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НОВЫЙ ДЕНЬ В МЕДИЦИНЕ
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TO STUDY THE PREVALENCE AND INTENSITY, DYNAMICS OF FISSURE CARIES OF PERMANENT TEETH IN CHILDREN

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✓ ***Resume***

Anatomical features of the structure of the chewing surfaces of teeth, long periods of maturation of enamel folds and imperfect diagnosis of early forms of caries are identified as the main factors in the development of carious lesions of the fissures. The preparation of the hard tissues of the tooth in the area of the carious lesion, followed by the replacement of the defect with an appropriate filling material, currently remains the main method of treating fissure caries.

Keywords. the development of carious lesions of the fissures, tooth surfaces, and defects with the appropriate filling material.

ИЗУЧИТЬ РАСПРОСТРАНЕННОСТЬ И ИНТЕНСИВНОСТЬ, ДИНАМИКУ ФИССУРНОГО КАРИЕСА ПОСТОЯННЫХ ЗУБОВ У ДЕТЕЙ

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✓ ***Резюме***

Анатомические особенности строения жевательных поверхностей зубов, длительные периоды созревания складок эмали и несовершенство диагностики ранних форм кариеса обозначены как основные факторы в развитии кариозного поражения фиссур. Препарирование твердых тканей зуба в области очага кариозного поражения с последующим замещением дефекта соответствующим пломбировочным материалом в настоящее время остается основным методом лечения фиссурного кариеса.

Ключевые слова. развитии кариозного поражения фиссур, поверхностей зубов, дефекта соответствующим пломбировочным материалом.

БОЛАЛАРДА ДОИМИЙ ТИШЛАРНИНГ ФИССУР КАРИЕСИНИНГ ТАРҚАЛИШИ ВА ИНТЕНСИВЛИГИНИ, ДИНАМИКАСИНИ ЎРГАНИШ

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✓ ***Резюме***

Тишларнинг чайнов юзалари тузилишининг анатомик хусусиятлари, эмал бурмаларининг узоқ вақт едирилиши ва кариеснинг эрта шаклларининг номукаммал ташхиси фиссралар кариес коваклари ривожланишининг асосий омиллари сифатида аниқланади. Кариоз ковак соҳасидаги тиш қаттиқ тўқималарини чархлаш, бўшлиқни тегишли пломба моддаси билан алмаштириш ҳозирги вақтда фиссураларни кариесини даволашнинг асосий усули бўлиб қолмоқда.

Калит сўзлар. пломба ашёлари фиссураларни мухирлаш, тиш юзалари ва ковакларнинг кариоз фиссураларини ривожланиши.

Relevance

Fissure caries is a significant problem in modern dentistry as one of the earliest and most common forms of destructive damage to the hard tissues of teeth. Despite the fact that the chewing surfaces cover only 12.5% of the total tooth surface area, they are the most susceptible to caries. It was found that the prevalence of caries of occlusal surfaces is more than 70.0%, occupying a leading place in frequency among carious lesions of other localization. Anatomical features of the structure of the chewing surfaces of teeth, long periods of maturation of enamel folds and imperfect diagnosis of early forms of caries are identified as the main factors in the development of carious lesions of the fissures. The preparation of the hard tissues of the tooth in the area of the carious lesion, followed by the replacement of the defect with an appropriate filling material, currently remains the main method of treating dental caries. However, the achievements of recent years are moving towards the preventive treatment of caries [1.3.5.7.9.11.13].

The method of "preventive filling" has become widespread, which is accompanied by minimal excision of tooth tissues and filling to "immune" zones, i.e. it combines surgical treatment of caries, restoration of anatomical shape with filling material, preventive sealing of fissures (invasive and non-invasive) and local fluoridation of tooth enamel, taking into account the individual caries resistance of the patient and the characteristics of the restoration materials used. There is an opinion that the method of preventive filling has a number of advantages over others due to the conservativeness of treatment, minimal removal of hard tooth tissues, the possibility of choosing treatment tactics depending on clinical manifestations, guarantees of long-term preservation of fillings and prevention of the development of recurrent caries. However, despite some success in preventing dental caries, unresolved issues remain. The presence of a number of anatomical features of the structure and maturation of dental fissures, low information content and imperfection of clinical and diagnostic criteria for fissural caries, the lack of clear indications for the choice of adequate methods of its treatment and prevention determined the relevance, purpose and objectives of this study [2.4.6.8.10.12.14].

The purpose of the study. Study of the prevalence and intensity, dynamics of fissur caries of permanent teeth in children.

Object of study. There is a prevalence of fissur caries of permanent teeth in children patient to carry out dental examination and treatment of children.

Results and analyzes

For the first time, based on a comparative assessment of the caries intensity indices of permanent teeth, the ICpz index was proposed, taking into account the number of carious and filled fissures on the occlusal surfaces of molars, which makes it possible to clarify the level of caries intensity in children during the period of replacement bite, as well as the effectiveness of therapeutic and preventive measures. At first, indications for the choice of methods for the prevention and treatment of fissural caries were determined based on morphometric studies of the occlusal surfaces of molars. The prevalence (14%) and intensity (0.28 ± 0.05) of fissure caries of the first permanent molars in 6- and 7-year-old children in Chita correspond to a low level and are due to a satisfactory hygienic condition of the oral cavity (IG-Y = 1.43 ± 0.04; IG according to Fedorov—Volodkina 1.64 ± 0.03), moderate indicators of enamel caries resistance ($40.0 \pm 1.05\%$) and the active remineralizing ability of saliva (3 days). The caries resistance and caries susceptibility of molar fissures in children are determined by the architectonics of their occlusal surfaces. Caries-resistant are distal-palatine fissures of the first order, vestibular, distal and palatine fissures of the second order of the upper and medial, vestibular fissures of the first order, vestibular, lingual and medial fissures of the second order of the lower molars, caries-susceptible are medial-vestibular fissures of the first order, medial fissures of the second order of the upper and distal, lingual fissures of the first order, distal fissures of the second order of the lower molars. The most informative indicator of the intensity of caries of permanent teeth and the effectiveness of therapeutic and preventive measures in children during the period of replacement bite is the index of caries intensity of permanent teeth (ICpz). Clinical observations over the course of 1 year revealed the high effectiveness of the preventive filling method and its component, the sealing of fissures, carried out taking into account the morphological features of the cariesactive and caries—resistant areas of the occlusal surfaces of the first permanent molars in children aged 7 years. A study of the condition of sealing coatings from Fuji VII and occlusal fillings from Fuji IX GP according to the retention indices and the USPHS has shown the expediency of using these materials for the prevention and treatment of

fissural caries in teeth with immature enamel. Prevention and treatment of fissure caries of permanent teeth in children should be carried out by preventive filling. When choosing an invasive technique for sealing fissures, data on the morphology of occlusal surfaces should be taken into account. Caries active medial-vestibular fissures of the first order, medial fissures of the second order of the upper and distal, lingual fissures of the first order, distal fissures of the second order of the lower first permanent molars are shown to open before applying sealant. In other fissures, a non-invasive sealing method can be used. To determine the intensity of caries of permanent teeth in children during the period of replacement bite, it is rational to use the ICpz index, which additionally takes into account the number of carious and filled fissures on the occlusal surfaces of molars and improves the accuracy of assessing the level of caries intensity and the effectiveness of therapeutic and preventive measures.

Fuji VII glass ionomer cement, which has a high level of retention, should be used to seal the fissures of permanent teeth with immature enamel. Fuji IX GP glass ionomer cement is recommended as a filling material for occlusal fillings in permanent teeth with immature enamel. Fissure caries occupies the first place in the structure of carious lesions of teeth. Based on this, the problem of prevention and treatment of fissure caries is extremely urgent. It has been established that caries of fissures occurs immediately after teething. The high incidence of fissure caries is associated with the features of the anatomical structure of the fissure, the accumulation of food residues and the formation of aggressive dental plaque in the natural recesses of the tooth and a longer period of hypomineralization compared to smooth tooth surfaces. There is a direct relationship between the initial level of mineralization of the enamel of the fissures of teeth and the risk of fissure caries. Along with local factors, the general level of somatic health affects the development of a cariogenic situation. The methods of preventing fissural caries are well known, and many studies have been devoted to sealing fissures. Currently, composite materials are traditionally used in clinical practice as sealants. However, there are still no objective criteria for assessing the marginal fit of composite sealants to the hard tissues of the tooth. In recent years, the concept of minimally invasive interventions has been introduced into clinical dental practice, the advantage of which is a gentle approach to excision of tooth tissues and a combination of preventive and curative aspects. The combination of simple sealing with an invasive technique and the development of a preventive filling method can increase the effectiveness of the preventive treatment of fissure caries, however, these methods are not widely used in our country. Currently, there are no clear indications and algorithms for minimally invasive interventions using various filling materials in different clinical situations. In this regard, the planned research is extremely relevant.

To study the prevalence and intensity, dynamics of fissure caries of permanent teeth in school-age children. To optimize indications and contraindications for minimally invasive treatment methods for the treatment of fissural caries of permanent teeth in children (methods of invasive sealing and preventive filling). Based on the data of clinical and laboratory studies, to substantiate the optimal choice of filling materials when conducting invasive sealing and preventive filling techniques in the treatment of fissure caries of permanent teeth in children. To develop a method for determining the degree of marginal adhesion of a composite sealant to the hard tissues of the tooth. To evaluate the effectiveness of preventive methods of treatment of fissure caries of permanent teeth. For the first time, the laboratory and clinical efficacy of materials of various compositions for noninvasive and invasive sealing of fissures and pits of teeth and preventive filling has been studied. A method has been developed to determine the degree of marginal adhesion of a composite sealant to the hard tissues of a tooth. Based on the analysis of clinical and laboratory methods, indications and contraindications for invasive sealing and preventive filling techniques in the treatment of caries of permanent teeth in children are formulated, depending on the initial level of mineralization of the hard tissues of the teething teeth and the nature of the carious cavities. In the course of this study, an algorithm has been developed for the treatment of fissural caries of permanent teeth in children within the framework of minimally invasive intervention (invasive sealing and preventive filling) - the rationale and boundaries of technology. The conducted laboratory studies make it possible to justify the choice of a composite sealant for non-invasive sealing. The conducted clinical and laboratory studies make it possible to justify the choice of filling materials when conducting invasive sealing and preventive filling techniques in permanent teeth with different initial levels of mineralization of hard tissues and features of the carious process. A method has been developed to determine the degree of marginal adhesion of a composite sealant to the hard tissues of a tooth. The obtained clinical and laboratory data make it possible to increase the effectiveness of the prevention and treatment of fissural caries in children. A high prevalence of fissure caries of permanent

teeth was revealed - the proportion of caries of the fissures and pits of permanent teeth among all carious lesions was 100% at the age of 6 years and 94.26% at the age of 13 years. Carrying out the technique of preventive filling of permanent molars in children makes it possible to achieve a 100% reduction of fissure caries. When carrying out minimally invasive methods of treatment of fissure caries of permanent teeth in children, it is recommended to use highly filled composite sealants with the preliminary application of a primer.; In the case of preventive sealing techniques, preference should be given to combining a liquid-flow composite with a highly filled composite sealant. To increase the effectiveness of assessing the quality of minimally invasive methods of treatment of fissure caries, the developed electrometric method for determining the degree of marginal adhesion of a composite sealant to the hard tissues of the tooth should be used. The widespread introduction of minimally invasive methods of treatment and prevention of fissure caries of permanent teeth in children makes it possible to achieve a high reduction in fissure caries (98-100%).

A high prevalence and intensity of fissure caries of permanent teeth was revealed in children aged 6 to 13 years. The proportion of caries of the fissures and pits of permanent teeth was 100% at an intensity of 0.93±0.36 at the age of 6 years and 94.26% and 5.79±1, respectively, at the age of 13 years. The K index prevailed in the structure of the YUTU fissures index, there were practically no sealants, which indicates a low level of dental care for children. Based on the conducted clinical study, the reduction of fissure caries during the preventive filling method was 100%, while the traditional method of filling permanent molars led to a marked increase in the intensity of caries of fissures — 32.95%. As a result of laboratory research, it has been reliably established that the adhesive strength of the joint of enamel with a highly filled composite sealant in the case of pre-application of the primer is 1.3 times higher than that of the joint of enamel with a highly filled composite sealant without pre-priming. According to laboratory research, when using the preventive sealing technique, the bond strength of a combination of a liquid-flowing composite with a composite sealant is 1.4 times higher than with preventive sealing when combined with a composite sealant. In order to increase the effectiveness of assessing the quality of minimally invasive methods of treatment of fissure caries, an electrometric method for determining the degree of marginal adhesion of a composite sealant to the hard tissues of a tooth has been developed. The developed algorithm for carrying out minimally invasive technologies for the treatment of fissure caries of permanent teeth in children made it possible to achieve 98-100% reduction of fissure caries after 12 months of follow-up. When assessing the condition of the hard tissues of permanent teeth in children and adolescents, it is proposed to introduce the index "G" (the presence of sealant). This indicator reflects the availability of preventive measures and the quality of preventive care for children. In order to prevent and treat fissure caries, minimally invasive methods of treating fissure caries should be widely used. In order to improve the adhesion of the sealant to the enamel during non-invasive sealing, preference should be given to a highly filled composite sealant with prior primer application. When deciding on the choice of preventive treatment methods, the following algorithm should be followed: the invasive sealing technique should be used in the case of hard-to-reach narrow and deep fissures in teeth at the stages of enamel maturation with different IUMS, as well as in the presence of initial fissure caries (enamel caries, K02.0) in teeth with immature and mature enamel. When conducting invasive sealing techniques, preference should be given to liquid-flowing composites and highly filled composite sealants. The method of preventive filling should be used for caries of enamel and dentin (K02.0, K02.1) in the presence of carious cavities no more than 2 mm in diameter, localized on the chewing surface of molars and premolars. To carry out the technique of preventive filling in teeth with immature and mature enamel with superficial (enamel caries, K02.0) and moderate (dentine caries, K02.1, favorably occurring) caries, it is preferable to use a combination of a liquid-flowing composite and a highly filled composite sealant, which remain on the teeth for a long time and contribute to a significant reduction in caries growth. In the treatment of fissural caries in teeth with immature enamel during the active course of the carious process (in teeth with low IUM), seals made of CIC and composite sealant were used as preventive fillings.

Conclusion

To assess the condition of the sealant during follow-up after minimally invasive techniques for the treatment of fissural caries, it is recommended to introduce into the work of dentists a developed method for determining the degree of marginal adhesion of a composite sealant to the hard tissues of the tooth. For this purpose, an electrometric examination is performed at the tooth- sealant boundary and, at an

electrical conductivity value of 0-1 μA, a complete marginal fit of the sealant is diagnosed, and at a value of more than 1 μA, a violation of the marginal fit of the sealant to the hard tissues of the tooth. Electrometric examination for an objective assessment of the condition of the sealant should be carried out as part of the dental examination of children and adolescents.

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