

DETERMINATION OF CLINICAL AND LABORATORY INDICATORS OF CHANGES IN DENTAL HARD TISSUE UNDER THE INFLUENCE OF CARBOHYDRATES IN CHILDREN.

<https://doi.org/10.5281/zenodo.17342421>

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Abstract

This article highlights the importance of research on the changes in dental hard tissue caused by exposure to rapidly decomposing carbohydrates in children and the need to improve their treatment and prevention. Dental diseases caused by exposure to rapidly decomposing carbohydrates are widespread, difficult to diagnose and treat, and studies conducted over the past twenty years have shown that up to 15% of oral diseases are caused by rapidly decomposing carbohydrates, and up to 24.5% of these diseases are observed in combination with various syndromes.

Key words

Rapidly decomposing carbohydrates, dental hard tissue diseases, assimilation process, medical and preventive measures, spectrophotometric method, fluorimetric method, electrophoresis, isozyme analysis, statistical method.

Carbohydrates are divided into 2 large groups: monosaccharides and polysaccharides. Polysaccharides consist of sugars (oligopolysaccharides) - disaccharides (bioses), trisaccharides, tetrasaccharides and non-sugar polysaccharides. They are also called simple carbohydrates (monosaccharides or monoses) and complex carbohydrates (polysaccharides or polyoses). Mono and oligosaccharides are substances with a low mol. m. that are well soluble in water. Non-sugar carbohydrates have a high mol. m. and solutions exist only in colloidal form. Non-sugar carbohydrates (starch, starch) are composed of a large number of monosaccharide molecules[2,5].

The structure of monosaccharides has been determined by a series of reactions, taking into account the fact that glucose forms 2-iodohexane when

reduced with hydrogen iodide HI, that glucose is oxidized to gluconic acid under mild conditions, and that it has 5 hydroxyl groups when acylated and alkylated. In fructose, the aldehyde group in glucose is replaced by a ketose group. Monosaccharides belonging to simple carbohydrates are optically active crystalline substances that are highly soluble in water, and most of them are sweet. They have a reducing property. They are polyatomic aldehyde and ketone alcohols (mostly in the form of internal cyclic hemiacetals). Oligosaccharides, which belong to these, consist of 2-10 monosaccharides linked by a glycosidic bond. Disaccharides include sucrose, trehalose, and lactose, which are widely distributed in nature. Numerous glycosides (physiologically active substances) of oligosaccharides are used in medicine[3,8].

Polysaccharides are linear or branched high-molecular compounds, the molecules of which consist of monosaccharides linked by glycosidic bonds. They are reserve carbohydrates - starch, inulin, glycogen, hemicelluloses. Carbohydrates accumulate in large quantities only in certain plants. Sugar, beets contain sucrose, mushrooms contain mannitol, potatoes contain starch, cotton contains cellulose. Carbohydrates are converted into organic acids, polyatomic phenols, tannins, anthocyanins, amino acids, fats, proteins, etc. Carbohydrates make up 2% of the dry mass of the animal body. 1 g of carbohydrates provides 4.1 kcal of energy and is obtained mainly from plants. This energy is spent in the animal body anaerobically, i.e., by glycolysis, and aerobically. During respiration, about 30 times more energy is released. Part of the lactic acid formed during glycolysis is oxidized, and the rest is synthesized into glycogen due to the release of energy[7,11].

Carbohydrates are used to produce glucose, fructose, ascorbic acid, antibiotics, cardiac glycosides, etc., which are necessary for the body. Carbohydrates are also an important source of raw materials for industry and the national economy, pharmaceuticals and medicine, the food industry, and other sectors. Dyes, dozens of acids, medicines, and the main raw materials of the textile industry - cellulose, paper, fibers, and plastics - are also produced using carbohydrates. Explosives, films, parchment, gum arabic, etc. are also among them[8,12].

There are more than 150 types of rapidly decomposing carbohydrates. Rapidly decomposing carbohydrates are distinguished by their multifaceted effect on the body. Dental diseases caused by the effects of rapidly decomposing carbohydrates occupy a special place due to their widespread distribution and complexity in diagnosis and treatment. Studies conducted in scientific sources over the past twenty years have shown that up to 15% of oral diseases caused by rapidly decomposing carbohydrates occur, and up to 24.5% of these diseases are observed in combination with various syndromes[8,13].

At the same time, the prevalence of dental hard tissue diseases caused by rapidly decaying carbohydrates, which range from 14.2% to 22.5%, indicates the high prevalence of the pathology. This is explained by the fact that the initial stages of the disease proceed without clear symptoms, the inability to obtain sufficient information about changes in both clinical and laboratory tests, and the lack of a single etiopathogenetic approach among specialists. This indicates the need to improve methods of treatment and prevention of the problem[3,7].

Carbohydrates are compounds made up of carbon, oxygen, and hydrogen atoms, and are starchy or sugary substances. Each of them contains different elements and performs different functions. Carbohydrates are divided into two types: simple and complex. Simple carbohydrates include monosaccharides and disaccharides, and it is impossible not to notice their sweet taste in products. Glucose, fructose, galactose, lactose, sucrose, and maltose belong to this group, they dissolve quickly in water, are easily absorbed by the body, and have the property of quickly providing energy. Complex carbohydrates contain polysaccharides, including starch, fiber, glycogen, and pectin[5].

Once in the body, carbohydrates perform a number of functions other than providing energy: They cleanse the gastrointestinal tract. Not all substances in food products are beneficial to the human body. The body is cleansed thanks to fiber and other carbohydrates. Otherwise, the individual could be poisoned[4,9].

Glucose nourishes the brain tissue and heart muscles and participates in the formation of glycogen, a component necessary for liver function. Carbohydrates strengthen the body's immunity and protective functions. Heparin reduces excessive blood clotting, and polysaccharides enrich the intestines with necessary active substances, increasing the body's resistance to various infections. Carbohydrates provide the structure of the human body. Without carbohydrates, the formation of a number of types of cells in the body, including nucleic acids and cell membranes, is inhibited[5,9].

Carbohydrates control metabolic processes in the body. They accelerate and slow down the oxidation process. Carbohydrates are involved in the assimilation of proteins and fats that come with food. In order for carbohydrates to benefit the body, rather than harm it, they should be consumed in limited quantities[13].

Diseases that develop due to an excess of carbohydrates in the body: The main problem that arises from excessive consumption of carbohydrates is metabolic disorders, which leads to a number of other consequences:

- Slows down the rate of breakdown of nutrients;
- Disrupts hormonal balance;
- Increases the rate of conversion of carbohydrates into fat molecules;

Causes a decrease in insulin-producing cells in the pancreas and the development of diabetes;

Increased blood sugar levels increase platelet aggregation;

Increases the risk of blood vessel wall fragility, heart problems, heart attack and stroke.

Glucose and fructose in the oral cavity create a breeding ground for pathogenic microflora, which leads to tooth enamel discolouration, discoloration and caries.

To normalise the food consumed, carbohydrates should be consumed in the following amounts:

Children under one year of age should be given 13 grams of carbohydrates per 1 kg of body weight;

Adults under 30 years of age who do not engage in heavy physical activity are recommended to consume 300–350 grams per day;

After 30 years of age, this amount is reduced to 50 grams; For women, all amounts should be less than 30–50 grams;

People who play sports or lead an active lifestyle are allowed to consume 40–50 grams more carbohydrates than the norm. In order for the self-cleaning function of the intestines to work well, the amount of fiber in the diet should not be less than 20 grams. For people who do not work at night and on night shifts, it is not recommended to eat carbohydrate-rich foods on an empty stomach. This is because at this time, metabolic processes slow down, and the energy released is not spent[3,14].

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