WEB OF SCIENTIST: INTERNATIONAL SCIENTIFIC RESEARCH JOURNAL
ISSN: 2776-0979, Volume 3, Issue 11, Nov., 2022

THERAPEUTIC EFFECT OF IMPROVED ENAMEL SURFACE PREPARATION TECHNIQUE IN THE TREATMENT OF ACUTE INITIAL CARIES OF TEMPORARY TEETH IN CHILDREN

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ANNOTATION

In the course of the study, the therapeutic effect of an improved technique for preparing the enamel surface was studied in the treatment of acute initial caries of temporary teeth in children.

The state of 109 teeth was assessed in 28 children aged 1.5 to 3 years with clinical manifestations of acute focal enamel demineralization. The observation was carried out in two groups of 14 children each, formed according to the principle of preparing the tooth surface before applying components for deep enamel fluoridation. When examining a vital staining test with 2% methylene blue solution and photoregistration were used. The state of 54 teeth in the first group and 55 in the second was studied. In the course of treatment after 1 month, the narrowing of the area of demineralization of all teeth was registered in 73% of patients of the second group and 64% in the first. At the same time, the average values of the degree of enamel staining at the initial examination were 5.39 ± 0.25, in the second group - 5.35 ± 0.23. A month after the repeated application of the composition for deep fluoridation, they were 3.28±0.19 and 1.84±0.09 in the first and second groups, respectively. The obtained effect indicates that the treatment of foci of acute demineralization with polymerized finishers made of urethane dimethacrylate resin, impregnated with aluminum oxide particles, with a size of 40 μm, at medium speeds can be recommended for. increasing the effectiveness of complex treatment of initial forms of caries of temporary teeth in children.

Keywords: temporary teeth, deep fluoridation of enamel, acute focal demineralization of enamel.

Introduction

Caries in temporary teeth is still one of the main problems in pediatric dentistry. If left untreated, carious lesions can cause pain, the child refuses to eat, and sleep disturbances. And complications such as inflammatory processes in periodontal

disease and damage to the rudiments of permanent teeth, impaired growth and development of the maxillofacial region, are also dangerous for general somatic health, worsening the quality of life in general.

According to Global Burden of Disease 2015, conducted in 195 countries, tooth decay is the most common disease among 313 diseases identified in 2.3 billion people. At the same time, 573 million children have untreated carious lesions. According to researchers, this disease in children occurs five times more often than asthma, and seven times more often than hay fever.

The prevalence of caries varies in different countries. It depends on the model of the health care system that ensures the availability of dental care and the implementation of preventive measures, the level of education of the population, cultural habits entrenched in society, the presence of negative environmental factors affecting the health of mother and child, as well as some other factors.

The initial clinical stage of a carious lesion is acute focal demineralization, which manifests itself in the form of white spots that appear in plaque accumulation areas and is due to the direct effect on the enamel surface of organic acids produced by cariogenic microflora during the fermentation of carbohydrates. The local pH value on the surface, which decreases to a value of 4.5, after about 30-40 minutes, is restored to normal. If the situation is repeated repeatedly, hydrogen ions, penetrating between the enamel prisms, form a lesion in the subsurface layer. The permeability of enamel in it increases significantly, the volume of microspecies at a rate of 1% reaches 14%.

The surface layer remains denser, less damaged for some time, the volume of microspecies increased slightly, from 1.75 to 3%. It contains more calcium, phosphorus and fluorine.

As a rule, the diagnosis of "acute focal enamel demineralization" is established during a routine examination, since there are no complaints about a visually detectable tissue defect and pronounced subjective sensations. In children of the first years of life, the presence and progression of the process, when defects are formed and sensitivity appears, parents can often judge only indirectly, focusing on negative changes in the child's behavior when brushing their teeth.

In the absence of control by a pediatric dentist, the resulting defects and increased sensitivity are largely the result of poor-quality hygienic oral care. The situation contributes to the accumulation of plaque, the progression of demineralization, as well as irritation of the marginal periodontium and the development of gingivitis, which in turn creates additional problems in care, both on the part of parents - the fear of causing pain, causing bleeding, and on the part of the child - negative behavior,

up to until complete cleansing. proven that the process of demineralization is reversible, and due to remineralization, it is possible to achieve restoration of damaged structures. Remineralization is reduced to the replacement of defects in the enamel crystal lattice and can be performed using a number of methods that provide a different effect and have certain indications and contraindications. In general, the early treatment of initial lesions of the enamel surface is one of the constantly developing areas of research. The currently existing methods for eliminating focal demineralization and stabilizing the carious process are distinguished by their minimally invasiveness and, therefore, do not require anesthesia, which is important at a pediatric appointment.

The topical application of fluoride preparations is actively used for the prevention and treatment of carious lesions, due to the ability of fluorine ions to inhibit the metabolism of bacterial flora, to transform hydroxyapatites into fluorapatites, which are more resistant to acids. However, fluorine particles in a varnish, gel or solution are large and practically do not penetrate into the deep layers of the enamel. The surface layer is remineralizer and only under the condition of constantly repeated contact with fluorine sources. An example of this are fluoride toothpastes, chewing gums, rinses, which are recommended for daily use.

In young children, exogenous prophylaxis with the use of fluorides in the form of long-term applications, rinses give an unequal effect, since it largely depends on the possibilities of the qualitative implementation of the procedure itself. Therefore, it is rarely used in children of this age group due to the difficulties of implementation. Mostly for prophylactic purposes, single-stage applications of foams with APF, application of varnishes are used. Fluoride toothpastes are recommended for long-term use. Publications of recent years indicate a pronounced stabilizing effect of silver deaminate fluoride in relation to various forms of uncomplicated caries.

Despite the interest in the results of the use of silver preparations as a minimally invasive intervention, in many countries it has not found wide distribution due to the increased requirements for aesthetics.

The improvement of nanotechnologies contributed to the development of products containing nanostructured microparticles with an average size in the range of 5–20 μm and a fine nanostructure in the range of 50–100 nm.

If it is necessary to treat initial lesions, one of the main components of success is the properties of the enamel and the properties of the preparation, which provide the possibility of penetration of the medicinal substance into the focus of demineralization. Due to the peculiarity of the pathomorphological of the development of the carious process and the accumulation of dental deposits, this

access is difficult. Therefore, manufacturers indicate the need for professional hygiene before topical application of fluoride preparations. It is usually recommended to treat the surface with an antiseptic, followed by the use of a brush and abrasive paste. The use of pastes and brushes makes it possible to remove only soft dental deposits and not always the pellicle. The surface layer of enamel, which has a higher degree of mineralization compared to the "body" of the carious lesion, remains unaffected. The demineralization zone, which is characterized by significant structural changes, remains closed and inaccessible to remedial preparations. And this presents a certain problem.

In the proven “resin infiltration” it was solved by using a gel, which is a mixture of acids. Under the influence of this gel, a dense “pseudo-intact” enamel layer is removed to a depth of approximately 40 μm.

In the course of some other therapeutic and prophylactic manipulations, in order to remove the surface layer of enamel, a micro abrasion procedure is used, which provides for the combined action of acid and abrasive. That is, non-standard methods of enamel surface treatment are offered, which at first glance could lead to irreparable damage, and in the end the result of their use is more pronounced and effective. As mentioned above, large molecules of some demineralizing drugs cannot overcome the barrier of the surface layer and only modify it. The method of deep fluoridation of enamel is distinguished by the use of substances that promote the formation of nanocrystals Ca F 2 c with a diameter of 50A, which are able to penetrate into the pores of the enamel. At the same time, the features of the surface layer can change the level of penetration that the user expects and influence the therapeutic effect.

Purpose

Improving the effectiveness of the treatment of initial forms of caries of temporary teeth in children by improving the method of preparing the enamel surface.

Materials and methods of research: Children aged 1.5 - 3 years old with clinical manifestations of acute initial caries were involved in the study. The diagnosis of acute focal demineralization was established on the basis of an examination in which the presence of white spots on the surface of the enamel of the temporary incisors of the upper jaw was visually determined.

To objectify and determine the severity of the lesion, the diagnosis was supplemented by a vital staining test with a 2% methylene blue solution and photo registration, followed by a study of the results in magnification.

formed according to the principle of preparing the tooth surface before applying components for deep enamel fluoridation.

In the first group, alternate application of solutions from the deep fluoridation kit on the affected enamel surface was carried out in accordance with the manufacturer's recommendations for cases of "treatment of caries in the stain stage." Namely: the surfaces to be treated were cleaned with circular brushes and special abrasive pastes without fluorine, which allow removing soft dental plaque and pellicle. After that, they were washed with water, dried with a jet of air, then abundantly moistened with liquid No. 1. After 1 minute, the excess liquid was removed with a dry swab, and liquid No. 2, a suspension of calcium hydroxide, was applied to the treated surface (the vial was preliminarily shaken). Then, after 1 minute, washed with a stream of water.

In the second group, the preparation of the enamel surface was different. Soft dental plaque was removed by careful treatment of the surface of the teeth with cotton swabs soaked in a 2% solution of chlorhexidine bigluconate and rinsing with a stream of water. After that, in order to remove the surface layer of enamel, the surface of carious lesions was treated with polymerized fins made of urethane dimethacrylate resin, impregnated with particles of aluminum oxide, with a size of 40 microns, at medium speed. The enamel surface was again washed and dried. The stages of applying preparations from the kit for deep enamel fluoridation, consisting of a liquid containing fluorine and copper ions and a suspension of finely dispersed calcium hydroxide in distilled water with the addition of a stabilizer, did not differ from those in the first group. To consolidate the achieved effect, the procedure for applying preparations for deep fluoridation was repeated after 2 weeks in both groups.

Pursuing an integrated approach in the treatment of acute focal demineralization, diet control and hygienic care of the oral cavity were additionally prescribed using toothpaste with a fluoride concentration of 1000 ppm. Finally, the results obtained before the start of the study and 1 month after re-treatment with the drug for deep fluoridation were compared.

Statistical processing of the results was performed using the application packages for statistical data analysis Microsoft Excel and Statistica 8.0. with the calculation of the arithmetic mean (M) and average errors (m).

Results

The study involved 28 children, 14 people in each group. Studied condition of 109 temporary teeth. In the first group, 54 teeth were processed, in the second - 55 teeth. On the first visit, before treatment with the preparation for deep fluoridation, the average values of the degree of enamel staining according to the standard 10th scale in both subgroups were commensurate: in the first group it corresponded to 5.39 ± 0.25, in the second group - 5.35 ± 0.23. In the photo, there were no enamel defects

corresponding to the diagnosis of "superficial caries". The decision to prescribe a fluoride paste and dietary adjustment was made taking into account the interests of the patient. In the interval between visits, the patients, taking into account the timing of obtaining information and the child's ability to adjust to a new regimen, tried to stick to a diet and performed oral care procedures using fluoride-containing paste. 1 month after re-treatment with a preparation for deep fluoridation. the average values of the degree of enamel staining were 3.28±0.19 and 1.84±0.09 in the first and second subgroups, respectively. A decrease in the intensity of staining indicates successful remineralization and a tendency to stabilize the process. Improved oral hygiene. During the study of photos of foci of demineralization, there were no enamel defects corresponding to the diagnosis of "superficial caries". There was a significant narrowing of the area of demineralization in 73% of all teeth in patients of the second group and 64% in the first.

Conclusion: These studies indicate that the treatment of acute demineralization foci with polymerized finishers made of urethane dimethacrylate resin, impregnated with aluminum oxide particles, with a size of 40 μm, at medium speeds, gives a positive therapeutic effect, which can be recommended to increase the effectiveness of the treatment of initial forms of caries in temporary teeth in children.

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