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ORTHODONTIC AND PRE-SURGICAL PREPARATION FOR PRIMARY CHEILOPLASTY IN CHILDREN WITH CLEFT LIP AND PALATE

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Abstract: The number of children born with congenital pathology of the maxillofacial region remains significant. Such patients have pronounced anatomical and functional disorders that require long-term and multi-stage recovery. Currently, the treatment of such patients is carried out comprehensively and includes the participation of a maxillofacial surgeon, speech therapist, otolaryngologist, pediatrician, orthodontist, etc. At the same time, it is necessary to clarify some details of the method itself and the design features of the device, as well as to develop indications for the use of a particular type of orthodontic treatment, depending on the degree, severity and shape of the existing deformity and the choice of tactics for preparing the patient for primary surgical treatment.

Key words: bilateral cleft of the upper lip and palate, orthodontic treatment.

Children with cleft lip and palate (RGN) need comprehensive treatment with the participation of specialists of various profiles: pediatrician, orthodontist, maxillofacial surgeon, otolaryngologist, speech therapist, geneticist, etc. [1,4,7,13,21].

In recent years, a lot of experience has been accumulated to improve the methods of surgical treatment of RGN, new types of operations have been developed, an approach to age-related indications for treatment, improved orthodontic Medical and genetic examinations are being developed and implemented (Starikova N.B.). The importance and role of psychological and pedagogical work with families with children with congenital cleft have increased. However, as some authors note, these works highlight mainly the positive experience of helping such children [9.10].

Analysis of the results of clinical and X-ray examination of patients of different age groups revealed the most characteristic disorders of facial skull growth for each of these groups (Katasanova E.S. 2012). It is believed that a step-by-step integrated approach and timely forecasting of growth and possible deformations of the facial skeleton allows us to develop a certain algorithm of actions of an orthodontist at various stages of rehabilitation of patients.

Bilateral cleft of the upper lip, alveolar process, hard and soft palate is the most complex of all congenital malformations of the maxillofacial region (CHLO). Bilateral RGN is characterized by the division of the maxillary arch into three segments: the interdigital bone and two fragments of the jaw (right, left). In addition, there is an anatomical defect of the hard and soft palate throughout, dissociation of the circular muscle of the mouth, underdevelopment of the central fragment of the upper lip, congenital shortening or absence of the cutaneous part of the nasal septum, varying degrees of protrusion of the jawbone and underdevelopment of the upper jaw as a whole. The clinical picture of a complete bilateral cleft of the upper lip and palate largely depends on the position of the jawbone and the coulter. In some cases, the coulter fuses with the palatine processes of the upper jaw, in the anterior part the interdigital bone adjoins it, connecting with the lateral fragments of the alveolar process of the upper jaw, and in the posterior part with the palatine process. In cases where this process is disrupted, the coulter and the interdigital bone remain freely located between the palatine and alveolar processes: a bilateral cleft is formed [15, 18, 20]. Based on the pathoanatomical examination of the skulls of deceased newborns with RGN, the authors presented information about the structure of the upper jaw, confirming clinical observations that showed that its deformities are not limited to changes in the alveolar process of the upper jaw [4]. The maxillary bone in children with RGN is

reduced in size in all (sagittal, transversal and vertical) planes. The zygomatic bones have also been reduced in size and deformed, the shape of the eye sockets and the vault of the cerebral skull has been changed. The lateral fragments of the alveolar process are mesially displaced in 80% of cases.

RGN is accompanied by a violation not only of the anatomical shape of the newborn's face — the functions of breathing and sucking are increasing. The observed violations of the patency of the airways relieve the strength of the respiratory muscles, reduce the excursion of the chest, which causes diseases of the upper respiratory tract, children are more likely to suffer from bronchitis, pneumonia [11,13].

With complete bilateral RVH, it is difficult to breastfeed due to the inability to breastfeed, frequent regurgitation through the nose, as a result of which the child's body weight is lost. Ingestion of food into the respiratory tract creates a risk of aspiration pneumonia.

Thus, the initial data of facial skeletal deformity in patients with RGN consist mainly of congenital underdevelopment and anatomical defect of tissues adjacent to the cleft. Secondary deformities of the upper jaw and other facial bones caused by dysfunction of the muscles surrounding the anatomically altered upper jaw have a significant impact on the treatment planning of such a patient from the newborn period [12, 14].

Children born with a complete bilateral cleft of the upper lip, alveolar process and palate need urgent medical care in order to normalize feeding conditions, prevent the process of increasing the size of the birth defect, progression of secondary deformities of the jaw bones, and create the necessary conditions for cheiloplasty at an early age [2,3,6]. It has been proven that the early separation of the oral and nasal cavities ensures the natural feeding of the child, since during these hours, he has already developed a sucking reflex. The establishment of feeding a child contributes to its growth and development. Some authors were suspicious of the use of obturators, fearing a free position in the edges of the cleft, recommending their use after the formation of a temporary bite [5, 16, 17].

T.V. Sharova et al. (1985) proved that the obturator, immersed in the depth of the cleft, exerts pressure on the free edges of the palatine processes with its lateral trimmings, is a mechanical spacer that restrains the growth of the palatine processes of the upper jaw and changes their topography, pressing their free edges into the nasal cavity. Nevertheless, despite the contradictory views on the use of a floating obturator, various modifications of it are still used in practice [19, 22].

Currently, significant experience has been accumulated in our country and abroad in the surgical treatment of cleft lip in the early stages. The analysis of long-term results shows that cheiloplasty performed immediately after the birth of a child, with an unfavorable ratio of fragments of the upper jaw, without prior orthodontic preparation leads to the development of deformation of both the dentoalveolar arch (narrowing of the upper jaw) and to the development of secondary scarring on the restored upper lip. The protrusion of the jawbone creates difficulties in performing cheiloplasty in patients with bilateral RGN, has a negative effect on the results of the operation. With congenital bilateral cleft of the upper lip and palate, the lateral fragments are blocked by the jawbone, which leads to even greater narrowing and underdevelopment. As is known, after primary cheiloplasty, under the influence of pressure from the restored upper lip, the lateral fragments of the alveolar process shift to the center, while the interdigital bone remains pushed forward. The position of the jawbone in a state of protrusion under the pressure of the lateral fragments on both sides makes their orthodontic movement difficult. The opinion that the restoration of the circular muscle of the mouth exerts pressure on the jawbone turned out to be untenable. And the healing of tissues under conditions of pronounced tissue tension is accompanied by their local hypoxia, while creating a threat of divergence of the postoperative wound and pathological scarring of tissues. In order to avoid these complications, when eliminating a bilateral cleft of the upper lip, some surgeons perform a resection of the jawbone, although most specialists do not agree with this [19, 21]. It was found that in the area of the seam between the coulter and the jawbone there is a center of its growth, which regulates the development of the upper jaw in the sagittal plane. In the case of traumatic damage to the center of potential growth,

the growth of the alveolar processes anteriorly stops, the jawbone atrophies, shifts orally, and subsequently underdevelopment of the entire middle zone of the face is formed.

In order to preserve the jawbone, various methods of setting (moving) it into the alveolar arch are used, for example, such as vertical or oblique osteotomy of the coulter and dissection of the cartilaginous mouth of the nasal septum. However, such operations are accompanied by significant blood loss in the absence of a pronounced positive result, subsequently, the mobility of the jawbone remains, despite all attempts to eliminate it by fixing the jawbone to the coulter and the anterior sections of the lateral fragments of the upper jaw with a wire ligature, synthetic thread, metal pins.

Despite such a complex fixation, the interdigital bone remains mobile, atrophies, the function of biting and speech formation is impaired, significant defects of the upper dentition and alveolar process appear. The need for early preoperative orthodontic treatment of maxillary deformity in children with RGN during the newborn period was first justified by S.K. McNeil (1950, 1954). The author suggested starting orthodontic treatment immediately after birth and completing it by six months of the child's life. After completion of orthodontic treatment, primary cheiloplasty was performed, and constant supervision by an orthodontist was carried out until the formation of a permanent bite. In 1957, the author described a method of hardware treatment of children with bilateral RGN before primary cheiloplasty, which was aimed at setting the jawbone and then holding it in a new position. S.K. McNeil recommended using this equipment when the potential for osteogenesis is very high. He was the first to express the idea of orthodontic effects on fragments of the upper jaw in order to stimulate their growth, correct the position of the palatine processes and reduce the size of the defect. Bilateral RGN primary plastic surgery of the upper lip was preceded by surgical reduction of the interdigital bone with subsequent retention of it in a new position. The method has found wide application abroad. It has been used by many specialists in various clinics. All of them noted the positive aspects of early orthodontic treatment for congenital malformations of the lip and palate [22]. Elastic rubber bands were used for preoperative extraoral orthodontic treatment of a wide form of RGN, which, according to the authors, reproduce similar efforts of the normal circular muscle of the mouth.

According to their data, elastic pressure on the jawbone normalizes the position of the jawbone and reduces the width of the cleft of the alveolar process. However, this method did not eliminate the protrusion of the jawbone when the lateral fragments of the mesial were displaced.

Many experts recommend starting the correction of jaw deformities in children with RGN as early as possible during the growth and development of all elements of the upper jaw. The earlier orthodontic treatment is undertaken, the more effective it is and, consequently, the better the functional and aesthetic results [18]. This possibility is due to the child's jaw bone growth potential. In addition, when using orthodontic devices at an early age, it is easier to achieve balance in the action of the lips, cheeks, tongue, chewing and facial muscles of the mouth.

N.V. Starikova showed that under the influence of sucking jerky movements of the tongue at the moment of sucking the nipple, the latter pushes the palatine processes up and to the sides, changing the position of the palatine processes from horizontal to vertical. The lateral fragments of the alveolar process are displaced distally, the interdigital bone is pushed forward, thereby increasing the size of the congenital anatomical defect. The position of the palatine processes and fragments of the alveolar process is negatively affected by unusual airflow pressure due to impaired nasal breathing. Specialized care was provided from the first day of the newborn's life through the use of a preformed standardized plate. At the age of one month, the child was made an apparatus for setting the jawbone, which was a monolithic plate carrying a multi-link structure for the anterior part of the upper jaw. The device provided targeted growth of the facial skeleton. Initially, the jawbone was displayed on the axis of symmetry, then the jawbone was used to set the jawbone an external bandage. The reposition of the jawbone was achieved during the treatment period from 25 days to 6-8 months. It is noted that the earlier treatment was started, the faster It was possible to achieve the reposition of the jawbone. The disadvantages of this method were the use of standardized devices that do not allow taking into account the individual characteristics of jaw deformity in a particular child, as well as the need to

manufacture a large number of devices that might not be in demand. A number of authors have proposed early orthodontic treatment to bring the alveolar processes closer together due to their natural growth in the direction set by the doctor. For this purpose, an apparatus was made with an obturating part and a screw, the interdigital bone was covered with a mouth guard connected to the parts of the apparatus by a wire arc. When the screw was activated, the arc was stretched, the reposition of the jawbone, in addition, an extra-oral pressure bandage was additionally used. The duration of treatment was 4-8 months, depending on the age and general condition of the child.

Analyzing the experience of early orthodontic treatment, it can be concluded that the use of removable intraoral devices ensures separation of the nasal and oral cavities, normalizes feeding. During the treatment, an optimal ratio of upper jaw fragments is created for primary cheiloplasty. The duration of treatment is on average 4 months, but sometimes they increase depending on the severity of the deformity of the upper jaw, the age of the child at the beginning of treatment, the parents' compliance with the doctor's recommendations, etc.

However, this approach has drawbacks. This is insufficient good fixation of the device, frequent replacement of devices, frequent corrections of the basis of the device. The experience of using additional extraoral fixing devices indicates that they also did not provide sufficient fixation of intraoral devices and, in addition, traumatic damage to the oral mucosa in children is possible, an increase in the time required to eliminate deformation.

N.G. Georgiade [14] described a method for eliminating deformity of the upper jaw before primary cheiloplasty in children with complete bilateral cleft lip and palate using a non-removable intraoral apparatus. In this case, Kirchner needles are used, which are passed through the cheek under local anesthesia into the distal zone of the upper jaw posteriorly from the dental follicles. The anterior spoke is inserted using a hand drill through the vestibular surface of the interdigital bone in the area of the apical base. Then an additional Kirchner spoke is inserted, providing additional fixation. The spokes are laid in the cheek grooves so that their free ends are reshaped into hooks for rubber traction. Rubber rods are fixed to this point, and movement is carried out in the sagittal plane — backwards or along the buccal surface, depending on the type of cleft. At the same time, the lateral fragments are expanded. This device with intraosseous fixation was first used as a non-removable dynamic orthodontic device to eliminate deformities of the upper jaw. However, the N.G. Georgiade device has not found wide application in orthodontic practice due to its bulky size, imperfect anesthesiology, and reduced elasticity of rubber rods.

In 1980-1999, D.R. Millard and R.A. Latham presented a detailed description of the modified dynamic apparatus and the results of treatment of children with complete bilateral cleft lip and palate. They explained the displacement of the wings of the nose posteriorly by the retroposition of the lateral fragments of the alveolar process of the upper jaw. The device consisted of plastic mouthguards superimposed on the lateral fragments of the alveolar process of the upper jaw and interconnected by a dynamic device. The mouthguards are fixed to the alveolar process using intraosseous rods. The planning of the insertion of rods is carried out in the conditions of a dental laboratory on plaster models of jaws. The locking part of the rods is immersed in the base of the device. The device is applied under intubation anesthesia in the operating room. A metal pin is passed through the jawbone, which is connected by an elastic rubber chain to the base of the base. When the lateral fragments expand, the chain stretches, draining the retusion of the jawbone. The duration of treatment is on average 3 weeks.

A non-removable device has its advantages and disadvantages. The advantage is reliable fixation, rapid achievement of results, simultaneous elimination of jaw deformation in all planes (sagital, transversal and vertical), the absence of auxiliary external elements. However, there is a danger of damage to the rudiments of permanent teeth, and in some cases, it is possible to attach a secondary infection and reject the screws.

Thus, early orthodontic treatment of children with congenital bilateral cleft of the upper lip and palate remains an important and urgent problem. Early orthodontic treatment using fixed devices in this

group of patients is poorly covered in the literature, the question of the optimal age period for this type of treatment has not been resolved. There is no informative set of diagnostic measures. There are conflicting opinions about the advantages and disadvantages of this method. Some details of the method itself and the design features of the device require clarification. There are no indications for the use of one or another type of orthodontic treatment, depending on the degree, severity and form of the existing deformity and the choice of tactics for preparing the patient for primary surgical treatment.

LIST OF LITERATURE:

1. Амануллаев Р. А., Икрамов Г. А., Насриддинов Ж. Х., Хатамов У.А. Клинико-микробиологическая характеристика полости рта у детей с врожденной расщелиной верхней губы и неба до и после уранопластики // Stomatologiya. - 2020. - Nol (78). - С.48-50.
2. Аверьянов С.В. Распространенность и интенсивность кариеса зубов, заболеваний пародонта и зубочелюстных аномалий у детей города Уфы // Современные проблемы науки и образования. – 2016. – № 2. – С.114-118.
3. Аверьянов С.В., Гараева К.Л., Исаева А.И. Зубочелюстные аномалии у детей города Уфы // Проблемы развития современной науки. – 2016.– № 4. - С. 232-235.
4. Аверьянов С.В., Зубарева А.В. Этнические особенности распространенности и структуры зубочелюстных аномалий у студентов города Уфы // Стоматология детского возраста и профилактика. – 2012. – Т. 11. – № 4. – С. 69-72.
5. Азимов М., Дусмухамедов Д., Юлдашев А. окклюзион аномалияларнинг гнатик шакллари бўлган беморларни жарроҳлик даволашнинг узоқ муддатли натижаларини баҳолаш // Стоматология. – 2018. - Вол. 1. - №. 4 (73). - 33-35 б.
6. Аверьянов С.В., Чуйкин О.С. Распространенность и структура зубочелюстных аномалий у детей крупного промышленного города // Dental Forum. – Общество с ограниченной ответственностью "Форум стоматологии", 2009. – № 2. – С. 28-32.
7. Алешина О.А. Оценка состояния ортодонтической помощи населению в аспекте междисциплинарного подхода лечения пациентов с зубочелюстными аномалиями // Медико-фармацевтический журнал «Пульс». – 2020. – Т. 22. – № 6. – С.31-34.
8. Богдан В.Е., Щитова А.В., Тищенко В.Н. Профилактика зубочелюстных аномалий и ортодонтическое лечение в раннем возрасте // Главный врач Юга России. – 2013. – № 6 (37). – С. 4-6.
9. Бриль Е.А., Смирнова Я.В. Структура зубочелюстных аномалий и деформаций у подростков г. Красноярска // Фундаментальные исследования. – 2014. – № 10-7. – С. 1280-1283.
10. Вагнер В.Д. Протокол экспертизы качества заполнения медицинской карты ортодонтического пациента при диагностике зубочелюстных аномалий и деформаций // Клиническая стоматология. – 2016. – № 1. – С. 36-39.
11. Вологина М.В., Маслак Е.Е., Гоменюк Е.В. Распространенность и потребность в лечении зубочелюстных аномалий среди 12-15-летних детей по данным эстетического дентального индекса // Вестник Волгоградского государственного медицинского университета. – 2016. – №. 4 (60). – С. 63-65.
12. Фозилов У.А. Болаларда тиш-жағ анамалияларини эрта ташхислаш ва ортодонтик даволаш усулларини такомиллаштириш. Автореф. Тиббиёт фан. докт.-Бухоро.2024.-76 б.
13. Aldhorae K.A. Prevalence and distribution of dental anomalies among a sample of orthodontic and non-orthodontic patients: A retrospective study // Journal of International Oral Health. – 2019. – Т. 11. – N 5. – P. 309-312.

14. Borrie F., Bearn D., Innes N., Iheozor-Ejiofor Z. Interventions for the cessation of non-nutritive sucking habits in children // Cochrane Database of Systematic Reviews. - 2019. - Vol. (3). - P. 86-94.

15. Zhao Y.W., Gao R.1., Sun H.Q. The Protocol of Fixed Reconstruction for Severely Worn Teeth Combined with Anterior Deep Bite // Case Rep Dent. - 2017. - 9378091.

16. Adali N., Mars M., Petrie A. et al. Presurgical orhodontics has по affect оп archform in unilareral cleft lip and palate //Cleft Palate Craniofac. J. —2012.— Vol. 49. — P. 7-13.

17. Dreise M., Galiwango G., Hodges A. Incidence of Cleft lip and palate in Uganda // Cleft Palate-Craniofac J. - 2011. - 48(2). P.156-160.

18. Flinn W., Long R.E., Garattini G., Semb G. A mulй center outcomes assessment of five-year-old patients with unilateral cleft lip and palate // Cleft Palate Craniofac. J. — 2006. — Vol. 43. — P. 253-258.

19. Felton M., Lee J.W., Balumuka D.D., Arneja J.S., Chadha N.K. Early placement of ventilation tubes in infants with cleft lip and palate: A systematic review // Otolaryngol Head Neck Surg. - 2018. - 158(3). - P.459-464.

20. Kang S.H., Lee J.W., Lim S.H. et al. Dental image replacement оп cone beam computed tomography with three-dimensional optical scanning of a dental cast, occlusal bite, or bite tray impression // Int. J. Oral. Maxillofac. Sшg. — 2014. — Vol. 43. — P. 1293-3014.

21. Latief B.S., Lekkas K.C., Schols J.H. et al. Width and elevtion of the palatal shelves in unoperated unilateral and bilateral clefi lip and palate patients in the permanent denttion //J. Anat —2012. — Vol. 220, N•3. — P. 263-270.

22. Millard D.R., Latham R. et al. Cleft lip and palate treated by presurgical orhodontics, gingivoperiosteoplasty, and lipadhesion (POPLA) compared with previous lipadhesion method a preliminary study ofserial dental casts //Plast. Reconstr. Surg. — 2022. — Vol. 103. — P. 1630-1644.

23. Nadtochij A., Starikova N., Safronova U. et al. Position and Function of the tongue in children with cleft lip and Palate//XX congress of Evropean association for Cranio- Maxillo-Facial Surgery-2010.-Belgium, Bruges.—Abst. 6. — P. 420-421.

24. Reiser E., Skoog V., Gerdin B., Andlin-Sobocki A. Association Between Clefi Size and Crossbite in Children With Cleft Palate and Unilateral Cleft Lip and Palate // Cleft Palate Craniofac. J. — 2010. — Vol. 47. — P. 175-181.

25. Hong M., Baek S.H. Differences in the alignment pattern of the maxillary dental arch following fixed orthodontic treatment in patients with bilateral cleft lip and palate: Anteroposterior-collapsed arch versus transverse-collapsed arch // J Craniofac Surg. - 2017. - 29(2). - P.440-444.

26. Ulrich Joos. Cleft lip, alveolus and palate: Defect or dislocation malformation? Importance of adopting a physiological concept for surgical repair in achieving optimal outcomes in LMICs. Part 2: Integration of physiological growth considerations into a surgical concept— 2021. — Vol. 76. — P. 810816.

27. Suri S., Disthaporn S., Atenafu E.G., Fisher D.M. Presurgical Presentation of Columellar Features, Nostril Anatomy, and Alveolar Alignment in Bilateral Cleft Lip and Palate Afier Infant Orhodontics With and Without Nasoalveolar Molding// Cleft Palate Craniofac. J. —2012.— Vol. 49, N•3. — P. 314-324.

28. Zhao Y.W., Gao R.1., Sun H.Q. The Protocol of Fixed Reconstruction for Severely Worn Teeth Combined with Anterior Deep Bite // Case Rep Dent. - 2017. - 9378091.

29. Zymperdikas F.V., Koretsi V., Papageorgiou S.N. Treatment effects of fixed functional appliances in patients with Class II malocclusion: a systematic review and meta-analysis // European Journal of Orthodontics. - 2016. - Vol. 38. - N 2. - P. 113-126.

30. Zhou X., Zhang Y., Wang Y. Prevalence of Malocclusion in 3- to 5-Year-Old Children in Shanghai, China // International Journal of Environmental Research and Public Health. - 2017. - Vol. 14(3). - P. 328-329.

31. Yassin S.M. Prevalence and distribution of selected dental anomalies among Saudi children in Abha, Saudi Arabia // Journal of clinical and experimental dentistry. – 2016. – Vol. 8. – N 5. – P. 485-489.

32. Valarelli F.P. Treatment of a Class II Malocclusion with Deep Overbite in an Adult Patient Using Intermaxillary Elastics and Spee Curve Controlling with Reverse and Accentuated Archwires // Contemporary Clinical Dentistry, 2017. - N 8(4). - P. 672-678.

33. Wiedel A.P. Fixed or removable appliance for early orthodontic treatment of functional anterior cross bite // Swedish Dental Journal. Supplement. -2015. - N 238. - P. 10-72.