

Development and Implementation of a Set of Preventive Measures Aimed at Preventing the Development of Complications in the Orthodontic Treatment of Patients Using Fixed Technology

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Abstract In modern orthodontic dentistry acute problem of prevention of dental caries and periodontal diseases, especially in children and adolescents who have not yet completed the process of mineralization of hard tissues: soon after teething create a situation of increased risk of tooth decay. The purpose of this paper is to analyze complex information about methods of prevention of dental caries in patients with removable and non-removable orthodontic appliances.

Keywords Prevention, Treatment hardware, Orthodontics, Dental Caries, Periodontal disease

1. Introduction

Recently, significant changes have taken place in domestic orthodontics. If before removable devices were used in 90% of cases, now they are used only in 16% of cases. Today 84% of patients undergo treatment using non-removable equipment [1]. In this regard, the problem of prevention of dental caries and periodontal diseases in the process of orthodontic treatment is especially acute. The practical significance of the issue is determined by the high prevalence of dental caries among the population and the incidence of periodontal tissues [2,3]. Braces, rings, arches fixed on the teeth significantly impede oral hygiene, which leads in 32.7% of cases to damage to hard tissues of the teeth, mainly immune to caries surfaces, and in 92% of cases, an unfavorable state of periodontal tissues is noted. Poor orthodontic treatment also contributes to these changes [3,5]. To prevent the development of these complications, various preparations with a content of calcium and fluorine have been proposed. However, these drugs do not always give the desired effect, since 65-67% of the examined patients have poor oral hygiene, and local fluoridation is not effective enough due to the rapid loss of calcium fluoride crystals. [7]

Prevention, in the context of this work, is a complex of various kinds of measures aimed at preventing the occurrence of caries in the treatment of dentoalveolar

anomalies with removable or non-removable orthodontic appliances and / or elimination of risk factors leading to this pathological process. [8]

Prevention of caries in orthodontic patients can be divided into the following groups:

- individual prevention;
- mass prevention.

Individual prevention includes preventive measures. the caries that the patient carries out, his doctor should teach these methods, if possible with the use of visual aids - imitations of the jaws, oral cavity, brochures and booklets, videos. At a children's reception, this should be done in a playful way. So, the doctor provides training in cleaning removable orthodontic appliances and mouth guards. The main tools used by the patient are a toothbrush, an orthodontic brush, dental floss and toothpaste, the selection of which the patient carries out on the basis of the recommendations of his attending physician.

Depending on the state of health, the presence of risk factors for caries or the severity of the pathology, three types of prevention can be considered:

- primary prevention - a system of measures to prevent the occurrence and impact of risk factors for caries (rational nutrition, environmental factors, etc.);
- secondary prevention - a set of measures aimed at eliminating pronounced risk factors, which under certain conditions (reducing the protective properties of enamel, increasing the total number of microorganisms in the oral cavity, the appearance of mineralized plaque in the cervical region of the teeth and plaque on the orthodontic apparatus) can lead to caries;

- Some experts suggest the term tertiary prevention as a set of measures aimed at treating existing caries or its complications.

As a result of the analysis of the literature and research materials of various authors, the following conclusion was drawn: the incidence of caries in patients is combined with dentoalveolar anomalies in 20-50% of cases, depending on the age and history of the patient. The risk group includes two age groups - from 12 to 15 years (34.2% of cases of caries) and from 22-40 years (46.2% of cases). A predictor of caries in orthodontic treatment is a distal bite. In these age groups, gender does not play a big role: in adolescents and adults of both sexes carious processes are equally pronounced with the use of fixed technique [2].

According to some authors, individual recommendations on nutrition and proper oral care can increase the effectiveness of orthodontic treatment and significantly reduce the likelihood of complications in the form of focal demineralization of enamel, dental caries and gingivitis when using non-removable equipment. In the arsenal of dentistry today there are many tools for the prevention of dental caries and periodontal diseases. The most widespread and universal in all conditions are toothpastes and flocs.

In the prevention of caries in children, an educational component with the participation of parents and a doctor is important. The age and psychophysiological characteristics of children and adolescents should also be considered.

So, at the initial instruction by a doctor, it does not matter in what form (written, oral or by video) a patient with a braces system receives information on oral hygiene, since they all help reduce the amount of non-mineralized plaque on the teeth. The prevention of dental caries and periodontal diseases must be approached individually.

The use of non-removable orthodontic techniques has significantly expanded the possibilities of treating dental anomalies. Its use is effective for normalizing the shape and size of the dentition, correcting the growth and development of the apical bases of the jaws and jawbones, creating an optimal myodynamic balance of the muscles, as well as improving the aesthetics and functioning of the dentition system. However, the technology of applying braces has significant disadvantages, in particular, the occurrence of bacterial corrosion of the composite around the bracket, carious process, hypesthesia, gingivitis and parodontitis. In addition, metal locks and ligatures often injure the oral mucosa and make it difficult to perform hygiene procedures, which leads to inflammatory periodontal diseases and enamel demineralization.

Caries develops in 15-52% of carriers of the bracket system [9]. If the orthodontist is not able to achieve optimal oral hygiene from the patient, predict the risk of caries and take timely preventive measures, this can end in disaster, both for the patient and for the orthodontist. The patient may suffer damage to the tissues of the teeth and periodontal, and the attending doctor may be sued for damages. In such situations, American courts, for example, force the

orthodontist to pay compensation in the amount of 100-200 thousand us dollars.

Despite the appearance of a huge Arsenal of tools currently offered to ensure oral hygiene and prevent caries, this problem still remains the main one in orthodontics. The solution to this problem may depend on the identification of individual characteristics of the sensitivity of the patient's body with dental anomalies to the effects of specific factors that can cause caries when using braces and the timely application of adequate prevention measures. [10]

In patients undergoing orthodontic treatment with non-removable devices, an increasing cariogenic situation is noted. This is due to the fact that around braces, rings, on other orthodontic elements, in the interdental spaces and cervical areas, due to the deterioration of self-cleaning and hygiene processes, food residues are delayed for a long time and accumulate. In these retention sites, microorganisms accumulate a significant amount of organic acids. [6]

Currently, many fundamental aspects of prevention in the process of orthodontic treatment have not yet been fully resolved. There is no data on the use of the deep fluorination method in orthodontics. The issues of assessing the resistance of tooth enamel and the effectiveness of remineralizing agents using the electrometric method in the process of orthodontic treatment are not adequately covered. There are no effective motivational teaching methods and self-monitoring of the quality of toothbrushing for orthodontic patients. In this regard, the urgent task is the further development of preventive measures in the process of orthodontic treatment.

The high prevalence of dental diseases among children is associated with negative changes in hard tissues due to the imposition of the bracket system and other structures.

One of the most urgent and complex problems in children's dentistry is the pathology of hard tissues of teeth in children.

The development of preventive, diagnostic and organizational measures based on the study of monitoring of dental morbidity in children in different age groups determines the relevance of the chosen research problem, the solution of which is important for practical health care.

Quality of life is an integral characteristic of a patient's physical, psychological, emotional and social functioning, based on a subjective perception of their health. Assessment of quality of life allows to solve many clinical and medico-social problems:

- provide monitoring of the patient's condition in the dynamics of treatment;
- determining and evaluating the effectiveness of health monitoring;
- evaluate the need to change the treatment regimen.

The method of assessing the quality of life is widely used to assess the health of patients in various fields of medicine. However, studies on the use of this method in patients with diseases of the hard tissues of the teeth of school-age children are rare and scattered.

It is known that the medical concept of quality of life includes indicators related to the state of human health in General. However, the maxillofacial system as a unique concentration of important functional elements of various organs occupies a large place in the complex of physical, emotional, and intellectual characteristics of patients. Therefore, healthy teeth are an important attribute of the fullness of the psyche and behavioral responses, starting from an early age.

Given the above, conducting research in this area of dentistry is relevant and in demand.

2. Purpose of Research

Development and implementation of a set of preventive measures aimed at preventing the development of complications in the orthodontic treatment of patients using fixed technology.

3. Materials and Methods

Scientific research work in four areas of Bukhara region, 120 children are studied in Olot, Romitan, Gijduvan and karakul districts. The age of patients ranges from 7 to 17 years of age.

The results of the study will help to establish risk factors for caries during orthodontic treatment. In the process of orthodontic treatment, an assessment will be given of the condition of the hard tissues of the teeth around the fixed and non-fixed braces. The effectiveness of the complex of preventive measures in patients with a reduced and increased risk of developing dental caries at the stages of treatment with orthodontic appliances will be studied.

4. Results of the Study

To conduct the study, children aged 7 to 17 years who live permanently in 4 districts and its suburbs were examined. Contingent selection is concerned with the subject matter of this study as well as the presence of a regional problem of the development of solid tooth tissue diseases including dental diseases in children in four districts.

A clinical examination of children was carried out in all medical associations of this Olot, Gijduvan, Romitan and Karakol districts. In order to fulfill the purpose of the study, 30 children aged 7-17 with severe tissue diseases of preschool teeth were taken from alot District, 36 children from Gijduvan District, 28 children from Romitan district and 38 children from Karakul district. All children studied in secondary schools. The analysis of the age-sex composition of the respondents showed that those who were examined on these parameters are close to each other and represent groups.

The problem of prevention of dental caries and periodontal diseases in the course of orthodontic treatment is

particularly acute. The practical significance of the issue is determined by the high prevalence of dental caries among the population and the incidence of periodontal tissue. Fixed braces, rings, and arches significantly hinder oral hygiene, which leads in 32.7% of cases to damage to the hard tissues of the teeth, mainly surfaces that are immune to caries, and in 92% there is a dysfunctional periodontal condition. Incorrect orthodontic treatment also contributes to these changes. To prevent such complications, various medications containing calcium and fluoride are offered. However, they do not always give the desired effect, since 65-67% of the examined patients have poor oral hygiene, and local fluoridation is not effective enough due to the rapid loss of calcium fluoride crystals.

For the prevention and treatment of dental hard tissue lesions, a method of deep fluoridation with typhenfluorides was proposed, which emit fluoride in high concentrations for a long time, contributing to reliable remineralization.

At present, many fundamental aspects of prevention in the process of orthodontic treatment have not yet been fully resolved. There is no data on the use of deep fluoridation in orthodontics. The issues of assessing the resistance of tooth enamel and the effectiveness of remineralizing agents using the electrometric method in the course of orthodontic treatment are not sufficiently covered. There are no effective motivational methods for teaching and self-monitoring the quality of dental cleaning in orthodontic patients. In this regard, an urgent task is to further develop preventive measures in the process of orthodontic treatment.

The results of the study will help to determine the risk factors for caries in orthodontic treatment. In the course of orthodontic treatment, an assessment of the condition of the hard tissues of the teeth around fixed and non-fixed braces will be made. The effectiveness of a set of preventive measures in patients with a reduced and increased risk of developing dental caries at the stages of treatment with orthodontic techniques will be studied.

5. Conclusions

In this study, we will use a multivariate analysis of anamnestic, anthropological and clinical and dental data, aimed at identifying the relative role of constitutional and paratonic factors that form the predisposition of patients with dentoalveolar anomalies to caries before and during the use of orthodontic equipment.

The results of the study will help to establish risk factors for caries during orthodontic treatment. In the process of orthodontic treatment, an assessment will be given of the condition of the hard tissues of the teeth around the fixed and non-fixed braces. The effectiveness of the complex of preventive measures in patients with a reduced and increased risk of developing dental caries at the stages of treatment with orthodontic appliances will be studied.

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