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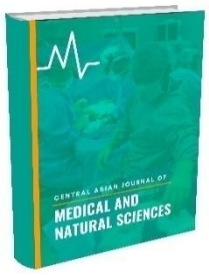

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Modern Concepts of Treatment of Caries of Milk Teeth

1. Isaeva Muqaddasxon Mahammadovna

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[1] A.S.M.I. Faculty of Dentistry Assistant of the Department of Pediatric Dentistry

Annotation: The article analyzes the modern concepts of the treatment of early childhood caries. The following issues were considered: patient-centered approach to treatment; caries risk assessment; detection and effective treatment of the initial stages of caries to prevent carious cavities; minimally invasive treatment of carious defects; preservation of healthy tissues during the preparation of carious cavities; "repair" of fillings instead of replacement; caries control to stop caries progression and support remineralization

Key words: caries, infiltration method, remineralization method, micro invasive treatment, caries detector.

Despite the widespread implementation of preventive programs, caries of milk teeth (early childhood caries) remains the most common disease of children in most countries of the world [1, 2, 7, 8]. In Uzbekistan, the prevalence and intensity of caries in milk teeth, as well as the need for caries treatment in children, are at a high level. Carious destruction, complications of caries, premature removal of milk teeth not only contribute to the development of other local and general pathologies (dental anomalies, hypoplasia of permanent teeth, acute and chronic inflammatory diseases of the maxillofacial region, chronic sepsis, focal-caused diseases of the body, etc.), but and significantly disrupt the quality of life of children and their parents.

Treatment of caries of milk teeth is one of the most important and urgent problems of modern pediatric dentistry. Currently, a wide range of different technologies, methods and materials for the treatment of caries is offered, but the use of many of them in pediatric dental practice is difficult. Barriers to the use of various methods of caries treatment can be the low level of cooperation between children and their parents, dental phobia, financial contradictions, conservatism of dentists, etc. [1, 3, 8, 10].

Modern concepts for the treatment of caries of milk teeth in children include:

- application of a patient-centered approach to treatment;
- determination of the risk of developing caries, identification and effective treatment of the initial stages of caries in order to prevent the formation of carious cavities;
- minimization of aggression (preparation) in the treatment of carious defects, the use of minimally invasive methods, maximum preservation of healthy tissues, "repair" of fillings instead of replacement;
- establishing control over caries (preventing the progression of carious lesions, supporting remineralization).

A patient-oriented approach to treatment implies that in each case a treatment method will be chosen that primarily meets the interests of the child at the moment and minimally disrupts the child's quality of life during and after treatment. In particular, for young children, fast and painless treatment is most important, and the restoration of the shape, function and aesthetics of the teeth is of less importance. The same principles are important for older children with severe stomatophobia, or for health reasons unable to cooperate with the dentist, when treatment under general anesthesia is not possible. At the same time, when choosing a method for treating caries of milk teeth in children, it is necessary to take into account many individual medical and biological factors: the activity of the course of the carious process, the degree of risk of developing secondary and recurrent caries, the degree of formation of the roots of the teeth, the location, length and depth of the carious cavity, the possibility hygienic cleaning, etc. [9, 10]

It should be clearly understood that there are no unambiguous solutions in pediatric dentistry. In each clinical case, various options for the treatment of caries of milk teeth can be applied, depending on the level of mental development of the child, his ability to perceive and tolerate various manipulations in the oral cavity, taking into account the position of the parents regarding the dental treatment of the child. Without the written informed consent of parents or guardians, it is impossible to carry out not only treatment, but also a diagnostic examination of a child under the age of 15 years [24]. The level of compliance of parents, their financial capabilities, education and social status can have a direct impact on the consent to the implementation of a particular method of treating dental caries in a child [1, 8, 9].

An assessment of the risk of further development of caries in a child should precede the choice of a method for treating caries of a particular tooth. To determine the risk of developing caries, it is necessary to identify existing cariogenic and caries-protective factors in children, assess the caries resistance of hard dental tissues, establish the presence of focal enamel demineralization and carious lesions of the teeth, and determine the dynamics of caries development over the past three years [4]. The assessment of caries risk helps to justify the choice of caries treatment and control methods in each case, since more active interventions are indicated at a high risk of developing caries than at a low risk. For example, for children with a high risk of developing caries, it is advisable to carry out course therapy with fluoride varnish, give preference to fluoride-releasing filling materials, and use prophylactic crowns if two or more tooth surfaces are affected.

Identification of the initial stages of caries on the vestibular, chewing or oral surface of the teeth is carried out in children after thorough cleaning and drying of the enamel, usually visually. The use of dyes (caries detectors) helps to differentiate between carious and non-carious dental diseases. To identify initial carious lesions on the contact surfaces of the teeth, it is necessary to use x-ray methods of examination. The use of modern diagnostic technologies (laser fluorescence, etc.) expands the possibilities of timely detection of initial carious lesions of the teeth [2]

Treatment of the initial stages of caries (enamel caries, code K.02.0) in children can be carried out using non-invasive and micro-invasive methods of treatment. The first stage of caries development - focal enamel demineralization - is reversible, therefore, in treatment, preference should be given to remineralizing therapy. Despite the appearance on the dental market of a large number of calcium phosphate agents, only the use of fluorides for remineralization therapy has a high level of evidence [4, 6].

After applying fluoride preparations to the teeth, calcium fluoride is formed, which accumulates on the surface, in the subsurface layer of enamel, and especially in areas of demineralization. The mechanism of action of fluorides is multifaceted, but the most important in the treatment of caries is their ability to suppress demineralization and activate remineralization of enamel and dentin of teeth. In children under the age of 6, only fluoride varnishes should be used, which adhere well to the surface of the

teeth. From 6 years of age, when the risk of accidental ingestion of fluoride preparations is reduced, fluoride gels and solutions can be used. The disadvantages of remineralizing therapy include the need for repeated courses of treatment (3-5 procedures every 1-2 months) and high requirements for parental compliance. Parents should, on the one hand, provide children with a caries-protective regimen at home (regular and thorough oral hygiene using fluoride toothpaste, reduce the frequency of sweets, etc.), on the other hand, bring children to preventive procedures on time to the dental clinic. Effective treatment of the early stages of caries contributes to the complete remineralization of demineralization areas, restoration of gloss, color and density of the enamel surface. A positive result should also be considered the stabilization of the process, compaction and pigmentation of demineralized areas. The negative result of remineralizing therapy is the formation of a carious cavity in the area of demineralization and the need for further treatment.

Another non-invasive method for treating caries of the enamel of milk teeth in children is the silvering method. As a result of successful treatment by the silvering method, the demineralized tissues are stained black and the carious process is stabilized. The course of treatment includes 3-5 procedures, which are repeated every 3-6 months. Despite the ease of performing the procedures, the method is not very popular, as it negatively affects the appearance of children. A survey of parents of patients in dental clinics showed that in a small town only every third respondent agreed to such treatment of children, in a big city - every seventeenth respondent [9].

The non-invasive method of ozone therapy for caries of milk teeth enamel has not found wide application, on the one hand, due to the high cost and complexity of use in pediatric practice, and on the other hand, due to the lack of evidence base [3].

A micro-invasive method - caries infiltration - is applicable in children with a high level of cooperation or in treatment under sedation. Caries infiltration is carried out simultaneously and has a high level of efficiency [8]. However, if for remineralization and silvering it is possible to use domestic drugs that are paid for in the system of compulsory medical insurance (CMI), then there are no domestic drugs for infiltration of caries, a unique foreign drug ICON (DMG, Germany) is used. Accordingly, microinvasive therapy is not paid for in the compulsory health insurance system, which makes it difficult to apply the method in practice.

With a small area of damage to the dentin of milk teeth, a silvering method can be applied using both silver nitrate with a reducing agent and silver aminofluoride.

When a carious lesion spreads to two or more surfaces of the tooth, the silvering method is not recommended, since the likelihood of complications increases significantly [1].

With the location of small carious defects on the chewing surface of milk teeth, one of the methods of choice is non-invasive sealing, in which the carious cavity is sealed with JIC without excavation of carious tissues, tooth preparation, anesthesia.

The procedure is fast, easily tolerated by children, complications occur less frequently than after traditional treatment with preparation and filling of carious cavities [9]. At the same time, sufficient experience of the dentist is required, the use of additional diagnostic studies in order not to miss the extensive and deep carious cavities hiding under a small inlet.

All non-invasive methods of treatment of caries of milk teeth are friendly to small patients and help in the prevention of the formation of dental phobia in children. If non-invasive therapy is not possible, minimally invasive treatment methods can be used to treat caries of the dentin of milk teeth in children. The ART method (atraumatic restorative therapy) involves manual preparation of a carious cavity using a sharp excavator and an enamel knife, and filling with CIC [9]. The method of chemical-mechanical preparation (CMP) involves preliminary softening of carious tissues with the help of

chemical compounds (sodium hypochlorite, amino acids lysine, leucine, glutamic acid, etc.), curettage of softened tissues with special tools, filling with CIC [10].

Minimally invasive methods, as a rule, do not require anesthesia, allow only infected tissues to be removed, while maintaining healthy dentin, reduce the risk of opening the tooth cavity and trauma to the pulp, and are easier on children than traditional preparation with a drill [10]. The use of a caries detector improves the quality of the preparation of carious cavities. However, ART and CMP methods require more time for preparation, not all materials are suitable for filling, a set of reagents and special tools are required for CMP. Nevertheless, the use of minimally invasive methods for the treatment of caries in milk teeth can reduce the likelihood of developing dental phobia in children.

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The method of treating deep carious lesions with incomplete removal of carious dentin has not found wide application in the treatment of milk teeth due to the lack of sufficient evidence of effectiveness in early childhood [3, 7]. Nevertheless, this method is considered to be safer in terms of opening the tooth cavity than traditional treatment using a drill [5, 6]. The desire to carry out a complete excavation of carious dentin in one visit often leads to pulp exposure, and direct pulp capping or pulpotomy complicates and increases the cost of treatment, and gives more complications. The effectiveness of the treatment of dentine caries depends on the localization of carious lesions and the filling materials used. As a rule, the clinical efficiency of filling cavities of the second class according to Black is lower than that of the cavities of the first class. However, there are no unequivocal results regarding the effectiveness of filling materials [9, 10]. According to our data, the clinical and economic efficiency of CIC in filling milk teeth at a mass dental appointment was higher than that of chemically cured composite materials [3]. With significant carious destruction of the crowns of the teeth, damage to more than two surfaces of the teeth in children, the lowest efficiency of dental filling is observed [9]. In these cases, the use of the method of vital amputation or pulp extirpation, the use of prophylactic crowns after filling carious cavities is indicated. In young children, the presence of at least one carious lesion is a sign of a high risk of developing caries. Therefore, it is recommended to include daily brushing of teeth 3 times a day using toothpaste with a high concentration of fluoride (1000 ppm F^-) and daily flossing in the complex of treatment of caries in milk teeth. All children should be given nutritional advice, systemic fluorides, and topical fluorides (fluoride varnish, etc.) 4-6 times a year. In addition to fluorides, local application of calcium and phosphate preparations (paste, gel) can be prescribed. In each case, the methods of complex treatment of caries of milk teeth should correspond not only to the severity of the carious lesion and the activity of the course of the disease, but also to meet the needs of the child and his parents.

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