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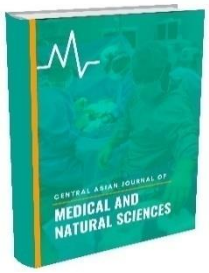

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Characteristics of Anthropometric Indicators of the Face in Patients with Congenital Cliffs of the Upper LIP and Palate after the Main Stages of the Operation

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Abstract: The urgency of the problem of developing and improving methods for the surgical treatment of secondary deformities of the upper and lower jaws is determined by the increase in the number of patients with facial skeleton deformities after primary operations on the lip and palate. Numerous studies conducted by domestic and foreign scientists indicate that only the study of the long-term results of treatment of patients with jaw deformities can answer many questions, namely: how effective are improved or developed treatments, is a comprehensive approach, suitable for planning and treating patients with jaw deformities, what should be the sequence and timing of rehabilitation treatment.

Key words: osteotomy, micrognathia, retrognathia, orthognathic surgery.

Introduction: Congenital clefts of the upper lip and palate account for approximately 86% of maxillofacial anomalies and about 13% of all human congenital malformations. According to some studies, there will not be a decreasing trend in the frequency of children born with congenital anomalies of the maxillofacial region in the coming years. As the child grows, irrespective of the anatomical characteristics of cleft lip and palate and the timing of primary cheilo- and uranoplasty, the deformation of the upper jaw worsens and entails secondary deformation of the jaws, causing a violation of the ratio of teeth, tooth rows and jaw bones [1,3,4]. All of the above-described leads to impaired function of the dento-jaw system and forms a certain facial phenotype. Along with the upper lip scars, nasal deformity, and speech disorders inherent to the cleft, this aggravates the psycho-emotional state of patients, leads to personal disadaptation in society, and increases the patient's motivation for the upcoming treatment [2,5,6].

Material and methods: Examination and complex treatment of 89 patients aged from 7 to 42 years after the main stages of rehabilitation: cheiloplasty and uranoplasty were carried out. X-ray examination was carried out to reveal the degree of anomaly of the gnathic pathology as well as to plan the method of surgical treatment. All patients underwent X-rays in lateral and straight projections, orthopantomograms, and intraoral pictures of the frontal part of the upper jaw, if indicated. To study

the morphometric features of the anomaly, we analyzed TRGs of the head in the lateral projection in patients with BPH after cheiloplasty and uranoplasty.

Results and discussion: Preoperative examination of 89 patients with GERD revealed the following anatomical abnormalities of the middle face expressed in various degrees: the intermandibular bone is unfolded and protrudes forward; there is hypoplasia of the maxilla on the cleft side, its small fragment is displaced backward; the base of the columella and the nasal septum are displaced to the healthy side; the columella on the cleft side is shortened; deformation of the large nasal wing cartilage on the cleft side leads to asymmetry of the tip and wings, different shapes of the nostrils the base of the nasal wing is displaced laterally, downward, and backward; the nasal floor is absent; nasal mucosa deficiency of the nasal fornix on the cleft side is noted; the circular muscle of the mouth is split and its attachment sites are changed; the filterrum is shortened; the shape of the Cupid's bow is distorted, only one column of the filterrum is preserved; hypoplasia of the central lip fragment is noted. According to comprehensive clinical and radiological studies, 20 of 89 patients after cheilo- and uranoplasty had an orthognathic jaw ratio, and 69 (77.5%) had various types of maxillary system deformities, including upper jaw narrowing (43) and its retrognathia (58). Narrowing and underdevelopment of the upper jaw in the sagittal plane is the most frequent deformation of the maxillary system in the patients we examined. In the patients we examined with unilateral and bilateral congenital cleft upper lip and palate after cheilo- and uranoplasty, the jaw position was disturbed, upper retrognathia was noted. The facial type was retrognatic. The analysis of linear and angular cephalometric indices testifies to the presence of upper retrognathia, micrognathia in combination with lower macro- or prognathia as well as posterior inclination of the entire gnathic part of the facial skeleton in all examined patients (Table 1).

Table 1. Angular and linear indices of head TRG, characterizing the position of the jaws in sagittal direction, in patients with unilateral and bilateral cleft upper lip and palate after cheilo- and uranoplasty in comparison with normal indices

Linear and angular parameters, degrees, mm	Norma	Unilateral Congenital cleft lip and palaten, n=50	Bilateral Congenital cleft lip and palaten, n=28
SNA º	82,0±3,0	73,1±2,4*	75,5±2,4*
SNB º	80,0±3,0	80,1±2,1	82,1±2,2
ANB º	2,0±2,0	-7,0±0,9*	-6,6±0,9*
SNPog º	82,0±3,0	82,1±2,4	84,1±2,5
NSBa º	130,0±6,0	135,2±2,3	136,6±2,1
arGoGn º	126,0±10,0	122,0±2,5	128,0±3,7
ML NSL º	32,0±6,0	39,6±2,1	39,6±2,1
NL NSL º	8,5±3,0	12,9±1,1	12,9±1,1
ML NL º	23,5±3,0	25,5±1,9	25,5±1,9
Max1-NA º	22,0±3,0	19,0±1,1	21,0±1,2
Mand1-NB º	25,0±3,0	27,2±1,2	23,2±1,3
Max1-NSL º	102,0±2,0	95,1±2,2*	95,2±2,2*
Mand1-ML º	90,0±3,0	94,1±1.2	93,1±1.2
Характеристика Уитса	0±1,0 мм	-7,4±1,5*	-6,4±1,5*

II - Interincisal angle º	131,0±6,0°	141,0±2.2*	139,0±2,1*
N-S mm	77,7±1,0	65,3±2,3	65,3±2,3
S-ar mm	32,0±3,0	31,0±1,2	33,1±1,4
U6-Ptv mm	21,0 ±1,0	10,8±0,6 *	11,8±0,7*
Snp-A- mm	45,5±1,0	40.9±0,6	42,9±0,7
Ls-NsPog' mm	-4,1 ±1,0	-15,4±1,6*	-14,1±1,4*
Li-NsPog' mm	2,0 ±0,1	4,8±0,5*	5,2±0.4*
Go-Pg'- mm	74,5 ±1,5	71,9±1,1	73,9±1.2
S-Go mm	71,5 ±1,5	72,9±1.4	72,9±1.4
N-Me mm	109,0 ±2,0	113,4±2.1	114,4±2.2
N-Sna mm	50,0 ±1,0	53,9±1.3	53,1±1.5
Sna-Me mm	59,0 ±2,0	64,8±0.6*	63,8±0.6*
Ar-Go mm	44,5±5,5	48,8±0.9	46,8±0.9
sn-st mm	20,5 ±1,0	16,1±0.4*	16,3±0.4*
st-me mm	41,0 ±1,0	53,1±1.2*	53,9±1.2*

Note. * - p<0.05 compared to normal.

The Whits number was impaired in groups 1 and 2. Moreover, in group 1, in patients with unilateral complete cleft, point A was projected on the occlusal plane significantly posterior to the projection of point B, which corresponds to the disproportionate position of the apical bases of the jaws in the anterior region. In group 2, various variants are found. This position is confirmed by the parameters of the ANB angle. The ANB angle, which characterizes the mutual position of the apical bases of the upper and lower jaws, in all patients with unilateral and bilateral BPH significantly deviated from the norm and had a negative value of -1 to -15°. The position of the first molars was assessed in relation to the winglet vertical (Pt), perpendicular to the Frankfurter horizontal (FH). The parameter characterizes the possibility of mesial or distal position of the first molars of the upper and lower jaws. Patients in groups 1 and 2 have a statistically significant decrease in the distance from the Pt-vertical to the upper sixth tooth, indicating underdevelopment and stunted growth in the distal parts of the upper dentition. The same is observed for the lower sixth tooth in patients with bilateral complete cleft. The SNA angle in patients with unilateral and bilateral clefts is significantly lower than normal, indicating that the point A is displaced backwards. The sagittal position of the mandible in relation to the skull base is characterized by the SNB angle, which in patients with unilateral TMJD was not significantly changed relative to the norm. This parameter was increased in 7 (30%) of 23 patients. In 9 (53%) children with bilateral BPH, the SNB angle was reliably greater than the statistical average by 1-2° above the norm. When analyzing the position of the upper and lower jaw base plane in relation to the skull base plane, we found that in all patients, the NL/NSL and ML/NSL angles were significantly increased, indicating retroinclination of the jaws in the distal region. The analysis of the angles characterizing the relationship of the gnathic part of the skull with its base in the vertical plane revealed reliable changes in the form of increasing parameters N/Go/Me, AG/Go/Me, ML/NSL, NL/NSL, which also indicates posterior rotation of the entire gnathic part of the facial skeleton in all examined patients. There was one common symptom in all subgroups: the base of the skull was shortened. It was reduced either in all sections or predominantly in the area of the anterior cranial fossa or in the area of the posterior cranial fossa. All cases of anterior cranial fossa shortening were combined with upper retro- and sometimes upper retromicrognathia. The peculiarities include concave or more often straight profile of the facial cranium (significantly increased); retroposition of the upper lip, characterizing its significant recession in relation to the aesthetic plane; significantly reduced dimensions of the maxilla base by

length (PNS-ANS) according to the age individual norm; 83% of patients had retroposition of the apical base of the maxilla and mandibular body (<SNA and <SNB decreased); frequently increased angle of inclination of the mandibular body plane to the skull base (<NSL\ML significantly increased), indicating significant rotation of the mandible to the back. A teleroentgenogram of the head in direct projection shows dental-alveolar shortening of the small fragment of the upper jaw and stepped occlusal curve of the upper jaw, shift of the central incisal point of the upper jaw to the side opposite to the cleft, distortion of the upper dental arch, curvature of the lower occlusal curve according to the upper, shift of the midline jawline point to the side of the cleft. In bilateral cleft - to the side of a more pronounced disorder. Parameters of TRG head in straight projection in patients with unilateral and bilateral cleft upper lip and palate after cheiloplasty and uranoplasty are presented in Table 2.

Table 2. Parameters of the TRG of the head in the direct projection in patients with unilateral and bilateral cleft upper lip and palate after cheiloplasty and uranoplasty

Index, mm	Unilateral Congenital cleft lip and palaten=50	Bilateral Congenital cleft lip and palaten=28	Norma
Width of dentition between distal margins 6|6	42,9±1.2*	45,7±1.3*	54,0±1,0
Deviation of the midline	1,4±0.2	3,2±0.3	0
Upper jaw width	54,2±1.3*	53,4±1.5*	65,3±2,5
jaw	76,5±2.6*	81,3±2.9*	92,2±3,0
Lower jaw width	109,5±2.9*	115,2±2.7*	143,0±4,0
jaw width	-0,8±0.2	-1,8±0.1	0
Facial width	26.4±1.1*	31,4±1.1*	37,0±1,5
Postural symmetry	50,2±1.9	55,4±1.7	52,5±2,0

Note. * - p<0.05 as compared to the norm.

Conclusions: complex clinical and radiological examinations revealed orthognathic jaw ratio in 22.4% of patients after cheiloplasty and uranoplasty, and deformities of the maxillary system in 77.6%, including upper jaw narrowing in 16% and its retrognathia in 84%. The analysis of linear and angular cephalometric indicators of TMG of the upper jaw in these individuals indicates the presence of upper retro-micrognathia in combination with lower macro- or prognathia, bite distortion in three planes - sagittal, vertical and transversal.Due to upper retro-micrognathia and posterior inclination of the entire gnatic part of the facial skeleton, they form a concave face type. This form of deformity can only be corrected by surgery.

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