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A RATIONAL APPROACH TO THE TREATMENT OF EARLY CHILDHOOD CARIES

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Introduction

Early childhood caries has been and remains one of the most pressing and acute problems in modern dentistry. The increasing intensity and prevalence of early childhood caries among young children represent a growing medical, social, and economic problem [Antonova A.A., 2012; Leontiev V.K., 2010; Kiselnikova L.P., 2014].

The current situation is обусловлена the difficulty of providing dental care to young children. Despite improvements in treatment methods and the efforts made by pediatric dentists, this disease remains widespread in countries with developing economies [Kuzmina E.M., 2011; Maslak E.E., 2015].

The selection of rational approaches to the treatment of early childhood caries should be justified with consideration of the histomorphological condition of the hard tissues of primary teeth and the physicochemical parameters of oral fluid. Therefore, the search for and development of optimal treatment protocols adapted to the specific course of early childhood caries is promising.

Treatment of caries in infants and preschool children is associated with a number of problems due not only to the anatomical and physiological characteristics of primary teeth but also to the complexity of performing many procedures. Despite advances in modern dentistry in the prevention and treatment of dental diseases, most children experience psychological states such as tension, anxiety, fatigue, stress, and fear before and during dental visits, which may lead to persistent anxiety. These mental states, manifested by increased facial expressions, verbal and motor reactions, can be classified as negative, as they interfere with the dentist's work and reduce the quality of treatment. The highest degree of such fear—dentophobia—most often develops in childhood and may persist throughout life.

For children experiencing increased fear of dental treatment, the WHO has proposed and developed the Atraumatic Restorative Treatment (ART) method, based on chemical-mechanical removal of carious dentin followed by restoration

with glass ionomer cements (GIC). Despite advances in modern technologies for caries treatment and prevention, recent studies confirm the relevance and clinical effectiveness of the ART method, especially in children.

The Atraumatic Restorative Treatment (ART) method is the most conservative approach to treating dental caries. It involves removing caries-damaged hard dental tissues manually using special instruments, followed by restoration with cement materials, without the need for local anesthesia.

Innovative methods for treating primary teeth are aimed at avoiding the most unpleasant aspects of dental treatment. Most patients consider cavity preparation with a dental drill to be the most uncomfortable stage. Instead of a drill, special hand instruments, chemical agents, and even lasers are successfully used.

The aim of our work is not only to improve methods of atraumatic removal of hard dental tissues in children using the chemical-mechanical technique but also to identify the advantages of the "Caricleanz" gel system produced by the Russian manufacturer "VladMiVa.

Materials and Methods

A new method of chemical preparation of hard dental tissues using the "Caricleanz" gel system, developed by the company "VladMiVa," ensures painless dentin necrotomy and creates optimal conditions for achieving highly durable restorations.

The "Caricleanz" kit includes two gels for sequential application, allowing approximately 100 preparations. Gel No. 1 contains a hard tissue complexing agent designed to dissolve destructured mineral components of carious dentin. The complexing agent dissolves unstable calcium phosphates and hydroxyapatite without damaging healthy dentin. Gel No. 1 also contains the antiseptic cetrimide, which is active against Gram-positive, Gram-negative, and anaerobic bacteria.

The main active component of Gel No. 2 is sodium hypochlorite, which dissolves exposed collagen fibers (the organic component of dentin). Sodium hypochlorite has bactericidal activity against Gram-positive and Gram-negative microorganisms, fungi, and viruses. Due to the softening effect of the gels, affected and healthy dentin become clinically distinguishable.

The "Caricleanz" gel system is intended for use in both pediatric and adult dentistry to soften carious dentin in cases of moderate caries and root caries without damaging healthy dentin. Caries-affected dentin can be effectively and safely removed using special atraumatic instruments included in the kit, which have different working geometries and a 90° cutting edge angle. The atraumatic rectangular sharpening of the cutting edges classifies these instruments as "excavating" rather than "cutting," reducing the risk of removing healthy dentin.

The manual instrument set is designed to remove softened carious dentin without the use of a dental drill. When gels and instruments are used together, maximum effectiveness of chemical-mechanical cavity preparation is achieved. After treatment, the cavity should be checked for softened dentin using a probe or the "Color-Test No. 2" indicator included in the kit.

Removal of carious tissue in moderate caries using the "Caricleanz" gel system takes approximately 8–10 minutes. The method ensures silent cavity preparation and comfortable, painless treatment, which is especially appreciated by children.

It should be noted that the use of "Caricleanz" increases the adhesion of filling materials because there is no need to remove the smear layer formed during mechanical preparation with diamond burs. The smear layer is compacted into dentinal tubules and interferes with adhesion of composite and glass ionomer materials; therefore, its removal is usually required in conventional methods.

Results

For the first time in our country, the effectiveness of the chemical-mechanical method of cavity preparation was studied in comparison with the traditional method. Clinical practice has shown that chemical-mechanical preparation of primary teeth using the "Caricleanz" system has several advantages over traditional methods, including:

- safety and effectiveness of use;
- absence of drill noise, ensuring psychological comfort for the child;
- no need for anesthetic injection;
- preservation of healthy dental tissues;
- no irritation of the pulp.

Conclusions

Based on the obtained data, it can be concluded that chemical-mechanical preparation of hard dental tissues using the "Caricleanz" gel system can be recommended for the treatment of enamel and dentin caries in both primary and permanent teeth. The method is characterized by minimal pain, relatively short procedure time, and comparatively high long-term effectiveness.

This method makes it possible to provide broad coverage of the pediatric population with accessible dental care at early stages of caries development and to prevent complications.

Thus, an актуальное направление in pediatric dentistry is the use of Atraumatic Restorative Treatment (ART) for caries management in children with the "Caricleanz" preparation.

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