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EFFECT OF ALVEOLAR DEFECT REPAIR ON NASOLABIAL ASYMMETRY IN CLEFT LIP AND PALATE

Tozhiev F.I.
Azimov A.M.
Muqimov I.I.
Musayev Sh. Sh.
Ismoilhuzhaeva K.G.
Tashkent State Dental Institute

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Abstract:

Congenital cleft lip and palate (CHL) being one of the most frequent malformations of the maxillofacial region since the birth of the child is accompanied not only by the cosmetic defect but also by severe functional disturbances. The high frequency of congenital cleft lip and palate, severe anatomical and functional disorders, the difficulty of social adaptation of such children indicate the particular relevance of this problem. According to the World Health Organization (2009), among all congenital malformations, congenital cleft lip and palate takes 2-3rd place and by the severity of anatomical and functional disorders - the leading place. It should be noted that the congenital cleft lip and palate is not only a medical but also a social problem worldwide. The alveolar process plasty appears to be a difficult task, and it has not yet found a solution.

Keywords: alveoloplasty, congenital cleft lip and palate, nasal deformity and nasal septum cheilo- and uranoplasty

INTRODUCTION: Congenital cleft lip and palate is one of the most common human malformations, which from the moment of birth due to severe anatomical and functional disorders complicates the life of the child and his surrounding relatives [2,5,7]. It has been noted that the incidence of congenital malformations depends both on the type of malformation and on the sex of the individual. The contribution of isolated congenital cleft lip (CH) to the structure of anomalies is about 25.0%, cleft palate alone is also 25%, unilateral pathology - CHD - occurs more frequently and is 40-45%, bilateral CHD, which is a more severe malformation, is detected with a frequency of about 10% [1,5]. The sex ratio among those born with GERD is 3:2, i.e., boys are born with this pathology more often than girls. Isolated cleft palate in girls is twice as rare as in boys [3]. Statistically, congenital isolated cleft palate in women is 2 times more common than in men, but GERD in boys and girls is registered with approximately the same frequency [4].

According to G. Swennan (2001), out of 387 patients with congenital cleft lip and palate, a deformity of the middle zone of the face was detected in 50%. According to the observations of P.D. Waite (1996), 75% of patients with congenital cleft lip and palate have a cleft alveolar process (CAO). B.N. Davydov (1999) established delayed jaw growth due to postoperative scarring. Studies by M.B. Ubaidullaev (2001) established the degree of deformation of the nose and nasal septum after cheilo- and uranoplasty. M.Z. Dusmukhamedov (2006) on the basis of correlation analysis of clinical and biochemical findings and complications developed a mathematical model for prediction of local complications and surgical planning taking into account the shape of the palatine pharyngeal ring. A.M. Azimov (2007) found that after uranoplasty the level of nonspecific factors of oral cavity protection decreases. S.S. Murtazaev (2008) identified reduced calcium levels in the saliva of children with GERD and due to this, a high incidence of dental caries. Amanullaev R.A. (2005) studied the frequency of birth of children with cleft lip and palate in the republic. According to his data, in Karakalpakstan the frequency of birth of children with this anomaly was 1:540, in Tashkent 1:745. Murtazaev S.M. (2010) found intestinal dysbacteriosis, immune system dyscoordination, increased somatic pathology and physical underdevelopment in children with GERD who were fed artificially. Sh.T. Shokirov (2011) in his expediency of alveolar defect plasty with a bone block and its fixation with miniplates. A.A. Yuldashev (2016) in his works substantiated the effectiveness of using the umbilical cord as a membrane in the experiment on animals and in children with congenital malformation in plasty of the jaw defect with autograft and development of an improved method of alveoloplasty.

To date, despite the presence of numerous scientific studies to improve methods of treatment and rehabilitation of children with congenital cleft lip and palate, alveolar defect plasty does not lose its relevance. In particular, many issues remain unsolved including the prevention of graft resorption, stimulation of osteoreparation, the problem of ingrowth of soft tissue

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structures into the graft and its prevention with the use of biological membranes is not solved.

PURPOSE OF WORK: improvement of methods of the upper jaw defects restoration with application of individually made implants for increasing efficiency of complex treatment and rehabilitation of the upper jaw defects in congenital cleft lip and palate

MATERIALS AND METHODS OF RESEARCH. The work is based on the results of examination of 44 patients with maxillary defects in congenital cleft lip and palate, who were hospitalized at the department of children's maxillofacial surgery of TGSI clinic during the period from 2019 to 2023, in order to compare the results of surgical treatment and determine the optimal method of surgical treatment.

RESULTS OF THE STUDY. Analysis of the data obtained during clinical and instrumental examination allowed us to identify a number of features peculiar to each of the studied groups, anatomical and functional disorders affecting physiological indicators and the degree of aesthetic changes. We observed pronounced deviation of the nasal end section and flattening of the tip in patients of both groups, which was promoted by pronounced shortening of the columella as well as difference in the vertical and horizontal sections of the nasal passages anatomical structure in addition to abnormalities of the cartilaginous nasal end section. All these factors were aggravated by multiple scar deformities of this area as a result of previous reconstructive interventions. These factors were especially pronounced in group 2 patients, but in large numbers in group 1 patients as well. A detailed analysis of MSCT and the causes of such deformities in patients who had previously undergone reconstructive bone grafting operations on the upper jaw revealed that only 14 of the 20 patients examined had bone autografts. In the remaining 6 patients, the bone blocks were significantly displaced or there was a violation of their consolidation, as well as mobility relative to the lateral fragments of the upper jaw. This indicates that even in those clinical cases where patients received a comprehensive multistage treatment, when the elimination of bone defects on the upper jaw should be a priority, the risk of complications and recurrence of various deformities is quite high, and the use of classical methods of surgical treatment is sometimes not enough to obtain the best results in adult patients. All this has been repeatedly described by various authors [6,7,8], which we took into account when planning surgical interventions and predicting the long-term results of treatment. Functional study of nasal breathing also showed a direct impact of the maxillary defects on the degree of nasal passageway patency, where we see that in group 1 patients the resistance to the inhaled air flow is more than 4 times stronger than in group 1 patients as a result of a more pronounced anatomical disposition of tissues. The main area of nasal passage obstruction was observed in the area of the internal nasal valve, and it was especially evident in those clinical cases where there was instability of the intermaxillary bones, which, in turn, affects the position of the cartilaginous part of the nasal septum in the distal region. But at the same time there were no statistically significant deviations of the nasal passageway parameters in the area of the internal bony part of the nose where the position of the bony part of the nasal septum did not depend on the displacement of the maxilla fragments. The obtained data confirm the studies of R.D. Novoselov, A.A. Lavrentiev (1970), G.E. Anastassov et al. (1990) and A.A. Lavrentiev (2001) [8], who noted changes in the size and direction of the mimic muscles on the cleft side as compared to the norm. In our opinion, these differences are associated with a deformation of the facial skeleton and a change in the attachment sites of facial muscles. When these muscles contract during mimic movements, the vectors of acting forces change, which aggravates the existing deformity of the cartilaginous part of the nose. In practice, we encountered various combinations of anatomical abnormalities and degrees of pathological deformities of the nasolabial soft tissue complex, regardless of the anamnesis and previous treatment, which caused difficulties in determining surgical tactics, since it is technically impossible to eliminate these problems in most clinical cases by one-stage. Combinations of different methods for correcting deformities were used. Measuring the ratios of various facial areas, such as the nasolabial angle, maxillary angle, and upper lip protrusion, played an important role in planning and determining the surgical treatment algorithm.

Indicators	Value	
	1-group	2-group
chR-cphR	22.2±3,1	25.1±1,9
chL-cphL	22.4±3,4	25.4±2,4
SbalR-cphR	18.0±2,8	20.0±2,3
SbalL-cphL	18.0±2,3	20.0±2,1
nIR-ndR	12.9±2,2	13.5±1,8
nIL-ndL	12.7±2,5	13.4±1,9
alR-Sn	19.7±1,8	17,3±1,2
alL-Sn	19.8±2,1	17,2±1,8

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aIR-N	45.6±5,6	46.5±3,2
aIL-N	44.8±5,5	46.8±5,1
SbaIR-SbaIL	27.0±4,3	24.5±3,1

As our studies have shown, these findings directly reflect the degree of tissue volume deficiency in the area of the upper lip, the bases of the nasal wings and columella. The most pronounced deformities are noted in the area of the base of the pear orifice, which entails many functional and aesthetic abnormalities of the nasolabial complex as a whole. In patients of Group 1, manifestation of these disturbances is reflected in a high degree of asymmetry of the nasal passages in the area of the external nasal valve, which is more than 30% higher than in patients of Group 2. This is also clearly noted in such parameter as the upper lip stand, where we see that in Group 2 patients the values are close to the average normal values, and the maxillary angle is greater than this index by more than 15% due to the anatomically more correct configuration of the upper jaw bone component and, accordingly, a higher soft tissue projection. We were able to identify a number of anthropometric regularities and correlations confirmed by functional examination methods, which are important in the choice of treatment tactics, in particular, to eliminate such a significant factor as the lack of tissue volume of the nasolabial complex. When the nasolabial angle is <900 and the maxillary angle is <170, with an upper lip elevation of <3.5 mm, this indicates a significant tissue volume deficit in the upper lip and nasal base, and performing reconstructive cheilorinoplasty with local tissues carries a high risk of primary tension failure of regeneration due to significant pathological tension and lack of support for the soft tissue structures. This was also confirmed by electromyographic examination data, which clearly reflected changes in the bioelectrical activity of the muscles of the nasolabial complex in two groups of patients, particularly pronounced during functional load, which were directly influenced by the degree of maxillary dysgnathia and position of the interjaw bone in patients with a history of missing bone grafting.

CONCLUSION. We can conclude that the individually fabricated titanium implants surpass the standard methods of treatment in their functional characteristics due to the 1:1 accuracy in replicating the shape of the maxillary alveolar defect. Individually fabricated implants reproduced according to MSCT data most accurately recreate the anatomical shape of the jaws, at the same time being a universal implant.

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