

Dietetic Treatment
of
Digestive Disease.

Ella Criss.

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References.

- Practical Dietetics - - - - Thompson.
 Practice in Medicine - - - - Ostler.
 Manual of Physiology - - - - Stewart.
 Dietetic and Hygienic Gazette - June 1900.
 Food and Dietetics - - - - Hutchinson.
 Food and Dietaries - - - - Burnett.
 Lectures on Food - - - - Lethelby.
 Human Physiology - - - - Huxley.

Dietetic Treatment of Digestive Diseases

The correct feeding of persons in perfect health is of very great importance, but when disease takes possession of the body then the food consumed becomes a question of supreme importance. It is said by learned doctors that over half of all disease is based upon errors of diet. Drugs are used less at the present day than ever before as the physicians realize that recovery to health from an attack of disease is a natural process and the drugs are only to assist nature in effecting a cure.

The unperverted appetite, in health, is generally a safe guide as long as only plain simple foods are taken, but when diseased conditions enter in, it must not be followed. The nature of the disease must be studied; the character of the foods must be studied; then the foods administered to correspond with the needs caused by the disease. The kind and quantity of food will vary

according to the portion of the body affected. Personal likes and dislikes must be taken into consideration in feeding in illness, but even then the patient must not be allowed to choose or refuse among all food.

A brief outline of the classes of food will assist, and is necessary, in an understanding of the dietetic treatment of disease.

"A food may be defined as any-thing, which, when taken into the body is capable either of repairing its waste or of furnishing it with material from which to produce heat, or nervous and muscular work."

Foods.

I Organic.

1. Nitrogenous.

(a) Protein.

2. Non-nitrogenous.

(a) Carbohydrates.

A. Sugars

B. Starches.

(b) Hydrocarbons.

A. Fats.

II Inorganic.

1. Mineral Salts.

2. Water.

A knowledge of the normal digestion and digestive system is necessary before we can understand how the perverted digestion is to be treated.

The food, when taken into the mouth is ground by the teeth and mixed with the fluid saliva. The saliva is a secretion from a group of glands opening into the mouth.

The liquid is thin, and except while fasting, of slight alkaline reaction. It contains about one percent of solid matter, half of which is called ptyalin, and the remaining portion composed of chloride and phosphate of sodium, with some carbonate and sulphocyanide.

Ptyalin is an enzyme which converts starch into soluble sugar called maltose, hence it is sometimes called "animal diastase." Mialhe says

"One part of ptyalin is capable of converting eight thousand parts of insoluble starch into soluble glucose." This action of the ptyalin does not cease when the food leaves the mouth, but is active for one or two hours afterward.

Ptyalin has no chemical action on fat or protein bodies, its real function being to lubricate the food for deglutition. The food, after being thoroughly ground by the teeth and mixed with saliva, is carried through the oesophagus into the stomach.

The mucous membrane lining the stomach is made up of numerous small glands, long and tubular in shape, called gastric glands. These secrete a clear, colorless, acid fluid called gastric juice. The acidity is due to the presence of free hydro-chloric acid to the extent of two tenths per-cent. There is also a peculiar substance called pepsin, a soluble enzyme, in many respects similar to, though very different in its effects from, ptyalin. Another ferment is called rennin. Proteids in the stomach are acted on by the hydro-chloric acid, but the solvent power of gastric juice over proteids is due to pepsin.

The characteristic proteid which is formed during the solvent action of the juice is called peptone. Peptone differs from all other proteids in its extreme solubility and characteristically in that it is highly diffusible; it is soluble in water and is not coagulated by boiling. The rennin of gastric juice causes the caseinogen in milk to coagulate. Gastric juice appears to have no direct action on the fats but it breaks up the proteid framework and sets them free. Carbohydrates are not acted upon by gastric juice. Some of the food that has digested will be absorbed directly from the stomach, but the larger part of the food material, then called chyme, is passed into the intestine through the pyloric orifice. When the food has passed the pylorus it enters the intestine.

The intestine forms one long tube, with mucous and muscular coats like the stomach, and are also

enveloped in peritoneum. The intestine is divided into two portions, the small and the large. The first portion of the small intestine is the duodenum where the chyme is mixed with the pancreatic juice. The secretions, besides those of the proper intestinal glands, which enter the intestine are those of the liver and pancreas, the bile and the pancreatic juice. The pancreatic juice is the chief agent concerned in the digestion of fat. As the food passes along the intestine, absorption of its ingredients takes place. Each constituent of the food influences the absorption of the others, although not much is known about it. The addition of starch to proteid tends to diminish the absorption of the latter. If fat is withheld the phosphoric acid is not so well absorbed. If fat is not well absorbed the destruction of proteids by putrefaction is greatly increased, owing to the

unabsorbed fat enclosing the particles of proteid and interfering with their proper digestion. As it is obvious that the influence of the carbohydrates retards the putrefaction of the proteids, it is readily understood that fats cannot replace carbohydrates in the intestine. Digestion is completed in the duodenum, and as the food is absorbed the remaining portions are being acted upon by bacteria which have escaped the action of the gastric juice.

The carbohydrates present are broken up and organic acids are produced, which restrain the putrefaction of the proteid constituents, that would otherwise be liable to occur. The fluid poured out by the glands of the intestine in attempting to neutralize these acids, more than makes up for any absorption of water. The contents of the small intestine remain very fluid until the large intestine is reached. Then

the production of acids by bacteria ceases and the rapid absorption of water cause the residue to assume a solid form. The residue is usually eliminated about twenty-four hours after the food is eaten.

We will now consider the use of food as a therapeutic agent in the treatment of the sick. As we now understand the normal digestion it is easy to understand how disease could throw it out of its regular action. It is obvious that a special treatment in diet is necessary for a diseased condition, especially in diseases of the digestive system. Typical diseases to illustrate the treatment in the different parts of the digestive tract will be discussed.

Cancer of the Stomach.

A dietetic treatment can not cure a cancer of the stomach, but the life and strength of the patient will be prolonged and the personal comfort increased by such treatment, more than any other. Nourishment in a concentrated and predigested form should be given and if there is obstruction of the pyloric orifice the food must be such as will be absorbed direct from the stomach, as the food can not pass on to the intestine. Such foods include the peptones, albumoses which may be taken up by the circulation in considerable quantity. Theoretically, albumoses would constitute the most useful food but a patient will weary of such a diet. If the disease has not progressed too far, patients do best on a solid diet, such as soft cooked eggs, scraped or minced beef and chicken. The digestion is facilitated by use of pepsin and hydrochloric acid. In advanced cases the diet must be wholly fluid and concentrated, with small quantities

given frequently. Buttermilk, skimmed milk and koumiss may be given. By means of a better general nutrition this fatal disease can be kept from doing its work so rapidly. Loss of appetite is a very constant symptom and patients are often afraid to take food. Others may find little difficulty in taking food as long as it is simple and very fluid. Failure of appetite is usually a marked and early symptom in cancer but sometimes, when the cardiac orifice is involved, the trouble comes in difficulty in getting food into the stomach and not much in loss of appetite. The food, then, does not reach the stomach but is sent back. Rapid loss of strength is the result unless the patient be supported by predigested nutrient enemata.

An important point in regard to cancer of the stomach is, that the tissues of that organ, beyond the limits of the growth, are involved in the degenerative changes and consequently secretion and absorption are greatly disturbed and

nutrition is in that way the more hampered. The extensive disorganisation of the stomach calls for the use of prepared foods and peptonised milk, which will pass through the stomach easily and be acted upon lower down the intestinal canal. The feeding depends upon the portion of the stomach diseased, the likes and dislikes of the patient, and the stage of the disease.

In severe cases, in brief, give liquids in small quantities at frequent intervals, depending upon the amount that can be given at one time. All food must be taken very slowly and neither hot nor cold. The quantity of food given at one time should not exceed two or three ounces and the intervals should not be longer than two hours. About two pints of fluid will then be given in a day. If it consists mainly of milk and a farinaceous material, as baked flour, powdered biscuits or a prepared food, such as Mellin's, it gives a fair quantity of nutriment, and may be sufficient for some time.

without nutrient enemata. But if the milk has to be diluted with soda water or lime water, the nutritive value is reduced and a nutrient enemata should be given twice a day.

Predigested foods by enema.

Rectal feeding has constituted a therapeutic recourse for a long time, but recently the value of this method of administering nourishment has been studied more scientifically. Nourishment that is to be given in this manner, to be of the best form, should be prepared and predigested substances such as peptonised milk and gruel, beef peptones, malt extract and prepared farinaceous foods. In order to be retained the enema should be small in bulk and lukewarm in temperature. Not more than one and a half or two ounces should be given at a time, and this must be given slowly.

The absorptive power of the large intestine for proteids has been investigated and the results show that (1) peptone is readily absorbed; (2) milk

proteids are not absorbed very extensively; (3) eggs given alone are not well absorbed but if about fifteen grains of salt be added to each egg they are well utilized; (4) raw beef juice is almost completely absorbed; (5) albuminoids like gelatin are not absorbed.

As to carbohydrates, the sugars are well absorbed, but in a concentrated solution are apt to prove irritating to the sensitive mucous membrane. The solution should not be stronger than ten to twenty percent. Starch is absorbed readily, even when given in the raw state. It is not at all irritating but positively soothing.

The fats are not at all well absorbed when given by enema. The total amount absorbed depends on: (1) the total quantity given; (2) the length of time retained in the bowel; (3) the temperature; (4) absence or presence of common salt.

These experimental results show that the best ingredients for nutrient enemata are: (1) peptones or albumoses; (2) eggs with

addition of salt; (3) raw beef juice; (4) dilute solutions of grape-sugar; (5) unboiled starch. (Boiled starch is too thick to inject readily.)

Just why these articles are absorbed when injected into the large intestine is not exactly understood, as it is quite clearly understood or established that no digestive ferments are secreted in the colon. The explanation generally believed and accepted is that a reverse peristalsis carries the injected substance through the ileo-caecal valve into the small intestine. Here digestion and absorption can take place. The addition of salt to nutrient enemata promotes their absorption to a very great extent. This is probably due to the stimulation of the reverse peristalsis, and the exciting of the intestinal cells so they will absorb the food more readily.

Milk is commonly used as the basis for enemata as it is convenient and unirritating. The casein is only about one third absorbed.

Some enemata containing milk.

Peptone and Milk Enema,

Milk. - - - - 250 c.c.

Peptone - - - - 60 grammes.

Egg and Milk Enema,

Eggs. - - - - 3,

Milk - - - - 250 c.c.

NaCl - - - - 3 grammes.

Sugar and Milk Enema,

Grape-sugar - - - 60 grammes.

Milk - - - - 250 c.c.

Starch and Milk Enema,

Starch (unboiled) 60 grammes.

Milk - - - - 250 c.c.

It is better to peptonise the milk before it is used.

Catarrhal Enteritis and Diarrhoea.

This disease is the result of excessive peristalsis. It may be caused by a large volume of fluid in the intestine. This fluid may be caused either by lack of absorption of an excess of liquid taken into the digestive tract, or by hypersecretion, or the failure to absorb the food fluid called chyme.

Excessive peristalsis is occasioned by

1. Chemical products contained in food.
2. Bacteria which cause abnormal fermentation.
3. Nerves and muscles irritated by coarse or undigested particles of food.

Acute diarrhoea is due to temporary errors in diet, such as an unbalanced dietary of carbohydrates which ferment and form acids which irritate the intestine. It may also be due to taking cold, impure food, improper medicine, change of drinking water or sudden change of climate, and will often subside of itself if no food is given until the irritant products have passed off. The digestive system needs rest and fasting will give nature a chance to help itself.

Chronic diarrhoea is complicated with some intestinal or other disease, and requires great care in treatment.

As a general rule the first thing to do is to moderate the quantity of food given. All irritating substances, fruits and vegetables, substances liable to ferment such as sugars, and foods having much residue, must be forbidden.

As the digestive tract needs rest, when an acute attack of diarrhoea commences food should be withheld for a time. Then a little barley water or strained arrowroot gruel may be given. Milk diluted with one-third lime water may be given if the patient can take it. Koumiss is highly recommended. Oyster and clam broth may be ~~given~~ next and then gradually return to the ordinary diet by eating such foods as oysters, sweet-breads, baked potato and milk toast. When a cure diarrhoea comes on suddenly after a meal it is probably due to some one article of diet, and

so the diet must be restricted until the trouble is past.

Acute Catarrhal Enteritis in Adults.

Cholera Morbus.

This disease is caused by bacteria. The germs enter the system through the drinking of impure water, or by eating of overripe fruit. Unripe fruit or vegetables will sometimes cause the disease, also. The patient must lie perfectly quiet and if the attack is severe no food should be allowed for at least twenty-four hours. The first food to be given should be very simple, such as pancreatinised milk diluted with lime water, meat broth, or milk toast. Water must be given to replace the excessive drain on the system. The thirst may be relieved by giving pieces of cracked ice or oatmeal water. As long as the diarrhoea lasts, milk and broths must be the only food given but as soon as the patient begins to improve, soft cooked eggs,

raw oysters, scraped beef and toast may be given. Care must be exercised for several days that the food is not too harsh or the sensitive tissues will again be affected.

Acute Milk Infection or Cholera Infantum.

This violent form of diarrhoea prevails especially in hot weather. It will attack infants fed by artificial means but not those that are nursing.

The giving of milk in any form must be stopped immediately and the poison from the food washed out of the system. No matter how much vomiting and diarrhoea have occurred the stomach must be cleansed by lavage and the intestine by an injection of water. No food can be given for at least twenty four hours. The first nourishment to be given should be warm meat juice and pancreatinised meat broth, or koumiss and egg albumen in teaspoon quantities about every hour. The food must be simple.

Constipation.

There is a recognized rule that the intestines should be emptied of their waste material at least once every day, yet we sometimes find persons who have formed the habit of getting rid of this waste product every two or three days and yet have almost perfect health. These habits are, nevertheless, not good ones.

The periodic evacuations are determined by peristaltic contractions of the muscular wall of the intestines, excited by their contents. The chyme which enters the small intestine from the stomach is altered by the absorption of water and soluble ingredients. The action in the small intestine is greater than it is in the large intestine for it has a triple function of mixing the chyme with the intestinal and pancreatic juices and the bile; bringing the whole contents in touch with a larger surface for absorption and propelling the residue toward the large intestine.

At the same time the local blood current is increased, and the flow of blood also stimulates peristaltic contractions near the lower end of the small intestine the products are found to be slightly diminished in bulk, by absorption of food. Reflex mechanism relaxes the ileocaecal valve and the peristalsis of the small intestine propels the food onward into the large intestine where absorption is still continued until only a residue is left.

Constipation is due to lack of peristalsis, as diarrhoea is due to excessive peristalsis. It may result from the following causes:

1. Insufficient quantity of food, consequently too little bulk to excite peristaltic motion.
2. Two highly nutritious or concentrated foods, are almost completely absorbed and the residue, which is very small, collects.
3. Insufficient fluid will cause constipation: first, the chyme is not liquid enough to mingle with the digestive juices; second, the intestinal walls become dry; third, there is less fluid absorbed by the blood and consequently the digestive juices and intestinal mucus are reduced in

amount and altered in quality. 4. Irregularity in diet or in the intervals of taking food, imperfect mastication or hurried eating, variations in quantity, all tend to disorder the natural rhythm. 5. Too large bulk of food will be liable to obstruct the passage. 6. Weak muscles or imperfect nerve stimulation causes slow movement. 7. Lack of exercise deprives the blood of needed oxygen to oxidize the food. 8. Constipation is sometimes complicated with diseases such as anaemia, hysteria and chronic diseases of liver and stomach.

Constipation will eventually disorder the whole system and probably be the cause of some other, and perhaps, dangerous disease.

There are some important regulations necessary before ordering a diet for this disease. Regular hours must be established for meals, exercise and sleep. A simple, regular, systematic plan of living would be the ideal plan.

Vegetable food, in general, as distinguished from animal, furnishes a much larger proportion of waste material. The principal underlying dietetic treatment of chronic

constipation must be based upon a supply of digestible food, which will excite peristalsis by bulk or by physical or chemical properties.

Water. One of the principle foods to be given is a large quantity of water, about one or two pints, to be taken before retiring and on rising. Water should not be taken at meal-time, but should be taken between meals. It may be either hot or cold as the temperature makes little difference. Unless the gastric juice lacks in acidity it will aid digestion to take a half pint of hot water about an hour after a meal, as the absorption of the moisture from the food and the gastric juice will leave the contents somewhat dry, therefore they will be better digested if more moisture is added. If the patient objects to so much water it may be given in the form of lemonade.

Vegetables. The cellulose of starchy foods contains very little nutriment as it is so difficult to digest; therefore, it has a large percent of waste material, and

is an excellent kind of food to give in cases of constipation. The vegetables that may be given are tomatoes, corn, beans, peas, onions, potatoes, cabbage celery and asparagus.

Fruit. Fruits are laxative for two reasons: first, because they contain indigestible seeds which will act mechanically in the intestine. Second, the acids and salts which they furnish when absorbed stimulate the digestive secretions and peristalsis. Fruit is always more laxative when eaten before breakfast or between meals. It will then enter the intestine more promptly and will not be retarded by other articles. Water should be taken with it. The fruits, to be taken, which contain seeds are raisins, figs, blackberries, strawberries and grapes. Fruits which contain special laxative properties through chemical action are pears, plums, apples, peaches, oranges, cherries and prunes. With some persons who do not have perfect digestion the raw fruits will disagree and since the laxative properties are not much

weakened by cooking it is better to have them cooked. They are rendered more digestible by stewing or baking and the nutritive qualities are not impaired. If the fruit needs a quantity of sugar to make it palatable, a little bicarbonate of soda will partially neutralise the acidity and saccharin may be used instead of sugar. A quantity of sugar would probably cause abnormal fermentation. Saccharin, which is benzoic sulphamide is seven hundred times sweeter than sugar. If too much fruit is eaten it will occasionally cause dyspepsia.

Cereals. When coarsely ground cereals still retain a portion of the hard outer layer which is rough. This, when taken into the digestive tract will stimulate activity through mechanical irritation. Therefore, the coarse breads such as Graham, rye, whole-wheat and Boston brown bread are regulating as well as nutritious in the digestive system. The cooked cereals, such as cornmeal, oatmeal, wheatling, and others similar in character, are also excellent.

Fats. Sometimes the constipation is caused by absence or insufficient quantity of fat or oily material in the diet. This is easily remedied by adding those articles to the diet which contain hydrocarbons, such as cream, butter, fat meats and olive or salad oil in salad dressings.

Therefore, it is obvious that, by a regulated, systematic diet, the chronic cases of constipation can be cured in the majority of persons affected by this common disease.

Disease of the Liver.

Diabetes.

This is a disease depending almost entirely upon the feeding. It is a disorder of nutrition in which sugar accumulates in, and is secreted by, the urine, in the form of grape sugar or glucose.

Diabetes is in three forms: glycosuria in which there are continuous traces of sugar in the urine; polyuria, which is the passage of a large amount of urine; diabetes mellitus in which the sugar is grape sugar. Diabetes is becoming a very common disease but is seldom found in children. Persons such as vegetarians are liable to have it on account of the excess of carbohydrates taken into the system. Strain, injuries on the back and nervous shocks will sometimes cause the disease.

The liver is the storehouse for the excess of sugar taken up from digestion. It is kept in the form

of glycogen so it will not enter the system until needed. The theories concerning the cause of the disease are

1. That it is due to impaired glyco-genic function and the sugar taken as food is not stored in the liver, but is passed directly into the circulation.

2. Increased glyco-genic work and an over production of sugar from the glycogen, and the newly formed sugar is thrown into the blood.

3. A normal liver but the working of the other organs of the body is imperfect.

Immense amounts of water is needed to carry away this waste of sugar, so extreme thirst is always present. The face will be drawn and the body emaciated for the tissues are drained of their moisture.

Cures may sometimes be effected by means of a dietetic treatment, but all attempts to cure by drugs has failed.

The diet must be determined, for each individual patient, by the degree of severity of the disease. 1. In mild cases the diet should contain more proteid than normal, with the addition of a large proportion of fat and as much carbohydrate as may be tolerated without the appearance of sugar in the urine. 2. In the more severe cases in which the carbohydrates are withheld and the sugar disappears, but comes back again if any ~~starch~~ or sugar is allowed the diet should be very much like the above but contain more fat. 3. The most severe cases of all, in which sugar is found in the urine when carbohydrate is not taken, require rigid treatment. The carbohydrate must be reduced to the very smallest amount; the proteid should be in smaller proportion than normal; the amount of fat must be as large as the patient can digest. In each case the diet must be suited to the needs of the patient.

Fats. If a small quantity of carbohydrate is allowable there is not so much difficulty in taking fat in large quantities. The best sources of fat are butter, bacon, pork, fish, suet, cheese and thick cream. A patient should eat at least a half pound of butter and a half pint of cream per day.

Proteids. The proteid can be obtained from the animal foods such as lean meat, fish and eggs. From four to six eggs may be taken daily. Milk may usually be taken, also cheese, as both contain fat and proteid.

Carbohydrates. If carbohydrates are to be allowed to a patient they should be selected from the common articles of diet such as bread or potatoes. Green vegetables may be allowed in every case as they contain very little carbohydrate. Tomatoes, celery, asparagus, rhubarb, cabbage, cauliflower, cucumbers, horse-radish, lettuce, onions, string beans, olives, cranberries and water-cress may be in the dietary.

Fruits and nuts are nourishing and give variety to the diet. All nuts are allowable except chestnuts. The fruits that may be given are apples that are sour, apricots, blackberries, gooseberries, currants, grapes, oranges, lemons, plums, peaches, and strawberries. Oranges and grapes are especially valuable.

As diabetes causes a constant drain on the moisture in the system, and thirst is a constant symptom, water should be given freely. Tea and coffee may be allowed if no sugar is added. Lemonade should be sweetened with saccharin, ~~or~~ benzoic sulphamide.

Frequent feeding is desirable, and therefore several lunches should be introduced besides the three meals a day.

Active exercise, ~~simple~~ and hygienic living will usually prevent this disease, but when an attack comes it should be treated by means of dieting.

It is much easier to prevent a disease than it is to cure it, therefore we study first how to live healthful lives.