Overview of the Digestive Tract

A brief overview of the digestive (or gastrointestinal) tract will help explain how the symptoms of gastroparesis occur. The digestive tract is a long (about 8 to 9 metres), continuous muscular tube which starts at the mouth, passes through the chest and abdomen, and ends with the anus.

The job of the digestive tract is to propel food from the mouth to the anus, where the body absorbs and digests nutrients along the way, with the elimination of leftover waste (stools or faeces) at the anus.

The digestive tract breaks down food and drink into usable components that the body absorbs and uses for energy. This energy is used for growth, repair, and maintenance of cells that make up the human body.

The digestive tract consists of the mouth, oesophagus, stomach, small intestine, large intestine or colon, rectum, and anus.

The surfaces of the mouth, stomach, and small intestine are lined by a layer of cells (mucosa) that contain tiny glands that produce digestive enzymes.

The digestive tract also contains a layer of smooth muscle that helps break down food and move it along the tract. The liver and pancreas, which are connected to the digestive tract, also secrete juices that help break down food into products that can be absorbed into the bloodstream.

Liquid and solid foods are able to move along the digestive tract through a mechanism called peristalsis. This describes the organised contraction of smooth muscle that occurs throughout the digestive tract. Muscle contraction is automatic and creates a wave-like motion that propels food forward.

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The Movement of Food Through the Digestive System

The Mouth and the Oesophagus

The digestive process begins in the mouth. In the mouth itself, the tongue and teeth help start digestion by the process of chewing and breaking down food small enough to be swallowed. This chewing process, as well as carbohydrates in food, stimulate the salivary glands to secrete saliva.

Saliva contains digestive enzymes (e.g., amylase and lipase) that break down starch and fat. Swallowing is a complex process involving muscles and nerves. The tongue pushes food back into the throat or pharynx, and into the opening of your oesophagus, the second part of the digestive tract.

The oesophagus is a 25-cm long tube that transports the swallowed food from the mouth to the stomach by powerful peristalsis. As the food reaches the end of the oesophagus, the lower oesophageal sphincter opens to allow the food to exit.

The oesophagus prevents food from regurgitating and re-entering the throat by the upper oesophageal sphincter.

The Stomach

The stomach is a muscular J-shaped sac attached to the oesophagus. The stomach has three important jobs:

1. to store the food you’ve eaten:
2. to break down the food into a liquidy mixture
3. to slowly empty that liquidy mixture into the small intestine

The stomach temporarily stores ingested food. It can hold up to 2 litres in an adult, and has a thick muscular wall covered by about 3 mm of mucous. The stomach mixes the partially digested contents by mechanical action (peristalsis). This mixing is also aided by hydrochloric acid and enzymes (pepsin) produced by the glands that line the stomach. Hydrochloric acid and pepsin help break down proteins into their basic parts, amino acids.
After several hours, when the food has been further reduced in size and mixed with the gastric juices, the stomach slowly delivers its contents to the small intestine. Different foods are emptied from the stomach at different rates, with foods high in fat taking the longest.

A regular-sized meal normally takes about two hours to be emptied from the stomach. Some things, such as drugs and fluids, are absorbed directly from the stomach into the bloodstream.

The Small Intestine

The small intestine is about 6 metres in an adult, and is designed to have maximum surface area for its length by having villi and microvilli (tiny finger-like projections). The main role of the small intestine is to absorb nutrients.

The small intestine has three sections: the duodenum (5%), the jejunum (40%), and the ileum (55%). The stomach empties food into the first part of the small intestine, the duodenum. Here bile and pancreatic enzymes are added to the food mixture.

In the second part of the small intestine, the jejunum, fats, starch, and proteins are broken down and absorbed by the lining into the bloodstream. In the last part of the small intestine, the ileum, water is absorbed along with other nutrients and bile salts.

Most liquids move through the small intestine within an hour, while solids take about three to five hours, with fats and proteins taking the longest.

The Large Intestine (or Colon)

After passing through the small intestine, food passes into the large intestine. The large intestine is about 1 metre long in an adult, and is curved like an upside-down U-shape.

Most of the digestion and absorption of nutrients from food has already occurred by the time it reaches the colon. The main job of the colon is to absorb water and salt from food in order to produce solid waste (faeces or stool).

Motility and contractions move the stool from the right side of the colon over to the left. Eating a meal causes colon contractions. The larger the meal and fat content, the stronger the contractions.
The colon contains a large number of bacteria that aid digestion by metabolizing carbohydrates, proteins, and lipids not absorbed in the small intestine. The bacteria also produce hydrogen, carbon dioxide, methane gas, and fatty acids, which provide energy for cells lining the colon.

Leftover waste, made up of water, indigestible fibre, and used up bacteria is propelled away from the centre of the body by contractions of the colon wall to the rectum. The rectum is guarded by a sphincter muscle at the anus that helps controls defecation.

Waste accumulates until stretching signals the sphincter to relax, triggering an urge for bowel movement. This sphincter is under voluntary control, helping to control the timing of the passage of faeces.

How often you go to the toilet depends on several factors including intake of food and drink, exercise, medications, sleep, and stress.

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