

Nutrition

Dental diseases

1. dental caries

This is when the tooth decays and develops a cavity as a result of bacteria feeding on the sugary food left between the teeth, producing organic acids which corrode the teeth.

There is no pain when the cavity is in the enamel.

Some pain is felt when the cavity reaches the dentine. A lot of pain is felt when the cavity reaches the pulp cavity and at this level the tooth must be extracted.

causes of dental caries

Too much sugary food

Lack of vitamin C

Lack of calcium

Poor mouth (oral) hygiene.

2. Periodontal disease (gum disease)

This is also known as gum disease and is characterized by bleeding of gums even after proper brushing.

The teeth become loose and eventually they may be lost.

Causes of periodontal disease.

Lack of vitamins A and C

Improper cleaning of the teeth and the gums.

Dental care

Brush the teeth after every meal to avoid bacteria which cause tooth decay.

Avoid sugary foods in between meals and especially at night as this would encourage growth of bacteria which would cause tooth decay.

Avoid using the teeth to bite very hard objects e.g opening bottle tops as this would cause teeth breakage.

Avoid eating cold and hot foods together as they would cause teeth paralysis.

Eat foods rich in calcium and vitamin C regularly to strengthen the teeth.

Eat foods rich in tough fibres like maize, vegetables, sugarcane, carrots etc. to strengthen the teeth and encourage proper blood circulation.

Visit a dentist regularly to check on the state of your teeth.

NUTRITION IN MAN.

Man carries out holozoic nutrition.

This type of nutrition is characterized by; ingestion, digestion, absorption, assimilation and egestion.

INGESTION

This is the taking in of food into the mouth.

DIGESTION

This is the process by which complex, insoluble food is broken down into simpler, soluble molecules which can be absorbed and assimilated or used by the body.

TYPES OF DIGESTION

Digestion may be extracellular if it occurs outside the cells of an organism like in fungi and bacteria, or it may be intracellular if food is broken down inside the cells of an organism like in Amoeba.

There are two basic types of digestion namely; Mechanical and chemical digestion.

MECHANICAL DIGESTION / PHYSICAL DIGESTION.

This is the breakdown of food by the action of the teeth and muscular contractions.

CHEMICAL DIGESTION

This is the breakdown of food by the action of enzymes.

ABSORPTION

This is the passage of the digested nutrients into the bloodstream and lymph.

OR

This is the process by which small, soluble molecules produced during digestion enter blood and lymph from the lumen of the alimentary canal.

ASSIMILATION

This is the utilization of the absorbed food nutrients by the body.

The absorbed nutrients are mainly glucose, amino acids, fatty acids and glycerol.

DIGESTION IN MAN

IN MAN, the process of digestion takes place in a long tube called the gut that runs down from the mouth to the anus. The gut is also referred to as the alimentary canal or the digestive tract.

The gut and its associated organs together make the digestive system.

THE DIGESTIVE SYSTEM IN MAN.

Assignment; Draw the digestive system and then proceed.

Digestion in the mouth

Digestion in the mouth is both physical and chemical. physical digestion in the mouth is done by the teeth during mastication or chewing.

Physical digestion in the mouth is important because;

The food is broken down into smaller pieces hence increasing the surface area for enzyme action.

It mixes food with saliva which softens the food for the enzyme to work on it.

It stimulates the secretion of enzymes.

The tongue rolls food into bolus for easy swallowing and movement through the gut,

In the mouth, chemical digestion is done by salivary amylase / ptyalin which converts starch into maltose. The digested food in the mouth is rolled into bolus and swallowed. From the mouth, food goes to the stomach through the oesophagus or gullet by the process called **peristalsis**.

During swallowing, the epiglottis prevents food from entering the trachea. Entry of food into the stomach is controlled by the cardiac sphincter muscle.

Digestion in the stomach

When food reaches the stomach, the stomach walls (gastric walls) secrete gastric juice which contains two enzymes pepsin and rennin, hydrochloric acid, water and mucus.

Pepsin breaks down proteins into peptides and polypeptides.

NB: pepsin is secreted in an inactive form called pepsinogen which is activated into pepsin by **hydrochloric acid**.

In children, rennin coagulates the soluble milk protein **Caseinogen** into insoluble curd **casein** which is then digested by pepsin.

The importance of mucus is to protect the stomach walls from the action of hydrochloric acid and enzymes.

NB: in the absence of mucus, hydrochloric acid may attack the gastric walls and might cause gastric ulcers.

In addition to activating pepsinogen to pepsin, hydrochloric acid has the following uses;

- i) it provides an acidic medium in which pepsin works best.
- ii) it kills bacteria which may be swallowed with food.
- iii) it stops the action of ptyalin.

Some physical digestion occurs in the stomach. The stomach movements and the rhythmic contractions of the stomach walls pound the food into a semi-fluid Chyme.

Chyme is released in small quantities into the duodenum which is the first part of the small intestines by pyloric sphincter muscles.

Digestion in the duodenum.

Presence of acidic food (Chyme) in the duodenum stimulates the duodenal walls to secrete Secretin hormone into the blood which stimulates the release of pancreatic juice from the pancreas and bile from the gall bladder into the duodenum.

Pancreatic juice contains three enzymes;

- i) pancreatic lipase;** which converts lipids into fatty acids and glycerol.
- ii) Trypsin;** Which converts proteins into peptides and amino acids.
- iii) Pancreatic amylase;** which breaks down the starch into maltose.

NB; Trypsin is secreted in an inactive form called Trypsinogen and it is activated by Enterokinase enzyme from the small intestines.

Pancreatic juice also has sodium bicarbonate which creates an alkaline medium for the action of enzymes found in pancreatic juice.

Bile has no enzyme but it has organic acids, water and inorganic salts such as sodium chloride and sodium hydrogen carbonate. These salts neutralize hydrochloric acid from the stomach making the conditions alkaline and hence stop the action of pepsin.

Bile also emulsifies fats into droplets increasing the surface area for enzyme action.

From the duodenum, food goes to the ileum(second part of the small intestines) by peristalsis.

Digestion in the ileum

Presence of food in the ileum stimulates the production of intestinal juice called **Succus entericus** which contains enzymes that complete the process of digestion as shown below;

Lipase; Converts lipids into fatty acids and glycerol.

Peptidase (Erepsin); which converts peptides into amino acids.

Sucrase; which converts sucrose to glucose and fructose.

Maltase; which converts maltose to glucose molecules.

Lactose; which converts lactose to glucose and galactose.

Assignment.

Define the following terms.

i) Swallowing.

ii) peristalsis

ABSORPTION

This is the passage of food across the intestinal wall into the blood stream.

Absorption of digested food occurs in the ileum mainly through structures known as Villi (singular; villus).

NB: water, common salt and alcohol are partly absorbed through the stomach walls.

Adaptations of the ileum to absorption

It is relatively long and so provides a large absorbing surface to the digested food.

The internal surface is covered with tiny finger-like extensions called villi which are the actual sites for absorption.

The lining epithelium is very thin therefore the digested food can easily diffuse through.

It has a network of blood capillaries and lacteals inside each villus which provide transport to the absorbed food.

The inner surface is highly folded to increase surface area for absorption

It is coiled slow down the flow rate of food, giving it more time for digestion and absorption.