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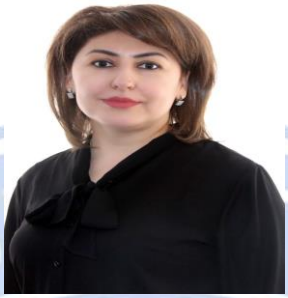
ASSESSMENT OF THE ROLE OF DENTAL AND PHYSIOTHERAPEUTIC MEASURES IN THE COMPLEX TREATMENT OF DISEASES THAT DEVELOP AS A RESULT OF RAPIDLY DECOMPOSING CARBOHYDRATES.



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ABSTRACT

This article presents the results of research on the changes in dental hard tissue caused by fast-digesting carbohydrates in children and their improvement in treatment and prevention. Dental diseases caused by fast-digesting carbohydrates are of particular importance due to their prevalence, complexity of diagnosis and treatment. Studies conducted over the past twenty years have shown that oral diseases caused by fast-digesting carbohydrates account for up to 15% of cases, and these diseases, together with various syndromes, account for up to 24.5%.

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

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“TEZ PARCHALANUVCHI UGLEVODLAR NATIJASIDA RIVOJLANADIGAN KASALLIKLARNING KOMPLEKS DAVOLASH JARAYONIDA STOMATOLOGIK VA FIZIOTERAPEVTIK CHORALARNING O‘RNINI BAHOLASH”

ANNOTATSIYA

Ushbu maqolada tadqiqot natijalari bolalarda tez parchalanuvchi uglevodlar ta’sirida tish qattiq to‘qimasi yuzaga keladigan o‘zgarishlar va ularni davo-profilaktikasini takomillashtirish, tez parchalanuvchi uglevodlarning ta’siri natijasida yuzaga keladigan stomatologik kasalliklar keng tarqalganligi, tashxislash va davolashda murakkabligi bilan alohida o‘rin egallashi, so‘nggi yigirma yil davomida o‘tkazilgan tadqiqotlar tez parchalanuvchi uglevodlar natijasida yuzaga keladigan, og‘iz bo‘shlig‘i kasalliklari 15% gacha, turli sindromlar bilan birga esa bu kasalliklar 24,5% gacha kuzatilishi qayd etilgan.

Kalit so‘zlar. Tez parchalanuvchi uglevodlar, tish qattiq to‘qimasi kasalliklari, assimilyatsiya jarayoni, tibbiy-profilaktik tadbirlar, spektrofotometrik usul, flyuorimetrik usul, elektroforez, izoferment tahlil, statistik usul.

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«ОЦЕНКА РОЛИ СТОМАТОЛОГИЧЕСКИХ И ФИЗИОТЕРАПЕВТИЧЕСКИХ МЕРОПРИЯТИЙ В КОМПЛЕКСНОМ ЛЕЧЕНИИ ЗАБОЛЕВАНИЙ, РАЗВИВАЮЩИХСЯ ВСЛЕДСТВИЕ ВОЗДЕЙСТВИЯ БЫСТРОРАЗЛАГАЮЩИХСЯ УГЛЕВОДОВ»

АННОТАЦИЯ

В данной статье представлены результаты исследований изменений твердых тканей зубов, вызванных быстроусвояемыми углеводами у детей, и пути их совершенствования в лечении и профилактике. Заболевания зубов, вызванные быстроусвояемыми углеводами, имеют особое значение в связи с их распространенностью, сложностью диагностики и лечения. Исследования, проведенные за последние двадцать лет, показали, что заболевания полости рта, вызванные быстроусвояемыми углеводами, составляют до 15% случаев, а в совокупности с различными синдромами – до 24,5%.

Ключевые слова: Быстроусвояемые углеводы, заболевания твердых тканей зубов, процесс усвоения, лечебно-профилактические мероприятия, спектрофотометрический метод, флуориметрический метод, электрофорез, изоферментный анализ, статистический метод.

Currently, the prevalence of non-carious dental lesions that occur after eruption ranges from 64.4 to 72.9% [1]. The most common causes of increased tooth erasure are morphological inferiority, functional insufficiency of dental hard tissues, dental overload, chemical exposure, and occupational hazards [2,4].

The modern literature describes in detail the clinical picture of increased erasability of dental hard tissues [1.5–8], while experts are particularly interested in the possibility of using modern research methods to assess the morphofunctional state of the maxillary system with localized increased erasability of dental hard tissues[2,8].

The aim of the study was to identify etiopathogenetically proven diseases of dental hard tissues caused by rapidly decomposing carbohydrates in children, improve early diagnosis and modern approaches to treatment and prevention.

Research objectives:

to study the relationship between changes in assimilation processes in children's bodies caused by rapidly decomposing carbohydrates and the formation of oral diseases;

to determine the progression of the disease by examining enzymes in the oral fluid in case of damage to the hard tissues of the teeth caused by rapidly decomposing carbohydrates;

to determine the importance of complex therapeutic measures in children with diseases of the hard tissues of the teeth;

improvement and evaluation of the effectiveness of therapeutic and preventive measures aimed at treating diseases of the hard tissues of teeth caused by rapidly decomposing carbohydrates in children;

The research material and method. 125 children with diseases of the hard tissues of the teeth caused by rapidly decomposing carbohydrates and 35 children of the same age group without lesions of the hard tissues of the teeth, who made up the control group, were examined.

Each chemical element has a strictly defined energy and wavelength of X-ray radiation. This is the basis for quantitative energy-dispersed RLA (electromotive force). Thus, scanning electron microscopy, in our opinion, will make it possible to determine the earliest destructive changes that occur during demineralization in the surface layers of hard tissues of teeth, and changes in the chemical composition of the surface zone of teeth.

Results and discussion. Electron microscopic images of the surface of enamel and dentin with varying degrees of increased erasability have the following features. The surface of the enamel has a smooth relief without signs of abrasion, although convex and concave areas are present on it. This drawing shows a smooth tooth surface with a dense, massive structure, but with traces of a fairly strong mechanical impact – furrows, scratches, small depressions, cavities. The results of chemical destruction are not observed.

The chemical composition is stoichiometrically very close to pure apatite. The reduced calcium content is due to the replacement of the latter with strontium and sodium (heterovalent isomorphism) in the original tooth substrate. On the surface of a tooth with the 1st degree of erasability (Fig. 2), a fine fibrillate of the degree of their erasure and assessment of the chemical composition of teeth with increased erasability by X-ray spectral local analysis is formed in the enamel area. Electron microscopic studies were performed using a JSM-6390LV scanning electron microscope (Jeol, Japan) with electron probe attachments for local X-ray spectral analysis INCA Energy 350 (Oxford Instruments, Great Britain). 10 electronic

Material and methods. To assess the condition of the hard tissues of the teeth, we applied a set of methods that allow us to obtain the most complete characteristics of the objects of study [9, 10] and including scanning electron microscopy and local electron probe (X-ray spectral) analysis. All electron probe research methods are based on the analysis of signals that occur when an electron beam (the so-called electron probe) hits an object. In this case, the phenomena of elastic and inelastic scattering of electrons of the incident beam are observed.

The energy of the incident beam for a scanning electron microscope (SEM) ranges from 5 to 50 keV. In SEM, a thin beam of high-energy electrons is focused onto the surface of the sample and then scanned over the surface. The signal of low-energy secondary electrons knocked out of the sample surface by a beam of primary electrons (inelastic scattering) is most often used to obtain an image. The secondary electrons are collected with a very high degree of efficiency (close to 100%) by the control grid (locking voltage) and sent to the secondary electron detector. After amplification, the received signal is transformed from it into an image on the monitor screen. Due to the small size of the focused electron beam (electron probe), the REM resolution (up to 3 nm) and the large depth of field make it possible to obtain contrasting images of morphological elements of objects 1-10 microns in size. A thin conductive layer of carbon is sprayed onto the surface of the sample to increase electrical conductivity (relieve electrostatic stress).

Electron probe microanalysis, or X-ray spectral local analysis (XRD), is currently one of their main methods of studying matter. It allows quantitative determination of the chemical composition of minerals in the range of elements from B (Z=4) to U (Z=92). The volumetric locality of the method is several micrometers in a cube. The absolute sensitivity of the method is 10-8-10-15 g. When an electron is knocked out from the inner electron shells of atoms (K-, L- or Fig. 1. Enamel without signs

of increased erasability. Fig. 2. Damage to the enamel with the formation of defects of various sizes and depths – erasability of the 1st degree [2,5].

After eating, a thin film composed of saliva components forms on the tooth surface. Initially, this film is harmless, as it does not contain pathogens that could negatively impact the condition and integrity of teeth. However, after a couple of days, bacteria begin to multiply within it. After 5-9 days, plaque forms on the enamel, containing microbes and their aggressors (metabolites). As a result of the absorption of saccharides by these bacteria, acids are produced that can leach calcium and negatively impact the integrity of the enamel. Lactic acid is considered the most harmful for teeth[1,3].

Damage to the tooth surface leads to increased permeability. A chalky spot subsequently forms at this site, which is the main sign of damage. If left untreated, this spot gradually develops into a carious lesion. Causes of tooth demineralization. The leaching of mineral salts from tooth enamel occurs under the influence of a number of factors:

Age. This pathology affects people of all ages. In children, tooth demineralization occurs as a result of excessive consumption of carbohydrate-rich foods. Without proper oral hygiene and a lack of fluoride, the situation will gradually worsen, leading to multiple carious lesions. Hormonal changes during adolescence can also affect dental health. After 40–45 years of age, the body begins to weaken, resulting in a decreased immune system, which is less able to fight pathogens [1, 4].

Professional. Workers in confectionery and acid-base production facilities are susceptible to demineralization of hard dental tissue. This condition also affects people who frequently encounter stressful situations at work [2,5].

Gender. Caries most often affects women. During pregnancy and breastfeeding, women lose many nutrients, resulting in weakened tooth enamel. The risk of mineral deficiency also increases with gastrointestinal and endocrine diseases [2].

Geographic. Climate and the presence of minerals in water and soil affect the body and dental health. Resistance to caries is influenced by the fluoride level in water. The higher the level, the less susceptible the local population is to caries. However, excess fluoride is also harmful, as it can cause fluorosis [3,5].

Experimental and theoretical studies with an increase of 2000 times, a microporous structure of tissues with shallow channels formed during chemical etching is observed. The chemical composition of the grain surface practically does not change, the condition of the tooth surface is shown with pronounced morphological changes. The structure becomes loose, cavernous, with flakes of stratified microcrystals of apatite. Numerous uneven cracks of deep penetration can be traced (at a magnification of 500 times). At a magnification of 2000 times, relics of apatite microcrystals are observed in the form of elongated needles or thin plates randomly scattered over the tooth surface, often crossing at different angles. When the enamel is erased, the plates lose their leaf-like shape, taking on the appearance of thinned strips [1,5].

The enamel bundles, which normally look like small cone-shaped formations facing the dentin with a narrow part, change in structure and resemble separate clusters of fibrils. There are no noticeable changes in the chemical composition of the tooth surface. Strontium and sodium replace calcium in the structure of apatite. The stoichiometric ratio of the main components of apatite CaO and P2o5 is maintained.

With the 3rd degree of erasability, the changes in the tissues become irreversible. In the areas where the enamel was preserved, there is a fine-grained disintegration of the prisms. In some areas, the prisms are indistinguishable, and the enamel detaches from the dentin. The erasure of primary dentin is so great that it reaches the values of secondary dentin. The cement is noticeably thinning, which is probably due to the general phenomena of demineralization of teeth during abrasion and disruption of the periodontal structure. The tooth surface is shown with serious morphological

changes in hydroxyapatite crystals. The subhexagonal structure of microcrystals outlined by a white intercrystalline substance is clearly discernible[3, 8].

The size of microcrystals is about 50 microns (×500). At high magnification (2000), micro-scaly detachment of hydroxyapatite microcrystals with deep channels of chemical etching and resorbed microcrystal faces is observed. According to X-ray spectral microprobe analysis, a solar network is created that repeats the course of enamel prisms. The loose structure of the fabric is noted, which is explained by a partial violation of the structure of the prisms themselves and the interprism spaces.

This leads to early destruction of fibrillar structures with hydroxyapatite crystals, resulting in the formation of enamel clearance zones. The structure of the tooth surface at the 1st degree of erasability (see Fig. 2) relatively dense, massive, at low magnifications (500), but Fig. 3. Cracks extending in different directions are grade 2 erasure. Fig. 4. Areas of dentine with significant damage and lack of enamel are grade 3 erasure [1.5].

Conclusions. 1. The average values of the Ca/P coefficient in the enamel of all samples are less than 1.67, which is typical for stoichiometric hydroxyapatite, which confirms a calcium deficiency in enamel with increased erasability.

2. There is no morphologically clear line between physiological erasability and the initial degree of increased erasability of dental hard tissues. With the 2nd and 3rd degree of abrasion, irreversible changes in the structure of tooth tissues develop quite quickly.

3. The development of methods of prevention and effective orthopedic treatment of patients with increased tooth erasure is an urgent task of modern dentistry.

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