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PREVENTION OF CARIES DEVELOPMENT DURING ORTHODONTIC TREATMENT

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Abstract:

The main object of this article is to improve the diagnosis and prevention of the development of caries and its complications during orthodontic treatment.

Keywords: Orthodontic treatment, caries, healthcare

RELEVANCE.

During the years of independence, the healthcare sector in the country has been radically updated, today an urgent problem of medicine is paying special attention to early diagnosis of diseases and reducing their complications. In this regard, wide-ranging program activities have been carried out. According to the Action Strategy for the five priority areas of Development of the Republic of Uzbekistan in 2017-2021, important tasks have been set to further improve the provision of medical care to the population, aimed at increasing the availability and quality of medical and social medical services to the population, and the formation of a healthy lifestyle of the population [1.2.3.5.7.9.11.13.15].

Recently, significant changes have taken place in Russian orthodontics. Previously, removable devices were used in 90% of cases, but now they are used only in 16% of observations. Today, 84% of patients are treated with non-removable equipment. In this regard, the problem of prevention of dental caries and periodontal diseases in the process 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 tissues [4.6.8.10.12.18.19].

For the prevention and treatment of lesions of hard tissues of teeth, a method of deep fluoridation with typhenfluorides has been proposed, which for a long time emit fluoride in high concentration, contributing to reliable remineralization.

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 fluoridation method in orthodontics. The issues of assessing the resistance of tooth enamel and the effectiveness of remineralizing agents using mouthguards in the process of orthodontic treatment are insufficiently covered. In this regard, the urgent task is the further development of preventive measures in the process of orthodontic treatment [14.16.17.20.21].

THE AIM OF THE STUDY

Is to improve the diagnosis and prevention of the development of caries and its complications during orthodontic treatment.

OBJECTIVES OF THE STUDY:

Negative changes in the mineralization of hard dental tissues in children who received removable and non-removable orthodontic devices revealed the effectiveness of the kappa effect with the complex application of modern methods of studying oral hygiene and periodontal tissues;

Installation and constant monitoring of orthodontic devices using dental floss, fluorescent caps and modern fillings is a guarantee of healthy formation of the mineral composition of the hard tissues of the tooth;

The effectiveness of the kappa-fixed method in eliminating the identified foci of demineralization in the hard tissues of teeth in children who received removable and non-removable orthodontic devices was determined;

Improved diagnosis and primary prevention of caries and its complications in patients treated with removable and non-removable orthodontic methods by light induction fluorescence.

The object of the study. In accordance with the tasks, 201 children aged 7 to 18 years with dental anomalies and deformities were examined in the Bukhara Regional Children's Dental polyclinic.

Subject of research: school-age children with developing dental anomalies and deformities, oral fluid was used for biochemical studies.

Research Methods: Dental, instrumental, biochemical studies and statistical processing of the data obtained.

In children treated with removable and non-removable orthodontic devices, the effectiveness of using the kappa-fixation method in eliminating foci of

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demineralization in the hard tissues of the teeth was determined;

Improving the diagnosis and primary prevention of caries and its complications in patients treated with removable and non-removable orthodontic techniques by light-induced fluorescence.

The proposed complex of therapeutic, preventive and diagnostic measures, taking into account the risk of dental caries, contributes to improving the quality of orthodontic treatment using fixed and removable orthodontic equipment, prevents the development of complications from the hard tissues of teeth and periodontal tissues;

It was found that the initial foci of enamel demineralization around fixed braces, visually indistinguishable, but detected by light-induced fluorescence, occur in all patients undergoing orthodontic treatment using non-removable orthodontic technique;

It is noted that focal enamel demineralization around braces occurs at an earlier time in the cervical region of the teeth of the upper and lower jaw;

Carrying out professional and individual oral hygiene with the help of highly effective hygiene products, exogenous and endogenous prevention of caries with the use of "R.O.C.S. Medical Minerals" preparations, which was fixed with the help of mouthguards, made it possible to reduce the increase in dental caries in children by 90.2%.

The practical significance of the results of the study is determined by the light-induced fluorescence around fixed braces, in which the initial source of enamel demineralization was found in all patients undergoing orthodontic treatment using removable orthodontic equipment; early enamel demineralization was observed around the braces in the cervical region of the upper and lower jaw teeth; it is proved that professional and individual oral hygiene with the use of highly effective hygiene products, as well as the use of mouthguards fixed with "R.O.C.S. Medical Minerals" reduces the growth of caries in children up to 90.2%.

1743 dental examinations were carried out, 201 of them primary, 1542 repeated, with calculations of CPU, OHI-S, PHP, PMA indices, evaluation of TER-test, COSRE-test; 1730 quantitative light-induced fluorescence (Qrayview C) was performed in dynamics, including before and after the use of various preventive means. 763 preventive procedures, 431 classes on teaching individual oral hygiene, 24 conversations, a survey of 123 children, a survey of 201 children were conducted.Dental examinations were carried out for 18 months in the following terms: initial examination, before the installation of fixed and non-removable orthodontic equipment, through 1, 3, 6, 9, 12, 15 and 18 months. The study was carried out in three stages: stage 1; 1743 dental examinations were carried out, 201 of them primary, 1542 repeated, with calculations of CPU, OHI-S, PHP, PMA indices, evaluation of TER-test, COSRE-test; 402 quantitative light-induced fluorescence (Qrayview C) was performed in dynamics, including before and after the use of various preventive means. Stage 2; 763 preventive procedures, 431 classes on teaching individual oral hygiene, 24 conversations, a survey of 123 children, a survey of 201 children were conducted. Stage 3; in the control subgroup A1 (n=26), teeth were examined clinically and by light-induced fluorescence in dynamics without the use of prophylactic agents. Only the usual oral hygiene was carried out. In patients of subgroup B1 (n=20), "R.O.C.S. Medical Minerals" was used twice with an interval of 14 days and with a repeated course every 6 months for the purpose of prevention. The cream was applied and fixed with the help of mouthguards. In subgroup A2 (control group, n=77), the usual oral hygiene was carried out. Preventive measures were not used. In subgroup B2 (n=78), in order to increase the functional resistance of enamel, "R.O.C.S. Medical Minerals" was used twice with an interval of 14 days and with a repeated course every 6 months. and for prevention during orthodontic treatment 2 times after 7 days every 3 months. The cream was applied and fixed with the help of mouthguards.

Dental education and motivation of patients, professional and individual oral hygiene, restriction of carbohydrate intake, the use of fluoride preparations are considered the basics of preventive dental programs. It should be remembered that there are numerous means of preventing carious lesions and periodontal pathology, there is a need for their clinical analysis by known informative criteria and their application taking into account the individual characteristics of the patient.

RESULTS.

The initial values of the CPI index ranged from 1.97 ± 0.14- 2.43± 0.16, i.e. low intensity of carious lesions of the teeth. The parameters of caries intensity ranged from average (4.26±0.25) to high (4.77±0.24) in all our patients. Before the start of orthodontic correction, all patients had their oral cavity sanitized, after which only component P was noted in the index.

The compliance of tooth enamel to acid (TER-test) at the initial examination in children with honeycomb and NOTES was within the high indicators of structural and functional resistance of enamel (27,22±0,19 - 32,96±0,47%).

In the control groups, the assessment of oral hygiene at the final examination according to the OHI-S and RNR indices was unsatisfactory and exceeded the initial indicators. Lower indicators of hygiene indices in groups

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with extended prevention in comparison with the indicators of control groups can be explained by the use of professional oral hygiene and therapeutic and prophylactic drugs, which justifies the correctness of regular training and enlightenment of patients, monthly monitoring and motivation of children throughout orthodontic correction.

Inflammatory changes in the periodontium throughout the orthodontic correction were assessed by the study of the PMA index, which in patients of all groups was less than 30% - mild gingivitis.

At further stages of the study, there was a tendency to decrease the inflammatory phenomena of periodontal disease (Fig. 1).

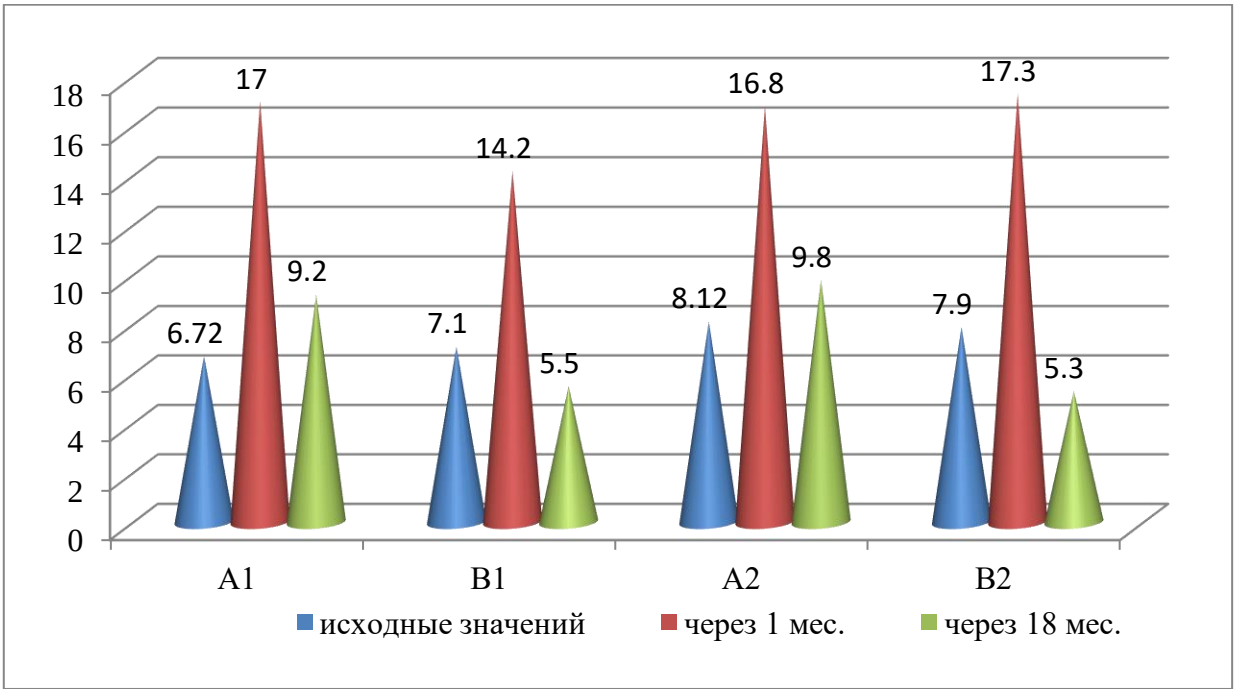

Fig. 1. Dynamics of the state of periodontal tissues (PMA) in the oral cavity during treatment

At the end of orthodontic correction, the PMA index of the groups with extended prevention significantly differed from the initial data, but significantly worse in groups A1 and A2 by 103.1% and 128.3%, respectively.

The parameters of caries intensity ranged from low to high from 1.96 to 4.67 in all our patients. Before the start of orthodontic correction, all patients had their oral cavity sanitized, after which only component P was noted in the index.

The compliance of tooth enamel to acid (TER test) at the initial examination in children with SOT and NOTES was within the average and high values of 58.32 ± 1.37 - 68.13 ± 1.3% (Table 1).

Table 1
Indicators of changes in the TER test in patients in the dynamics of treatment

Subgroup	TER-test (%)				
	Initial	Before	treatment 1	month. 6	months.
A1	63,14±2,24	61,35±1,17	66,31±0,22	72,46±0,38	76,61±0,62
A2	65,42±0,62	49,21±3,29	34,34±0,18	36,93±0,32	36,85±0,66
B1	68,13±1,32	48,91±2,65	56,16±1,24	57,52±0,16	59,82±0,12
B2	58,32±1,37	47,16±0,58	32,89±0,16	35,31±0,13	31,73±0,41

Note: * - reliability of data between treatment groups A and B ($p<0.05$)

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To increase the acid resistance of enamel in the preventive subgroups of group 2, "R.O.C.S. Medical Minerals" and mouthguards were used for treatment and prevention.

To improve the performance of the TER test in the preventive groups, we conducted a course of therapeutic and preventive measures using "R.O.C.S. Medical Minerals" and kappa, where we found a strong tendency to decrease the values of the TER test in comparison with the initial indicators by 27.8%, due to an increase in acid resistance of tooth enamel before fixing honeycombs and NOTES. It has been established that the processes of enamel demineralization in children with removable orthodontic devices are directly dependent on the therapeutic and prophylactic agents used. The results of the study stated the relationship remineralization of the enamel and the use of health care resources (Fig. 5).

Good results after 18 months was achieved in 93.3 per cent of children from group B1 and 90,5% of the B2 group that was credible in relation to the performance of the group A1 and A2 – 68,9% and 65.8%, respectively (Fig. 7).

Despite the introduction of a complex of therapeutic and preventive measures, the formation of new carious foci inevitably occurred, but in the main groups their number was 2.3 times less ($p<0.05$) than in the comparison groups, which indicates the effectiveness of its use in patients with orthodontic treatment of NOTES and honeycombs for the prevention and treatment of caries.

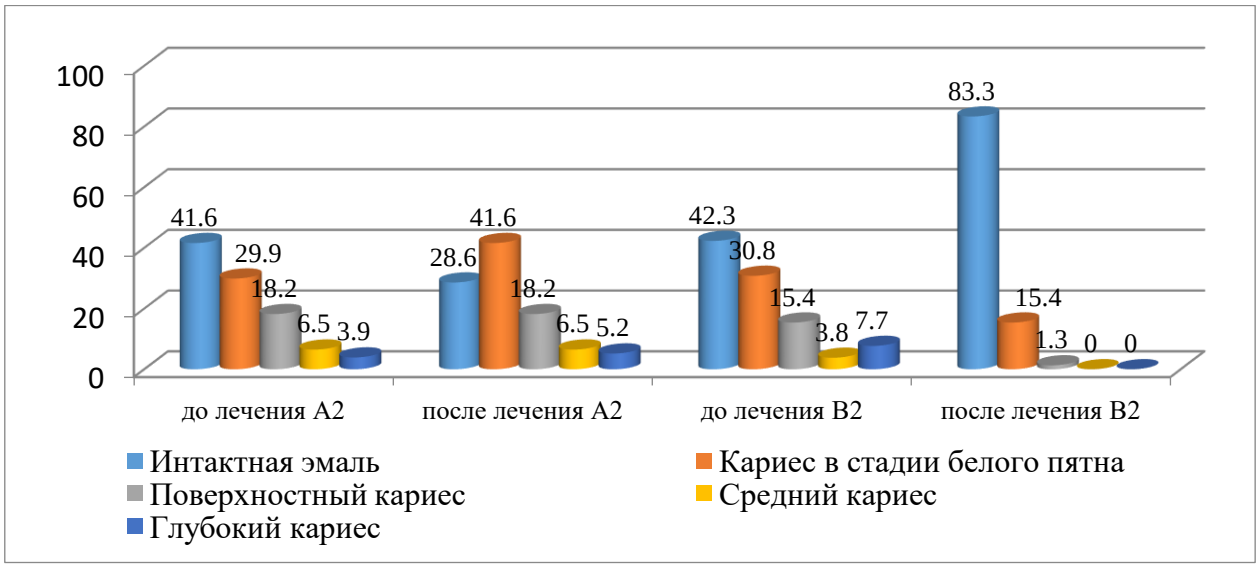

Fig. 2. Dynamics of indicators of clinical assessment of the condition of hard tooth tissues using light-induced fluorescence in patients with fixed orthodontic technique (NOT)

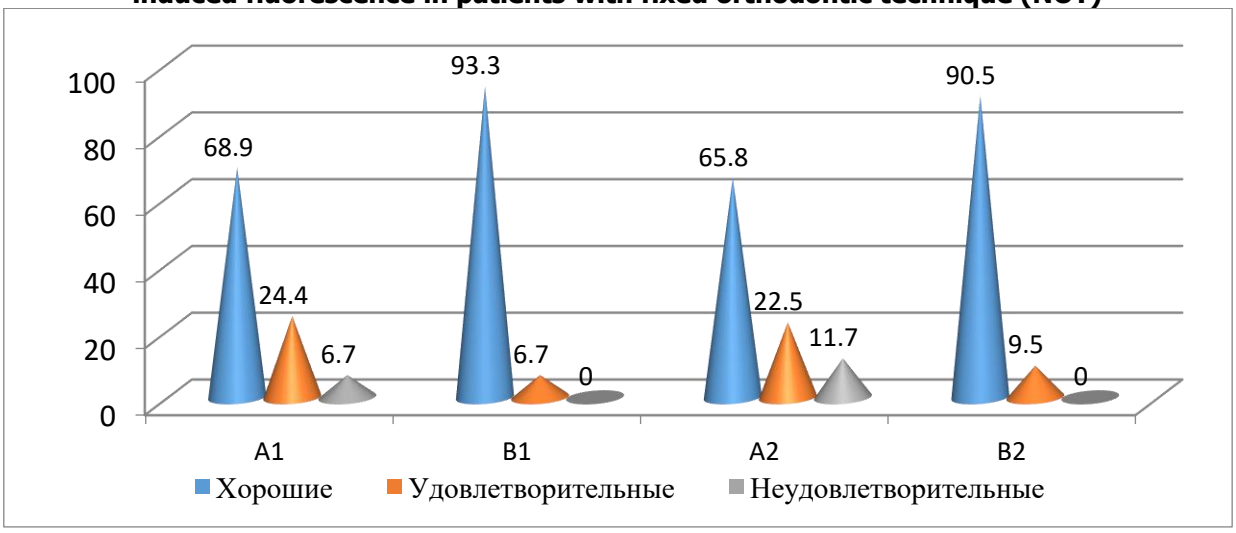

Fig. 3. Indicators of treatment results

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Based on the above, it should be noted that throughout our study in patients of the main group (B1, B2 subgroups) after 1 month of anti-carious measures with the appointment of the gel "R.O.C.S. Medicalminerals" of patients, there was no complete disappearance of all carious spots, despite the fact that this process is reversible (this may be due to the structure of hard tissues, errors in diet and failure to properly observe all daily hygiene measures).

CONCLUSION.

Children with orthodontic treatment have high phosphorus levels ($p<0.05$) against the background of a tendency to decrease in calcium and normal pH levels.

Carrying out sanitary and educational work, individual and professional oral hygiene, along with the use of "R.O.C.S. Medical Minerals" and mouthguards, allowed after 18 months of orthodontic treatment to increase the resistance of hard dental tissues, stabilize the development of initial caries, as evidenced by a clinical assessment using the light-induced fluorescence method. The developed and tested modern complex of preventive measures makes it possible to prevent the development of complicated forms of major dental diseases and contributes to improving the quality of orthodontic care for children.

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