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*Ekimov E.V.,
Fedotova O.K.*

MODERN TREATMENT METHODS OF PRIMARY CHILDHOOD DENTAL CARIES

Ekimov Evgenii Vladimirovich, Assistant Lecturer, Department of Pediatric Dentistry
Omsk State Medical University, 21-A Voloshaevskay St., Omsk, 644043, Russia
E-mail: evgeniy.ekimov@list.ru

Fedotova Olga Konstantinovna, Student, Department of Stomatology
Omsk State Medical University, 21-A Voloshaevskay St., Omsk, 644043, Russia
E-mail: fedotovaokoo@mail.ru

АБСТРАКТ

The uniqueness of tooth enamel focal demineralization (primary caries) is that it is the only form of tooth decay, which can be treated conservatively without any surgical treatment and filling. Therefore, the integral task in dentistry is to study all the possibilities of diagnosis and to increase the effectiveness of conservative treatment [10]. To determine the dental health of children in Omsk we carried out a dental check-up of 1682 schoolchildren from 7 to 12 years of age. In addition to oral cavity sanitation and oral hygiene instruction, there was administered "Sluna" calcium-phosphate gel developed at the OSMA Pediatric Dentistry Department. To diagnose the spot-stage caries the following techniques were implemented: vital staining and determination of the electrical conductivity of dental hard tissues [2,3,7]. Different centers of demineralization process activity were studied in the development and showed the need for a differentiated approach to the children treatment depending on caries activity degree.

Ключевые слова: dental caries; demineralization; children; "Sluna" remineralizing gel; various caries process activity

*Екимов Е.В.,
Федотова О.К.*

СОВРЕМЕННЫЕ МЕТОДЫ ЛЕЧЕНИЯ НАЧАЛЬНОГО КАРИЕСА ЗУБОВ У ДЕТЕЙ

Екимов Евгений Владимирович, ассистент кафедры детской стоматологии
Омский Государственный Медицинский Университет, ГБОУ ВПО ОмГМУ,
ул. Волочаевская, 21 А, г. Омск, 644043, РФ; E-mail: evgeniy.ekimov@list.ru

Федотова Ольга Константиновна, студентка 4-го курса стоматологического факультета
Омский Государственный Медицинский Университет, ГБОУ ВПО ОмГМУ,
ул. Волочаевская, д. 21 А, г. Омск, 644043, РФ; E-mail: fedotovaokoo@mail.ru

АННОТАЦИЯ

Уникальность очаговой деминерализации эмали зубов (начального кариеса) состоит в том, что это единственная форма кариеса, которую можно лечить консервативно без оперативных мероприятий и пломбирования. Поэтому изучение всех возможностей диагностики и повышения эффективности консервативных мероприятий является неотъемлемой задачей в стоматологии [10]. Для определения стоматологического здоровья детей г. Омска нами был проведен стоматологический осмотр 1682 школьников в возрасте от 7 до 12 лет. Помимо санации полости рта и обучения гигиене полости рта назначался кальций-фосфатсодержащий гель модель «Слуна», разработанный на кафедре детской стоматологии ОмГМА. Для диагностики кариеса в стадии пятна использовались следующие методики: витальное окрашивание и определение электропроводности твердых тканей зуба [2,3,7]. Проведенное нами изучение в динамике очагов деминерализации при различной активности процесса показало необходимость дифференцированного подхода к лечению детей в зависимости от степени активности кариеса.

Key words: кариес эмали, деминерализация, дети, реминерализующий гель модель «Слуна», различная активность кариозного процесса.

Timeliness: Dental caries remains one of the most urgent problems of modern dentistry, posing a serious threat to public health. According to the World Health Organization, dental caries is included among the six diseases of our time [4]. Despite the developed system of prevention, a wide range of tools and objects for oral hygiene, the oral health of the population is still poor. Therefore, the study of all the possibilities to improve the conservative treatment effectiveness is an essential task in dentistry and its solution will reduce the incidence of childhood dental caries [2,9].

Materials and Methods: The uniqueness of tooth enamel focal demineralization (primary caries) is that it is the only form of tooth decay, which can be treated conservatively without any surgical treatment and filling. Therefore, the integral task in dentistry is to study all the possibilities of diagnosis and to increase the effectiveness of conservative treatment.

Currently it is reliably established that the leading element in dental caries pathogenesis is a dynamic disequilibrium of demineralization and remineralization processes in the oral cavity [1,8]. Thus, the mainstream of the treatment issues development and dental caries prevention is to increase the mineralizing potential of mixed saliva and boost of tooth enamel resistance. [6].

Objective: to study the characteristics of childhood primary dental caries with different decay process activity to improve and enhance the effectiveness of conservative treatment.

To determine children's dental health in Omsk we carried out a dental check-up of 1682 schoolchildren from 7 to 12 years of age. During examination we found only 13% of children resistant to caries, 52% were previously treated and 35% were in need of sanitation.

Incidence of caries was 86.9% and its intensity was 4.3. Prevalence of degree I caries activity was 45%; degree II – 38%; degree III – 17%.

When examining children the primary caries was detected in 19.7% of patients. Moreover it was found in children with compensated caries process in 2.9% of cases, with subcompensated process in 14.9% of cases and with decompensated process in 32.6% of cases.

According to the objectives of the study

3 groups of children were formed, depending on the degree of caries process activity (compensated, subcompensated and decompensated form of caries) conformly with T.F. Vinogradova methodology. Each group consisted of 20 children. Each group was divided into two subgroups. The first subgroup included children who received oral cavity sanitation and oral hygiene instructions without the use of health-care facilities (control group). The second subgroup included children, who were administered "Sluna" model calcium phosphate gel developed at the Department of Pediatric Dentistry OSMA (inventor's certificate №1119693 from 22.06.1984g.) [5,6] in addition to oral cavity sanitation and oral hygiene instruction.

Model "Saliva" gel was administered for a 15-day course after oral cavity sanitation and oral hygiene instruction at home by tooth brushing with "Saliva" gel instead of toothpaste in the morning and in the evening for five minutes [5].

We used the following techniques to diagnose caries in the spot stage: vital staining (enamel permeability determination method by the procedure of Aksamit L.A.), hard tissues electrical conductivity determination by the procedure of Ivanova G.G. using a highly sensitive «DENTEST» device. The following was also taken into account: the oral hygiene index (OHI-S) and PMA index in Parma modification of [3,6].

Results and Discussion: We found that the upper teeth are affected with primal caries twice more often than the lower teeth. The front group central incisors of the upper jaw are mainly affected but the lateral ones of the lower jaw. It was discovered that children with decompensated caries course have their canines highly affected by caries process (21%), which also indicates the current features of demineralization in this group of children.

The average demineralization degree in the lesion focus in children with decompensated caries course is higher than in children having middle level of decayed, sealed and removed teeth. White carious spots on the premolars affect the greatest area (more than 7 mm²), and on the canine – the smallest (less than 3mm²). The most profound enamel changes (the highest demineralization) was observed in the anterior teeth.

When observing the demineralization focus size in control groups of children with compensated caries process, the area of demineralization was decreased by 50.1% just after oral cavity sanitation and hygiene instruction. In a year from the beginning of the observation the spots size increased by 9.7% relatively to the second examination (15 days after oral cavity sanitation and oral hygiene instruction) because the children lost motivation to comply with the personal oral hygiene rules.

The compensated caries course group showed the 75.5% of decrease in caries spots and 60% of complete disappearance of carious spots but in addition to oral cavity sanitation and oral hygiene instruction this group was administered therapeutic and preventive "Sluna" gel.

The control group with subcompensated caries course demonstrated a slight reduction in the sizes of spots (1, 9%) after oral cavity sanitation and oral hygiene instruction. At the end of the observation period the demineralization lesions increased by 9.1%. The group getting therapeutic and prophylactic "Sluna" gel showed a decrease in the size of the lesions by 27.1%.

The control group having decompensated course of the caries process had an increase in the size of the lesions by 1%. By the end of the observation period the spots increased by 12% relatively to the second examination. On the contrary, the treatment receiving group demonstrated the lesions decrease by 15, 2%, and by the end of the observation period the size of carious spots had almost reached the original data.

Studying the staining intensity index in children from compensated caries control groups the decrease in this index by 42.5% was revealed after oral cavity sanitation and oral hygiene instruction; the group receiving treatment with "Sluna" gel also showed a reduction of this index by 78.7%. By the end of the study the staining intensity index was increased in the control group and in the group receiving gel treatment by 17% and 11.3% respectively.

The subcompensated caries course control group had no changes in staining intensity index after oral cavity sanitation and oral hygiene instruction. On the other hand, the group receiving therapeutic and prophylactic gel treatment demonstrated the index decrease by 15.9%. In spite of this, by the end of the observation peri-

od the staining intensity index increased in the groups by 24.4% and 21.7%, respectively.

The control group having decompensated caries process showed a significant increase of the intensity staining index during the study time-frame. The group using remineralizing gel showed a minor decrease of this index (9.2%) after treatment.

The compensated caries course showed the decrease of electrometry index after treatment with "Sluna" gel by 51% and 74.4% at the second examination. There was a slight increase in this index in both groups at the end of the studies.

The subcompensated caries course control group had an insignificant decrease (3.58%) of electrometry index at the second examination, and in the group getting remineralizing therapy this index was decreased by more than 20%.

In groups with decompensated form of caries the electrometry index was slightly decreased in both groups at the second examination. Unfortunately, this index increased rapidly during the study.

Conclusions: Thus, oral cavity sanitation and measures improving the hygienic condition of the oral cavity intensify the remineralization process of hard tissues of children's teeth. However, the remineralization process was taken in different ways depending on the degree of caries activity in children. Our study of demineralization lesions at different caries process activity performed in dynamics proved the need for a differentiated approach to the treatment and prevention of dental caries in children. Thus, oral cavity sanitation and oral hygiene normalization is enough to strengthen the processes of tooth enamel natural remineralization at compensated caries course. While, it takes more than only oral cavity sanitation and oral hygiene normalization to strengthen the processes of tooth enamel natural remineralization in children with decompensated caries course. Treating children with active caries course requires the use of highly remineralizing agents according to individual optimal application schemes. It is necessary to administer some supplementary agents and methods totally affecting the child's body; it helps to increase the effectiveness of primary caries local therapy at decompensated form of tooth decay.

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