

PREVALENCE, PROPHYLAXIS AND TREATMENT PRINCIPLES OF PRIMARY TEETH EROSION IN CHILDREN

¹Alibek B. Akhmedov, Munira K. Ishanova, Maftuna T. Qodirova, ElmurodKh. Dosmukhamedov, Iroda Z. Utesheva

Abstract---One of the urgent problems of modern dentistry is primary teeth erosion, which is in most cases connected with incorrect diagnosis and improper evaluation of dental state at lesions of dental tissue observed in children. The erosion of tooth hard tissue is characterized by various degrees of enamel abrasion, enamel discoloration, prisms and dentin tubules abrasion, yellowing of the dentin layer. As a result, erosive lesion of the dentin layer causes a pulp tissue inflammation, which in its turn leads to a complete loss of a tooth if the treatment is not applied in time [4]. A retrospective analysis of 2-5 years old children (495 patients) was performed according to **the research theme and aim**. Development and implementation of main principles in treatment and prophylaxis of erosion of tooth hard tissue in children was carried out. **Objects and methods of the work**. The research was performed at the Bukhara Regional Children's Dental Clinic, by using a standard set of dental instruments and completing checklists for every patient. Erosive hotbeds of enamel were identified according to O'Sullivan Index. **Results of the research and discussion**. The prevalence rate of teeth erosion in 2-5 years old children was 29.9% (confidence interval 95% — 24.4–35.4). Considering external and internal factors in development of pathology, as well as taking into account modern studies and effectiveness of medications aimed at prevention of erosive lesion in treatment of primary teeth erosion in children, a three-stage complex of measures was implemented in practice. Such medications as fluocal gel (Fluocal gel, Fluocal solution, Septodont), calcium gluconate solution for injection (10%), ROKS gel (ROCS® Medical Minerals) were used for basic treatment. Biologically active substances as fuji glass-ionic cement (Fuji-IX, GC) and argetcem (VladMiVa) were used. On the base of data presented in the article, **aconclusion** is made that the complex of treatment-prophylactic measures described above can effectively help to reduce erosion lesion in children and to obtain normalized mineralization of the tooth hard tissue. Also, it is emphasized that the primary teeth erosion should be diagnosed correctly and in time so that to prevent of complications development and prevalence to healthy teeth. Taking into account seriousness of primary teeth erosion and need for further investigations, it is advisable to continue the research in development of modern treatment methods and prophylaxis ways of this pathology.

Keywords---retrospective analysis, erosion of tooth hard tissue, children, primary teeth, prevalence, prophylaxis, treatment.

¹Tashkent State Dental Institute, Makhtumquli 3, Tashkent, Uzbekistan. 100147

I. Introduction

One of the most important problems in dental diseases, connected with incorrect diagnosis and improper evaluation of dental state at lesions of dental tissue observed in children, is an incorrect and late diagnosis of erosion of tooth hard tissue. [2] Erosion of tooth hard tissue, in contrast to enamel or dentine caries, leads to the change of pH in the oral cavity and demineralization of tooth hard tissue without participation of microorganisms. The erosion of tooth hard tissue is characterized by various degrees of enamel abrasion, enamel discoloration, prisms and dentin tubules abrasion, yellowing of the dentin layer. As a result, erosive lesion of the dentin layer causes a pulp tissue inflammation, which in its turn leads to a complete loss of a tooth if the treatment is not applied in time [4].

The results of a number of investigations in dental sphere have shown epidemiological indicators of erosion of tooth hard tissue for the last two decades, especially for primary teeth: 6-50% in 2-7 years old children, 14% for permanent teeth in 5-9 years old children and 11-100 % in 9-17 years old children [3, 8, 11].

In the conditions of the Central Asian region - the warm climate and the specificity of foodstuff - there is a probable factor for the prevalence of tooth hard tissue lesions [13]. In order to evaluate the epidemiological state of erosion of tooth hard tissue in Bukhara region in recent years, 10370 outpatient cards of 1-18 years old children, examined at the Bukhara Regional Children's Dental Clinic for the period from 2011 to 2017, were diagnosed with "tooth erosion" (K03.2 according to ICD-10). We have concluded that the data in the literature mentioned above are very miserable compared to the data presented. In our view, taking into account that disease indicators were very low as a result of the incorrect diagnosing, we performed our research work using modern and advanced diagnostic techniques for epidemiologic evaluation of the tooth erosion prevalence in 2-5 years old children in Bukhara and development of pathology treatment principles.

The aim of the work is to develop and implement main principles in treatment and prophylaxis of erosion of tooth hard tissue in children.

Objects and methods of the work. The present research work was performed at the Bukhara city preschool educational institutions and the Regional Children's Dental Polyclinic on the basis of mutual agreement with the Bukhara regional preschool education department, Bukhara city preschool education department and the Bukhara Regional Children's Dental Clinic. The investigation was carried out in 2016 and involved 495 of 2-5 years-old preschoolers, permanent residents of Bukhara, where 133 children were 2 years-old, 109 - 3 years old, 124 - 4 years old, 129 - 5 years old.

The research was carried out by using a standard set of dental instruments and completing a checklist for every patient. Erosive hotbeds of enamel were identified according to O'Sullivan Index [9]. The treatment principles of children with tooth erosion have been developed and implemented, based on the recommended treatment methodic, considering the etiology and pathogenesis of the disease [2, 4, 5, 6, 7, 10].

The obtained results were statistically analyzed using Statistics 6.0 and Microsoft Office Excel 2007 software introduced in the operating system of MS Windows 7 / Microsoft Corp.

II. Results of the research and discussion

Erosion of tooth hard tissue of primary teeth was found in 148 children (Figure 1). The lowest rate of pathology prevalence was observed in two-year-old children (15.8%), and then reliably increased with age: three-year-old patients made 29.4%, four-year-olds made 36.3%, and five-year-olds - 38.8%. On average, pathology rate of primary teeth in 2-5 years old children made 29.9% (95% confidence interval - 24.4 - 35.4).

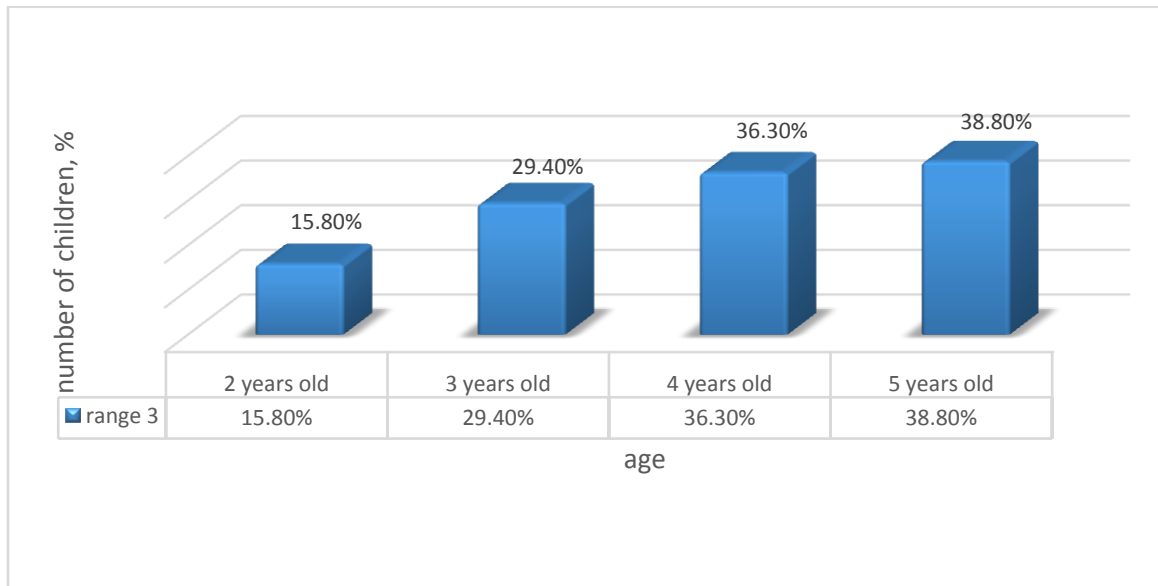


Figure 1. Prevalence of primary teeth erosion in 2-5 years old children.

Teeth erosion was diagnosed in 453 of 148 children's teeth. On average there was 3.8 teeth per child. The least number of teeth with erosion, namely 2.9 teeth per child, was observed in two-year-olds. At 3, 4 and 5 years old children the number of erosive teeth was almost the same: 3.9 per child, respectively; 4.0 and 3.9 teeth.

The degree of primary teeth erosion depth (Figure 2), in most cases the initial rate of pathology was 67.1%; 37.7% of it were insignificant lesions of the enamel with preservation of the tooth crown; 29.4% the enamel lesions, which caused significant changes in the outline of the dental crown, but the dentin prisms were not fully remineralized and the enamel incomplete pathology was determined.

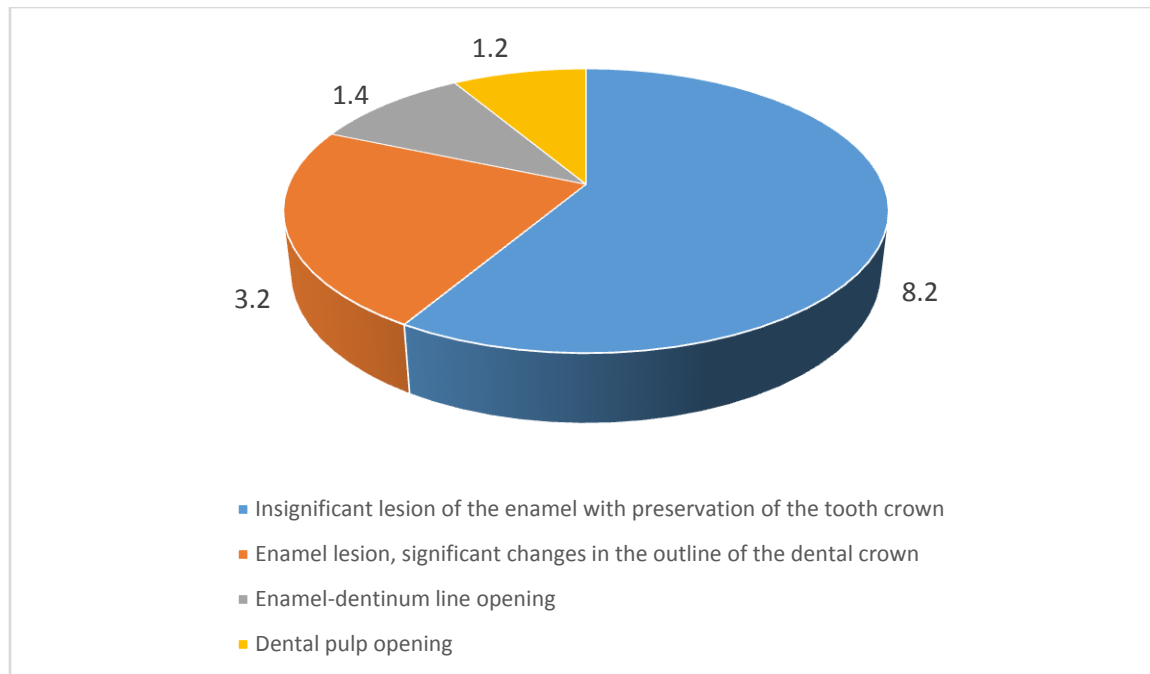


Figure 2. The indicators of teeth erosion prevalence at the various depth

The severe form of pathological process at the enamel-dentine line has the low erosion rate - 32.9%, 21.2% of cases is the enamel-dentin line opening and loss of enamel prisms; 9,5 % of cases is yellow-brown staining of the dental layer and its lesion, and 2.2% of cases is severe form of dentinlesion and opening of the tooth pulp. In contrast to the caries there was no softening in erosion of the tooth hard tissue.

Erosion hotbeds were found in teeth and molars at the same rate: 33; 36.4%. In most cases, erosion hotbeds were located on the cutting edges of the upper and lower jaws and on the chewing surfaces of the molars (21.4%). Different surface erosive defects were observed on various sites of all teeth, making 9.3%; most erosive sites (89.6%) occupied less than half of the surface area of the tooth; prevalence rate of erosion to the most surface area of the tooth crown made 10.4%.

Thus, the epidemiology of the tooth erosion prevalence in 2-5 years old children proves that erosional lesions are common and the dentin layer is affected by the pathological process in every third case.

Having considered external and internal factors in development of pathology, as well as taking into account modern studies and effectiveness of medications aimed at prevention of erosive lesion in treatment of primary teeth erosion in children, we implemented in practice a three-stage complex of measures and evaluated its effectiveness:

Stage I – establishment of the etiological factors of erosion of tooth hard tissue in a child; elimination of external factors - foods, drinks and medicines, factors affecting the pH of the oral cavity, the manifestation of minerals [5, 10]; elimination of internal factors – factors related to gastrointestinal tract [4, 12], as well as measures aimed at elimination of adverse effects of endocrine, psychoneurological, metabolic disorders on oral homeostasis.

Stage II – restriction of low pH medications use and treatment methods in children with somatic pathology; recommendations on using intensive abrasive toothpastes and brushes, as well as consulting parents on a child nutrition and oral hygiene, which are the following:

- depending on severity of erosion of tooth hard tissue, restriction or exclusion of food and drinks with low pH in the ration of a child: fruit and citrus juices, sweet carbonated beverages, vinegar, sour and unripe vegetables, citrus and berries. Use soft-tooth brush and toothpaste for morning and evening cleaning.
- reducing of time contact and amount of sour products and drinks with teeth;
- normalization of the acidic medium in oral cavity by drinking milk and unsweetened yogurt, chewing cheese and other products containing casein;
- intensification of salivation by using xylitol chewing gums to remove acids from the oral cavity and normalize acid medium;
- abstaining from teeth cleaning immediately after eating sour products, burping, vomiting and other acid effects due to the mechanical damage of the demineralized layer of the tooth hard tissues;
- rinsing with water the oral cavity for acidic effect decreasing after eating sour products, and then using 2% solution of sodium bicarbonate for neutralization of acid residues;
- rinsing with fluoride and phosphate solutions after acid effects for children who can rinse their mouths independently;
- intensification of initial teeth protection by help of soft fluoride preparations containing amino fluorides;

Stage III – the following treatment, consisting of special measures, was aimed to enhance the resistance of the tooth hard tissues to acidic effects, regenerate demineralized areas and prevent erosion-related hyperesthesia: fluocal applications (Fluocal Gel, Fluocal Solution, Septodont), Calcium Gluconate (Calcium Gluconate solution for injections 10%), ROKS gel (R.O.C.S® Medical Minerals) were used; erosive defects of primary teeth were coated with biologically active substances such as fuji glass-ionomer cement (Fuji-IX, GC), argemcem (VladMiVa) after hygienic cleaning and medico-surgical treatment. At severe erosion of tooth hard tissue 2-3 years old children underwent clinical examination every 1-2 months, and 4-5 years old children - every 2-3 months.

Thus, the effect of curative and prophylactic activities after repeated dental examination showed positive results, such as neutralization of oral pH, regeneration of demineralized areas, prevention of erosive hyperesthesia, stopping of erosive process spread into the internal tissues after regeneration of tooth solid tissue. In order to justify the positive effects of gained results, it is advisable to perform a thorough examination to evaluate the biochemical, immunological, microbiological medium of the oral cavity and to highlight the obtained results in our subsequent researches.

III. Conclusion

To summarize the above stated, it must be noted that primary tooth erosion occurs in every third child between the ages of 2-5 and the prevalence of pathology increases with age. On the one hand, tooth erosion treatment requires daily efforts of both a child and his parents to prevent the causal factors, as the control over the further development of the pathology cannot be achieved without regular keeping to the rules of nutrition and oral hygiene. On the other hand, for effective treatment of tooth erosion it is necessary to identify and prevent the somatic pathology, to conduct teeth remineralization and fluorination treatment, as well as regeneration treatment of tooth defects by modern curative means, and the most important – to carry out regular clinical examination of children. The algorithm of treatment-prophylactic measures can effectively help to reduce erosion lesion in children and to obtain normalized mineralization of the tooth hard tissue. The present research work highlights the seriousness of the problem discussed above, and we consider it advisable to continue further investigation in development of modern treatment methods and prophylaxis ways of this pathology. We

also want to emphasize importance and need for correct and early diagnosis of erosion of tooth hard tissue at the sanitation level in the process of dental examination and controlling the registration of medical records.

REFERENCES

- [1] Aidi H. E, Bronkhorst E. M, Huysmans M. C. D, et al. Dynamics of tooth erosion in adolescents: A 3-year longitudinal study // *J Dentistry*. – 2010. – Vol. 38, № 2. – P. 131 – 137.
- [2] Almeida E Silva J. S, Baratieri L. N, Araujo E, et al. Dental erosion: understanding this pervasive condition. // *J Esthetic and Restorative Dentistry*. – 2011. – Vol. 23, № 4. – P. 205 – 216.
- [3] Bardolia P., Burnside G, Ashcroft A, et al. Prevalence and risk indicators of erosion in thirteen to fourteen year olds on the isle of man // *Caries Research*. – 2010. – Vol. 44, № 2. – P. 165 – 168.
- [4] Bassiouny M. A. Clinical features and differential diagnosis of erosion lesions: systemic etiologies. // *Gen Dent*. – 2010. – Vol. 58, № 3. – P. 244 – 257.
- [5] Caglar E, Cildir S.K., Sandalli N. The erosive potential of different malt drinks: an in vitro and in situ study. // *J Clin Pediatr Dent*. – 2008. – Vol.33, № 1. – P. 35 – 37.
- [6] Harpenau L A, Noble W. H, Kao R. T Dental erosion and tooth wear // *CDA J*. – 2011. – Vol. 39, № 4. – P. 225 – 231.
- [7] Lussi A, Jaeggi T. Erosion - Diagnosis and risk factors // *Clin Oral Invest*. – 2008. – Vol. 12, № 1. – P. 5 – 13.
- [8] Nayak S. S, Ashokkumar B. R, Ankola A. V, et al. Distribution and severity of erosion among 5-year-old children in a city in India // *J Dent Child*. – 2010. – Vol. 77, № 3. P. 152 – 157.
- [9] O'Sullivan E. A. A new index for measurement of erosion in children. // *Eur J Paediatr Dent*. – 2000. – Vol. 2. – P. 69 – 74.
- [10] Scheutzel P. Etiology of dental erosion – intrinsic factors. // *Eur J Oral Sci*. – 1996. – Vol. 104, № 2. – P. 178 – 190.
- [11] Taji S. S, Seow W. K, Townsend G. C, et al. A controlled study of dental erosion in 2- to 4- year- old twins // *Int J Paediatr Dent*. – 2010. – Vol. 20, № 6. – P. 400 – 409.
- [12] Wang X., Lussi A. Assessment and Management of Dental Erosion. // *Dent Clin N Am*. – 2010. – Vol. 54, № 3. – P. 565 – 578.
- [13] S. A. Gafforov, G.E. Idiyev, S.S. Agzamkhudjaev. Frequency and clinic of non-carious dental lesions in workers of “Navoiazot” production association // *Bulletin of the Association of Doctors of Uzbekistan, Tashkent -2001 №4*. C. 110-112.
- [14] Malekmakan, L., Mansourian, A., Khodadadi, M.T., Izadpanahi, N. Effect of Ketamine and remifentanyl on blood glucose level during cholecystectomy (2018) *International Journal of Pharmaceutical Research*, 10 (1), pp. 314-317.
- [15] Amraee, M., & Koochari, A. (2016). Face recognition using a training sample from each individual. *International Academic Journal of Innovative Research*, 3(1), 19-26.
- [16] Kashanian, H., & Peashdad, M.H., & Kondori, M.A.P. (2016). Development of umbrella activities in agile methodologies. *International Academic Journal of Innovative Research*, 3(1), 27-31.
- [17] Hossieni, H. From magic matter to quantum superposition; A guide line to study on the origin of life from modern scientific viewpoint (2019) *NeuroQuantology*, 17 (2), pp. 102-106.
- [18] Bayazit, Z.Z. The determination of brain localization in adult second language learning process (2019) *NeuroQuantology*, 17 (2), pp. 8-15.