MINISTRY OF HEALTH OF THE REPUBLIC OF MOLDOVA
PUBLIC INSTITUTION STATE UNIVERSITY OF MEDICINE AND PHARMACY
"NICOLAE TESTEMITANU"
DOCTORAL SCHOOL IN THE FIELD OF MEDICAL SCIENCES

With manuscript title
C.Z.U: 617.51/.52-007.2-0.53.1

RAILEAN SILVIA

DIAGNOSIS AND TREATMENT CRITERIA OF CRANIOFACIAL DEFORMITIES IN CHILDREN

323.01. Stomatology

Summary of the doctoral thesis in medical sciences

CHISINAU, 2023

The thesis was developed within the Department of Oro-maxillo-facial Surgery, "Nicolae Testemițanu" State University of Medicine and Pharmacy from the Republic of Moldova.

Scientific consultant: FALA Valeriu, academician, PhD in medicine, university professor

Scientific consultant: RENEE DAVID Lisa,MD, MBA is the Program Director, Professor, and Department Chair of Plastic and Reconstructive Surgery in Winston-Salem, North Carolina, USA

Gheorghe Țâbârnă

academician, PhD in medicine, university professor

Ion Lupan

academician, PhD in medicine, university professor

Official references:

GUDUMAC Eva, MD-PhD in medicine, university professor, Department of Surgery, Urology, Orthopedics, Traumatology, Anesthesiology and Pediatric Reanimation IP USMF "Nicolae Testemițanu", director-coordinator of the National Scientific-Practical Center for Pediatric Surgery "Natalia Gheorghiu", academician AȘ RM;

BURLUI Vasile, MD-PhD in medicine, university professor, president of the Apollonia University, Iasi, Romania;

BARBU Mihail Horea, MD-PhD in medicine, university professor, "Titu Maiorescu" University, Bucharest, Romania;

The composition of the Public Presentation Commission:

President: CHELE Nicolae, MD-PhD in medicine, university professor, Department Chair of Oro-Maxillo-Facial Surgery and Oral Implantology "Arsenie Guțan" IP USMF "Nicolae Testemițanu", Chisinau, Moldova;

Secretary: **SPINEI Aurelia**, MD-PhD in medicine, university professor, Oro-Maxillo-Facial Surgery Department, Pediatrics and Pedodontics "Ion Lupan", IP USMF "Nicolae Testemițanu", Chisinau, Moldova;

Members: **FORNA Norina Consuela**, MD-PhD in medicine, university professor, UMF "Grigore T.Popa", Romania;

CIOBANU Sergiu, MD-PhD in medicine, university professor, Department Chair of Odontology, Periodontology and Oral Pathology "Sofia Sîrbu", IP USMF "Nicolae Testemițanu", Chisinau, Moldova;

UNCUTA Diana, MD-PhD in medicine, university professor, Head of the "Pavel Godoroja" Dentistry Propedeutic Department, IP USMF "Nicolae Testemițanu", Chisinau, Moldova;
"Nicolae Testemițanu", Chisinau, Moldova;

The thesis presentation will take place on "29" November 2023, 2 P.M., in the premises of the "Nicolae Testemițanu" State University of Medicine and Pharmacy, bd. Stefan cel Mare si Sfânt, 165, office 204 in the meeting of the Public Presentation Commission of the doctoral thesis, approved by Senate Decision no. 1 from 29 September 2023, IP "Nicolae Testemițanu" State University of Medicine and Pharmacy.

The doctoral thesis and the summary can be consulted at the IP library of the "Nicolae Testemițanu" State University of Medicine and Pharmacy and the ANACEC website (www.cnaa.md).

The summary was sent on "20" October 2023.

Scientific Secretary
of the Public Presentation Commission: **SPINEI Aurelia** _____
Scientific consultant: FALA Valeriu _____
Scientific consultant: RENEE DAVID Lisa _____
Author **Railean Silvia** _____

Table of Contents

CONCEPTUAL FRAMEWORK OF THE RESEARCH

Congenital anomalies are a major public health concern because they represent structural conditions with varying degrees of severity and fall within the scope of priority prenatal research, determined by teratogenic conditions, and genetic or multifactorial defects [1].

In reality, they affect annually up to 1 in 33 newborns, it is estimated that in the first 28 days of life an average of 270,000 newborns die and up to 3.2 million cases of associated long-term disabilities are registered. In 50% of cases, they have causes that currently cannot be identified even though in another 50% of cases, they can be prevented and treated [5, 6].

In this way, congenital anomalies are highlighted by a variable incidence between 3% - 5% of cases and occupy the first place in the structure of morbidity and mortality of the newborn [4, 7].

Craniofacial dysmorphism, as a component of congenital anomalies, manifests the specificity of clinical variability depending on age through premature fusions of the cranial sutures or pathological shapes and sizes with or without a genetic aspect of the structure. These pathological variables lead to an increase in the disability degree by disrupting attention, thinking, speech, and hearing, especially mastication, which, with age, affects the child's integration into society and, not least, the mortality [9, 10, 13, 17, 22].

In 2010, the World Health Assembly developed a national program for the prevention and care of congenital anomalies, and the Global Strategy for Women's and Children's Health, in collaboration with the World Health Organization (WHO) and UNICEF, implemented cost-effective interventions with a major impact on improving the health of these children. In this context, a resolution was adopted calling on all the member states to promote priority preventive interventions for children with congenital anomalies at the national and international levels [2, 8, 12, 16, 21].

Preventive health measures, especially medical genetic screening, together with early surgical treatment, applied to children, decrease the frequency of severe complications [8, 28].

In this context, the World Health Organization collaborates with the National Center on Birth Defects and Developmental Disabilities of the Center for Disease Control and Prevention (CDC) in the USA to establish a global policy on the fortification of prophylaxis with folic acid [16, 27].

The WHO's Department of Reproductive Health and Research and the Department of Nutrition for Health and Development, in collaboration with the International Clearinghouse for Birth Defects Surveillance and Research (ICBDSR) and the CDC's National Center for Birth

Defects and Developmental Disabilities (NCBDDD), organize annual workshops on birth defects surveillance and congenital prevention. And the World Alliance for Vaccines and Immunization (GAVI) helps countries to eliminate rubella and congenital rubella syndrome through immunization [14, 18, 19].

WHO develops norms and a global plan of action supporting the implementation of the *Convention on the Rights of Persons with Disabilities*, the integration of medical care and rehabilitation services, and the development of community rehabilitation programs [11, 13, 20, 24].

According to the specialized literature, the most common congenital anomalies are considered of the central nervous system (spina bifida, anencephaly, encephalocele), followed by anomalies of the face's middle region (cleft lip and palate), anomalies of the musculoskeletal system (polydactyly, syndactyly) and cardiovascular anomalies [3, 15, 23].

In this regard, until now there have been no actions to prevent the complications caused by syndromic and non-syndromic congenital craniofacial dysmorphisms, therefore, it is considered that the number of congenital dysmorphisms will double over 50 years [4, 9, 26].

Thus, the knowledge of craniofacial dysmorphism constitutes a primary concern in oro-maxillo-facial surgery, recognizing that the main role is played by the influence of unspecified brain development changes [1, 17, 21].

Within this context, there are not enough polysystemic studies of the etiopathogenic mechanisms of craniofacial dysmorphism in the later development periods of the child's cranium and the impact of its correlation with the aspect of cognitive development, anthropometric structure, and aesthetics [5, 13, 22].

Taking into account the variable clinical manifestations of congenital craniofacial dysmorphism in children at different age stages, we applied the diagnostic, curative, and prophylactic criteria in the mechanism of secondary complications, based on the analysis of craniofacial asymmetry and its role in the basic deformations of the cranial box [2 , 11, 19].

We deduced that children with congenital craniofacial deformities present a high risk of complications ranging from aesthetic deformities to functional disabilities and serious brain disorders. In the absence of treatment, these children are abandoned by society, becoming a financial burden for both the family and the state [12, 28].

Only through timely diagnosis and treatment, up to 70% of these children can return to the development of society [7, 17, 23].

The study of craniofacial deformations caused by the fetus' position in the intrauterine period, by prematurity, in the forced position of the child's head, especially in the presence of

torticollis and at a young age, began in the last 20 years. Since the term "back to sleep" appeared, introduced by the American Association of Pediatrics, the incidence of craniofacial deformities (plagiocephaly) has increased astronomically and there are reports of frequency from 1:300 to 1:10 newborns [3, 13, 19].

In this sense, under examination were the satisfactory results of children in whom the surgical remodeling treatment started between four and six months of life, following the post-surgical rehabilitation treatment with a 24-hour helmet for at least six months. Helmet technology does not require the child to be hospitalized, unlike other curative technologies. The effect is determined when the intracranial volume is used to assess the effectiveness of the treatment by improving the cranial (IC), facial (IF), and ocular (IO) indices, a fact confirmed by CT in the 3D regime, from the age of three months of life [3, 8, 15].

Thus, the helmet treatment is effective in deformed plagiocephaly and it is recommended to be applied from the age of three months of life, with the subsequent determination of the craniofacial parameters asymmetry decrease. [4, 18, 26].

The National Bureau of Statistics of the Republic of Moldova does not have data on the incidence and prevalence of craniofacial deformities in children. There is no data on their impact on the functional and aesthetic development of the child, and the problem of jaw retrusion is not solved. The absence of a material-technical base, familiarization of family doctors, narrow-profile specialists, a strict legislation on the results of the objective clinical and imaging examination of craniofacial deformations, as a priority objective of maxillofacial surgery for these children. As a result, it becomes impossible to develop certain clinical-paraclinical treatment criteria, a favorable prognosis is not possible because no clinical recovery and functional restoration is achieved [10, 17, 25].

In consequence, from the reported above, I noted that:

a) in the late period, in children with craniofacial deformities from the Republic of Moldova, the association of severe complications is frequently detected;

b) up to 100% of children in these cases are treated insufficiently and inappropriately;

c) in about 70% of cases, a severe degree of disability is maintained postoperatively.

The aim of this study was the early surgical remodeling of the craniofacial parameters responsible for the pathology of the craniofacial mass, with the application of the reconstructive approach to reduce the potential action of the causal factors, improving the child's health and aesthetic appearance.

In accordance with the formulated purpose, the objectives of this study are the following:

1. The incidence analysis of the craniofacial anomalies in children born in the Republic of Moldova, using standardized anthropometric and cephalometric data as a benchmark (in a mixed population - urban and rural).

2. The evaluation of craniofacial changes, syndromic and nonsyndromic, by anthropometric and cephalometric methods in children.

3. The neurophysiological characteristic of the functional motor activity of the sucking reflex of the child with pre- and postoperative craniofacial deformities.

4. The therapeutic approach to craniofacial dysmorphism, is the conduct of treatment with special headphones in different forms of clinical manifestation.

5. The synthesis of the surgical treatment criteria and postoperative recovery of craniofacial deformities according to their type and the age of the child, with the elucidation of the criteria for the prophylaxis of secondary complications.

6. The estimation of the management strategy of children with craniofacial deformities, surgical and postoperative reconstructive approaches, with the need to develop effective recovery criteria.

The approach to the study theme derives from the objective reality, but also from the fact that the Republic of Moldova has no official statistics regarding deformations and craniofacial anomalies in children, and the increased attention to this pathology represents a challenge for specialists in several fields, especially from pediatrics, genetics, pediatric oro-maxillo-facial surgery, pediatric neurosurgery, pediatric dentistry, pediatric neurology, recovery and family medicine, specialists who have been specially trained to know the particularities of diagnosis and treatment of this pathology.

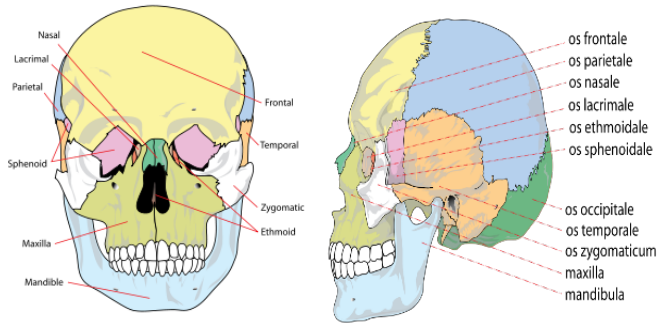
An important starting point in carrying out appropriate and specific surgical interventions is the explosive development of imaging methods and the possibility of their use in establishing and assessing the normal and pathological parameters of the craniofacial region in children.

THESIS CONTENT

1. CONTEMPORARY ASPECTS OF CRANIOFACIAL ANOMALIES IN CHILDREN

As a whole, the human skull, on the one hand, is composed of bones that participate in the neurocranium formation, and on the other - in the viscerocranium formation. The viscerocranium reflects the complex picture of developmental processes through phenomena of spatial organization and the installation of specific craniofacial symmetry and is supported by the vertebral column, it includes the main sense organs, especially vision (eyes and optic

nerves), hearing (ears and auditory apparatus), taste (taste buds on the tongue) and smell (specialized neurons inside the nasal cavities), which are protected by the skull bones.



a b

Figure 1. **The human skull is seen: a) from the front; b) from the side**

The ethmoid bone is the only bone that participates in the formation of the neurocranium and the viscerocranium.

The baby's skull consists of seven bones: the occipital bone, two frontal bones, two parietal bones, and two temporal bones. The joints of the skull's bones are immobile and fix the bones together using cartilages (synchondrosis) or fibrous connective tissue (synfibrosis) or through sutures (suturing). In children, especially in newborns, we highlight a series of sutures: coronal, metopic, sagittal, and lambdoid (figure 2).

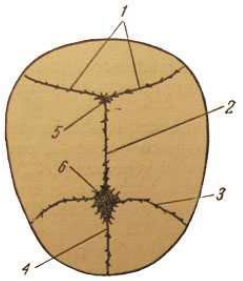


Figure 2. **Skull sutures: 1) lambdoid suture; 2) sagittal suture; 3) coronal suture; 4) metopic suture**

In such conditions, the child's brain undergoes protection and physiological development within the cranial cavity.

Based on the information presented, it can be concluded that the sutures' flexibility and their directly proportional positioning to the growth (and development) of the brain remain strictly necessary at least until the beginning of the definitive fusion of the skull's bones, which corresponds approximately to the age of two years. To fully understand the entire clinical

complexity related to the unspecified abnormalities of the craniofacial region, which appear in various pathologies in children, the skull must be viewed as a whole, and not as a sum of bones separated from other anatomical structures. From these considerations, the disease in children can result from the imbalance between the organism's possibilities and the demands on the adaptation mechanisms.

According to the research, the premature fusion of the cranial bones' sutures can be determined, as a whole, by the reserves of the body, especially of the bone, muscle, and nervous systems. From what has been reported, we note the fact that the structural component must be viewed including through the prism of the (performed) function. It results that one of the basic peculiarities of the child's normal neurophysiological development presents a wide range of deviations from the average standards of the statistical indices, only within the limits of the functional disorders' absence.

Thus, from the mentioned, we retain the hypothesis that the structure must be analyzed and appreciated only through the prism of the function's decompensation degree. It is also important that between these two components in children, there is a third particularity - the intermediate state (or adaptation), which also manifests itself differently depending on age, constitutional type, gender (boy/girl), etc. This particularity of the child's health state is determined by the reserves of the muscular, vascular, and nervous systems in the region involved in the process. It is proven that the function's disturbance of one of these structures, depending on the severity and duration, can cause different developmental anomalies, which can be congenitally grouped into hereditary and non-hereditary. The first group includes the anomalies resulting from the primary diseases of the genetic apparatus, clinically assessed as syndromic, and the non-hereditary congenital anomalies resulting from the dysregulation of morphogenesis under the influence of various exogenous, especially environmental harmful factors.

In this context, we can conclude that when the parameters of the normal physiological growth process exceed the extreme limits (lower and upper), this fact can be an alarm signal, indicating the existence of a pathological phenomenon of slowed or accelerated growth. Through a deeper knowledge of the influencing factors action, we could more clearly perceive the onset of clinical manifestations, determined by the disturbance of the structure, form, and the anatomical structures function involved in the process of the child, through the early multi-functional regulation, non-surgical or surgical, of these pathological disorders and, most importantly, by preventing secondary consequences through preventive rehabilitation. This

would increase the effectiveness of surgical treatment in the field of cranial box pathology in children until the onset of secondary complications.

Moreover, these congenital anomalies also lead to severe pathological changes in speech, hearing, mastication, and breathing, which affect the child in the long term, with side effects by affecting his psycho-emotional development, causing difficulties in the integration process into society, various forms of disabilities and, in finally, invalidity.

The total medical and social rehabilitation of patients with congenital craniofacial dysmorphisms is carried out according to the pathological mechanisms over time, in stages and complexly, by multidisciplinary teams.

Currently, it is considered that any craniofacial deformity can be removed by the craniofacial surgeon and neurosurgeon. If the child with such an anomaly does not benefit from special treatment programs, it will become persistent and will gradually turn into profound secondary sequelae in later periods of development.

Unfortunately, this process is not sufficiently studied in the Republic of Moldova, neither by specialists in the field, nor by doctors of another profile, but through the primary and secondary clinical disorders, it clearly highlights the role of the various correlations between the bone, muscle, and nervous system, as well as their intersystemic relationship involved in the pathological process.

For these reasons, pediatric dental surgery urges to study the dysfunction particularities to confront the organic pathology in the region, especially in newborns and young children.

2. MATERIAL AND RESEARCH METHODS

2.1. The study planning and batch scheduling

The study was conducted within the *Nicolae Testemițanu* State University of Medicine and Pharmacy (USMF), at the clinical base in the IMSP Mother and Child Institute (IMC), and within the IMSP *V. Ignatenco* Municipal Children's Clinical Hospital in Chisinau, Republic of Moldova.

In the **first stage** of the research, in the context of highlighting the harmful action of the fundamental risk factors on osteogenesis, under the anamnestic examination were subjected medical files of 5123 children, including: a) 823 children admitted to the Mother and Child Institute and SCMC *V. Ignatenco* with various forms of craniofacial dysmorphism; b) 1114 children from preschool institutions with special purpose and c) 3186 children from educational institutions. Simultaneously with the anamnesis, we used anthropometry according to the standard anatomical landmarks (Jonathan Hass) and we made mandatory measurements in each child with

craniofacial dysmorphism, and the obtained results were compared with the same parameters in 25 children from the control group.

Due to the cranial box growth aspect through vertical and horizontal dimensions, we focused the assessment of the neuro- and viscerocranium parameters on the age period between 0 and 6 months of life, taking into account the basis of dentition formation and the development of the masticatory muscles. The observed results were subjected to the statistical analysis of the estimated linear and angular parameters in plagiocephaly, craniosynostosis, and clefts in the detected children.

To quantify the facial asymmetry landmark of the child's dysmorphism, his facial image was divided into four basic areas: the upper face (above the endocanthion line), the upper middle face (between the endocanthion line and the subnasal line), the lower middle face (between the subnasal line and the cheilion line) and the lower face (below the cheilion line), (figure 2.1).

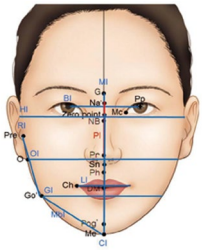


Figure 2.1. **Median and lateral craniometric points (craniometry) of the soft tissues of the face. Fixed and precise landmarks: MI – middle line; CI – chin line; G – glabella; HI – horizontal line (of the endocanthion); OI – subnasal line (otobasion inferiorius); GI – cheilion line; Mbl – mandibular body line**

We measured the average variables of the facial parameters, bilaterally, also comparing the parameters' average values of the children with craniofacial dysmorphism with the similar parameters of the children from the control group. We performed, bilaterally, the correlation of the face parameters with the variables of the skull base parameters according to the type of cranial box pathology (sagittal, metopic, lambdoid craniosynostosis, clefts), gender (boy/girl) and location (right/left), we compared their mean with the standard deviation.

In craniofacial asymmetries, we followed the significant variables of the bone tissue concerning the neurophysiological indices of the soft structures, which were appreciated by us as having a basic role in the functional motor activity of the child's sucking reflex.

In the **second stage** of the research, through a developed diagnostic algorithm, we examined 25 children without craniofacial anomalies to establish the variables of facial and cranial parameters within the limits of the norm, simultaneously with the neurophysiological examination

(EMG) by applying orthodontic headphones and performing the intervention surgical, following the variables of the craniofacial parameters at one and three years in the postoperative period.

The inclusion criteria in the research are prematurely born children; children born at term with craniofacial dysmorphism; children with positional plagiocephaly and children with imaging-confirmed craniosynostosis at birth.

The exclusion criteria are hydrocephalus, microcephaly, brain trauma, multiple developmental anomalies incompatible with life, and parental refusal.

In our study, 61 children underwent surgical treatment, namely: 41 with sagittal craniosynostosis, especially metopic – 12 and lambdoid – 7, but also 14 children with clefts, comparing the selected parameters with their postoperative results and with those of the 25 children from control lot. The method of surgical treatment was selected according to the type of craniosynostosis, the persistence of comorbidities, and the age of the child.

In the **third stage** of the study, we highlighted the statistically significant changes even after the applied treatment, compared to the case-control study, without this pathology, elaborating the research design (figure 2.5).

Consequently, we processed the collected primary data, including grouping, generalizing, and tabulating them in summary form. The presentation of the processed statistical data is illustrated in text, table, or graph form.

2.2. Statistical analyses

After the conducted research, we presented the processed statistical data in text, table, or graph form. We performed the scientific analysis of the studied phenomena in the average values form and their dynamics after treatment with special headphones and surgical treatment. The linear and angular measurements of the cranial box were carried out by anthropometric methods, before and after the treatment with a view to the possible correlations between the basic craniofacial parameters when we chose as the threshold of statistical significance a maximum 0.05, using the $\chi 2$ analysis, simultaneously with the model of mixed-effects regression.

3. PREOPERATIVE ASSESSMENT OF CRANIOFACIAL PARAMETERS IN CHILDREN WITH DYSMORPHISM THROUGH THE STANDARDIZED EXAMINATION PRISM

According to the analysis of the primary medical documentation illustrated in table 3.1, we found that in children with craniofacial dysmorphism, the action of perinatal factors with a harmful effect does not act independently of each other, but coexist and interact depending on: a) the child's age (it manifests itself more frequently up to the age of 6 months compared to

those with the age of 12 months of life) and b) the nature of the factor with harmful action (infants with craniofacial dysmorphism are subject to the interaction of the harmful influence predominantly of the perinatal factors of hypoxia, birth trauma and asphyxia $p<0.001$; $p<0.01$ and $p<0.05$ respectively).

Table 3.1. **Evolving clinical examination of predominant perinatal adverse factors by age in children with cranial deformity**

Risk factors	Research period (age)			
	Up to 6 months		Up to 12 months	
	girls	boys	girls	boys
Asphyxia	31*	39*	17**	30**
Hypoxia	102***	121***	81**	91**
Birth trauma	62**	85**	74***	90***
Total	**195**	**245**	**172**	**211**

Note: * - p <0,05; ** - p< 0,01; *** - p < 0,001

The influence of acquired factors with harmful action, in these children, we highlight defects in nutrition (natural, artificial, or mixed) we found in 28% cases, 60%, and 12.1% cases respectively; associated with psycho-emotional tension, neurological pathology, and unfavorable somatic background in 38.6% cases, 52.1% cases and 13.4% cases, especially 9.3% cases we attested other chronic pathologies, especially surgical ones (table 3.2).

Table 3.2. **The role of other harmful factors in the occurrence of craniofacial dysmorphism in children**

Harmful factors		Absolute number	Share (%)
Food	Natural	123	28
	Artificial	264	60
	Mix	53	12,1
Psychoemotional tension	Persistent	170	38,6
	unknown	270	61,4
Neurological pathology	Severe	229	52,1
	Moderate	118	26,8
	Light	94	21,4
Other pathologies	Somatic	59	13,4
	Surgical	41	9,3

The particularities of the harmful factors, presented as a whole, only partially explain the plurality of semiological manifestations of craniosynostosis in infants (figure 3.1).

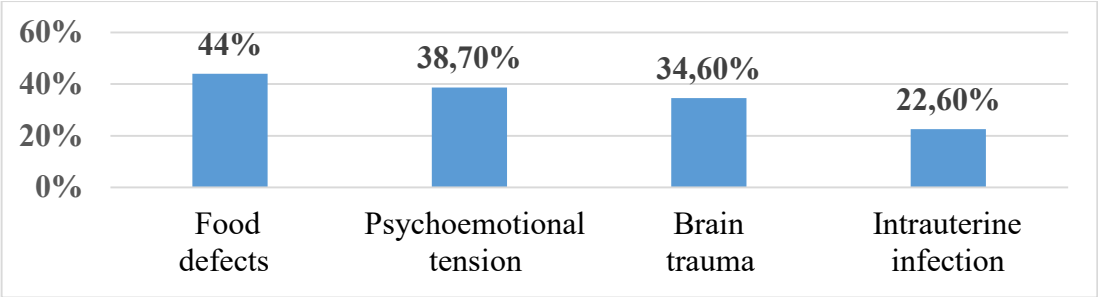


Figure 3.1. **Characteristics of risk factors in children with craniofacial dysmorphism from the research group**

From the mentioned, it can be concluded that the differentiated association of the harmful action of the risk factors manifests itself multi-factorially and influences the treatment of deformities through a) the inability of surgical intervention until the age of 6 months; b) increasing cases of the inefficiency of both surgical treatment and postoperative rehabilitation and c) both allow us to recommend treatment in this age period by applying special helmets.

3.1. The medico-social characteristics of the child's family with skull deformity

Following the analysis of the parents' education level, it shows that only 5.3% of fathers and 4% of mothers of children with craniofacial dysmorphism had incomplete secondary education, while 37.3% of fathers and 60% of mothers had complete secondary education. Special secondary education was certified in 28% of fathers' cases and 13.3% of mothers' cases. Higher education was found in 1/3 of the cases - 29.3% of fathers and 22.7% of mothers (figure 3.2).

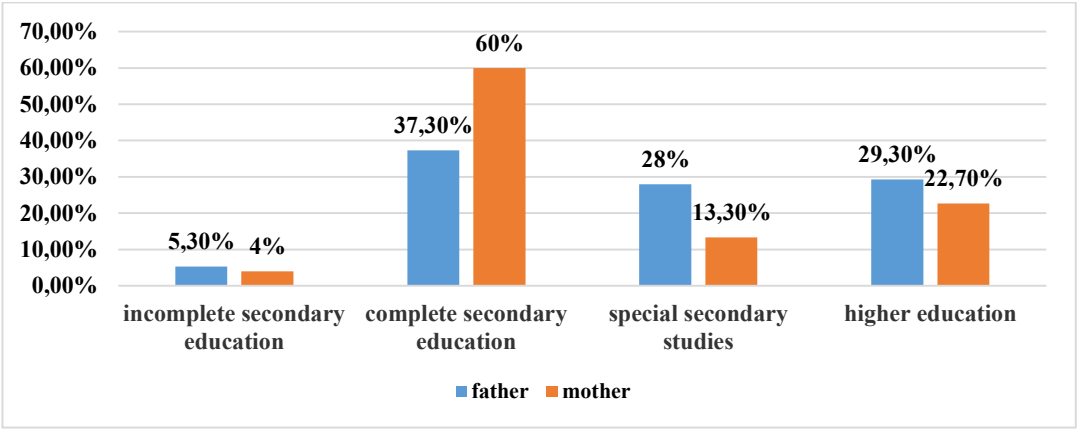


Figure 3.2. **Characteristics of the general research group according to parents' education**

The study carried out in 440 children with cranial box deformation up to the age of one year demonstrated the impairment of three major functional domains following the involvement

of secondary complications, starting from the age of more than six months of life. According to the obtained results, we highlighted sucking and swallowing difficulties in 166 cases (37.7%), 25 children (5.7%) required a nasogastric tube, 33 children (7.5%) had micrognathia, 70 children (15.9%) out of the investigated patients had nutritional disorders, and later these deformities in 75 children (17%) were the basis of dental-maxillary and palatal anomalies. At the same time, we observed in 30 cases (6.8%) language and hearing disorders, in 75 children (17%) the oral cavity and lower jaw were undersized, 27 children (6.1%) with tongue malformations, 31 children (7 .1%) - at the level of the veil and the palatine vault, in 78 children (17.7%) anatomical-functional changes in the dentition and hyperacusis, and in 82 children (18.6%) - changes in the skeletal system and muscle tone.

The obtained results were completed with the examination of the cephalalgic, facial, and orbital indices to assess the degree of left/right facial asymmetry and the type of premature fusion of the cranial sutures.

The percentage distribution of the patients included in the three study groups, depending on the craniofacial pathology nature and the applied surgical technique, is presented below.

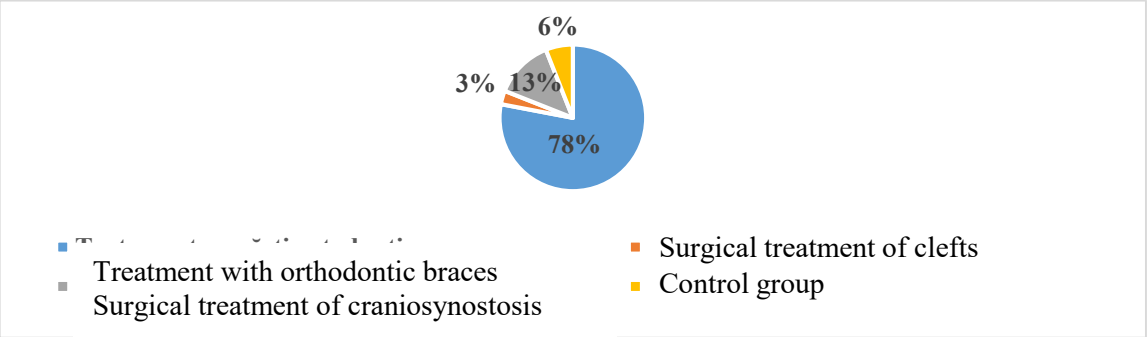
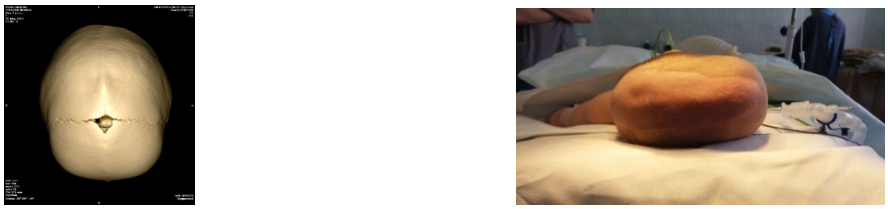


Figure 3.3. **Percentage distribution of patients in the three research groups depending on the nature of the craniofacial pathology and the treatment technique**

Surgical techniques were applied depending on the type of pathology and the age of the child. We applied the surgical techniques of H-transposition craniectomy (or flap for scaphocephaly), unilateral headband advancement, bilateral for plagiocephaly, anterior transposition for oxycephaly, and front orbital deepening for brachycephaly.

In children with structural abnormalities of the cranial cavity and nasolabial clefts, unlike those in the control group, the cranial index highlights both early and uneven fusion of the cranial sutures. For this reason, both pathological processes, detected in both craniosynostosis and nasolabial deformities, cause facial asymmetry, but in the first clinical case it manifests more slowly progressive and widespread character, and in the second case predominantly local.

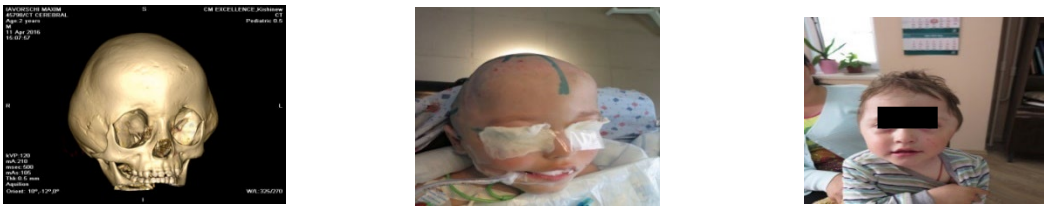
For this reason, the premature growth of the sagittal suture with age generates brain growth restriction in the transverse direction and its excessive expansion in the longitudinal direction. Thus, in these children, sagittal synostosis is formed with an average variable CI greater than 81, depending on the child's gender and age (figure 3.4).



a b

Figure 3.4. **Sagittal craniosynostosis: a) CT image; b) picture of the patient**

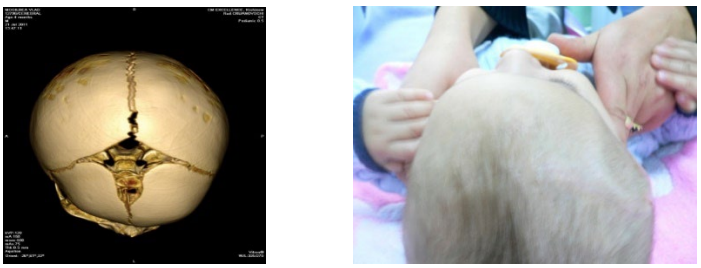
In another 12 children (19.7%), the premature growth of the coronal sutures was the basis, for which the diametrically opposite variant of scaphocephaly was specific, in which the deformation of the skull increases in its transverse direction and makes the clinical appearance of the face more flattened, associated with exophthalmos (uni - or bilateral), and the cranial index has values lower than 76. In these children, we see a cranial asymmetry with exophthalmos and a more specific pathological growth of the middle and posterior cranial fossa (figure 3.5).



a b c

Figure 3.5. **Multiple craniosynostosis: a) CT image; b and c) the image of the patient**

We included in 11.5% of cases children with premature fusion of the frontal suture, which forms anomalies with narrow frontal bone and brain, in association with wider occipital bone and brain, forming a triangular skull (figure 3.6).



a b

Figure 3.6. **Anterior plagiocephaly: a) CT image; b) superior examination image, synostosis metopic suture: trigonocephaly**

In children with craniofacial asymmetry from the newborn period, we applied the treatment with special headphones for 24 hours continuously until the age of six months due to exceeding the 76-81 limit of the cranial index. The clinical expression of craniofacial dysmorphism in 88.1% of cases is associated with sucking reflex disorders, pathological variations of the facial index, manifested by AnDM, strabismus, papillary edema, optic atrophy, intracranial hypertension, auditory or vestibular disorders, deteriorating in 100% cases the aesthetic appearance. In 73.8% of cases, we also highlight the lack of maxillary mass development through malocclusions, anterior open occlusions, supernumerary teeth, ectopic eruptions, milky-white opacities at the enamel level, and gingivae hypertrophy. In chronic (or untreated) cases, craniofacial dysmorphism creates moderate to severe mental health problems.

Using individual reference values, we determined the degree of deviation from normal developmental values. This fact allowed us to highlight the influence of the facial asymmetry degree imbalance, which through the deviations of the craniofacial complex measurements, reflects the character of the dysmorphism's pathological severity, but also the need for surgical intervention.

Attention must be drawn on the growth rate of the lower face total height (N-Gn – nasion gnation) in the second half of the first life year which accelerates due to the digestive floor development. This phenomenon could be explained in surgical practice by the diversification of the diet, by the appearance of a greater number of teeth, factors that possibly increase the more significant development of the facial muscles and the mandible, also influenced by the acceleration of the mastication and swallowing process.

It is necessary to emphasize the fact that in children with craniosynostosis, unlike children with clefts, especially in the control group, simultaneously with the average values of the cranial index variations, we also highlight a pathological reduction in the skull base parameters (S-Ba), but also in increasing the advancement degree of facial asymmetry imbalance. These values can serve as a basic criterion and as a clinical indicator for the surgery initiation.

3.2. General characteristics of the sucking reflex in children with craniofacial dysmorphism

For the newborn, the sucking reflex initially has an adaptive significance to the natural environment, and later underlies the initiation of the chewing process. The automaticity of the basic components of the sucking reflex, in particular the proboscis, Behterev (grasp-supplement-swallow-breathe) reflexes, associated in a unitary functional complex, is based on

a dynamic stereotype, with specific features of oral motility under conditions of facial asymmetry secondary to varied plagiocephaly.

In other words, the sucking reflex in healthy children is characterized by a protective-adaptive response, with the ability to maintain the automaticity of its components under varied activity conditions. In children with plagiocephaly, we show significant fluctuations in the automaticity of the sucking reflex components depending on the pathological process duration, the character of plagiocephaly, and the age of the child. Their interaction, especially in the normal variant, is not a static phenomenon, but children show a dynamically unstable automatism, which carries an adaptive character of the variability of this reflex.

To maintain the automaticity of the sucking reflex's basic components, a strict interaction of at least five pairs of cranial nerve activity is required: the vagus (shortest), trigeminal, hyoid, facial, and glossopharyngeal. In cases of craniofacial deformities of any type, there is obvious instability until the reflex disappears completely in about 37% of cases.

The multi-structural composition of the sucking reflex shows its complex morphological and functional organization. Therefore, its practical implementation requires a unique mechanism and a dynamic interaction between numerous specific or non-specific formations. In contrast to children with plagiocephaly, the activity of the sucking reflex in untreated craniosynostosis is accompanied by insufficient neurophysiological, predominantly motor development, confirmed by EMG of these reflex components (Figure 3.7).

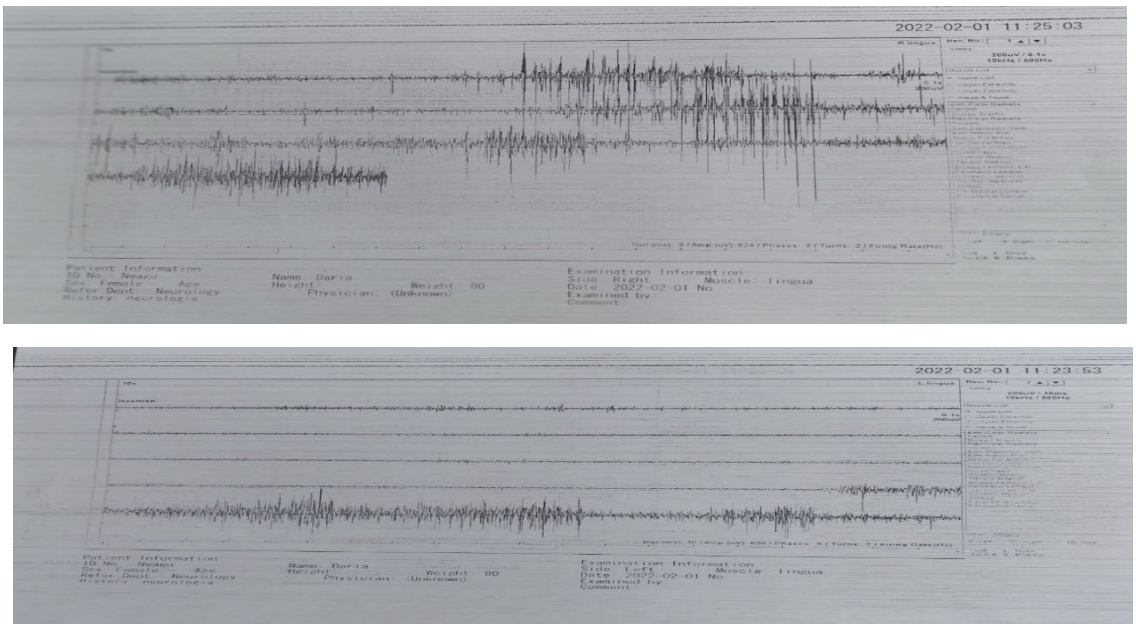


Fig.3.7**. Tongue muscle EMG in a child with sagittal craniosynostosis before surgical intervention**

The frequency and intensity decrease of the sucking reflex in children with craniosynostosis in 80% of cases was correlated with asymmetric muscle weakness of the oro-maxillo-facial skeleton, in 56% of cases we found an automaticity decrease of the parabiotic reflex ($p<0, 001$), which generated in 48% of cases the sucking reflex weakness ($p<0.001$), which, consecutively, in 51% of cases stimulated weakness of the swallowing reflex ($p<0.001$) and the breathing rate slowing by 2-3 breaths per minute ($p<0.05$).

In 45% of cases, the sucking reflex automaticity deregulation remains below the normal limits, in 35% of cases they develop concomitant persistent unhealthy habits, in particular, 17.5% of cases - the sucking of various objects (fingers, pens, hair ends, pillow edges, toys, etc.), and at an older age, in 28% of cases it manifests itself through the desire to bite their nails in any stress or conflict.

In children with untreated plagiocephaly, 70% of cases show facial asymmetry, clinically manifested by oral motor dysfunction, conditioned by marked local hypotonia, periodically associated with contralateral asymmetric hypertonia of the facial muscles, with neck activity limitation, ajar mouth, inactivity of the tongue and lips, similar to decompensated craniosynostosis. Unlike the clinical manifestations of complex craniosynostosis, which lately with aging may become unable to form a food bowl for swallowing, in plagiocephaly the clinical manifestations are reversible. In both situations food moves chaotically into the oral cavity, causing disordered swallowing rhythm and, correspondingly, swallowing. For this reason, in these children, breathing and swallowing occur symmetrically, redirecting the movement of food toward the pharynx and causing the aspiration risk. At the same time, shallow breathing increases and becomes more rapid, which further disrupts the swallowing automaticity and rhythm. For this reason, the jaw and tongue make unstable, arrhythmic movements, pathologically influencing the swallowing activity.

Thus, this means that the sucking reflex in children with craniofacial dysmorphism is based on muscle asymmetry with deterioration of local and central neuroreflexive mechanisms and may aggravate the underlying pathology. Therefore, treatment with special helmets in up to 70% of plagiocephaly cases has a significant positive influence on feeding quality.

3.3. Study of anthropometric and cephalometric parameters in children with craniofacial dysmorphism

In the context of studying the relationship between asymmetric structures of the face, neurocranium, and skull base, we found significantly greater sucking reflex decreases on the left side versus the right. From this perspective, in about 80.5% of cases, we determined a

correlation between pathological changes in sucking reflex and parameters of the skull base, upper and lower face, concomitant with statistically significant decreases in mandible length on the affected side.

Based on the neurophysiological data obtained by EMG in children with advanced craniosynostosis the main cause of the sucking reflex disturbance is the pathological facial asymmetry formation on the soft structures. Compared to children with clefts and those in the control group, differences in neurophysiological parameters in craniosynostosis are highlighted at the age of six months of life, associated with the primary eruption of teeth, which highlights the even more accelerated increase in facial asymmetry, bearing a slow progressive character (fig. 3.8).

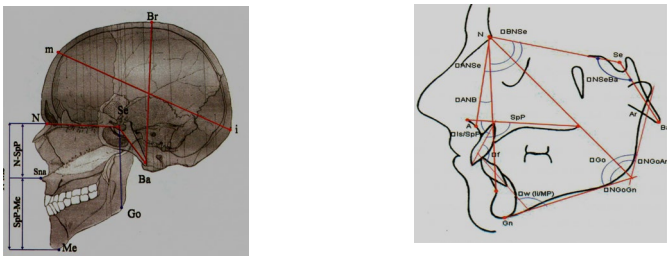


Figure 3.8. **Basic craniofacial parameters revealed in sucking reflex disorders in children with facial asymmetry**

In patients with clefts of the same age, the lower values of sucking reflex and cranial parameters remain constant but do not progress, only with length (G-Op) and height (V-Gn) of the skull ($p<0.001$; $p<0.05$) versus mean values in the control children.

Thus, the comparison of facial asymmetry highlights the deviation of the midline, which moves towards the contralateral side of the face's affected part. This parameter of facial asymmetry is associated with abnormal development of the lower jaw and the asymmetric effect increases after six months of age.

Applying the obtained results of landmark-based viscerocranial and neocranial parameters allows quantitative and qualitative monitoring of facial asymmetry, especially in the postoperative period.

3.4. The obtained results after the objective examination profile of the orbits in craniofacial anomalies

In children with craniosynostosis and clefts, we also followed the asymmetry of the orbital widths, initially invoking the condition of the orbits in 25 children from the control group.

Table 3.3. **Variables of orbital width by gender in children in the control group (mm)**

Parameters	Gender	Mean	SD	Variation amplitude	Min	Max
Width RO	b	40,18	0,99	3,29	38,66	41,95
	g	39,21	0,71	2,85	37,87	40,72
	b+g	39,71	0,99	4,08	38,87	41,95
Width LO	b	39,61	0,91	3,57	37,66	41,23
	g	38,47	1,44	4,98	35,83	40,81
	b+g	39,06	1,32	5,40	35,83	41,23

Note: RO – right orbit; LO – left orbit; SD – standard deviation, b – boys; g – girls.

The findings in Table 3.3 show that in craniofacial dysmorphism the minimum variables of orbital parameters by width are more specific for girls, while those with maximum values are more specific for boys.

The height of the eye sockets also shows higher mean values in boys compared to girls, being statistically insignificant. In contrast to width, the mean value of orbit height predominates in girls' orbits (Table 3.4).

Table 3.4. **Dispersions of orbit height by the gender of the child (mm)**

Parameters	Gender	Mean	SD	Variation amplitude	Min	Max
Width RO	b	34,80	1,28	5,74	31,94	37,68
	g	34,23	1,68	6,76	31,14	37,90
	b+g	34,53	1,50	6,76	31,14	37,90
Width LO	b	34,35	1,03	3,97	32,11	36,08
	g	33,45	1,39	6,42	30,53	36,95
	b+g	33,92	1,29	6,42	30,53	36,95

We analyzed the orbits of children with craniofacial dysmorphism according to the indirect characteristics of the orbital index [orbital height / orbital width X 100].

The characteristics of the orbits in 61 children with craniofacial dysmorphism were determined by comparing the control group's parameters. We considered the results of the interorbital (IO) and biorbital (BO) distance determination according to the type of dysmorphism, its degree of advancement, age, and gender of the child. The results obtained show that, similar to the parameters of orbital height, in these children the mean values of both interorbital and bioorbital distance parameters in metopic craniosynostosis, compared to other types of craniosynostosis, in girls are lower ($p<0.05$) than in boys. Thus, the minimum value of both interorbital and biorbital distance is specific for the female sex, and the maximum value – is for the male.

Table 3.25. **Interorbital and biorbital distance dispersions by child's sex (mm)**

Parameters	Gender	Mean	SD	Variation amplitude	Min	Max
Interorbital distance	b	19,26	1,44	5,09	16,82	21,91
	g	17,68	0,59	2,09	16,79	18,88
	b+g	18,50	1,36	5,12	16,79	21,91
Biorbital distance	b	96,00	2,51	10,56	90,32	100,88
	g	93,99	2,87	11,20	88,77	99,97
	b+g	95,03	2,86	12,11	88,77	100,88

In conclusion, we can state that in pathological changes of the cranial cavity in sagittal, metopic, or lambdoid craniosynostosis there are no significant differences in the changes of the orbital index depending on the patient's gender. We show statistically significant differences in orbital index values according to the craniosteal disease type (sagittal, metopic, lambdoid) and the advancement degree of cranial case pathology and can be used in the underlying disease diagnosis of the child with craniosteal disease.

4. SURGERY OF CRANIOFACIAL MALFORMATIONS IN CHILDREN

4.1. The general aspect and topicality of the issue

Congenital dysmorphisms are one of the main causes associated with craniofacial asymmetries in children. They occur under a wide spectrum of cranial and facial deformities, which often represent a complex and require surgical and therapeutic remedial measures. These malformations present clinically as malposition of a region or organ, disruption of the continuity of soft tissue, bone tissue, or both, as atrophies, hyperplasia, bulging, flattening, deformities, asymmetries, as irregularities of craniofacial relief - from insignificant to significant.

The research is based on epidemiological and clinical-evolutionary aspects of craniomaxillofacial anomalies. Patients were selected according to inclusion and exclusion criteria, with the informed consent of the parents, and the study was conducted according to the protocol approved by the Ethics Committee. Inclusion criteria were children aged 3 months to 18 years with congenital craniofacial asymmetries. Exclusion criteria were children with craniofacial asymmetries due to acute trauma or a benign or malignant tumor process and children with developmental asymmetries.

The present study was based on multidisciplinary care aimed at improving the quality of children's lives with congenital dysmorphism. A multidisciplinary team participated in this study, which is still involved in the postoperative rehabilitation of children.

Selected patients ranged in age from 3 months to 18 years and received staged surgical treatment in early childhood as well as remotely.

The surgical treatment of children with congenital craniofacial asymmetries was performed according to the surgical protocols for the rehabilitation of children with congenital dysmorphism. These protocols were based on the principles of following the sequence: intratracheal general anesthesia, early surgical rehabilitation by creating tissue integrity in accordance with the affected functions of the organs located in the given region, determination of morphological and functional rehabilitation stages, minimally invasive bone approach with considering the growth areas integrity, creation of pedicled soft tissue flaps and allograft remote bone grafts, wound closure by bone parts fixation and soft tissue parts suturing.

The impairment degree of patients with congenital craniofacial dysmorphisms requires complex multidisciplinary treatment. Heretofore, there is no classification of congenital craniofacial asymmetries that would be recognized worldwide and based on which a morphological and functional assessment would be made. The distribution of children with congenital dysmorphisms into groups was carried out according to the 1981 classification of the Committee on Nomenclature and Craniofacial Anomalies of the American Association for the Rehabilitation of Facial Disorders. The classification includes five categories of craniofacial asymmetries: I. Facial Discompositions; II. Atrophy/Hypoplasia; III. Neoplasia/Hyperplasia; V. Craniosynostosis; VI. Unclassified.

For the planning of aesthetic and functional rehabilitation, we used Strasser's grading system, which assesses the face aesthetics according to several parameters: deformations, malpositions, asymmetries, relief disorders, and continuity interruptions.

Taking the above into account, we have distributed craniofacial congenital asymmetries according to the five international norms required for cephalic extremity examination: vertical norm, frontal norm, lateral norm, occipital norm, and basal norm. Each region was characterized according to the Strasser system (deformities, malpositions, asymmetries, relief disorders, continuity interruptions).

Thus, we distributed patients with congenital craniofacial asymmetries into five subgroups.

1. *Craniofacial changes in the vertical norm,* concerning the calotte or vault of the skull, which, according to the cranial index, are distinguished by three types of calotte anatomical shape: brachiocephalic, dolichocephalic and mesocephalic, observed both in the occipital and frontal area;

2. *Craniofacial aesthetic changes in the frontal (upper) norm*, manifested in craniosynostosis, positional plagiocephaly, atypical clefts (Tessier), medial clefts in the deformation form, contour changes, asymmetries, malpositions of the front orbital complex, may be unilateral or bilateral;

3. *Craniofacial aesthetic changes in the frontal norm in the middle third of the face* are characterized by deformities, contour changes, asymmetries, malpositions of the orbits, and disruptions of continuity in bone or soft tissue, or in both layers.

4. *Aesthetic changes of the face in the lower frontal norm* are manifested by the presence of bone and soft tissue depressions on the sides of the face, with the presence of colobomas, cysts, hypoplasia of the mandible, tissue defects in the region of the upper lip, alveolar apophysis, hard and soft palate; deformation of the nose, flattening of the nasal lobe. In bilateral total clefts on the upper lip, there are three clefts - premaxilla and two maxilla. The nose is flattened, and the nasal wings are spread, and drawn out. The maxillae are hypoplastic, and the dental arch is deformed and narrowed anteriorly. The palatal apices are upright. The vomer hangs freely in the oral cavity, being situated between the palatal plates.

5. *Aesthetic changes in the lateral frontal norm* are clinically manifested by deformities, contour changes, asymmetries, malpositions of the ears, and interruptions of continuity, more frequently located unilaterally.

The endo-oral examination includes inspection of the oral mucosa (mucosa of the buccal floor, tongue, pharynx, lips), supplemented by dental examination: type of dentition (primary, mixed, permanent), intermaxillary relationships (maxillary protrusion, mandibular protrusion), dental crowding (upper and lower jaw), occlusion after Angle, the health status of teeth and examination of dental arch: shape of dental arch, symmetry, frenum of lips and tongue, tissue defects (bony or soft tissue), pharyngeal lymphatic system, tongue position.

The endo-oral examination is complemented by the paraclinical findings, performed by CT scan of the viscerocranium and craniofacial complex.

Indications for surgical and therapeutic treatment were functionally estimated in order to assess its effectiveness. The presence of craniofacial deformities was assessed on the basis of the VAS (visual analog scale) score (Figure 4.1).

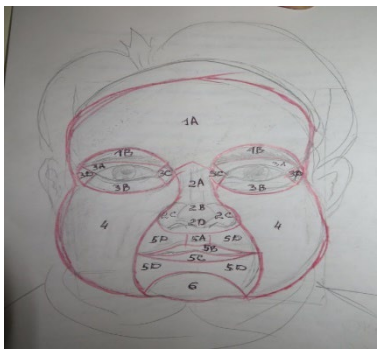


Figure 4.1. **Units and subdivisions of the face**

1. Forehead/glabella (1A forehead, 1B eyebrow); 2. Nose (2A dorsum, 2B tip, 2C wing, 2D columella); 3. Orbit/periorbital (3A upper eyelid, 3B lower eyelid, 3C medial angle of palpebral fissure/ canthus, 3D lateral angle of palpebral fissure/lateral canthus); 4. Maxilla/arms; 5. Oral cavity (5A philtrum, 5B upper lip, 5C lower lip, 5D perioral); 6. Mandible/chin.

The objective assessment focused on the clinical examination - soft tissue defects, asymmetries, and scars in the preoperative, postoperative, and remote periods. Surgical results were assessed according to a four-grade scale proposed by Bass, W. M, 1971. Grade one includes patients who do not require surgical revision. Grade two - needing minor surgical revision of soft or bony parts. Grade three includes those who need surgical revisions with bone tissue augmentation. Grade four includes children who need repeated or more extensive major surgical treatments.

Anthropometric measurements were performed at CT scan preoperatively, postoperatively, and remotely.

4.2. Craniofacial deformities in children with syndromic conditions

Treatment was carried out in stages, in priority order. The correction of aesthetic appearance with the creation of durable bone plasticity and suppression of cranial hypertension was the first stage goal of the surgical treatment. It was performed by the neurosurgeon and maxillofacial surgeon together. Anatomical reconstruction of the skull was performed by raising the orbital rim, tilting, advancing, and fixing it, followed by frontal bone plasty, partially the anterior margins of the parietal bones. Postoperatively, the children were under the supervision of a neurologist and psychologist, as moderate mental retardation was found in two patients, and severe - in one patient. One of these three children is under supervision for 14 years. Due to severe jaw hypoplasia, snoring during sleep, and drooping of the eye from the orbit, it was indicated the upper jaw advancement by the Le Fort III osteotomy type. Complications attested in these patients were mental retardation and partial optic nerve atrophy (Figure 4.2).

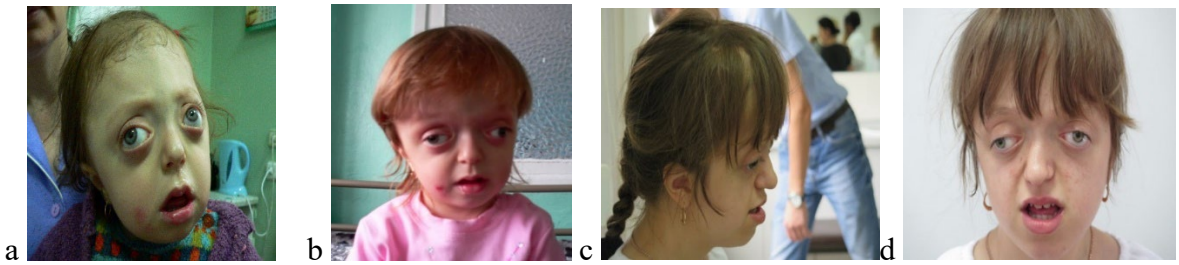


Figure 4.2. **Staged surgical recovery of the child with Crouzon syndrome**
a - primary preoperative; b - after cranioplasty;
c, d - preoperative second stage (anterior and lateral image);

The CT scan showed associated synostosis of the coronal, sagittal and lamboid sutures, forming the appearance of a microcephalic skull, sharp at the bregma level, bullet-shaped. Clinical and imaging examination established the diagnosis of Crouzon syndrome. A total of two surgeries were performed. At the age of 18 months, skull vault reconstruction was performed. In the first stage, by remodeling the cranial vault and advancing the orbitofrontal complex, intracranial tension was suppressed - complete atrophy of the optic nerves was stopped. The second surgery was performed at the age of 13 years. After the complex immobilization on the bilateral margins of the periform aperture, Le Fort III osteotomy was performed via intraoral and coronal access. Immediately after wound closure, the rigid extraoral distractor (Red II System) was applied and fixed with transfixing metal wires on the skin and secured by the system bars. The rigid extraoral distractor system was fixed so that the direction of the 3D vectors during distraction was controlled. Jaw complex distraction was achieved at 2 cm. As a result, the volume of the orbits and nasal cavity was increased. At the same time, symptoms of eye droop and snoring with elements of apnoea disappeared (Figure 4.3).

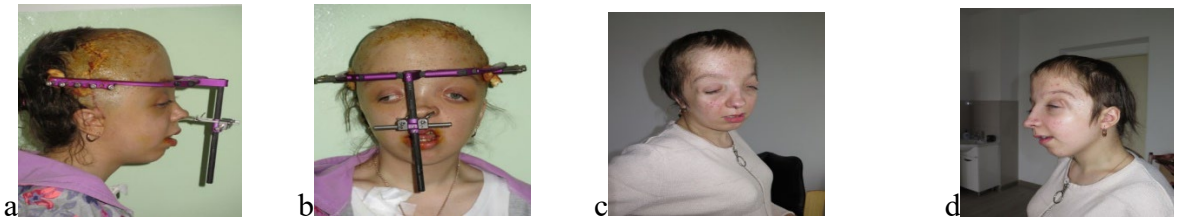


Figure 4.3. **Staged surgical recovery:**
a, b - after Le Fort III osteotomy (anterior and lateral image);
c, d - final result: anterior/lateral image after removal of the distraction

Labiomaxillofacial disorders (LMPD) occupy a special place in the Republic of Moldova, constituting 15% of cases in the activity of the oro-maxillo-facial surgery department in children, recording an annual average of 70 cases, mainly 56.4% male and 43.6% - female (Table 4.1).

Table 4.1. **Distribution of clefts according to patient gender**

Gender	Frequency	%
Male	354	56,4
Female	274	43,6
Total	**628**	**100**

In the retrospective analysis, we compared data regarding the frequency of labiomaxillopalatine clefts in children in the Republic of Moldova between the years 1987-2008 and 2008-2017, respectively. We found that the incidence of congenital facial malformations decreased in the years 2008-2017 compared to the years 1987-2008. The most children with DLMP were registered in 1992 - on average 269 children, and the fewest in 2000 - 89 children. On average, 113 babies with clefts were born annually. A decrease in the incidence of lip and palate cleft was observed between 2008 and 2017. Thus, in 2015 the most cases were detected - 90 children, and in 2011 - 46 cases.

Morphological changes (damage to the dentoalveolar, auditory, respiratory, and speech systems) and functional changes (hearing and speech disorders, occlusion disorders, difficulties in integrating into society) in these children are the main causes requiring prompt early treatment, with multidisciplinary monitoring throughout the children's development.

Labial clefts. Incomplete unilateral clefts of the upper lip are characterized by varying degrees of the upper lip vertical separation, but the bridge of the nose is preserved. Cleft orbicular muscles result in vertical shortening along the defect. The nasal bridge appears deformed. If the defect is accompanied by a lack of bone at the alveolar apophysis, the deformity occurs with the collapse of soft tissue towards the bony defect.

Primary upper lip plasty is performed at ages three to six months. One in three children with cleft lip has clefts of the alveolar process. Primary alveolar apophysis plasty is performed at the primary upper lip plasty stage. The bone grafting is carried out during the period of permanent dentition (Figure 4.4).

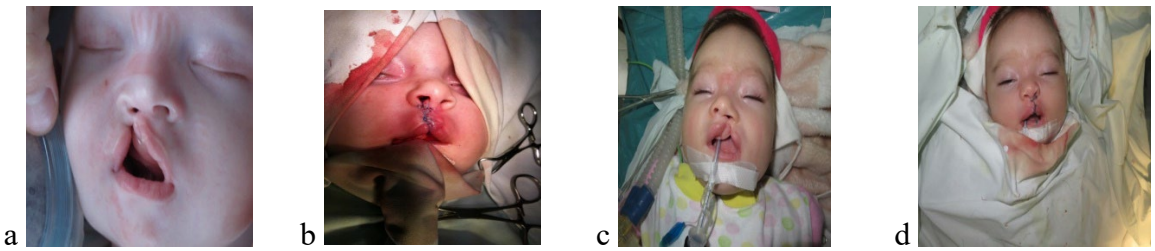


Figure 4.3. **Upper lip cleft on the right (a - preoperatively, cleft lip and palate; b - postoperative, surgical recovery of the upper lip (Millard); Cleft lip on the left: c - preoperative, d – postoperative**

4.3. Secondary palate clefts (median)

This type of cleft is characterized by defects on the soft and hard palate and is divided *into incomplete, complete, and transfixing.* The alveolar apophysis retains its anatomical integrity. Clinically it is manifested by intermaxillary relationships in which the maxilla is hypoplastic and the mandible protrudes anteriorly, which with age becomes more pronounced. The vomer hangs loosely in the oral cavity and does not fuse with the palatal plates. The oral cavity communicates with the nasal cavity. Food enters the nasal cavity, the soft palate is shortened. Surgical recovery by primary placement is performed at the age of 12 months of life. (Figure 4.4).

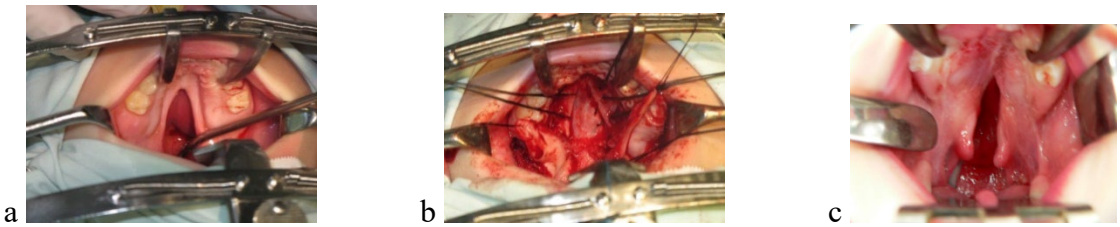


Figure 4.4. **Cleft palate: a - preoperative; b, c – intraoperative**

4.3.1. Unilateral labio-maxillo-palatine clefts

The complete unilateral clefts are characterized by disruption of continuity on the upper lip, alveolar apophysis, soft palate, and hard palate. The lack of bone support in the vertical and sagittal planes is accompanied by disturbances in the growth areas, and the upper jaw is divided into large and small segments. The oral cavity communicates with the nasal cavity, and the vomer is horizontal and fused. The small segment of the maxilla (on the affected side) is underdeveloped in vertical, horizontal, and sagittal planes. The lack of bony support leads to muscle imbalance. The large segment is positioned within the normal range. Surgical recovery is done in stages, starting at three months of age. In the first stage, the upper lip defect is removed, in the second - the soft palate defect, and in the third stage - the hard palate defect. The creation of muscle integrity on the soft palate in the second stage creates the necessary conditions for muscle function restoration (Figure 4.5).

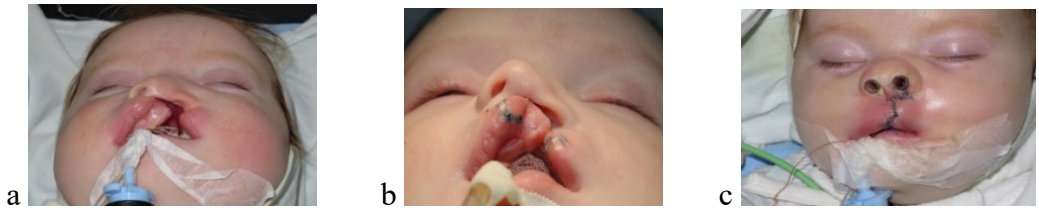


Figure 4.15. **Labiomaxillopalatine clefts on the left: a, b - preoperative, c – postoperative**

4.3.2. Complete bilateral clefts

It is characterized by the presence of defects on the upper lip, alveolar apophysis, soft palate, and hard palate. The upper lip consists of three relatively symmetrical bridges (left, right, and premaxilla). The medial bridge or premaxilla is composed of the anterior alveolar apophysis and a segment of the upper lip. Together they join the vomer on the midline. The columella is shrunken. The maxillae are hypoplastic and the dental arch is cone-shaped. The vomer hangs loosely in the oral cavity, and after an inspection, a slight hypertrophy of the vomer is observed. The oral cavity communicates with the nasal cavity extensively through both sides of the vomer. Due to the lack of bone tissue, the growth areas are deregulated. The surgical rehabilitation is carried out in parallel with orthodontic and speech rehabilitation (Figure 4.6).

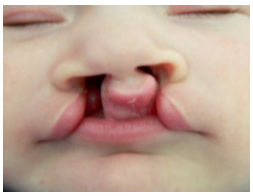
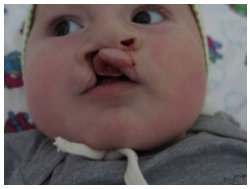
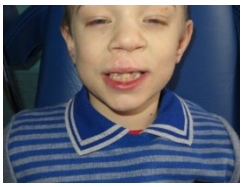
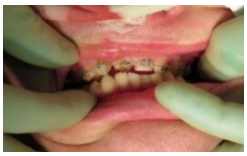
a  b  c 

Figure 4.6. **Complete bilateral cleft:** a - preoperative, b - after the first stage of placement, c - remote result

4.4. Secondary surgery

The secondary reconstructions are rarely indicated for lip and palate cleft. The complete unilateral and bilateral clefts need secondary surgical recovery much more often. A number decrease in secondary surgical sessions is a trend in contemporary surgery.

Jaw growth disorders. The total labio-maxillo-palatal defects present growth and development disorders of the jaws and midface, which cannot be resolved by orthodontic means alone, but also by surgical advancement of the jaws. The developmental defects of the upper jaw are corrected by Le Fort I osteotomies, and some reconstructions are also required in the lower jaw (Figure 4.7).

a  c  e 

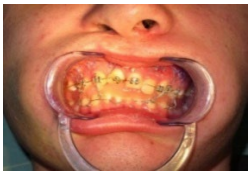
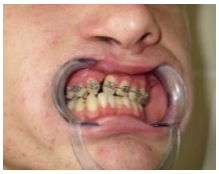
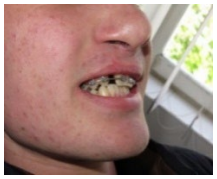
b  d  f 

Figure 4.7. **Growth disorders of the upper jaw in patient with complete unilateral cleft:** a, c, e - preoperative, b, d, f - postoperative

The aesthetic defects in the midface are often characteristic of children with labio-maxillo-palatine clefts. The reconstructions in the midface and buccal region of the face are scheduled for preschool and adolescent age. Due to the intensive growth of the child, the reconstructions are limited (Figure 4.8).

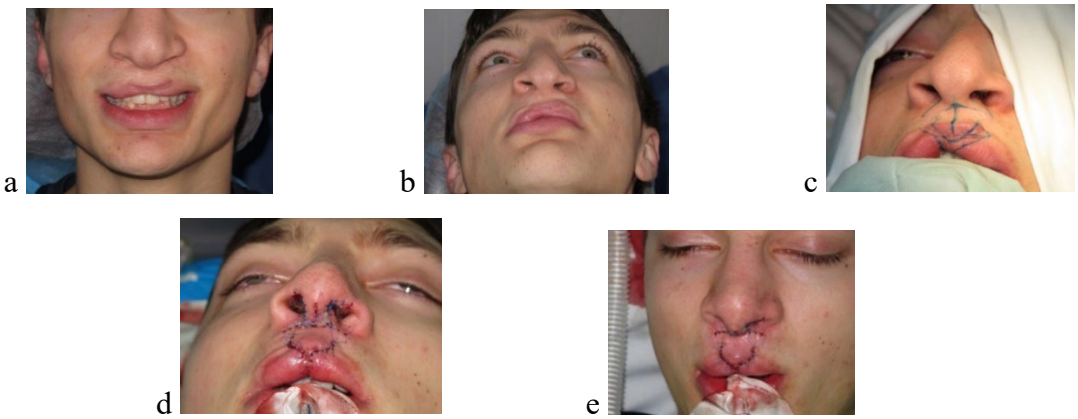


Figure 4.8. **Deformation of the nose and upper lip in bilateral cleft in a teenage patient:** a, b, c - preoperative, d, e - postoperative

Orthodontic treatment. The palatal and upper lip clefts affect the development of teeth, especially deviations in number, structure, shape, and eruption problems. The prophylaxis and treatment of these deficiencies are started by applying orthodontic treatment methods (Figure 4.9).

Figure 4.9. **Disorders of shape, number, and eruption of teeth in adult children with labio-maxillo-palatal clefts**

4.5. Surgical-therapeutic approach to rare clefts (according to Tessier classification)

The rare craniofacial clefts are manifested by multiple morphofunctional deformities, they are complex by involving bone tissue, soft tissue, tissue defects, and positional abnormalities of the upper lip, labial, nose, or eye commissure. Each patient presents clinical signs of individual aesthetic defects.

Over 10 years, we examined 13 children with facial dysmorphisms. One technique we used most frequently was to remove the defect by creating pedicled flaps from the adjacent parts to the defect and flap slips. The second technique we used was bone graft placement collected from the iliac crest and rib (Figure 4.10).

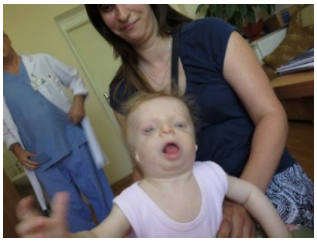
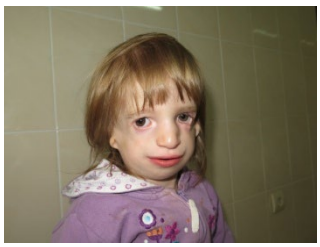
a  b 

Figure 4.10. **Oblique cleft of the face within the soft and bony parts limits (Tessier 7): a - at age 1 year; b - at age 5 years**

4.6. Congenital dysmorphisms in the lateral norm of the face

The hemifacial microsomia is clinically manifested by congenital dysmorphism in the lateral norm, expressed by underdevelopment of one side of the face. The clinical picture of this disease is characterized by a variety of facial asymmetries - from a small asymmetry of the face to significant underdevelopment, with involvement of the upper jaw and orbits, with underdevelopment of the ear and even lack of it. In 30-35% of cases, patients have hearing problems. The treatment of these children is difficult. There are two views on this topic. Some surgeons advocate early surgical treatment, which should be repeated with age to achieve facial symmetry. Others advocate surgical treatment applied in adolescence to achieve good immediate results. Thus far, there is no well-established protocol for the treatment of these pathologies. Below we present a similar case from our experience of early treatment (Figure 4.11).

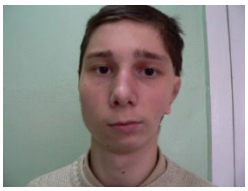


Figure 4.11. **Hemifacial microsomia**

4.7. Treatment characteristics of patients with craniofacial dysmorphisms

Cranial deformities. The clinical examination was performed according to the individual patient questionnaire. The positional plagiocephaly was found 23 times more often compared to the craniosynostosis. We analyzed the correlation between skull deformities and dental-maxillary deformities. As a result, we concluded that students with changes in cranial relief are more prone to other facial mass deformities, including dental-maxillary ones. Children with

dental-maxillary deformations in the three reference planes constituted twice as many as those without skull deformations.

In conclusion, we can confirm that shape anomalies of the skull tend to affect the child's development both functionally and morphologically. Secondly, it is recommended not to analyze the child from a single point of view, but only in a complex with all organs and systems in the craniofacial region. Thus, prophylaxis of craniofacial deformities should be carried out as early as possible in the child's developmental period.

4.8. Therapeutic approach to craniofacial dysmorphism in the vertical norm of the face

The cranial relief deformation in the vertical norm is characterized by asymmetries of the front orbital and frontonasal regions. The causes are unknown. The cranio-orbital-frontal-nasal syndrome includes craniosynostoses, positional plagiocephaly, rare Tessier-type clefts, and medial clefts.

The positional plagiocephaly is a malformation that clinically presents itself by altering the anatomical relief of the skull. In order to reshape the anatomical relief of the skull, children have been fitted with a passive helmet as a therapeutic option. The helmet was worn 23 hours/day, until the age of one year (Figure 4.12 a, b, c).

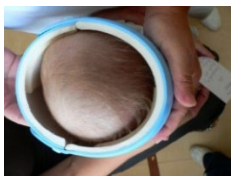
a  b  c 

Figure 4.12. **A child with functional skull deformities:** a - until treatment; b - during treatment; c - after treatment

4.9. Surgical-therapeutic approach to children with frontal cranial deformities. Brain region

In the frontal norm, the cranial bones meet at the bregma apex, the frontal-nasal angle is much larger, and the exorbitance is constant. The sagittal craniosynostosis was the most common form of craniofacial dysmorphism in both adolescents and young children. The deformity results in an elongated anterior-posterior head, palpation of the sagittal suture reveals a raised ridge. Imagistically, the deformity presents as the absence of sagittal suture, expressed by the disappearance of the suture's toothed appearance. In the absence of surgical recovery, a frontal bulge appears over time, particularly in the lateral norm. The surgical treatment in the early period was indicated in all children (Figure 4.13 a, b, c).

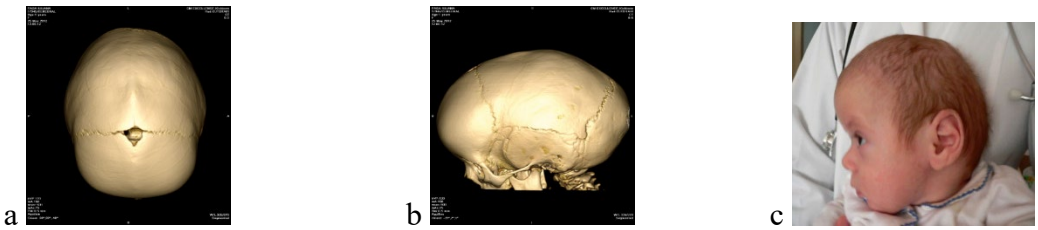


Figure 4.13. **Sagittal craniosynostosis: a, b - CT images (vertical and lateral norm), c - photographic image**

Coronary craniosynostosis was the second most common after sagittal craniosynostosis. The aesthetic appearance is clinically characterized by cranial dysmorphism observed in the vertical and frontal norm, upper floor. The cranial growth is restricted in the anterior-posterior plane, with development in the horizontal plane. We performed the surgical rehabilitation by advancing the orbital rim and reshaping the forehead.

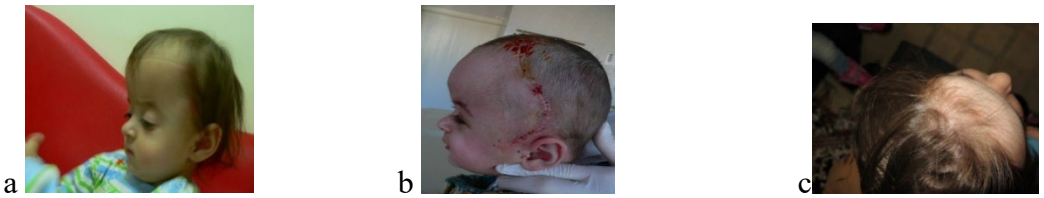


Figure 4.14. **Bilateral coronary craniosynostosis: a - preoperative, b - immediate postoperative, c - at two years**

The metopic craniosynostosis in the vertical norm appears in ridge-shaped form on the midline, with the lateral parts of the frontal region flattening, hypotelorism, and convergent strabismus. In the frontal norm, the cerebral region is narrowed, with depressions on the frontal and partially temporal sides, false hypotelorism (Figure 4.15).

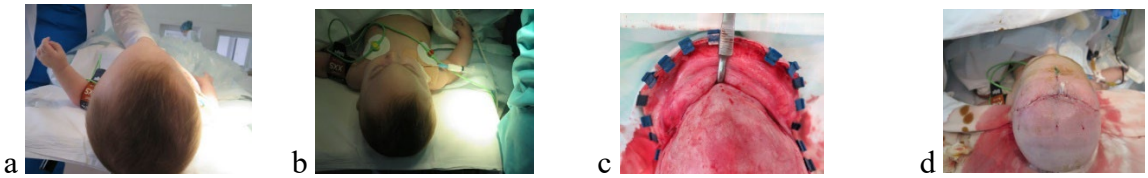


Figure 4.15. **Metopic craniosynostosis: a, b, c – before treatment, d – after treatment**

All patients with indications for surgical cranial plastic surgery responded by improving the cranial relief, which was observed immediately after the treatment.

4.10. Surgical-therapeutic approach to school-age children with cranial deformities in the frontal norm. Cerebral and middle region

In our records, there were 15 school-aged children diagnosed with craniosynostosis in the late period. Among these, 10 were boys and 5 were girls and they were experiencing headaches, epileptic syndrome, and behavioral disorders. They were clinically and imaging examined, which revealed cranial bone relief changes of the craniosynostosis type (Figure 4.16).

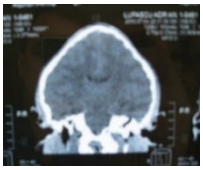
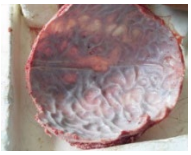
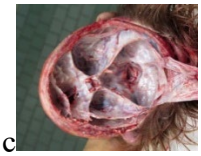
a  b  c 

Figure 4.16. **Pathomorphological examination of the child with sagittal craniosynostosis at the age of 17 years: a - digital compressions on the inner side of the cranial cavity; b - deformation of the cranial fossae; c - CT scan of the skull from the anterior side**

In all school-aged children examined, the main complications that were associated with various forms of uncorrected craniosynostosis were both cosmetic and functional problems. Without early diagnosis and early surgical treatment, craniofacial deformities in this age group became severe and irreversible.

Another case in our evidence that was not surgically rehabilitated was a patient with unilateral coronary craniosynostosis. Analyzing the patient, we made the comparison with an identical case of a one-year-old child. By comparing the cases we found that the facial asymmetry seems to be more pronounced because of asymmetry in the nose, eyebrow, orbit, frontal region, and eyelash region. Comparing these cases with another clinical case that was surgically rehabilitated within a period of up to one year, we notice that the aesthetic defects have completely disappeared (Figure 4.17).

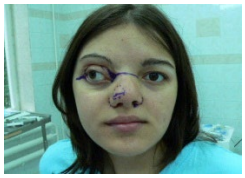
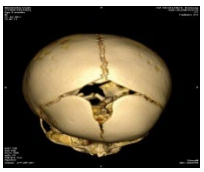
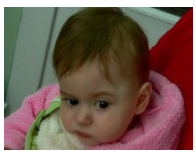
a  b  c  d 

Figure 4.17. **Unilateral coronary craniosynostosis: a - at the age of adolescence without surgical treatment; b - CT scan of the skull at this adolescence; c - unilateral craniosynostosis at the age of up to one year before treatment; d - unilateral craniosynostosis after surgical treatment**

4.11. Evaluation of the obtained results

Craniofacial dysmorphisms include a very broad spectrum of skull and facial deformities, expressed by both qualitative and quantitative changes. One method of assessment is anthropometric, but in craniofacial surgery, this method does not cover all the problems addressed. Congenital facial dysmorphisms, included in the syndrome or in rare clefts, are the most serious from an aesthetic point of view.

Through the analysis carried out in this study, we found that all forms of congenital facial dysmorphism are severe or very severe. After the surgical treatment, all these forms show an improvement in aesthetic appearance. However, with age, the aesthetic appearance of the face tends to worsen, although the results are better than in children who did not have surgery in early childhood. The most severe forms of congenital dysmorphism are those included in the syndrome and bilateral labio-maxillo-palatine clefts. In these cases, we applied midface advancement according to Le Fort III, Le Fort II, plus zygomatic repositioning, monobloc, or facial bipartition. Both the indications for surgery and the used techniques varied according to the referral time and the bone defect location. Surgical techniques have ranged from limited craniectomy to calvarial remodeling, with the more recent introduction of endoscopic methods in these children. Thus, craniosynostosis remodeling requires early and multidisciplinary involvement of specialists in neurosurgery, maxillofacial surgery, ENT, ophthalmology, neuropsychology, speech therapy, occupational therapy, and genetics. This would ensure the pathological process stopping, the restoration of the aesthetic appearance and functional relationships, especially motor skills (general and fine), the development of sensory processes, and the child's personality.

At the same time, timely surgical treatment of craniosynostosis can ensure normal brain development in the future.

5. OBTAINED RESULTS AND DISCUSSION

My participation in the studies and research led me to the selection of three pathological conditions of craniofacial anomalies at the early stage: plagiocephaly, craniosynostosis, and clefts, aiming the awareness-raising of specialists at the early diagnosis stage to prevent their secondary complications.

Depending on the morphological and structural disorders degree, they are divided into two basic types: *macro-somatic* (the structural defect can be determined by simple methods) and *micro-somatic* (requiring the application of complex investigation methods), both of which

require the calculation function: a) compensated; b) relatively (partially) compensated; c) decompensated.

In the first stage of clinical manifestation, which can last variably over time, we only show biochemical changes, later functional disturbances appear, associated with motor disturbances, which generate the partial inhibition of the sucking reflex components. At this stage of the pathological process, most children require curative intervention, and most frequently the surgery effectiveness is increased and the child's viability is avoided by secondary complications (Figure 5.1).

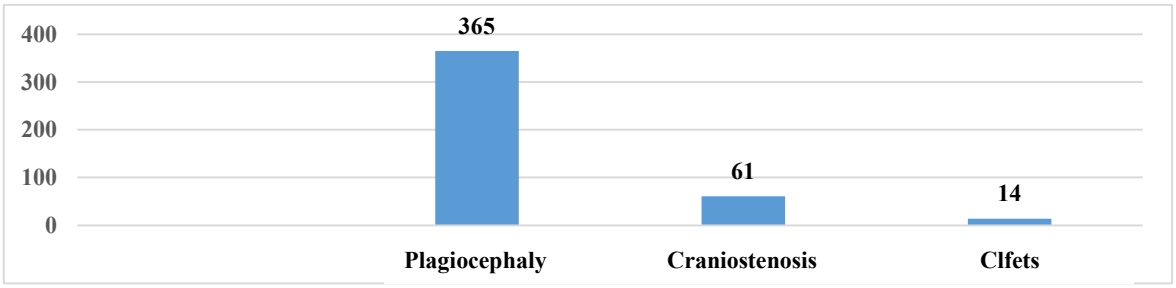


Figure 5.1. **The structure of craniofacial dysmorphism in children**

The harmful action of the predominant factors manifests itself through asphyxia, hypoxia, and craniocervical trauma depending on the clinical manifestation forms ($p<0.05$) (figure 5.2).

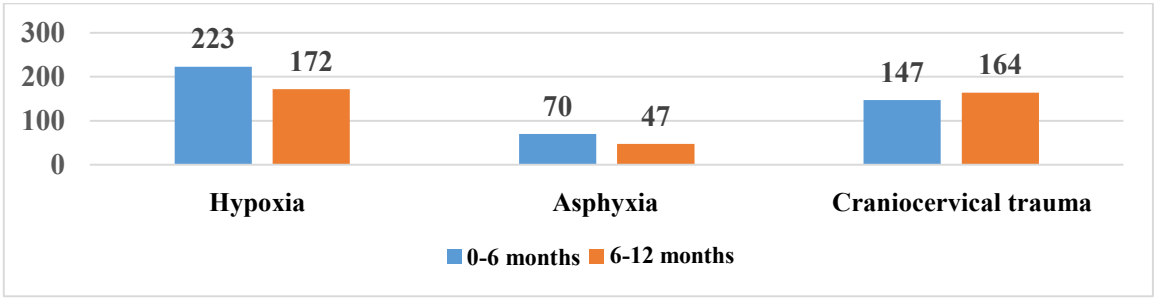


Figure 5.2. **Consequences of harmful factors in children with craniofacial dysmorphism in the first year of life**

Analyzing the clinical manifestations of craniofacial dysmorphism in children in the first year of life, we found food culture defects in about 72% of cases, with the predominance of artificial feeding in 60% of cases, in 38.7% of children coming from families with psycho-emotional tension, and 22.6% of cases had positive tests at intrauterine infections.

In order to examine the perfect coordination between sucking, swallowing, and breathing in children with craniofacial dysmorphism, we analyzed the sucking pattern through the automatism activity before treatment and, evolutionally, after the treatment with special headphones and surgical interventions. This fact allowed us to highlight both functional and

organic disorders of tongue and mandible movements, correspondingly, of the sucking reflex in 39.3% of cases.

Thus, in the craniofacial dysmorphism in children, we observe the sucking reflex dissociation of the upper and lower lip contraction, followed by specific closing and opening jaw movements compared to the control group children. Possibly for this reason the tongue performs chaotic anteroposterior movements, ensuring the delayed milk transmission to the hypopharynx. So, the automaticity of sucking, swallowing, and breathing are arrhythmic and uncoordinated, correspondingly, they do not ensure the automaticity of the sucking reflex, as a consequence, two actions of swallowing are followed by one of breathing. This condition creates the pathological link associated with other disorders, especially language (17.7% cases) in the form of dysarthria (42.2%), alalia (31%) and other speech disorders (26.8%), which, in case of metratio we also highlight vestibular changes with hearing loss (6.8% of cases), palatal deformities (17% of cases), chronic nutritional disorders (4.6% of cases), undersized appearance of the oral cavity and lower jaw (in 3.4% of cases), micrognathia (3% of cases), and in 1.6% of cases we also detected various forms of tongue malformations (figure 5.3).

Depending on the type of structural-anatomical and functional changes that follow as secondary consequences, we analyzed vertical, horizontal, and transverse parameter variables, compared to the same indices of children in the control group.

With regard to the results, they were children with plagiocephaly (figures 5.4 and 5.5), craniosynostosis, especially non-syndromic in 61 children, and syndromic in 20 (figures 5.6 and 5.7), nasolabial clefts in 14 children (figures 5.8 and 5.9) according to their gender.

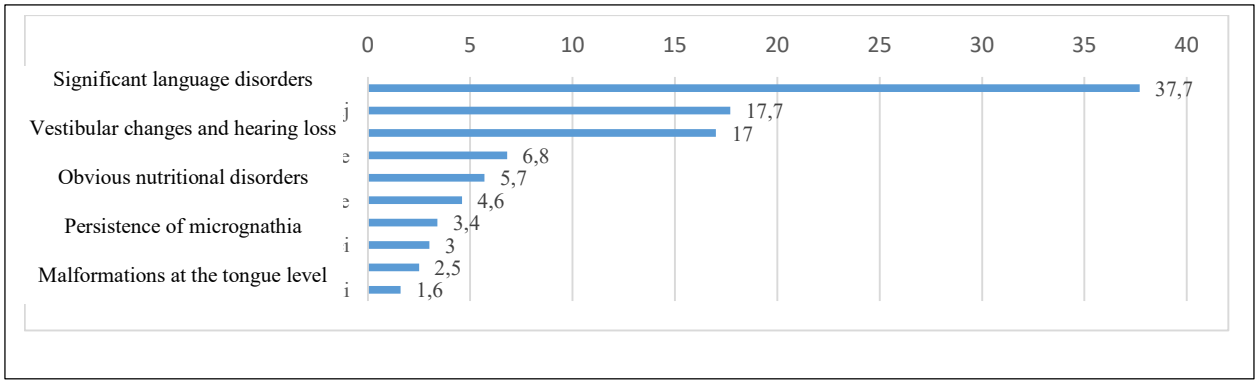


Figure 5.3. **Distribution of children with secondary complications of craniocerebral dysmorphism**

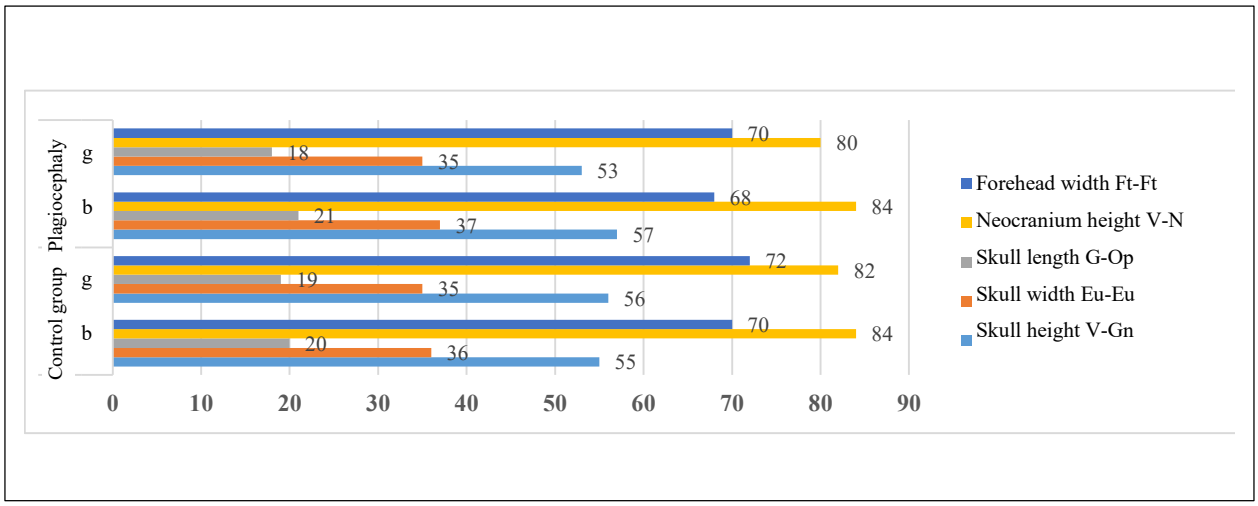


Figure 5.4. **The values of variable parameters of the neurocranium in children with plagiocephaly**

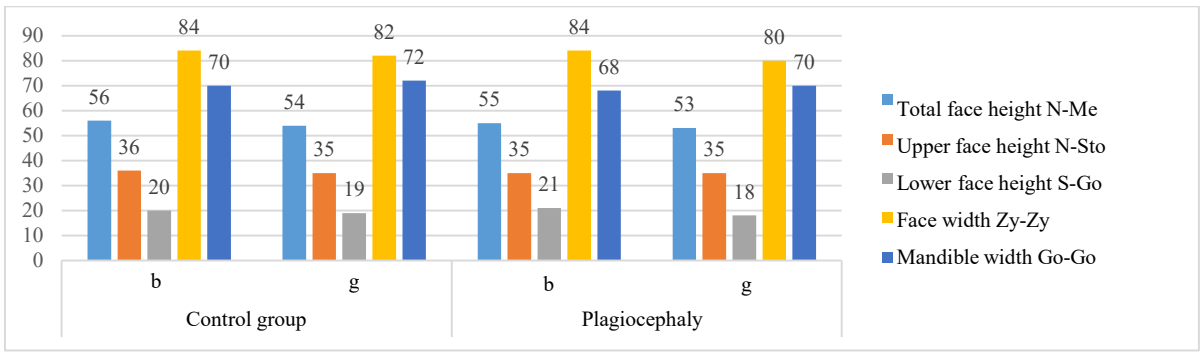


Figure 5.5. **The values of the variable parameters of the viscerocranium in children with plagiocephaly**

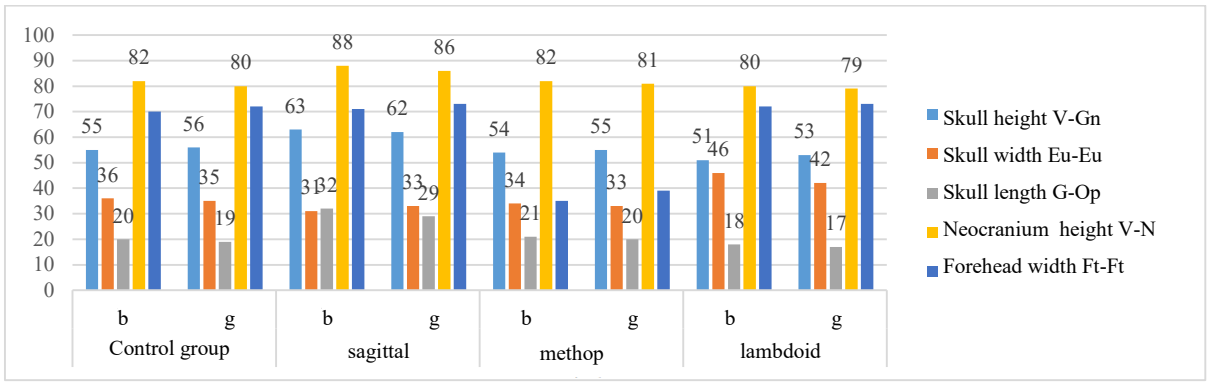


Figure 5.6. **The values of variable parameters of the neurocranium in children with craniosynostosis**

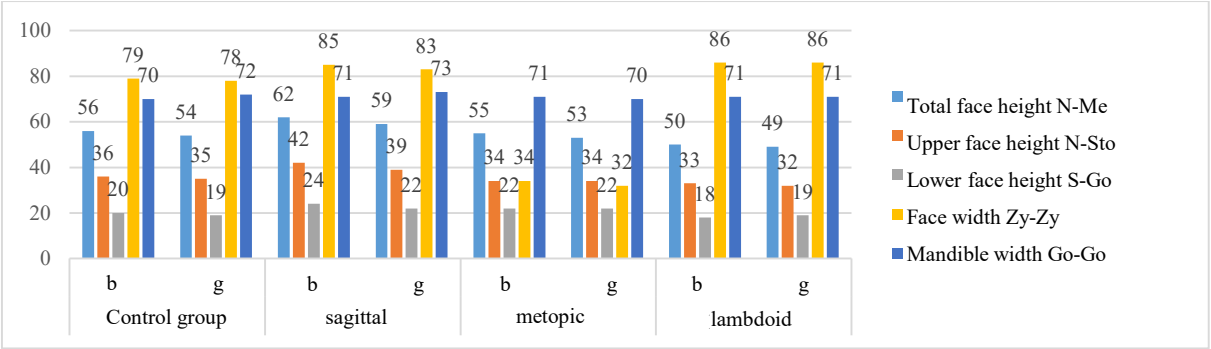


Figure 5.7. **The values of the variable parameters of the viscerocranium in children with craniosynostosis**

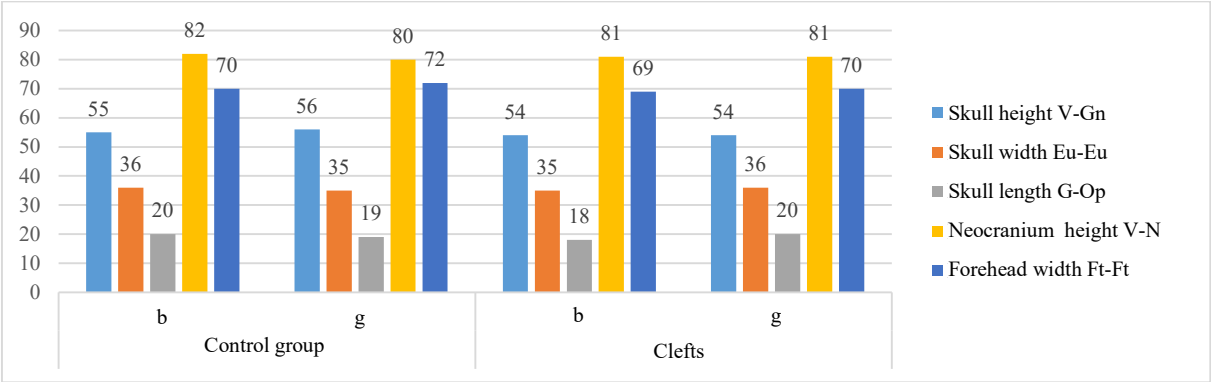


Figure 5.8. **Values of neurocranial variable parameters in children with clefts**

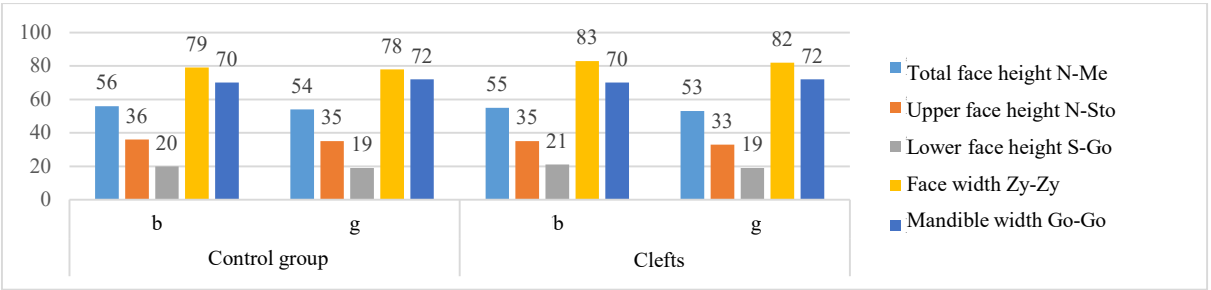


Figure 5.9. **Values of neurocranial variable parameters in children with clefts**

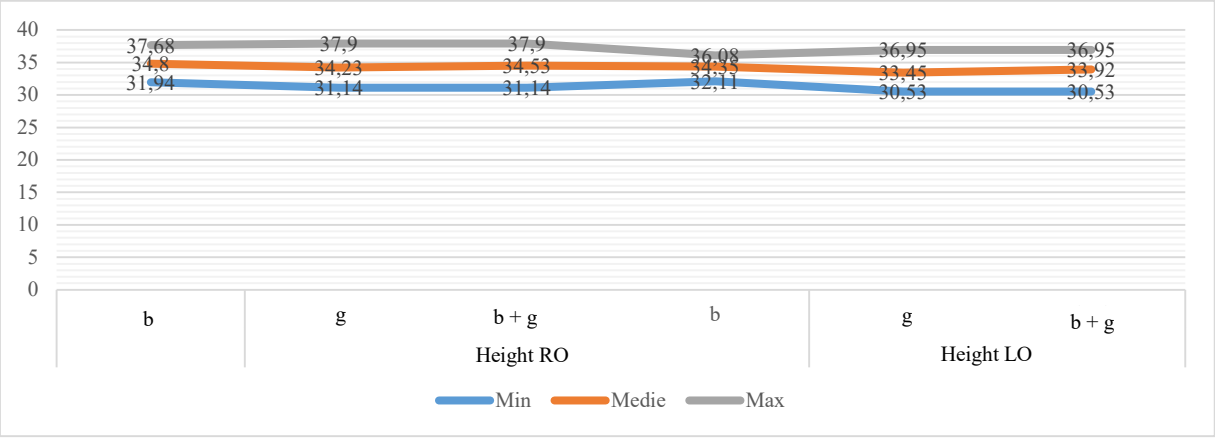
Thus, as can be seen from figures 5.6-5.9, in the vertical and horizontal profiles in a) sagittal craniosynostosis, the average parameters were found an increase for three indicators: skull height (V-Gn, V-N, $p<0.01$) and skull length (G-Op, $p<0.05$); b) in metopic c craniosynostosis we observed a reduction in the forehead width (Ft-Ft, $p<0.01$), especially of the orbits; c) lambdoid craniosynostosis or altered parameters of skull width (Eu-Eu, $p<0.001$), upper (N-Sta, $p<0.01$) and lower (S-Go, $p<0.01$) face height, face width (Zy-Zy, $p<0.01$) and mandible widths (Go-Go, $p<0.05$).

In consequence, the sucking reflex mechanisms and its components in conditions of craniofacial dysmorphism, reflect its fundamental role in the organism's survival and represent one of the most complex neuromuscular activities of the human body in general.

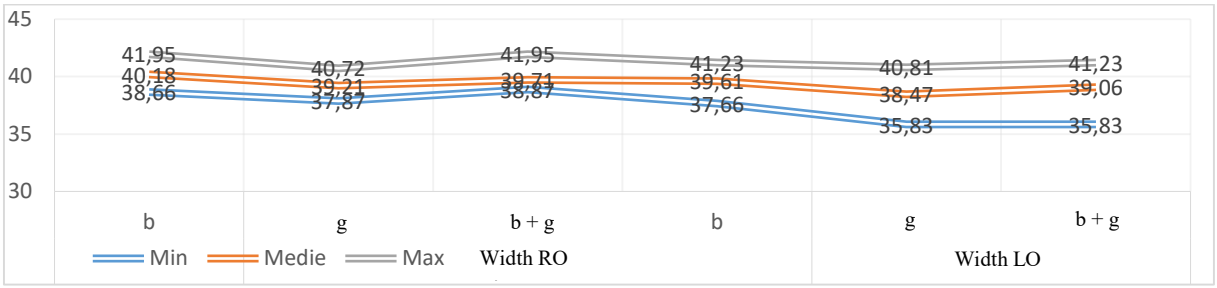
From what was previously reported, we conclude that the associated mechanism of the sucking, swallowing, and breathing reflex is directly dependent on two primary factors: the morphological state of the anatomical structures in the oro-maxillo-facial region (oral, buccal, and lingual cavities) and the degree of their neuro-reflective functionality.

In craniofacial dysmorphism, the neuro-reflective functions of the sucking/swallowing/breathing process are influenced by the changing activity of the negative anatomical structures evolution, the dysregulation of their functions, especially of the phenomena of mastication, swallowing, and breathing, especially in the first year of life, which also more severely alters the craniofacial dysmorphism with each stage of growth.

One of the most complex skull structures that manifests itself through the strict individualization of diameters and volume from one child to another is the orbit. An important role in this context is played by the measurement parameters of width, height, orbital index, inter-orbital and bio-orbital distance, which highlight the compensation degree of the pathological process and the absolute indications for surgical intervention in these children. We found that in craniofacial dysmorphism in children, the orbital index is higher in girls than in boys. In the decompensated craniosynostosis state, we demonstrated that the inter-orbital distance is more significant, simultaneously with the difference between the orbit width parameter, it presents statistically significant differences ($p<0.001$) (figure 5.10). By summarizing the characteristics of the orbital parameters in children with different types of craniosynostosis, we can confirm or deny the occurrence of secondary complications in craniofacial deformities of the craniosynostosis type. In this sense, it has a particularly large role in the diagnosis of craniofacial deformities, especially craniosynostosis ($p<0.001$).



a



b

Figure 5.10. **Height (a) and width (b) parameters of the orbit in children with craniofacial dysmorphism**

By analyzing the minimum and maximum values of the orbits height in children with craniosynostosis, we highlight a greater dynamic of the orbital index in girls versus the values in boys, and the inter-orbital and bio-orbital distance register lower values. Analyzing the parameters' average values of the orbits in craniofacial dysmorphism, we found that the inter-orbital index of the left orbit can be considered the most objective parameter, together with the values of the right ear location, mainly in boys, it reflects the decompensation degree of the pathological process.

In all forms of craniosynostosis known by their secondary consequences, surgical intervention has a major indication. The study of the cranial box put into discussion the involvement possibilities in the diagnostic process of variable parameters using the algorithm of diagnosis, treatment, and prognosis, using CT images comparing the obtained results with children in the control group. Based on the results of the study, we observe an association of facial asymmetry with orbital asymmetry through the insignificant width reduction of the left orbit, especially in boys with craniosynostosis, and in metopic craniosynostosis, especially in girls, both parameters are significantly smaller ($p<0, 05$).

In the more specific nasolabial clefts, the orbital height parameters were detected, more evident in girls, followed by the average increase of the orbital index, especially the right, but this difference is insignificant ($p>0.05$).

However, the surgical approaches had an individual character, depending on the type of craniofacial deformation and the age of the child, especially the craniosynostosis, and the compensation stage of the cranial box bones, involved in the pathological process.

In this sense, we applied 12 types of surgical interventions, based on clinical and imaging diagnostic criteria, reflecting the structural-anatomical and functional decompensation degree of the systems involved.

GENERAL CONCLUSIONS

1. Craniofacial deformities in children are clinically manifested in the form of positional plagiocephaly - in 83% of cases, craniosynostosis - in 13.9% of cases, and labio-maxillo-palatine clefts - in 3.2% of cases. They have an incidence of 44.2% cases in children with neurological disabilities, 17.8% of children from special institutions for children with sensory deficiencies, and 4% of children from pre-university schools.
2. The anthropometric and cephalometric tracing results determine the capacity for evolutionary pathological change of hard tissues in relation to the deregulation degree of soft tissue functions compared to the median line in plagiocephaly - in 15.3% of cases, and in the early fusion conditions of cranial sutures through syndromic craniosynostosis or nonsyndromic - in 1.2% cases, and in the general pediatric population this ratio is 4.3% and 0.6% cases respectively.
3. The neurophysiological parameters of the EMG in the initial stage and when applying the functional tests on the viscerocranium muscles highlight the quantitative and qualitative changes in the muscle neuroreflective function, both pre- and postoperatively, and can be used to assess the effectiveness degree of the applied treatment.
4. In 52.7% of craniofacial deformations cases at the age of 6 months, we found sucking and swallowing difficulties in children, who at birth in up to 16% of cases showed nutritional disorders and in up to 7.4% of cases required nasogastric tube. In these children, in their early and late childhood we found language disorders (42% of cases), in the form of alalia in 57 children (31% of cases) or dysarthria - in 78 children (42.2% of cases) and neurosensory hearing disorders - in 50 children (26.8% cases), and in 17% cases - dentition and palatal deformations. In the tongue muscles EMG in these children, we highlight the asymmetry of the contraction and relaxation capacity of the tongue, which simultaneously also participates in the facial asymmetry formation.
5. The application, with a duration of at least 3 months, of orthodontic helmets in the cranial box deformation, creates conditions to relieve mechanical stress by creating external forces that relieve the increased elasticity of the cranial bones, thus causing the restoration of neuromuscular functions diminished in plagiocephaly, compared with craniostenosis.
6. Surgical intervention in the craniosynostosis treatment is the sure way to create the necessary space for normal brain development and to obtain an optimal level of aesthetic and functional harmony.

PRACTICAL RECOMMENDATIONS

At the national level

- To increase the effectiveness of the surgical treatment, we recommend that a linear craniotomy be performed at the age of 6-12 months, when the soft tissues are cut parallel to the fused joint. In children over 3-5 years, the surgical intervention includes circular craniotomy, when the cutting of the soft tissues which cover the skull includes the simultaneous cutting of the periosteum, without desiccation of the soft tissues near the temporal arteries. We recommend this operative process fragmentarily in two stages with an interval of 2 weeks. In decompensated craniosynostosis cases in untreated children, we recommend performing a bilateral flap craniotomy by opening the cranial vault.
- It is recommended to raise the informational level of neonatologists, neuropediatricians, family doctors and the population regarding the cranial box deformations in newborns and infants, thus increasing early addressability to the neuropediatrician and benefiting from the special helmets application. At the same time, it is necessary to facilitate the access of the population - both urban and rural - to specialized medical services.
- Equipping medical institutions, especially rural ones, with modern equipment, especially with special helmets of different sizes, both for boys and girls, to ensure the possibilities of preventing secondary complications.
- Increasing the access of patients with craniofacial deformities and their inclusion in the list of mandatory brain CT investigations, for which the expenses are covered by the National Medical Insurance Company.

At the level of the health system and the dental service

- The inclusion in the study programs of the training courses for dentists, oro-maxillo-facial surgeons, neonatologists, and family doctors of the craniofacial dysmorphism topic in order to optimize the appropriate and early diagnostic and therapeutic assessment of patients with craniosynostosis for obtaining control over the secondary complications occurrence in these patients and reducing the cost of the treated case.
- Professional training of specialists, including through training in national and foreign specialized clinics, with the aim of improving the quality of provided medical services, which will have a positive economic impact on the life's quality of children with craniosynostosis associated with neurological disorders.

- Development of a clinical-instrumental evaluation strategy for children with detected primary craniofacial dysmorphism, the methods selection for establishing the diagnosis in these patients and the periodic updating of national and institutional clinical protocols to strengthen the regulatory base, in order to provide specialized medical assistance for craniofacial dysmorphism in children.

BIBLIOGRAPHY

1. Aarnivala, H.; Vuollo, V.; Harila, V.; et al. The course of positional cranial deformation from 3 to 12 months of age and associated risk factors: A follow-up with 3D imaging. In: *Eur. J. Pediatr.*2016; 175: 1893–1903. [Google Scholar] [CrossRef] [PubMed]
2. Aarnivala, H.; Vuollo, V.; Heikkinen, T.; et al. Accuracy of measurements used to quantify cranial asymmetry in deformational plagiocephaly. In: *J. Craniomaxillofac. Surg.*2017;45: 1349–1356. [Google Scholar] [CrossRef]
3. Badiu, G.A.; Tarţa-Arsene, E.; Ispas, Al.T.; et al. Sex Determination Using the Dimensions of Human Orbits. In: *Revista Română de Anatomie Funcţională şi Clinică, Macro- şi Microscopică şi de Antropologie*. 2019; XVIII(3): 145-151.
4. Ballardini, E.; Sisti, M.; Basaglia, N.; et al. Prevalence and characteristics of positional plagiocephaly in healthy full-term infants at 8–12 weeks of life. In: *Eur. J. Pediatr.*2018;177: 1547–1554. [Google Scholar] [CrossRef] [PubMed]
5. Coculescu, E.C.; Coculescu, B.I. *Algia bucală nespecifică. Compendiu: fiziopatologie, diagnostic pozitiv, direcţii terapeutice*. Bucureşti: Editura Universitară „Carol Davila", 2019.
6. Fala V., Lacusta V., Romaniuc D., Fala P. Metodă de diagnostic al dereglărilor activității mușchilor masticatori. Brevet nr. MD1093Z2017.06.30 din 30.11.2016.
7. Gudumac E., Babuci S., Tica C., Petrovici V., Nacu V., Ionescu C., Negru I. Comparative cellular local response in abdominal defect plastic surgery with bovine pericardium and bovine fascia preserved in formaldehyde in experimental rabbits. In: ARS Medica Tomitana Constanța, România,2017, p. 83-93. ISSN 1841-4036
8. Kunz, F.; Schweitzer, T.; Große, S.; et al. Head orthosis therapy in positional plagiocephaly: Longitudinal 3D-investigation of long-term outcomes, compared with untreated infants and with a control group. In: *Eur. J. Orthod.*2019;41: 29–37. [Google Scholar] [CrossRef]
9. Lozan, T. Epidemiology of primary headaches among adolescents in the Republic of Moldova. International Conference "Cefaleea la copil" organized by the Moldovan Pediatric Society jointly with the International Headache Society and the Child and Adolescent Neuropsychology Society from the Republic of Moldova, Chisinau 25.05.2018.

10. MANOLE, E., LISNIC, V., GROPPA, S., COSTRU-TAŞNIC, E., FILIOGLO, A., ODAINIC, O., MORE, V., DRAGAN, G., CIOBANU, N. Registrul RES-Q în Republica Moldova – primele rezultate naţionale în cadrul unui proiect internaţional. În: Buletinul Academiei de Ştiinţe. Ştiinţe Medicale. Chişinău, 2017, nr. 5(57), pp. 72-77. ISSN 1857-0011.

11. Moldovanu, I., Rotaru, L., Odobescu, S., Rotaru, V., Lozan, T., Grosu, O., Concescu, D. Asimetria creierului. Aspecte anatomice şi funcţionale (Revista literaturii). Buletinul Academiei de Ştiinţe a Moldovei. Stiinţe medicale. Nr. 2(38)/2013, p.156-168/ISSN 1857-0011

12. Öwall, L.; Darvann, T.A.; Larsen, P.; et al. Facial Asymmetry in Children with Unicoronal Synostosis who have Undergone Craniofacial Reconstruction in Infancy. In: *Cleft Palate-Craniofac. J.*2016;53: 385–393. [Google Scholar] [CrossRef]

13. Papilian, V. *Anatomia omului. Aparatul locomotor*. Vol. I. Bucureşti: Bic ALL, 2003.

14. Popovici, F. Durerea în teritoriul oro-maxilo-facial. Nevralgia de trigemen. In: Compendiul de chirurgie oro-maxilo-facială. Vol. II (sub redacţia Bucur A.). Bucureşti: Q Med Publishing, 2009.

15. Scully, C.; Felix, D.H. Oral Medicine – Update for the dental practitioner orofacial pain. In: *British Dental Journal*. 2006; 200(2): 75-80.

16. Siqueira de Lima, L.; Brunetto, D.P.; Nojima, M.D.C.G. Evaluation of facial soft tissue thickness in symmetric and asymmetric subjects with the use of cone-beam computed tomography. In: *Am. J. Orthod. Dentofac. Orthop.*2019;155: 216–223. [Google Scholar] [CrossRef] [PubMed]

17. Topalo V., Mostovei A., Chele N., Sîrbu D., Suharschi I., Atamni F., Mostovei M. Metodă de evaluare a remanierilor osoase periimplantare. Medicină Dentară NR. 1 (34) / 2015.

18. Van Vlimmeren, L.A.; Engelbert, R.H.; Pelsma, M.; et al. The course of skull deformation from birth to 5 years of age: A prospective cohort study. In: *Eur. J. Pediatr.*2017;176: 11–21. [Google Scholar] [CrossRef]

19. Vuollo, V.; Holmström, L.; Aarnivala, H.; et al. Analyzing infant head flatness and asymmetry using kernel density estimation of directional surface data from a craniofacial 3D model. In: *Stat. Med.*2016;35: 4891–4904. [Google Scholar] [CrossRef]

20. Vuollo, V.; Sidlauskas, M.; Sidlauskas, A.; et al. Comparing Facial 3D Analysis with DNA Testing to Determine Zygosities of Twins. In: *Twin Res. Hum. Genet. Off. J. Int. Soc. Twin Stud.*2015;18: 306–313. [Google Scholar] [CrossRef]

21. White, T.D.; Black, M.T.; Folkens, P.A. *Human osteology*. California: Academic Press, 2012.

22. Wikipedia contributors. Mann-Whitney U test Wikipedia} The Free Encyclopedia 2019. https://en.wikipedia.org/w/index.php?title=Mann–Whitney_U_test&oldid=899337823

23. Woda, A.; Dao, T.; Grémeau-Richard, C. Steroid dysregulation and stomatodynia (burning mouth syndrome). In:*J. Orofacial Pain*. 2009; 23: 202-210.

24. Resolution WHA63.17. Birth defects. Sixty-third World Health Assembly, Geneva, 17–21 May 2010. Geneva: World Health Organization, 2010. [citat 29.04.2015] Available at: http://apps.who.int/gb/ebwha/pdf_files/WHA63/A63_R17-en.pdf

25. Young, N.M.; Sherathiya, K.; Gutierrez, L.; et al. Facial surface morphology predicts variation in internal skeletal shape. In: *Am. J. Orthod. Dentofac. Orthop.*2016;149: 501–508. [Google Scholar] [CrossRef]

26. Zakrzewska, J.M. Multi-dimensionality of chronic pain of the oral cavity and face. In:*J. Headache Pain*. 2013; 14(1): 37. Disponibil pe: doi: 10.1186/1129-2377-14-37

27. Zhurov, A.; Richmond, S.; Kau, C.H.; Toma, A. Averaging Facial Images. In: *Three-Dimensional Imaging for Orthodontics and Maxillofacial Surgery*. Hoboken, NJ, USA: John Wiley & Sons, Ltd. 2010; 126–144. [Google Scholar]

28. Бельченко, В.А.; Асадов, Р.Н.; Притыко, А.Г.; Хаджиев, Э.М. Двусторонняя реконструкция лобно-верхнеорбитальных отделов черепа у пациентов синостозной лобной плагиоцефалией. 2014. Available at: http://www.npcmed.ru/wp-content/uploads/2014/08/Lobnaya-plagiocefaliya.pdf

LIST OF PUBLISHED WORKS ON THE THESIS THEME

1. Monographs

1.1 Single-author monographs

1.1.1 **RAILEAN, S.** *Anomalii congenitale carnio-maxilo-faciale la copii – abordare multidisciplinară*. Chișinău: Centrul Editorial Poligrafic *Medicina,* 2020. 267 p. ISBN 978-9975-56-772-5.

2. Articles in scientific journals

2.1 în revistele din bazele de date Web of Sciense și SCOPUS

2.1.1 DAVID, L. et al. Cranio-facial dysostosis of Crouzon Syndrom. Bibliography review. Case report. In: *Archives of the Balkan Medical Union*. Chișinău, 2008, v. 43, nr. 3, pp. 359-362. ISSN 0041-6940.

2.1.2 KIRMAN, C. et al. Difficulties of delayed treatment of craniosynostosis in a patient with Crouzon, increased intracranial pressure, and papilledema. In: *The Journal of Craniofacial Surgery*. 2011, nr. 22(4), pp. 1409-1412. ISSN 1049-2275. eISSN 1536-3732. https://journals.lww.com/jcraniofacialsurgery/Abstract/2011/07000/Difficulties_of_Delayed_Treatment_of.54.aspx

2.1.3. MORGAN, V. et al. Spring-Assisted Surgery for Treatment of Sagittal Craniosynostosis in Moldova: A Preliminary Report ORIGINAL ARTICLE. In: *The Journal of Craniofacial Surgery.*ian-feb 2021, Nr. 32 (1), pp. 164-167 ISSN 1049-2275. eISSN 1536-3732. https://journals.lww.com/jcraniofacialsurgery/Abstract/2021/02000/Spring_Assisted_Surgery_for_Treatment_of_Sagittal.39.aspx

2.2. in recognized foreign scientific journals

2.2.1. **RAILEAN, S.** et al. Incidența deformațiilor craniene la copiii cu dizabilități neurologice severe și impactul lor asupra ocluziei. În*: Revista Română de Medicină Dentară.* Iași,România, 2015, vol. 18, nr. 1, pp. 5-20. ISSN 1841-6924.

2.2.2. **RAILEAN, S.** The neurophysiology aspect of congenital craniofacial deformities. În: *Romanian Journal of Stomatology.* vol. 68, nr. 4, 2022, pp. 160-167. ISSN 1843-0805, e-ISSN 2069-6078, ISSN-L 1843-0805.https://rjs.com.ro/ .

2.3 in the scientific journals from the National Register of specialized journals, indicating the category:

B category

2.3.1 **RAILEAN, S.** Elaborarea criteriilor de tratament chirurgical și conservator la copilul cu craniostenoză. În: *Buletin de Perinatologie*. Chişinău, 2007, nr. 4, pp. 30-33. ISSN 1810-5289.

2.3.2 **RAILEAN S.** Deformațiile scheletului craniofacial la copii (plagiocefaleea). *Medicina Stomatologică*. Chișinău, 3(8)2008, pp. 61-63. ISSN1857-1328.

2.3.3 **RAILEAN, S.** et al. Malocluziile la copiii cu dizabilități severe în Republica Moldova. În: *Medicina Stomatologică*. Chișinău, 2014, nr. 3(32), pp. 20-24. ISSN1857-1328.

2.3.4 POȘTARU, C. et. al. Factorii de risc în anomaliile dento-maxilare la copiii cu dizabilități neurologice. În: *Medicina Stomatologică*. Chișinău, 2014, nr.1(30), pp. 16-19. ISNN1857-1328.

2.3.5 **RAILEAN, S.,** LUPAN, I., CRIHAN, A. Aspectul relațiilor intermaxilare la copiii cu deformații craniene din instituțiile de învățământ preuniversitare din Republica Moldova. În: *Medicinam Stomatologică*. Chișinău, 2015, nr. 2(35), pp. 39-42. ISSN 1857-1328.

2.3.6 **RAILEAN, S.** et al. Modificările cosmetice ale feței la copiii de vîrstă școlară cu deformații craniene. În: *Medicina Stomatologică*. Chișinău, 2015, nr. 3(36), pp. 39-42. ISSN 1857-1328.

2.3.7 **RAILEAN, S.** Incidență deformațiilor craniene la copii de vârstă școlară. În: *Buletinul Academiei de Științe a Moldovei. Științe Medicale*. Chișinău, 2015, nr. 1(46), pp. 265-269. ISSN 1857-0011.

2.3.8 **RAILEAN, S**. et al. Profilaxia complicațiilor estetice a feței prin plastia chirurgicală a deformațiilor craniene de tip craniostenoze. În: *Medicina Stomatologică.* Ediție consacrată celui

de al XVIII-lea Congres al Asociației Stomatologilor din RM. Chișinău, 2016, nr. 3(40), pp. 70-76. ISSN 1857-1328.

2.3.9 **RAILEAN, S.** Diagnostic algorithm of cranial deformities in children with severe neurogical disorders. In*: Curierul Medical*. Chișinău, 2016, vol. 59, nr. 2, pp. 15-19. SSN 1857-0666.

2.3.10 **RAILEAN, S.** Cranial deformities as a risk factor in the harmonious development of oral and maxillofacial region. În*: Curierul Medical*. Chișinău, 2017, vol. 60, nr. 2, pp. 13-17. ISSN 1857-0666.

2.3.11 **RAILEAN, S.** et al. Experiența tratamentului chirurgical al stenozelor sagitale la vîrsta de sugar a copilului în: Republica Moldova. În: *Buletinul Academiei de Științe a Moldovei*. *Științe Medicale*. Chișinău, 2017, nr. 2 (54), pp. 286-291 ISSN 1857-0011.

2.3.12 **RAILEAN, S.** et al. Aspectul cosmetic evolutiv al feței la copiii cu despicăturicraniofaciale. În: *Buletinul Academiei de Științe .a Moldovei. Științe Medicale.* Chişinău, 2019, nr. 4(64), pp. 190-195. ISSN 1857-0011.

2.3.13 POŞTARU, C. et al. Morfometria cranio-maxilo-facială la adolescenţi cu şi fără despicături labio-maxilo-palatine asociate cu malocluzia de clasa III. În: *Medicina Stomatologică.* Chișinău, 2020, vol. 3(56), pp. 127-135. ISSN 1857-1328.

2.3.14 **RAILEAN, S.** et al. Reabilitarea chirurgical-ortodontică a copiilor cu despicături totale unilaterale. În:*Buletinul Academiei de Științe a Moldovei. Științe Medicale.* Chișinău. 2022, nr. 2(73), pp. 48-53. ISSN 1857-0011.

2.3.15. **RAILEAN, S.** et al. Primary corectionon the nasal deformity on patients with uniletarel cleft lip. În: *Buletinul Academiei de Științe a Moldovei. Științe Medicale.* Chișinău. 2022, nr. 2(73), pp. 54-59. ISSN 1857-0011.

C category

2.3.16.**RAILEAN, S.** Deformațiile scheletului cranio-facial la copii (plagiocefaleea). În: *Medicina Stomatologică*. Ediție consacrată celui de-al XIV-lea Congres Național al ASRM. Chișinău, 2008, nr. 3(8), pp.64-67. ISSN 1857-1328.

2.3.17.**RAILEAN. S**., POROSENCOV, E.Evaluarea radiologică a rezultate lor grefării osoase secundare la pacienţi cu despicătură labio-maxilo-palatină. În: *Medicina Stomatologică.*Chișinău. 2021, vol. 3(59) pp. 51-56. ISSN 1857-1328.

2.3.18.**RAILEAN, S**., CIOBANU, G. Reabilitarea chirurgical ortodontică la copiii cu sindromul Tricer Collins. În:*Journal of stomatological medicine*/M*edicina Stomatologică.*Chișinău, 2022, vol. 1(61), pp. 84-87. ISSN 1857-1328.

4. Theses in scientific collections

4.1. in the works of international scientific conferences (abroad)

4.1.1. **RAILEAN, S**., SPINEI, A., POCITARI, C. Deformațiile cranio-dento-faciale la copiii cu dizabilități neurologice de vîrstă școlară. În: *Al XVIII-lea Congres Internațional UNAS.* București, România, 2014, pp. 46-47.

4.1.2. **RAILEAN, S**., LUPAN, I. Plagiocephaly incidence in schools of the Republic of Moldova with special needs. New Interdisciplinary Approaches in Oral and General Rehabilitation. In:*20-th Jubilee Edition Bass Balkan Stomatological Society*.București,România, 2015, p.366.

4.1.3. **RAILEAN, S.** et al. The severity of malocclusion in children with special needs in the Republic of Moldova. In: *92-nd EOS Congress.* Stockholm, Sweden, 2016, www.eons2016.org, poster SP336.

4.1.4. POȘTARU, C., **RAILEAN, S**., MELNIC, S. Malocclusion in mixed and permanent dentition in children from Republic of Moldova. In: *XV International Congress of Medical Sciences.* Sofia, Bulgaria, 2016, p. 301.

4.1.5.**RAILEAN, S.**et al. Orthopedic skull shape correction device. In: *Euroinvent. European Exhibition of Creativity and Innovation.* 2017, pp. 184-185.

4.1.6 **. RAILEAN, S.** et al. Incidence of cranial deformity according to the type of the school. In: *22nd International Congres of BASS*, Balkan Stomatological Society, "Contemporary challenges in dentistry". Grecia, Thessaloniki, 2017 pp. 288, p 366. www.e-bass.org.

4.1.7.**RAILEAN, S**., RAILEAN, Gh., SANGER, C. The risk of complications of untreated nonsyndromic craniosynostosis in children. Case presentation. „IAOMS-AÇBID Joint 12th Congress". Turkey, Antalya, 2018, p. 110. www.acbid.orgwww.iaoms-acbid2018.org

4.1.8.POSTARU, C. Functional electromyography of mastication muscle in children with malocclusion and tension type headache. In: *2nd Congress of the Balkanic Association of Orthodontic Specialist, 9th Romanian Association for Excellence in Orthodontics Congress*. Iasi, Romania, 2018, p.102.

4.1.9. POSTARU, C. Prevalence of malocclusion among 6-18 year old children with special needs in the Republic of Moldova. In: *94th Congress of the European Orthodontic Society.* Edinburg, U.K., 2018, p. 284.

4.1.10. **RAILEAN, S**. Malocclusion in school children with cranial deformities. In: The *24th EACMFS Congress.* Munich, Germany, 2018. www.eacmfs.eu

4.1.11. POSTARU, C. Caracterul cefaleelor de tensiune la copii cu anomalii dento-maxilare. În: *Al XXII-lea Congress Internațional al UNAS,* București, România. 2018, pp. 32-33.

4.1.12. **RAILEAN, S.** et al. Spring-assisted surgery for treatment of sagittal craniosynostosis in Moldova. In: *The 18th International Congress of Craniofacial Surgery (ISCFS)*. Paris, France, 2019, p. 71.

4.1.13. DILLINGHAM, C. et al. International establishment of craniofacial program: 15 years in the Republic of Moldova. In: *International Congress of Craniofacial Surgery (ISCFS)*. Paris, France, 2019, pp. 55-56.

4.1.14.**RAILEAN, S**. Recuperarea chirurgicală ale anomaliilor congenitale cranio-maxilo-faciale la copii. În: *Simpozium Uniunea Națională a Asociației Stomatologilor (UNAS)* cu tema „Interrelații între medicina generală și practica stomatologică". București, România, 2019, pp. 43-44.

4.1.15. POȘTARU, C., **RAILEAN, S**,. RAILEAN, GH. Surface electromyography evaluation of masticatory muscle in children with complete unilateral cleft lip and palate. În: *14th International Congress of Cleft Lip and Palate and Related Craniofacial Anomalies*. *Book of Abstracts.* Edinburg, UK. 11th to 15th July 2022. p. 112.

4.2. in the works of national scientific conferences

4.2.1.**RAILEAN, S.**, LUPAN, I., CRIJANOVSCHI, Iu. Morphometrical analyses of the skull in children with positional plagiocephaly. In: Pediatric Surgery International Conference (PerformancesandPerspectives in the Pediatric SurgeryDevelopment). În: *Moldxavian Journal of Pediatric Surgery*. Chișinău, 2017, p. 112.

4.2.2.**RAILEN, S.** et al. Diagnosticul și reabilitarea chirurgical-ortodontică în deformațiile faciale complexe la adolescenți. În: *Conferința științifică anuală:Cercetarea în biomedicină și sănătate calitate, excelență, și performanță.* Aspecte teoretico-practice în stomatologia modernă. Prezentare orală. Chișinău, 2021, p. 456.

4.2.3. POȘTARU, C. Impactul psiho-emoțional în rezultatele tratamentului chirurgical al copiilor cu despicături labio-maxilo-palatine. În: *Conferința științifică anuală. Cercetarea în biomedicină și sănătate calitate, excelență, și performanță.* Aspecte teoretico-practice. Chișinău, 2021, nr. 3(59), pp. 457.

4.2.4.**RAILEAN, S.**, POROSENCOV, E. Evaluarea radiologică a rezultatelor grefării osoase secundare la pacienţi cu despicătură labio-maxilo-palatină**.** În: *Conferința științifică anuală. Cercetarea în biomedicină și sănătate calitate, excelență, și performanță*. *Aspecte teoretico-practice în stomatologia modernă.* Chișinău, 2021, nr. 3(59), pp. 51-55.

4.2.5. POȘTARU, C. Devierea parametrilor cefalometrici la copii cu despicături labio-maxilopalatine unilaterale complete. În: *MJHS. Moldovan Journal of Health Sciences/Revista de Ştiinţe ale Sănătăţii din Moldova.* Culegere de rezumate: Cercetarea în biomedicină și sănătate: calitate, excelența și performanță. Conferința Științifică anuală. 29(3)/2022, 2022 p. 515. ISSN, 2345-1467.

4.2.6. POȘTARU, C. et al. Evaluarea activității mușchilor masticatori la copii cu despicături labio-maxilo-palatine unilaterale in dentația mixtă. În: MJHS. Moldovan Journal of Health Sciences/Revista de Ştiinţe ale Sănătăţii din Moldova Culegere de rezumate. Cercetarea în biomedicină și sănătate: calitate, excelența și performanță. Conferința Științifică anuală. /2022, 29(3), p. 516. ISSN,2345-1467.

5. Patents and other intellectual property

5.1.**RAILEAN, S.**, RAILEAN, Gh., POȘTARU, C. Aparat ortopedic pentru corecția formei craniului. Brevet de invenție N 852, MD 2014. 05. 08. În: *Buletin Oficial de proprietate Intelectuală. MD*. nr. 12/ 2014, p. 34.

5.2.POŞTARU, C., **RAILEAN, S.**, RAILEAN, GH. Metodă de diagnostic al dereglărilor neuromusculare la copii cu anomalii oro-maxilo-faciala..Brevet de invenție, N 1293. În: AGPI, *Buletin de proprietate intelectualăMD.* nr. 12/ 2018. p. 46. http://www.db.agepi.md/Inventions/details/s%202018%200055/LinkTitluElib

5.3. POȘTARU, C., RAILEAN, GH, **RAILEAN, S.**, UNCUȚA, D. Metodă de diagnostic a anomaliilor dentomaxilare la copiii cu tulburări senzoriale centrale Brevet de invenție N. 9396, În: AGPI, *Buletin de proprietate intelectualăMD.* nr. 12/2019, p. 51.http://www.db.agepi.md/Inventions/details/s%202019%200052/LinkTitluElib

5.4.ŢÎBÎRNĂ, Gh., **RAILEAN, S.**, ŢÎBÎRNĂ, A., MÂNĂSCURTĂ, Gh., SPINEI, A., TARNARUŢCHI, R., LISIŢA, N., GOLBAN, R., POROSENCOV, E., LUPAN, R., CIOCHINĂ, M.,Metodă de tratament chirurgical al tumorilor glandei salivare parotide la copii Brevet de invenție N 1549.

http://www.db.agepi.md/Inventions/details/s%202021%200012/LinkTitluElib

5.5. ŢÎBÎRNĂ, Gh., GUDUMAC. E., **RAILEAN, S.**, BERNIC, J., ŢÎBÎRNĂ, A., LISIŢA, N., TOFAN, E., DANILOV, L., ABABII, P., SPINEI, A., POROSENCOV, E., MÂNĂSCURTĂ, Gh., URSU, D., POŞTARU, C., Dispozitiv şi metodă de traheostomie la copii. Brevet de invenție N 1559. http://www.db.agepi.md/Inventions/details/s%202021%200011

5.6. ŢÎBÎRNĂ, Gh., **RAILEAN, S.**, CIORICI, V., ŢÎBÎRNĂ, A., MEREUŢĂ, I., LISIŢA, N., BÂRLĂDEANU, L., POROSENCOV, E., ABABII, P., POŞTARU, C., LUPAN, R., MÂNĂSCURTĂ, Gh. Metodă chirurgicală de tratament al tumorilor nazo-faringiene la copii. N 1592. http://www.db.agepi.md/Inventions/details/s%202021%200063/LinkTitluElib

Scientific-methodical and didactic works

6. Course notes

6.1. **RAILEAN, S**. *Curs de chirurgie orală și maxilo-facială pediatrică*. Chișinău: Centrul Editorial-Poligrafic *Medicina,*2009.306 p. ISBN 978-9975-915-7.

ADNOTARE
Railean Silvia
CRITERIILE DE DIAGNOSTIC ȘI TRATAMENT AL DEFORMAȚIILOR CRANIOFACIALE LA COPII
Teză de doctor habilitat în științe medicale, Chișinău, 2023

Structura tezei: introducere, 5 capitole, revizuirea literaturii, materiale și metode, 3 capitole originale, discuții, concluzii generale și recomandări, bibliografie din 221 de titluri, 2 anexe, 190 pagini de text de bază, 53 de figuri, 43 de tabele, publicate în 52 de lucrări ştiinţifice.

Cuvinte-cheie: chirurgie craniofacială pediatrică, sutură craniană, craniosinostoză ne-sindromică, metopică, sinostoză unicoronală, remodelare a bolții craniene.

Scopul studiului a fost remodelarea chirurgicală timpurie a parametrilor craniofaciali responsabili de patologia masivului craniofacial, cu aplicarea abordului reconstructiv pentru reducerea potențialului de acțiune a factorilor cauzali; îmbunătățirea stării de sănătate a copilului și a aspectului lui estetic. În acest context am formulat, obiectivele: analiza incidenței anomaliilor craniofaciale la copiii născuți în Republica Moldova, folosind ca reper datele antropometrice și cefalometrice standardizate (la o populație mixtă – urbană și rurală); evaluarea modificărilor craniofaciale, sindromice și nesindromice, la copii prin metode antropometrice și cefalometrice; caracteristica neurofiziologică a activității motorii funcționale a reflexului de supt al copilului cu deformații craniofaciale preoperatoriu și postoperatoriu; abordarea terapeutică a dismorfismului craniofacial prin tratament cu căști speciale în diferite forme de manifestare clinică; sinteza criteriilor de tratament chirurgical și de recuperare postoperatorie a deformațiilor craniofaciale în funcție de tipul acestora și de vârsta copilului, cu elucidarea criteriilor de profilaxie a complicațiilor secundare; estimarea strategiei de management al copiilor cu deformații craniofaciale, a abordărilor reconstructive chi- rurgicale și postoperatorii, elaborarea criteriilor eficiente de recuperare.

Noutatea şi originalitatea ştiinţifică. Reprezintă o primă încercare de cercetare integrală la nivel național, a dismorfismului craniofacial la copii, urmată de sporirea calității vieții în perioada postoperatorie. Am urmărit diferențierii markerilor neurofiziologici și imagistici ai sistemelor osos, muscular și nervos la copiii cu craniostenoză și despicături nazolabiale, care au permis ela borarea algoritmului profilactic al complicațiilor secundare, în special al celor estetice.

Problema ştiinţifică importantă: aprofundarea cunoştinţelor specialiștilor de diferit profil privind debutul și tipul craniostenozelor cu variabilități neurofiziologice a funcției complexului osos-muscular-nervos în asimetriea cerebrală și facială, aplicării diferențiate a tratamentului.

Semnificația teoretică. Studierea asimetriei faciale a cutiei craniene, cantitative și calitative, în raport cu deteriorarea reflexului de supt, a modificărilor neurofiziologice și imagistice poate influența conduita curativă și de reabilitare postoperatorie.

Valoarea aplicativă a lucrări. Rezultatele cercetării, concluziile și recomandările practice au servit la elaborarea algoritmului de diagnostic și tratament al deformațiilor craniofaciale în raport cu gradul de asimetrie facială a parametrilor craniofaciali, neurofiziologici, imagistici și clinici, în special cu gradul de afectare a reflexului de supt.

Implementarea rezultatelor. Au fost implementate în: departamentul consultativ specializat integrat, Clinica de Neurologie Pediatrică, secţia de Radiologie şi Imagistică, secţia oromaxilofacială a IMSP Institutul Mamei şi Copilului; IMSP SCMC Valentin Ignatenco; în procesul didactic postuniversitar pentru medicii-rezidenţi chirurgi-pediatri, neurologi-pediatri, pediatri şi de alte specialităţi; în procesul de educaţie continuă în Clinica de Chirurgie Oromaxilofacială a IP USMF Nicolae Testemiţanu; în instruirea medicilor de familie. Au fost înregistrate 6 brevete de invenție, 1 certificate de inovator și 5 acte de implementare a rezultatelor.

АННОТАЦИЯ
Райлян Сильвия
ДИАГНОСТИКА И КРИТЕРИИ ЛЕЧЕНИЯ ЧЕРЕПНО-ЛИЦЕВЫХ ДЕФОРМАЦИЙ У ДЕТЕЙ
Диссертация доктора хабилитат медицинских наук, Кишинэу, 2023 г.

Структура диссертации: введение, 5 глав, обзор литературы, материалы и методы, 3 оригинальные главы, обсуждение, общие выводы и рекомендации, библиография из 221 наименования, 2 приложения, 190 страниц основного текста, 53 рисунка, 43 таблиц. Результаты исследования опубликованы в 52 научных статьях.

Ключевые слова: детская черепно-лицевая хирургия, черепной шов, краниосиностоз, несиндромальный краниосиностоз, метопический краниосиностоз, одновенечный синостоз, ремоделирование свода черепа.

Цель работы было раннее хирургическое ремоделирование черепно-лицевых параметров, ответственных за патологию черепно-лицевого массива, с применением реконструктивного подхода для снижения потенциала действия причинных факторов; улучшение здоровья и эстетического вида ребенка. Мы сформулировали задачи: анализ заболеваемости черепно-лицевыми аномалиями у детей, родившихся в Республике Молдова, с использованием стандартизированных антропометрических и цефалометрических данных; оценка черепно-лицевых изменений у детей антропометрическими и цефалометрическими методами; нейрофизиологическая характеристика функциональной двигательной активности сосательного рефлекса ребенка с черепно-лицевыми деформациями; терапевтический подход к черепно-лицевому дисморфизму посредством лечения при различных формах клинического проявления; синтез критериев хирургического лечения черепно-лицевых деформаций и профилактики вторичных осложнений; оценка хирургические и послеоперационные реконструктивные подходы, разработка эффективных критериев восстановления.

Новизна и научная оригинальность представляет собой первую попытку комплексного всестороннего исследования на национальном уровне черепно-лицевого дисморфизма у детей из РМ, с последующим улучшением качества жизни. Полученные результаты позволили разработать алгоритм профилактики вторичных осложнений.

Важная научная задача: углубить знания специалистов разного профиля о возникновении и характере краниостенозов у детей. Выделение нейрофизиологической изменчивости функции костно-мышечно-нервного комплекса приводит к выделению асимметрии (мозговой и лицевой), ранней диагностике, дифференцированному и раннему применению послеоперационного хирургического лечения.

Теоретическая значимость. Изучение лицевой асимметрии черепной коробки, количественное и качественное, в связи с ухудшением сосательного рефлекса, нейрофизиологическими и визуализирующими изменениями, может повлиять на лечебнореабилитационное поведение в послеоперационном периоде.

Прикладное значение работы. Результаты исследования, выводы и практические рекомендации послужили для определения алгоритма диагностики и лечения черепнолицевых деформаций.

Внедрение результатов. Полученные результаты внедрены в Центра Матери и Ребёнка; в городской детской клинической больнице; в клинике челюстно-лицевой хирургии ИП ГУМФ Николае Тестемицану. Зарегистрировано 6 патентов на изобретения, 1 авторское свидетельство и 5 документов о внедрении результатов.

ANNOTATION
Railean Silvia
DIAGNOSIS AND TREATMENT CRITERIA OF CRANIOFACIAL DEFORMITIES IN CHILDREN
Doctoral thesis in medical sciences, Chisinau, 2023

Thesis structure: Introduction, 5 chapters, literature review, materials and methods, 3 original chapters, discussions, general conclusions, and recommendations, and bibliography of 221 titles, 2 appendices, 190 pages of basic text, 53 figures, 43 tables. The obtained results are published in 52 scientific papers.

Keywords: pediatric craniofacial surgery, cranial suture, craniosynostosis, nonsyndromic craniosynostosis, metopic craniosynostosis, unicoronal synostosis, cranial vault remodeling.

The aim of the study was the early surgical remodeling of the craniofacial parameters responsible for the pathology of the craniofacial massif, with the application of the reconstructive approach to reduce the potential action of the causal factors; improving the child's health and aesthetic appearance. In this context, we formulated the objectives: analysis of the incidence of craniofacial anomalies in children born in the Republic of Moldova, using standardized anthropometric and cephalometric data (in a mixed population - urban and rural); evaluation of craniofacial changes, syndromic and non-syndromic, in children by anthropometric and cephalometric methods; the neurophysiological characteristic of the functional motor activity of the sucking reflex of the child with craniofacial deformities preoperatively and postoperatively; the therapeutic approach to craniofacial dysmorphism through treatment with special headphones in different forms of clinical manifestation; synthesis of the criteria for surgical treatment and postoperative recovery of craniofacial deformities according to their type and the age of the child, with the elucidation of the criteria for the prophylaxis of secondary complications; estimating the management strategy of children with craniofacial deformities, surgical and postoperative reconstructive approaches, developing effective recovery criteria.

Novelty and scientific originality. The study represents the first attempt at complex, comprehensive research at the national level of craniofacial dysmorphism in children from the Republic of Moldova, followed by the improvement of the life quality in the postoperative period. We pursued this aspect by analyzing the differentiation of neurophysiological and imaging markers of the bone, muscle, and nervous system in children.

The important scientific problem. It deepens the knowledge of specialists of different profiles regarding the onset and type of craniosynostosis in children of different ages. Highlighting the neurophysiological variability of the bone-muscle-nerve complex function leads to the highlighting of cerebral and facial asymmetry, early diagnosis, differentiation, and early application.

Theoretical significance. The study of the facial asymmetry of the cranial box, quantitative and qualitative, in relation to the deterioration of the sucking reflex, and neurophysiological and imaging changes, can influence the curative and rehabilitation conduct postoperatively.

The applied value of the works. The research results, conclusions, and practical recommendations served to determine the diagnostic and treatment algorithm of craniofacial deformities concerning the facial asymmetry degree of the craniofacial, neurophysiological, imaging, and clinical parameters, especially with the impairment degree of the sucking reflex.

Implementation of the results. The obtained results in the scientific study implemented in the Mother and Child Institute; Clinic Valentin Ignatenco; and in the IP USMF Nicolae Testemitanu, 6 invention patents, 1 innovator's certificate, and 5 results implementation documents were registered.

RAILEAN SILVIA

DIAGNOSIS AND TREATMENT CRITERIA OF CRANIOFACIAL DEFORMITIES IN CHILDREN

323.01. Stomatology

Summary of the doctoral thesis in medical sciences

_____
Aprobat spre tipar Formatul hârtiei 60x84 1/16
Hârtie offset. Tiraj 50 exemplare
Coli de tipar: 3,7Comanda nr.:
_____
Centrul Editorial-Poligrafic *Medicina*