CONGENITAL CLEFT LIP AND PALATE IN CHILDREN: ETIOLOGICAL RISK FACTORS, PREVENTION METHODS

Kamalova Mekhriniso Kilichevna
DSc., Professor of the Department of Surgical Dentistry of the Abu Ali ibn Sina Bukhara State Medical Institute, Uzbekistan.
ORCID ID 0000-0003-1603-9164
e-mail: mexriniso.stomatolog@mail.ru

Rakhimov Sodik Shavkatovich
Scientific candidate of the Department of Surgical Dentistry of the Bukhara State Medical Institute named after Abu Ali ibn Sino

Abstract: the article presents data on the analysis of the frequency of birth, the prevalence of congenital cleft lip and palate, which have a great influence on the formation of the child's dentition. The data presented in the article may be useful for the development of preventive and therapeutic measures, in the prognosis and management of children with this pathology in an individual and family perspective.

Key words: congenital malformation of the maxillofacial region, congenital cleft lip and palate, risk factors, prevention methods

Relevance. Despite the successes in strengthening and protecting children's health, congenital anomalies are the leading cause of morbidity, disability and mortality in children [2, 13,18, 21].

According to the literature, congenital defects of the upper lip and palate (ICD-10 Q35.-Q37.) account for 12-30% of all human malformations and 86-88% of maxillofacial anomalies [1, 7, 15, 19, 30]. Scientific publications note that defects occur in various forms and in 69% of cases are accompanied by other severe anatomical and functional disorders in the body. Complex types of congenital defects of the palate include asymmetric defects of these structures [3, 6, 10, 16, 23, 32, 33].

According to the statistics of births with congenital defects of the upper lip and palate in the whole world, there is from 1:1000 to 5.38:1000, whereas in the Republic of Uzbekistan this indicator ranges from 1:745 to 1:510 [24, 29, 34]. Diagnostics, laboratory and instrumental studies, as well as surgical treatment of children with

congenital defects of the maxillofacial region in accordance with the execution of the Decree of the President of the Republic of Uzbekistan dated July 28, 2021 № DP-5199 "On measures to further improve the system of specialized medical care in the field of healthcare", the State included free medical services funded by insurance funds [20, 27, 31].

The correct assessment of defects and deformations in the maxillofacial region, functional disorders allows the surgeon to plan and use rational methods of uranoplasty [5, 14, 22, 25]. In practice, the treatment of patients with complex manifestations of congenital defects of the palate is carried out by "traditional" surgical methods of treatment. However, these methods do not always provide complete elimination of anatomical and functional disorders [4, 9, 11, 28]. It becomes obvious that there is a need to optimize complex treatment for congenital cleft palate, maximally restoring anatomical and functional disorders of these anatomical structures [8, 12, 17, 26].

Purpose of the study. To study and analyze risk factors for congenital cleft lip and palate in children, to determine ways of their prevention and comprehensive treatment.

Materials and methods of research. The modern scientific literature on congenital cleft palate preceding risk factors for secondary deformations of these structures has been studied. The search was carried out in Pubmed, e-library and other systems by keywords: children, 2-14 years old, organization of medical care, secondary deformities of congenital cleft palate, risk factors for secondary deformities of congenital cleft palate. In total, 50 papers published on the research topic in Russian and English in the period from 2012 to 2022 were critically analyzed.

Obtained results. The analysis of modern literature allowed us to identify the main risk factors leading to secondary deformities of congenital cleft palate in children and to offer comprehensive prevention and treatment of this pathology. Among the risk factors for the birth of children with congenital cleft lip and palate are: viral infections, toxoplasmosis, trauma, pregnancy toxicosis, hypovitaminosis, stressful situations, burdened obstetric history, hypoxic-ischemic fetal injuries, maternal smoking [12, 16]. A significant risk factor for the birth of a child with congenital cleft lip and palate is the

nature of the parents' production activities. Agricultural workers, chemical industry workers, drivers are more likely to have children with congenital cleft lip and palate [14]. However, the etiology of these forms of pathology has not been definitively clarified, which determines the relevance of research on their formation, treatment and prevention [17, 19].

Under the influence of one or more etiological factors, the fusion of the edges of the "physiological gap" is delayed, which leads to congenital non-fusion of the upper lip and palate [20, 22]. The primary palate is formed approximately at the 6th-7th week of intrauterine development and is a triangular-shaped piece of horseshoe-shaped tissue separating the nasal passages from the oral cavity. It is located in the area of the alveolar process, which includes the four upper incisors. Subsequently, the primary palate gives rise to the anterior (premaxillary) part of the final palate, as well as the middle part of the upper lip. As a result of the rapid growth of the maxillary and medial nasal processes, which converge and fuse with each other, a bookmark of the upper jaw and upper lip is formed. The middle part of the upper jaw, bearing incisors and the middle section of the upper lip (philtrum region), arises due to the fusion of the medial nasal processes. Therefore, in the embryonic period of development, the cleft of the upper lip often accompanies the cleft of the primary palate [20, 23, 24].

These are the so-called median clefts of the upper lip and upper jaw. But the most frequent is the formation of lateral clefts of the upper lip, as a result of non-fusion of the maxillary process with the medial nasal process. Approximately by the 8th-9th week of pregnancy, after the development of the primary palate ends, the secondary palate begins to develop. It is formed from the palatine processes, which are formations on the inner surfaces of the maxillary processes. When the tongue is lowered down, the edges of the palatine processes rise, move and fuse with each other and the nasal septum. By the end of the 12th week of pregnancy, fragments of the soft palate are fused together. Thus, the pathogenesis of the cleft of the hard and soft palate is associated with underdevelopment and non-fusion of the palatine processes [25, 27].

It is obvious that active monitoring of a child with congenital cleft lip and palate is necessary from the moment of birth. Taking into account pronounced anatomical, functional, cosmetic problems, as well as the presence of concomitant pathology, it is necessary to dynamically monitor and treat different specialists - maxillofacial surgeon, otorhinolaryngologist, dentist, pediatrician, speech therapist. Only the combined efforts of doctors of different profiles can achieve a good result in the treatment of such children [8, 10]. In the formation of the psychosocial development of a child with congenital cleft lip and palate, an important role is assigned to a neuropsychiatrist, who begins working with parents in the prenatal period, when the results of ultrasound diagnostics of the fetus are known [31, 12]. But the neonatologist and pediatrician are the first to meet such a newborn, whose task is to correctly assess his condition, taking into account the characteristics of such patients, and send him to specialists in a timely manner [1, 18, 28].

The presence of congenital cleft lips and palate is accompanied by pronounced violations of the formation of anatomical formations of the middle zone of the face [4,15]. A negative impact on the psycho-emotional sphere of such a patient is caused by psychological disorders that form as a result of awareness of one's own defect and the appearance of a sense of one's own inferiority with age [28, 35].

According to the generally accepted classification, congenital malformations of cleft palate development refers to large malformations, because it can lead to disability of the patient. The classification of N.M.Mikhelson takes into account the localization of the cleft and its extent. Incomplete crevices:

A. Affecting the uvula.

B. Affecting the uvula and soft palate, median.

C. Hidden crevice.

D. The uvula, soft and hard palate are one-sided.

Full crevices:

A. Soft, hard palate and alveolar process.

B. The soft, hard palate, alveolar process and lip are one and two–sided.

One of the main causes of congenital cleft palate is the mother's illness in the early stages of pregnancy. It can also be the influence of psychogenic factors, severe stress, excitement. This may be a job at some enterprises with professional harmfulness. Undoubtedly, bad habits cause irreparable harm to the development of the fetus. According to statistics, about 10-15% of the total number of children born with clefts have a genetic predisposition.

In the modern literature, it is often stated that with the correct management of patients with VRN, it is possible to achieve complete rehabilitation in 95% of cases, at the same time, the frequency of relapses and the development of unfavorable functional results still reaches 30-90% of cases. Insufficient attention is often paid to preoperative preparation, as well as to elements of comprehensive management, such as orthodontic treatment, speech therapy, etc.

Treatment of children with this pathology includes:

- preoperative orthodontic and orthopedic training; the duration of this stage depends on the type and severity of the cleft and the general somatic condition of the patient. This stage can last up to 3-6 months, and in severe concomitant defects up to 12-18 months, the coordinator of the work is the maxillofacial surgeon.

- surgical treatment (reconstructive and plastic surgery); must be completed before the formation of the child's speech by the age of 3.

- orthodontic and orthopedic treatment after surgery, preventing the development of secondary deformities of the palate.

Compliance with the pre- and post-operative rehabilitation of children with this pathology plays a huge role in maintaining the optimal result and consolidating the success obtained during the primary surgical intervention of cleft palates. Orthodontic treatment before uranoplasty surgery is combined with wearing a floating obturator, which improves the functions of nutrition, swallowing, and subsequently speech, prevents the formation of a pathological position of the tongue in the oral cavity and distorted compensatory sound formation, contributes to the normalization of impaired respiratory function and aerodynamic conditions of sound formation, allows speech therapy work in the preoperative period. Preparation for uranoplasty lasts exactly as

long as it takes to normalize the bite. Installation classes with a speech therapist are held. The surgeon and all the necessary specialists are constantly monitored.

Compliance with the basic principles of rehabilitation of children with congenital cleft palate not only significantly improves the aesthetic and functional results of treatment, but also minimizes the number of repeated corrective operations. The final rehabilitation stage includes measures for sound production and speech formation. One of the main indicators of the effectiveness of surgical treatment of children with this pathology is the quality of speech development in the postoperative period. Children with congenital cleft palate begin classes with a speech therapist in the hospital from the first days after uranoplasty, in addition, an orthodontist actively monitors the condition of the bite.

There is no doubt that the priority of surgical operations in the complex of measures for the treatment of congenital cleft palate. However, this is only one link out of many links in the complex of ongoing events. If orthodontic treatment is not carried out in preparation for the operation of uranoplasty, the congenital deformity of the upper jaw is not corrected, then the result of surgical treatment will never be positive.

Most often, these patients have various forms of speech disorders and voice formation. These disorders can be divided into three main groups: rhinolalia, rhinophonia and dyslalia.

Many authors associate these disorders with the insufficiency of the velopharyngeal curtain, as a result of which the oral and nasal cavities do not separate from each other. Moreover, this is not associated with a shortening of the size of the soft palate, but with the insufficiency of its muscular apparatus.

Features of treatment of children with congenital cleft lip and palate. Timely and correct implementation of the first stage of surgical treatment of congenital cleft lip and palate determines the success of rehabilitation of such patients. In recent years, special attention has been paid to the full restoration of not only anatomical structures, but also functions with minimal traumatic effect of surgical manipulations on the subsequent growth of the facial skeleton of a sick child [1, 3,10]. There is no doubt that the treatment of children with congenital cleft lips and palate is one of the complex tasks of

reconstructive surgery of childhood, the solution of which is not limited to the elimination of a cosmetic defect and reconstruction of facial proportions close to normal. [3, 7].

Flap methods of cheiloplasty, which have been reasonably undergoing changes and improvements over the past few years, are considered to be effective methods of upper lip plastic surgery with its clefts. Researchers who have been dealing with the problem of defect repair in patients with congenital cleft lip and palate for many years have very correctly noticed that "most of the methods are good when performed by their authors, but do not show reliable results when performed by other specialists". Taking into account the above facts, many specialists dealing with the problem of optimizing surgical treatment of patients with congenital cleft lip and palate, suggest instead of searching and developing new methods used earlier, it is preferable to develop and optimize indications for existing methods of surgical operations, depending on the size of the defect, age, violation of certain functions of the patient, etc.

Conclusion: Numerous studies have studied the influence of risk factors for congenital cleft lip and palate in the groups "genetic factors", "environment" and "lifestyle", but the group of risk factors for secondary deformities of congenital cleft palate has not been studied. This determines the importance of studies of risk factors for secondary deformities with congenital cleft palate, in order to further develop programs for complex treatment of this pathology, improve the quality of comprehensive medical and social rehabilitation of such patients and work with families of children with congenital cleft lip and palate.

References

1. Azadgoli B, Munabi NCO, Fahradyan A, Auslander A, McCullough M, Aflatooni N, Davidson Ward SL, Kumar SR, Sanchez-Lara PA, Swanson J, Magee WP 3rd. (2020) Congenital Heart Disease in Patients With Cleft Lip/Palate and Its Impact on Cleft Management. Cleft Palate Craniofac J. 57(8):957-966. doi: 10.1177/1055665620924915.
2. Chang L, Wang Y, Liu H. (2016 Apr;) Evaluation of the timing of orthodontic arch expansion and graft in cleft lip and palate]. Hua Xi Kou Qiang Yi Xue Za Zhi. 34(2):205-9. Chinese. doi: 10.7518/hxkq.2016.02.020.

3. FFlieger R, Kopczyński P, Matthews-Brzozowska T. (2015 Jan-Feb;) Analysis of skeletal maturity of children with cleft palate in terms of healthy children by the CVM method. Adv Clin Exp Med. 24(1):99-102. doi: 10.17219/acem/38165.
4. Ghassibe-Sabbagh M, El Hajj J, Al Saneh M, El Baba N, Abou Issa J, Al Haddad M, El Atat O, Sabbagh J, Abou Chebel N, El-Sibai M. (2021 Jun;) Altered regulation of cell migration in IRF6-mutated orofacial cleft patients-derived primary cells reveals a novel role of Rho GTPases in cleft/lip palate development. Cells Dev. 166:203674. doi: 10.1016/j.cdev.2021.203674.
5. Gilleard O, Sell D, Ghanem AM, Tavsanoglu Y, Birch M, Sommerlad B. (2014 Nov;) Submucous cleft palate: a systematic review of surgical management based on perceptual and instrumental analysis. Cleft Palate Craniofac J. 51(6):686-95. doi: 10.1597/13-046.
6. Jaruratanasirikul S, Chicharoen V, Chakranon M, Sriplung H, Limpitikul W, Dissaneevate P, Intharasangkanawin N, Tantichantakarun P, Sattapanyo A. (2016 May;) Population-Based Study of Prevalence of Cleft Lip/Palate in Southern Thailand. Cleft Palate Craniofac J. 53(3):351-6. doi: 10.1597/14-259.
7. Klinger M, Klinger F, Battistini A, Lisa A, Maione L, Caviggioli F, Vinci V. (2021 Mar-Apr) Secondary Treatment of Cleft Lip Correction Sequelae With Percutaneous Needleotomy, Autologous Fat Grafting, and Local Flaps: An Integrated Approach. J Craniofac Surg. 01;32(2):642-646. doi: 10.1097/SCS.0000000000007028.
8. Lee KC, Halepas S, Wu BW, Chuang SK. (2021 Jan;) For Patients With Isolated Cleft Palate Does Revision Palatoplasty Have an Increased Risk of Inpatient Complication Compared to Primary Palatal Repair? Cleft Palate Craniofac J. 58(1):72-77. doi: 10.1177/1055665620949121.
9. Lough KJ, Spitzer DC, Bergman AJ, Wu JJ, Byrd KM, Williams SE. (2020 Jul). Disruption of the nectin-afadin complex recapitulates features of the human cleft lip/palate syndrome CLPED1. Development. 13;147(21):dev189241. doi: 10.1242/dev.189241.
10. Luo X, Huang H, Yin X, Shi B, Li J. (2019 Mar). Functional stability analyses of maxillofacial skeleton bearing cleft deformities. Sci Rep. 12;9(1):4261. doi: 10.1038/s41598-019-40478-w.
11. Mazzetti MPV, Alonso N, Brock RS, Ayoub A, Massumoto SM, Eça LP. (2018 Sep;) Importance of Stem Cell Transplantation in Cleft Lip and Palate Surgical Treatment Protocol. J Craniofac Surg. 29(6):1445-1451. doi: 10.1097/SCS.0000000000004766.
12. Nguyen HL, Hoang MP, Nguyen VM, Tran TT, Le VS. (2022 May). Use of Septal Cartilage in Rhinoplasty to Correct Nasal Deformity After Unilateral Cleft Lip and Palate Surgery. Clin Cosmet Investig Dent. 18;14:131-140. doi: 10.2147/CCIDE.S364332.
13. Nguyen HL, Nguyen VM, Tran XP. (2021 Jul). Cleft Lip/Nasal Deformities After Plastic Surgery for Unilateral Cleft Lip/Palate: A Prospective Study at a Large Hospital in Vietnam. Clin Cosmet Investig Dent. 16;13:305-314. doi: 10.2147/CCIDE.S320636.
14. Nohara A, Owaki N, Matsubayashi J, Katsube M, Imai H, Yoneyama A, Yamada S, Kanahashi T, Takakuwa T. Morphometric analysis of secondary palate

development in human embryos. J Anat. 2022 Dec;241(6):1287-1302. doi: 10.1111/joa.13745.
15. Parveen S, Husain A, Johns G, Mascarenhas R, Reddy SG. (2021 Jan-Feb). Three-Dimensional Analysis of Craniofacial Structures of Individuals With Nonsyndromic Unilateral Complete Cleft Lip and Palate. J Craniofac Surg. 01;32(1):e65-e69. doi: 10.1097/SCS.0000000000006933.
16. Pastuszak P, Dunin-Wilczyńska I, Lasota A. (2020 Nov). Frequency of Additional Congenital Dental Anomalies in Children with Cleft Lip, Alveolar and Palate. J Clin Med. 25;9(12):3813. doi: 10.3390/jcm9123813.
17. Shkoukani MA, Lawrence LA, Liebertz DJ, Svider PF. (2014 Dec;). Cleft palate: a clinical review. Birth Defects Res C Embryo Today. 102(4):333-42. doi: 10.1002/bdrc.21083.
18. Sittah GA, Ghanem OA, Hamdan U, Ramia P, Zgheib E. Secondary Cleft Nasolabial Deformities: A New Classification System for Evaluation and Surgical Revision. Cleft Palate Craniofac J. 2018 Jul;55(6):837-843. doi: 10.1597/16-064.
19. Uchino M, Arima H, Kobayashi H, Nagata J, Yasumura T, Ishii T, Miyazaki H, Sakamoto T, Nojima K, Sueishi K. (2020 Jul). Survey on Condition and Orthodontic Treatment of Maxillary Lateral Incisors in Patients with Cleft Lip and Palate. Bull Tokyo Dent Coll. 4;61(2):95-102. doi: 10.2209/tdcpublication.2019-0013.
20. Kamalova M.K., Fomenko, I. V., Dmitrienko, D. S., Matvienko, N. V., Arjenovskaya, E. N., Gevorkyan, A. G., Maslak, E. E. (2020). Reasons for 1-17-year-old children to visit A dentist during the Covid-19 pandemic. European Journal of Molecular and Clinical Medicine, 7(7), 546-558. Retrieved from www.scopus.com
21. Maslak E. E., V. Naumova., Kamalova M.K. (2020). Relationship between General and Oral Diseases: Literature Review // American Journal of Medicine and Medical Sciences. - Америка, - Vol.10(9). - P. 690-696. Retrieved from www.scopus.com
22. Kamalova M. K., E.E. Maslak., I.V. Fomenko., A.L. Kasatkina., T.N. Kamennova., T.G. Khmizova., K.V. Nikitina. (2020). Reasons for primary teeth extraction in children aged 1-14 years: a retrospective study // Palarch's journal of archaeology of egypt. - Нидерланды, - Vol.17. - No6. - P. 13947-13964. Retrieved from www.scopus.com
23. Kamalova M.K., Komilov H.P. (2019). Maktabgacha yoshdagi bolalarda tish kariesini oldini olish va davolashni optimallashtirishning klinik-iqtisodiy tahlili [Clinical and economic analysis of the optimization of prevention and treatment of dental caries in preschool children]. Biologiya va tibbiyot muammolari xalkaro ilmiy jurnali.- № 4.2 (115). 53-56.
24. Kamalova M.K. (2019). Maktabgacha yoshdagi bolalarda tish kariesini davolashda stomatologik yordamni tashkil qilish [Organization of dental care in the treatment of dental caries in preschool children]. Biologiya va tibbiyot muammolari xalkaro ilmiy jurnali. - № 4.2 (115). 221-224.
25. Камалова М.К., Маслак Е.Е., Каменнова Т.Н., Осокина А.С., Афонина И.В., Огонян В.Р.(2020.) Результаты лечения очаговой деминерализации эмали временных резцов у детей раннего возраста // «Tibbiyotda yangi kun» научно -

реферативный, культурно - просветительский журнал. - Бухара, - №3(31). - С. 355-357.
26. Kamilov H.P., Kamalova M.K. (2018). The use of laser therapy in the treatment of chronic recurrent herpetic stomatitis in children // Scientific journal European science review Vienna, - No. 7-8.- pp. 120-121.
27. Маслак Е.Е., Камалова М.К. (2020). Проблемы организации стоматологической помощи детям дошкольного возраста // Biomeditsina va amaliyot jurnali. - Tashkent, - No. 1. - pp. 26-32.
28. Vokhidov U.G., Kamalova M.Q. (2020). The use of various techniques in the treatment of traumatic injuries of the oral mucosa in children // European Journal of Molecular & Clinical Medicine. - England, - Vol. 7. Issue 7. - P. 3743-3748.
29. Камилов Х.П., Камалова М.К. (2018). Современные подходы в лечении хронического рецидивирующего герпети-ческого стоматита у детей // «Достижения науки и образования» Международный научный журнал. - Москва, - №3 (25). - С. 46-48.
30. Kamalova M.K., Maslak E.E. (2022). Can Dental Screening of Preschoolerswith or without Education of the Parents Improve Children's Oral Health? The Longitudinal Study Results // Integrative dentistry and maxillofacial surgery. - Tashkent, - № 1(1). - P. 58-62.
31. Камалова М.К. (2020). Оценка экономической эффективности программ профилактики лечения кариеса зубов у детей дошкольного возраста // «Tibbiyotda yangi kun» научно - реферативный, культурно - просветительский журнал. - Бухара, - №4(34). - С. 173-176.
32. Камалова М.К. (2020). Медико-социальный и клинико-экономический анализ лечения и профилактики кариеса зубов у детей дошкольного возраста // «Tibbiyotda yangi kun» научно - реферативный, культурно - просветительский журнал. - Бухара, - №3(33). - С. 79-80.
33. Камалова М.К. (2020). Социально-экономический эффективность программ профилактики и лечения кариеса зубов у детей дошкольного возраста // «Образование и наука в XXI веке» международный научно-образовательный электронный журнал. - Россия, - №9. - Т.3. - С. 149-155.
34. Камалова М.К. Оценка результатов внедрения программ профилактики кариеса зубов у детей дошкольного возраста // «Журнал Медицина и инновации». - Ташкент, 2021. - №4. - С. 680-684.
35. Камалова М.К. (2021).Сравнительная оценка клинико-экономической эффективности программ профилактики лечения кариозных поражений зубов у дошкольников // «Журнал стоматологии и краниофациальных исследований» междисциплинарный подход по заболеваниям органов головы и шеи. - Самарканд, - Специальный выпуск, - С. 83-87.