaller than the right lobe. Quadrate lobe (Lobus quadratus) – located on the inferior surface of the liver, between the gallbladder and the porta hepatis. Caudate lobe (Lobus caudatus) – located at the posterior part of the liver.

The liver tissue is composed of liver segments (lobules). Each segment has a central vein in the center, surrounded by radially arranged liver cells (hepatocytes). Portal triads are located at the periphery of the segment, consisting of:

- Branch of the hepatic artery
- Branch of the portal vein
- Bile duct

The liver performs the following functions:

- Preparing food substances for metabolism
- Detoxification of harmful substances
- Bile production
- Storage and processing of biological substances in the blood
- Blood filtration
- Synthesis of proteins, glycogen, and other substances
- Blood production during the embryonic period

Gallbladder (Vesica fellea) and Bile Ducts

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The gallbladder is a pear-shaped organ located on the inferior surface of the liver, in the fossa between the right and quadrate lobes. Its capacity is fifty to seventy milliliters.

Bile is continuously produced by the liver and flows into the duodenum through the bile ducts. Between meals, bile passes from the common bile duct to the gallbladder, where it is concentrated. During the digestion process, bile is released from the gallbladder into the duodenum.

Bile serves to emulsify fats and improve the absorption of fat-soluble vitamins.

Pancreas (Pancreas)

The pancreas is a mixed gland located on the posterior wall of the abdominal cavity, behind the peritoneum. It performs both endocrine and exocrine functions.

The exocrine part of the pancreas produces digestive juice, which flows into the duodenum through a special duct (Ductus pancreaticus). This juice contains enzymes that break down proteins, fats, and carbohydrates:

- Trypsin, chymotrypsin – break down proteins
- Lipase – breaks down fats
- Amylase – breaks down carbohydrates

Pancreatic juice plays an important role in the digestive process and participates in the breakdown of all nutrients.

CONCLUSION

Knowledge of the anatomy of the digestive system organs is important for medical professionals. This system consists of complex and interconnected organs, and their proper functioning is necessary for human health.

The anatomical structure of the digestive system organs determines their functional roles. Food is mechanically broken down and mixed with saliva in the oral cavity. The esophagus transports food to the stomach. The processes of food storage, mixing, and partial digestion occur in the stomach. The processes of digestion and absorption actively occur in the small intestine. The absorption of water and electrolytes mainly occurs in the large intestine. Additional organs such as the liver, gallbladder, and pancreas play important roles in the digestive process.

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