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ЕЖЕМЕСЯЧНЫЙ НАУЧНЫЙ ЖУРНАЛ

Медицинские новости Грузии

საქართველოს სამედიცინო სიახლენი

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გამოიცემა თბილისის სახელმწიფო სამედიცინო უნივერსიტეტთან
თანამშრომლობითა და მისი პატრონაჟით

ЕЖЕМЕСЯЧНЫЙ НАУЧНЫЙ ЖУРНАЛ

ТБИЛИСИ - НЬЮ-ЙОРК

GMN: Georgian Medical News is peer-reviewed, published monthly journal committed to promoting the science and art of medicine and the betterment of public health, published by the GMN Editorial Board and The International Academy of Sciences, Education, Industry and Arts (U.S.A.) since 1994. **GMN** carries original scientific articles on medicine, biology and pharmacy, which are of experimental, theoretical and practical character; publishes original research, reviews, commentaries, editorials, essays, medical news, and correspondence in English and Russian.

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GMN: Медицинские новости Грузии - ежемесячный рецензируемый научный журнал, издаётся Редакционной коллегией и Международной академией наук, образования, искусств и естествознания (IASEIA) США с 1994 года на русском и английском языках в целях поддержки медицинской науки и улучшения здравоохранения. В журнале публикуются оригинальные научные статьи в области медицины, биологии и фармации, статьи обзорного характера, научные сообщения, новости медицины и здравоохранения.

Журнал индексируется в MEDLINE, отражён в базе данных SCOPUS, PubMed и ВИНИТИ РАН. Полнотекстовые статьи журнала доступны через БД EBSCO.

GMN: Georgian Medical News – საქართველოს სამედიცინო სიახლენი – არის ყოველთვიური სამეცნიერო სამედიცინო რეცენზირებადი ჟურნალი, გამოიცემა 1994 წლიდან, წარმოადგენს სარედაქციო კოლეგიისა და აშშ-ის მეცნიერების, განათლების, ინდუსტრიის, ხელოვნებისა და ბუნებისმეტყველების საერთაშორისო აკადემიის ერთობლივ გამოცემას. GMN-ში რუსულ და ინგლისურ ენებზე ქვეყნდება ექსპერიმენტული, თეორიული და პრაქტიკული ხასიათის ორიგინალური სამეცნიერო სტატიები მედიცინის, ბიოლოგიისა და ფარმაციის სფეროში, მიმოხილვითი ხასიათის სტატიები.

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При представлении в печать научных экспериментальных работ авторы должны указывать вид и количество экспериментальных животных, применявшиеся методы обезболивания и усыпления (в ходе острых опытов).

4. К статье должны быть приложены краткое (на полстраницы) резюме на английском, русском и грузинском языках (включающее следующие разделы: цель исследования, материал и методы, результаты и заключение) и список ключевых слов (key words).

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2. Size of the article, including index and resume in English, Russian and Georgian languages must be at least 10 pages and not exceed the limit of 20 pages of typed or computer-printed text.

3. Submitted material must include a coverage of a topical subject, research methods, results, and review.

Authors of the scientific-research works must indicate the number of experimental biological species drawn in, list the employed methods of anesthetization and soporific means used during acute tests.

4. Articles must have a short (half page) abstract in English, Russian and Georgian (including the following sections: aim of study, material and methods, results and conclusions) and a list of key words.

5. Tables must be presented in an original typed or computer-printed form, instead of a photocopied version. **Numbers, totals, percentile data on the tables must coincide with those in the texts of the articles.** Tables and graphs must be headed.

6. Photographs are required to be contrasted and must be submitted with doubles. Please number each photograph with a pencil on its back, indicate author's name, title of the article (short version), and mark out its top and bottom parts. Drawings must be accurate, drafts and diagrams drawn in Indian ink (or black ink). Photocopies of the X-ray photographs must be presented in a positive image in **tiff format**.

Accurately numbered subtitles for each illustration must be listed on a separate sheet of paper. In the subtitles for the microphotographs please indicate the ocular and objective lens magnification power, method of coloring or impregnation of the microscopic sections (preparations).

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In GMN style for each work cited in the text, a bibliographic reference is given, and this is located at the end of the article under the title "References". All references cited in the text must be listed. The list of references should be arranged alphabetically and then numbered. References are numbered in the text [numbers in square brackets] and in the reference list and numbers are repeated throughout the text as needed. The bibliographic description is given in the language of publication (citations in Georgian script are followed by Cyrillic and Latin).

9. To obtain the rights of publication articles must be accompanied by a visa from the project instructor or the establishment, where the work has been performed, and a reference letter, both written or typed on a special signed form, certified by a stamp or a seal.

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Articles that Fail to Meet the Aforementioned Requirements are not Assigned to be Reviewed.

ავტორთა საყურადღებოდ!

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1. სტატია უნდა წარმოადგინოთ 2 ცალად, რუსულ ან ინგლისურ ენებზე,დაბეჭდილი სტანდარტული ფურცლის 1 გვერდზე, 3 სმ სიგანის მარცხენა ველისა და სტრიქონებს შორის 1,5 ინტერვალის დაცვით. გამოყენებული კომპიუტერული შრიფტი რუსულ და ინგლისურენოვან ტექსტებში - **Times New Roman (Кириллица)**, ხოლო ქართულენოვან ტექსტში საჭიროა გამოვიყენოთ **AcadNusx.** შრიფტის ზომა – 12. სტატიას თან უნდა ახლდეს CD სტატიით.

2. სტატიის მოცულობა არ უნდა შეადგენდეს 10 გვერდზე ნაკლებს და 20 გვერდზე მეტს ლიტერატურის სიის და რეზიუმეების (ინგლისურ, რუსულ და ქართულ ენებზე) ჩათვლით.

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4. სტატიას თან უნდა ახლდეს რეზიუმე ინგლისურ, რუსულ და ქართულ ენებზე არანაკლებ ნახევარი გვერდის მოცულობისა (სათაურის, ავტორების, დაწესებულების მითითებით და უნდა შეიცავდეს შემდეგ განყოფილებებს: მიზანი, მასალა და მეთოდები, შედეგები და დასკვნები; ტექსტუალური ნაწილი არ უნდა იყოს 15 სტრიქონზე ნაკლები) და საკვანძო სიტყვების ჩამონათვალი (key words).

5. ცხრილები საჭიროა წარმოადგინოთ ნაბეჭდი სახით. ყველა ციფრული, შემაჯამებელი და პროცენტული მონაცემები უნდა შეესაბამებოდეს ტექსტში მოყვანილს.

6. ფოტოსურათები უნდა იყოს კონტრასტული; სურათები, ნახაზები, დიაგრამები - დასათაურებული, დანომრილი და სათანადო ადგილას ჩასმული. რენტგენოგრამების ფოტოასლები წარმოადგინეთ პოზიტიური გამოსახულებით **tiff** ფორმატში. მიკროფოტოსურათების წარწერებში საჭიროა მიუთითოთ ოკულარის ან ობიექტივის საშუალებით გადიდების ხარისხი, ანათალების შეღებვის ან იმპრეგნაციის მეთოდი და აღნიშნოთ სურათის ზედა და ქვედა ნაწილები.

7. სამამულო ავტორების გვარები სტატიაში აღინიშნება ინიციალების თანდართვით, უცხოურისა – უცხოური ტრანსკრიპციით.

8. სტატიას თან უნდა ახლდეს ავტორის მიერ გამოყენებული სამამულო და უცხოური შრომების ბიბლიოგრაფიული სია (ბოლო 5-8 წლის სიღრმით). ანბანური წყობით წარმოდგენილ ბიბლიოგრაფიულ სიაში მიუთითეთ ჯერ სამამულო, შემდეგ უცხოელი ავტორები (გვარი, ინიციალები, სტატიის სათაური, ჟურნალის დასახელება, გამოცემის ადგილი, წელი, ჟურნალის №, პირველი და ბოლო გვერდები). მონოგრაფიის შემთხვევაში მიუთითეთ გამოცემის წელი, ადგილი და გვერდების საერთო რაოდენობა. ტექსტში კვადრატულ ფჩხილებში უნდა მიუთითოთ ავტორის შესაბამისი N ლიტერატურის სიის მიხედვით. მიზანშეწონილია, რომ ციტირებული წყაროების უმეტესი ნაწილი იყოს 5-6 წლის სიღრმის.

9. სტატიას თან უნდა ახლდეს: ა) დაწესებულების ან სამეცნიერო ხელმძღვანელის წარდგინება, დამოწმებული ხელმოწერითა და ბეჭდით; ბ) დარგის სპეციალისტის დამოწმებული რეცენზია, რომელშიც მითითებული იქნება საკითხის აქტუალობა, მასალის საკმაობა, მეთოდის სანდოობა, შედეგების სამეცნიერო-პრაქტიკული მნიშვნელობა.

10. სტატიის ბოლოს საჭიროა ყველა ავტორის ხელმოწერა, რომელთა რაოდენობა არ უნდა აღემატებოდეს 5-ს.

11. რედაქცია იტოვებს უფლებას შეასწოროს სტატია. ტექსტზე მუშაობა და შეჯერება ხდება საავტორო ორიგინალის მიხედვით.

12. დაუშვებელია რედაქციაში ისეთი სტატიის წარდგენა, რომელიც დასაბეჭდად წარდგენილი იყო სხვა რედაქციაში ან გამოქვეყნებული იყო სხვა გამოცემებში.

აღნიშნული წესების დარღვევის შემთხვევაში სტატიები არ განიხილება.

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VALIDATION OF THE DIAGNOSTIC AND TREATMENT COMPLEX FOR PATIENTS WITH ORTHOGNATHIC DEFORMITIES AND PHONETIC DISORDERS

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Recently, there has been a tendency for the growth of dentognathic deformities of various origins, accompanied by phonetic abnormalities [1-4]. They can be caused by the disturbance of the dentognathic relationship, changes in the functional activity of the dentofacial muscles, the state of the articulation apparatus, ENT diseases, etc. [5-9].

These factors are in a cause-effect relation and require a simultaneous systematic multidimensional approach to the diagnosis and treatment of patients with dentognathic deformities and phonetic disorders [1-3,10-12].

To date, for this category of patients, various methods of orthodontic treatment of dentognathic deformities are used in combination with myogymnastics, teiping, as well as certain types of correctional speech therapy [1,2,13,14]. In this sense, it is of particular importance to determine the sequence, staging, volume, and duration of diagnostic and therapeutic measures to obtain the most effective end result.

The use of well-known methods of orthodontic treatment without directed speech therapy correction reduces the effectiveness of rehabilitation of patients with dentognathic deformities, which are accompanied by phonetic disorders. Attempts to normalize the dental occlusion without speech therapy and functional muscle restructuring complicate orthodontic treatment and make it impossible to achieve a stable result [6].

Given the above, there is a need for an in-depth study of the relationship between speech impairment disorders of speech function and deformities of the dentognathic apparatus, development of modern preventive, diagnostic and therapeutic measures based on a multidisciplinary approach to overcoming the problems identified.

Aim – to increase the effectiveness of orthodontic treatment of dentognathic deformities, accompanied by phonetic disorders, by developing and justifying a set of diagnostic and therapeutic measures based on a multidisciplinary approach.

Material and methods. The influence of the state of ENT organs on the formation of dentognathic deformities and phonetic disturbances is studied in 155 children who underwent rhinoscopy, pharyngoscopy, cone-beam computed tomography.

A clinical dental examination is performed in 82 patients aged 6-12 years with dentognathic deformities and phonetic disorders according to the conventional scheme with the use of objective and additional research methods. Thirty-eight patients were admitted for orthodontic treatment with distal deep, 16 – with distal, 18 – with open, 10 – with mesial bite (n = 82) with the use of removable (Schwarz`, Andresen-Haupl`s, Bruckl`s-Reeykhenbakh, Flis P.- Filonenko V.) and non-removable (Marco Rossa) orthodontic appliances [15-17] for 10-12 months following retention period.

Efficiency of orthodontic treatment was estimated based on the results of anthropometric measurements using 3Shape Viewer software on scanned models of upper and lower jaws in 82 patients with determination of the length of the anterior segment of the tooth rows by M. Mirgazizov's method (n=328), transversal sizes of the tooth rows by Moorrees method before treatment in all 82 patients (n=164), after - in 71 (n=142), as 11 patients lost their temporary canine teeth as a result of physiological change of teeth.

A cephalometric study was conducted for 45 patients (n=90) by A. Schwarz method using the RadiocefStudio2 computer program with superimposition of cephalometric images according to the structural landmarks of the supraorbital plane Cl-RO and Ce.

The volume of the upper respiratory tract (n=60) and topographic indices of the tongue (n=30) was determined using cone-beam computed tomography of the skulls of 30 children with dentognathic deformities. The obtained data were processed in the SIMPlant graphic dental program (Materialize Software, Belgium) with the construction of multiplanar, panoramic and 3D reconstructions. Cone-beam computed tomography was also used to determine the topographic parameters of the tongue in 10 children without orthodontic pathology, but with diseases of the ENT organs.

The functional state of the anterior surface of the m. masseter, front bundles of the m. temporalis, m. sternocleidomastoideus, anterior belly m. digastricus, m. orbicularis oris in 44 patients with dentognathic deformities and phonetic disorders (n = 440) was determined by the method of total (surface) electromyography using an eight-channel electromyograph "BioEMG III" company "BioResearch Inc." (USA). The state of physiological rest, volitional contraction and swallowing were subject to analysis.

Diagnosis of the phonological side of speech was carried out in 155 patients without phonetic disorders (73 people) and with deformities of the dentognathic apparatus (82 people). The indicators of sound pronunciation, the ratio of the most frequently detected distortions of sounds, the average number of violations of sound pronunciation per child in the age groups of 6-8 and 9-12 years are determined.

Individual corrective speech therapy work has been carried out to overcome the defects of the phonological side of speech, children without orthodontic pathology have been assigned 10 sessions of speech therapy three times a week, with deformities of the dentognathic apparatus and speech disorders - 2-3 courses of 10 sessions with breaks for 1-2 months.

In 12 children without orthodontic pathology, in addition to speech therapy, Dr. Hinz's MUPPY-P vestibular plates with beads were used, in 8 children – removable devices with beads, in 9 children – fixed Bluegrass appliances, in 6 children – the proposed fixed device for elimination and prevention of harmful language habits and training of muscle structures of the articulation apparatus [18,19].

Mathematical and statistical research. Statistical processing of the obtained results was carried out with the help of the mathematical program of medical and biological statistics STATISTIÑA 6.0. Statistica. The calculated parameters and correlation coefficients had equal reliability within the limits allowed for the processing of medical researches (<0, 05).

Results and their discussion. Among 82 children with deformities of the dentognathic apparatus, which are accompanied by phonetic disorders, hypertrophy of the nasopharyngeal tonsils (adenoid vegetation) of the first degree was diagnosed in 51.2% (n=42), II degree – in 30.5% (n = 25), III degree – in 18.3% (n=15). That is, in all examined patients with dentognathic de-

formities, hypertrophy of the nasopharyngeal tonsils was observed. Among 73 children without orthodontic pathology, but with speech pathology, adenoid growths of the first degree were detected in 43.8% (n = 32), II degree – in 20.5% (n = 15), and III degree – in 2.7% (n = 2). An increase in the size of nasopharyngeal tonsils in 32.9% (n = 24) without orthodontic pathology was not detected.

Adenoid growths of I degree in children with existing orthodontic pathology are observed 1.2 times more often than in children without orthodontic pathology, II degree – 1.5 times, III degree – 6.8 times. No children without an imbalance of the size of the nasopharyngeal tonsils were observed among persons with dentognathic deformities.

When conducting pharyngoscopy with determination of the size and condition of the tonsils in 82 children with dentognathic deformities, accompanied by phonetic disorder, I degree hypertrophy was found in 42.7% (n=35), II degree – in 32.9% (n=27), III degree – in 24.4% (n=20). A various degree of hypertrophy of the tonsils was recorded in all examined patients with dentognathic deformities. Among 73 children without orthodontic pathology with speech pathology, an increase in palatine tonsils of the first degree was detected in 38.4% (n=28), II degree – in 16.4% (n=12), and III degree – in 6.8% (n=5). Violation of the size of the tonsils in 38.4% of children (n=28) without orthodontic pathology was not detected.

Analysis of the state of palatine tonsils indicates that hypertrophy of the first degree in children with orthodontic pathology is 1.1 times more frequent than in children without it, II degree – 2 times, III degree – 3.6 times, respectively. The obtained data showed the presence of the relationship between dentognathic deformities and inflammatory diseases of ENT organs, which is an additional factor in changes in the volume of the upper respiratory tract, which in turn affects the location of articulation zones, speech breathing and contributes to the development of sound pronunciation disturbances.

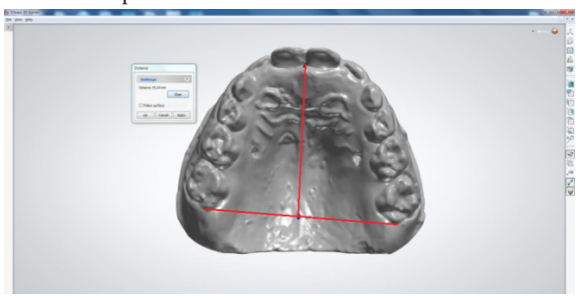
A certain pathological "chain" of cause-effect relationships of dentognathic deformities with phonetic disorders and diseases of the ENT organs became the basis for a multidisciplinary approach to solving the problems identified. A complex of diagnostic and treatment measures for patients with denthognathic deformities accompanied by phonetic disorders, consisting of motivational, diagnostic and treatment blocks, has been developed and introduced into practice [20].

The motivational block is aimed at the perception of the positive result of orthodontic treatment and speech therapy by the child and his parents; creation of the atmosphere of emotional comfort between the patient, orthodontist, speech therapist, otolaryngologist, children's therapist and dentist surgeon; formation of the child's personalized treatment and correctional training.

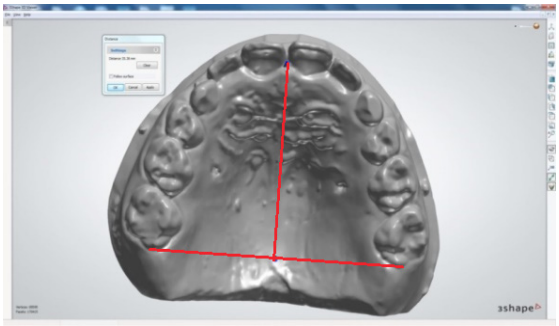
Diagnostic activities included surveys to determine the extent of treatment interventions and to assess their effectiveness. If the parents and the child turn to an orthodontist, clinical examinations, anthropometric measurements of scanned models of the upper and lower jaws, electromyography, orthopantomography, cephalometry, and photometry have been carried out, and complaints about ENT and sound disorders have been collected, followed by a consultation with an otolaryngologist and a speech therapist; a consultation with a pediatric dentist to determine the hygienic state of the oral cavity, the intensity of dental caries, the presence of inflammatory processes of periodontal tissue and oral mucous membranes; a consultation with a pediatric surgeon dentist to identify congenital defects in the frenulum of the lips, tongue, etc. The otolaryngologist collected anamnesis, an examination of nasopharyngeal and palatine tonsils using rhinoscopy and pharyngoscopy. Cone-beam computed tomography with multiplanar, panoramic and 3D reconstructions was performed according to the orthodontist's recommendation. The speech therapist determined the state of formation of the phonetic side of speech with the help of neuropsychological and speech therapy tests, reviewed the components of the articulation apparatus (tongue, lips, soft sky, bite), screening of pre- and postnatal factors of somatic health affecting the development of speech disorders.

The treatment unit included orthodontic treatment using removable and non-removable orthodontic apparatus, depending on the type of deformity, the age of the patient, the degree of formation of the dentognathic apparatus, etiology; phonetic correction with general obligatory (orofacial gymnastics, formation of speech breathing) and correctional directed (setting automation and differentiation of sounds) tasks; otolaryngological conservative and / or surgical treatment of adenoiditis and tonsillitis; control of the level of oral hygiene, therapeutic treatment of diseases of hard tooth tissues, inflammatory processes of periodontal tissues and oral mucosa; elimination of congenital defects of the frenulum of the lips, tongue, etc. This contributed to the implementation of a comprehensive multi-vector treatment of dentognathic deformities, accompanied by phonetic disorders.

After orthodontic treatment, anthropometric measurements of scanned jaw models using the M. Mirgazizov method (Fig. 1 a, b) and Moorrees method (Fig. 2 a, b) showed a change in the size of the dental row. The statistically significant reduction of the length of the frontal part of the upper tooth row was noted when treating patients with distal bite by 2.51±1.39 mm, distal deep bite – by 1.06±1.05 mm, and at mesial bite – the reduction of the lower one by 1.72±1.79 mm and the increase of the upper tooth row by 3.43±1.36 mm; enlargement in the area of canines on the upper jaw of patients with distal bite by 3.32±1.03 mm and distal deep bite – by 2.59±1.04 mm in comparison with the initial clinical picture.

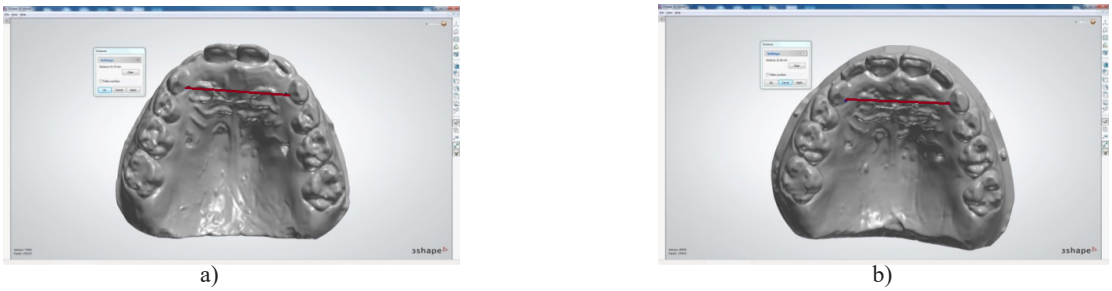


a)



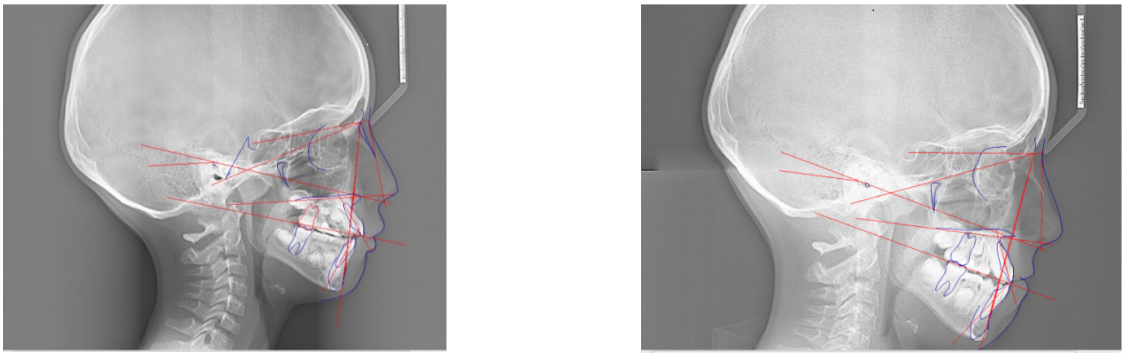
b)

Fig. 1 Anthropometric measurements using the M. Mirgazizov method on scanned models of the upper jaw of patient L. at the beginning of treatment (a) and at the end of treatment (b)



a) b)

Fig. 2 Anthropometric measurements using the Moorrees method on scanned models of the upper jaw of patient L. at the beginning of treatment (a) and at the end of treatment (b)



a) b)

Fig. 3. Patient B. cephalogram with open bite before (a) and after (b) treatment

Analysis of cephalograms using the A. Schwarz method confirms positive changes at the end of orthodontic treatment. The most informative improvements in the placement of the apical base of the lower jaw in relation to the base of the skull in the sagittal direction in the treatment of distal and distal deep bites, the vertical position of the jaw in the treatment of open bite.

The most informative improvements in the placement of the apical base of the lower jaw relative to the base of the skull in the sagittal direction (angle SeNB), by almost 5°, were found in the treatment of distal and distal deep bites. While treating an open bite, the vertical relative position of the jaws (angle B) changed by almost 9°. The inclination of the axes of the teeth (angle 1SpP, angle 1MP) relative to the planes of the base of the jaw improved (Fig. 3 a, b, 4).

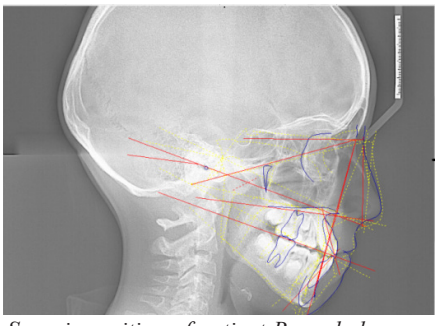
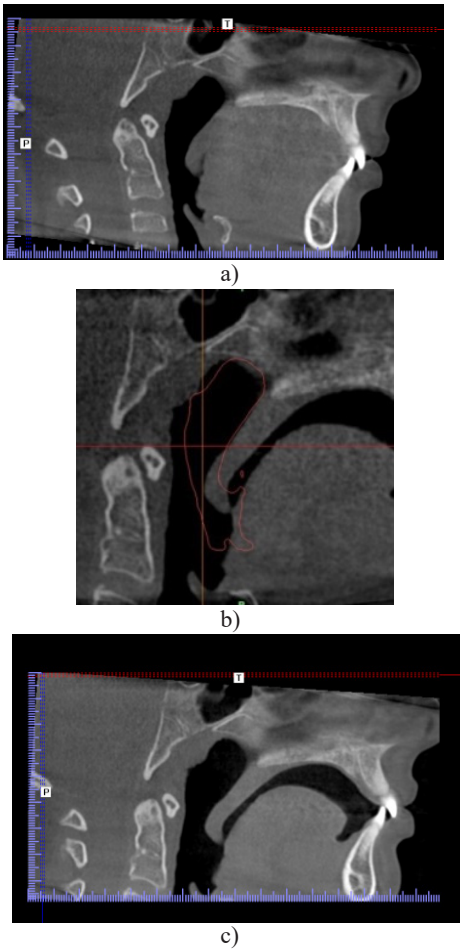


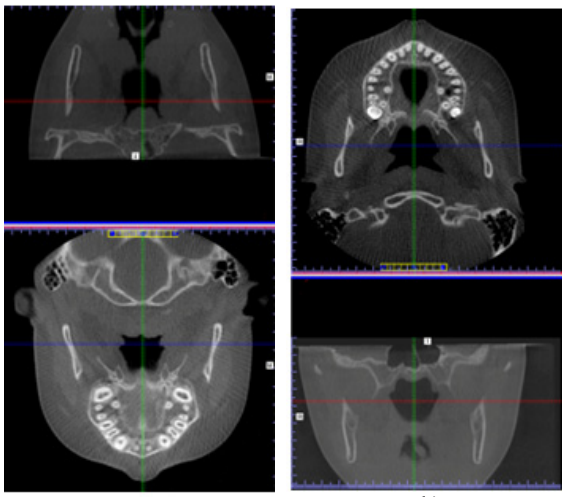
Fig. 4 Superimposition of patient B. cephalogram with open bite before and after treatment

By means of cone-beam computed tomography it is objectively proved the increase of the upper respiratory tract volume by 53.80±4.21% in patients with 11.82±2.06 ml up to 18.01±3.84 ml after enlargement of the upper jaw at the dentoalveolar level, which leads to a change in the position of the tongue with its dislocation to the hard palate, thus improving the results of orthodontic treatment and creating optimal conditions for effective correction of sound pronunciation (Fig. 5 a, b, c, 6 a, b, 7 a, b, 8 a, b).



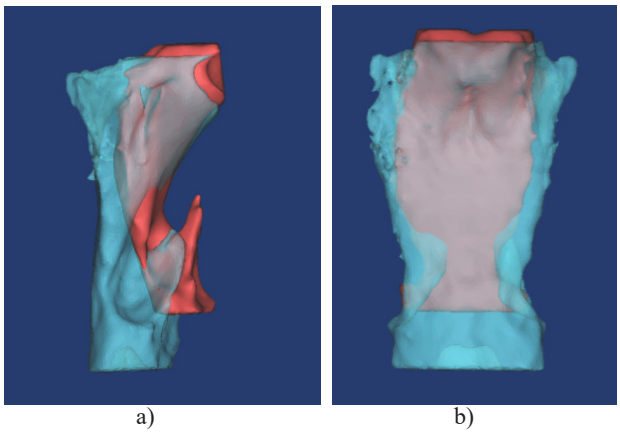
a) b) c)

Fig. 5 Coronary section of a cone-beam computed tomogram of patient C. airways, before (a) and after treatment (b), overlay of the airway profile before and after treatment (c)



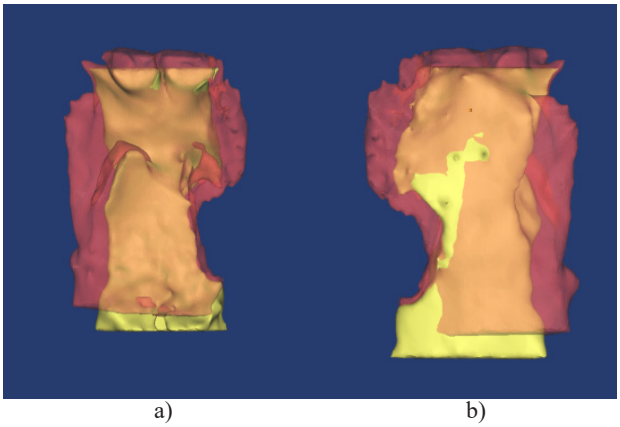
a) b)

Fig. 6 Axial and frontal sections of cone-beam computed tomography of the respiratory tract of patient C. before (a) and after treatment (b)



a) b)

Fig. 7 3D reconstruction of the upper respiratory tract and superposition of patient C. volumes (prior to treatment – volume reconstruction in red, after completion of treatment – blue, side view (a), front view (b))



a) b)

Fig. 8 3D reconstruction of the upper respiratory tract and superposition of patient P. volumes (before treatment, volume reconstruction in red, after treatment, yellow, side view (a), front view (b))

The determination of the volume of the respiratory tract is a clear criterion for evaluating the effectiveness of orthodontic treatment and creating conditions for speech therapy correction.

Changes in the indicators of the biopotentials of the muscular structures of the articulatory apparatus depending on the forms of dentognathic deformities, accompanied by phonetic disturbances, confirm their correlation. The given results of electromyographic analysis of the condition of the surface parts of the m. masseter, front bundles of the m. temporalis, m. sternocleidomastoideus, anterior belly of the m. digastricus, and m. orbicularis oris before orthodontic treatment indicate the group of muscles with the greatest dysfunction in accordance with the established orthodontic pathology and direct the work of the orthodontist and speech therapist to restore the neuromuscular balance of this particular group.

Patients with mesial bite before orthodontic treatment at rest registered an increase in the bioelectric activity of the front bundles m. temporalis (7.81±2.07 mV) and the m. masseter (2.29±1.03 mV) and a significant decrease in the contractile activity of the latter at will compression (19.94±7.37 mV); with open – the amplitude of biopotentials of the upper part of m. orbicularis oris was reduced at rest (3.21±1.07 mV) and at will compression (9.25±2.38 mV), the increase of bioelectric activity of the front bundles of the m. temporalis, at rest (4.62±1.13 mV); in distal deep and distal, the amplitude of biocapacities of the upper part of m. orbicularis oris in a resting state is the highest (5.24±1.17 mV and 5.04±2.01 mV, respectively).

After the orthodontic treatment, along with the speech therapy correction, changes in the electromyogram parameters were established, which showed an improvement in the functional state of the muscles and the effectiveness of the treatment by an average of 2.5 times. In patients with a mesial bite in a resting state, a decrease in the bioelectric activity of the front bundles of the m. temporalis (2.11±0.97 mV) and of the m. masseter (1.32±0.78 mV), an increase in their contractile activity during volitional compression was recorded (44,48±6.33 mV); open – an increase in the amplitude of the biopotentials of the upper part of m. orbicularis oris with volitional compression (12.84±3.51 mV), a decrease in the bioelectric activity of the front bundles of the m. temporalis at rest (0.87±0.22 mV) in the distal deep and distal – a decrease in the amplitude of the biopotentials of the upper part of m. orbicularis oris at rest (3.22±1.37 mV and 2.76±1.02 mV, respectively).

The topographic indices of the tongue as a powerful muscle factor of influence on the development of the dentognathic apparatus and sound pronunciation in children are determined. Analyzing cone-beam computed tomograms it was found that an increase in its size leads to changes in the anatomical and topographic relationship with surrounding tissues. The ratio of the thickness of the front, middle and back third of the tongue in children aged 8-12 years is 1:1.7:1.8, respectively. A change in any parameter can directly or indirectly affect an increase in its asymmetry, which is one of the reasons for the formation of dentognathic deformities. The asymmetry of the left and right halves of the tongue was within 5% in children without orthodontic pathology and 15% in children with intermaxillary interrelation disorders.

Diagnostic screening of sound pronunciation disorders was carried out and their dependence on dentognathic deformitis was established. The average number of violations of the pronunciation of whistling sounds per child is greatest with a mesial bite at the age of 6-8 years – 2.4 and with an open bite at the age of 9-12 years – 2.0 and sonant in distal deep at the age of 6-8 years – 1.7, at the age of 9-12 years – 1.1. The ratio of sound pronunciation disorder of sonant to whistling at the mesial bite at the age of 6-8 years is 6.0, at the open bite – 4.7, at the age of 9-12 years, respectively, 4.5 and 3.0. The lowest average number of

disorders of hissing at the age of 6-8 years – 0.4, at the age of 9-12 years – 0.6 per child at all bite pathologies is determined. A step-by-step work was carried out to overcome phonetic speech disorders, which contributed to the normalization of the sound pronunciation of whistling, sonant and hissing sounds in various types of dentognathic deformities.

The expediency and effectiveness of the proposed fixed device (Fig. 9), which helps to train the muscle structures of the articulation apparatus in combination with speech therapy correction, to improve the kinetic and kinesthetic praxis in the temporary and first period of the mixed occlusion, has been proved [19]. This is due to a decrease in the size of the device structure, an increase in articulation zones, and facilitation of hygienic care.

Fig. 9 Device for elimination and prevention of harmful oral habits

The device consists of a bracket on which a functionally active bead-shaped element is attached in the middle part of the device; the bracket is soldered to two thin-walled cast perforated crowns intended for fixation on temporary canines. The technical result is as follows: the fixation on the temporary canines makes the device compact by reducing the size of the construction, which in turn facilitates hygienic care and improves oral hygiene; the compactness increases the articulation zones of the tongue, which in turn has a positive effect on the quality of speech therapy treatment. The use of a functionally active bead-shaped element makes it possible to control the usual palatial position of the tongue, to activate the work of the tongue root, as the child unwittingly rolls it in the palate, stimulating the tongue muscles.

Evaluation of the effectiveness of the diagnostic and treatment complex of measures proposed for the patient with dentognathic deformities accompanied by phonetic disorders, based on the multidisciplinary approach, showed the need to determine the condition of the nasopharyngeal and palatine tonsils and proved the effectiveness of orthodontic treatment along with speech therapy correction accompanied by a pediatric therapist and surgeon. There was an improvement in electromyography, anthropometric measurements of scanned jaw models, cephalometry in 86.6% of patients; analysis of cone-beam computed tomography data confirmed a significant increase in the volume of the upper respiratory tract by 53.8±4.2% in patients after the orthodontic treatment, which in turn contributed to corrective speech therapy.

Conclusions. The etiopathogenetic relationship of otolaryngological diseases of an inflammatory nature with dentognathic deformities was determined. In children with orthodontic pathology, hypertrophy of the tonsils of the third degree was more often manifested (6.8 times nasopharyngeal and 3.6 times palatine) than in children without dentognathic deformities. The obtained data showed the presence of a relationship between dentognathic deformities and inflammatory diseases of the ENT organs, which are factors leading to a decrease in the volume of the upper respiratory tract to 11.82±2.06 ml, changes in articulation zones, speech breathing and affect the pronunciation of the sound. They are the basis for the prescription of otolaryngological conservative and/or surgical treatment of hypertrophied nasopharyngeal and palatine tonsils.

The qualitative and quantitative dependence of sound deterioration on the type of dentognathic deformities is established. After individually directed speech therapy correction with the use of orofacial gymnastics the indicators of sound pronunciation of whistling and sonorous sounds approached the norm. In combination with speech therapy correction for improvement of kinetic and kinesthetic praxis the fixed device which promotes the training of muscular structures of the articulation apparatus is offered. The expediency of its use in the temporary and first period of the mixed occlusion is confirmed.

The proposed complex of diagnostic and treatment measures made it possible to increase the efficiency of orthodontic treatment of children with dentognathic deformities with disturbances of sound pronunciation depending on the type of bite by means of a multidisciplinary approach involving an otolaryngologist, speech therapist, children's therapist and surgeon, which was confirmed in 86.6% of patients by the improvement of electromyography, anthropometric measurements of scanned models of jaws, cephalometry; the analysis of cone-beam computed tomography data showed a significant increase in the upper respiratory tract volume by 53.8±4.2%.

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SUMMARY

VALIDATION OF THE DIAGNOSTIC AND TREATMENT COMPLEX FOR PATIENTS WITH ORTHOGNATHIC DEFORMITIES AND PHONETIC DISORDERS

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Recently, there has been a tendency for the growth of dentognathic deformities of various origins, accompanied by phonetic abnormalities.

Aim – to increase the effectiveness of orthodontic treatment of dentognathic deformities, accompanied by phonetic disorders, by developing and justifying a set of diagnostic and therapeutic measures based on a multidisciplinary approach.

The influence of the state of ENT organs on the formation of dentognathic deformities and phonetic disturbances is studied in 155 children. A clinical dental examination and orthodontic treatment is performed in 82 patients aged 6-12 years. Individual corrective speech therapy work has been carried out to overcome the defects of the phonological side of speech.

A certain pathological "chain" of cause-effect relationships of dentognathic deformities with phonetic disorders and diseases of the ENT organs became the basis for a multidisciplinary approach to solving the problems identified. The qualitative and quantitative dependence of sound deterioration on the type of orthognathic deformities is established. A complex of diagnostic and therapeutic measures for patients with dental deformities accompanied by phonetic disorders, consisting of motivational, diagnostic and therapeutic blocks, has been developed and introduced into practice.

The proposed complex of diagnostic and treatment measures made it possible to increase the efficiency of orthodontic treatment of children with dentognathic deformities with disturbances of sound pronunciation depending on the type of bite by means of a multidisciplinary approach involving an otolaryngologist, speech therapist, children's therapist and surgeon, which was confirmed in 86.6% of patients by the improvement of electromyography, anthropometric measurements of scanned models of jaws, cephalometry; the analysis of cone-beam computed tomography data showed a significant increase in the upper respiratory tract volume by 53.8±4.2%.

Keywords: children, dentognathic deformities, phonetic disorders, diagnosis, treatment, multidisciplinary approach.

РЕЗЮМЕ

ОБОСНОВАНИЕ КОМПЛЕКСА ДИАГНОСТИЧЕСКИХ И ЛЕЧЕБНЫХ МЕРОПРИЯТИЙ ДЛЯ ПАЦИЕНТОВ С ЗУБОЧЕЛЮСТНЫМИ ДЕФОРМАЦИЯМИ И ФОНЕТИЧЕСКИМИ НАРУШЕНИЯМИ

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В последнее время наблюдается тенденция роста зубочелюстных деформаций различного происхождения, сопровождающихся фонетическими нарушениями.

Цель исследования - повышение эффективности ортодонтического лечения зубочелюстных деформаций, сопровождающихся фонетическими нарушениями, путем разработки и обоснования комплекса диагностических и лечебных мероприятий на основании мультидисциплинарного подхода.

Влияние состояния ЛОР-органов на формирование зубочелюстных деформаций и фонетических нарушений изучено у 155 детей. Клиническое стоматологическое обследование и ортодонтическое лечение проведено 82 пациентам в возрасте 6-12 лет. Выполнена индивидуальная корректирующая логопедическая работа по преодолению дефектов фонологической части речи.

Предложенный комплекс диагностических и лечебных мероприятий позволил повысить эффективность ортодонтического лечения детей с деформациями зубочелюстного аппарата и нарушениями речи, в зависимости от типа прикуса с помощью междисциплинарного подхода с участием отоларинголога, логопеда, детского терапевта и хирурга, что подтверждено улучшением показателей электромиографии, антропометрических измерений сканированных моделей челюстей, цефалометрии у 86,6% пациентов; анализ данных конусно-лучевой компьютерной томографии показал увеличение объема верхних дыхательных путей на 53,8±4,2%.

რეზიუმე

პაციენტების სადიაგნოსტიკო და სამკურნალო ღონისიებების კომპლექსის დასაბუთება პაციენტებისათვის ყბა-კბილთა დეფორმაციებით და ფონეტიკური დარღვევებით

პ.ფლისი, ლ.იაკოვენკო, ვ.ფილონენკო, ა.მელნიკი

ა.ბოგომოლცის სახელობის ეროვნული სამედიცინო უნივერსიტეტი, კიევი, უკრაინა

კვლევის მიზანს წარმოადგენდა ყბა-კბილთა დეფორმაციების და თანხვედრილი ფონეტიკური დარღვევების ორთოდონტიული მკურნალობის ეფექტურობის გაუმჯობესება სადიაგოსტიკო და სამკურნალო ღონისძიებების კომპლექსის მულტიდისციპლინური მიდგომით შემუშავებისა და დასაბუთების საშუალებით.

ყელ-ყურ-ცხვირის ორგანოთა მდგომარეობის გავლენა ყბა-კბილთა დეფორმაციების და თანხვედრილი ფონეტიკური დარღვევების განვითარებაზე შესწავლილია 155 ბავშვზე. კლინიკური სტომატოლოგიური გამოკვლევა და ორთოდონტიული მკურნალობა ჩაუტარდა 6-12 წლის ასაკის 82 პაციენტს. მეტყველების ფონოლოგიური ნაწილის დეფექტების აღმოფხვრისათვის ჩატარებულია ინდივიდური მაკორეგირებელი ლოგოპედიური სამუშაო.

სადიაგნოსტიკო და სამკურნალო ღონისძიებების შეთავაზებული კომპლექსი იძლევა ყბა-კბილთა დეფორმაციების და თანხვედრილი მეტყველების დარღვევების მქონე ბავშვების ორთოდონტიული მკურნალობის ეფექტურობის გაუმჯობესების საშუალებას თანკბილვის ტიპის გათვალისწინებით და ინტერდისციპლინური გუნდის მონაწილეობით – ოტორინოლარინგოლოგი, ლოგოპედი, პედიატრი და ქირურგი, რაც დასტურდება პაციენტების 86,6%-ში ელექტრომიოგრაფიის, ყბების მოდელების ანთროპომეტრიული გაზომვების სკანირების და ცეფალომეტრიის მაჩვენებლების გაუმჯობესებით; კონუსურ-სხივური კომპიუტერული ტომოგრაფიის მონაცემების ანალიზმა აჩვენა ზედა სასუნთქი გზების მოცულობის გაზრდა 53,8 4,2%-ით.

EVALUATION OF GENE POLYMORPHISM OF IL-1β AND IL-10 IN CHILDREN WITH NEPHROTIC SYNDROME

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Estimating the prevalence of chronic kidney disease (CKD) in children and investigating markers of the prognosis and progression are the priority for public health. Approximately 9 in every 1 million children in the developed world require renal replacement therapy treating end-stage renal disease of CKD. The prevalence of CKD and end-stage renal disease is growing worldwide [5,13]. Taking into account the considerable prevalence and progression of CKD in children, findings effective methods of the prevention of this disease is important goal of all pediatric nephrologists. The issue of early onset of prophylaxis, the individual factors of progression of CKD not completely understood [15].

Traditional risk factors of the progression of CKD are arterial hypertension, persistent proteinuria, anemia, congenital anomalies, progressive course of the disease and resistance to pathogenetic treatment, hereditary history, and acute renal failure [4]. Nephrologists have good results in decreasing of both progression of disease and number of patients with end-stage renal disease by avoiding or correction of risk factors of CKD, and widely using renoprotective therapy. However, despite the results, the improving of quality of life and reducing the number of patients with progressive CKD is still unresolved. Genetic factors may also influence the incidence and/or the progression of CKD and its complications. Studies of genetic factors are now interesting in this population. The goal of identifying genetic factors that contribute to the outcome of CKD is to gain further understanding of the disease pathogenesis and underlying causes and, possibly, to use this knowledge to predict disease or its complications. Furthermore, by identifying patients' genetic backgrounds, it is possible that a more individualized therapy could be performed [1,3].

Progression of CKD in children with chronic glomerulonephritis also connected with immune inflammation which is known to be a marker of unfavorable prognosis. Chronic glomerulonephritis is considered as immunocomplex disease in which monocytes are activated and secreted a wide variety of biologically active compounds into the blood.

The immune inflammation is a cascade of biochemical and immunological reactions regulated by a large number of mediators, among which a special place is belonged to cytokines – low-molecular weight proteins. Each cytokine has cross-linked, synergistic or inhibitor activity in relation to other cytokines.

It is known that in the development of glomerular injury and nephrosclerosis great role belongs to pro-inflammatory cytokine IL-1β [10]. It has been shown that IL-1β is a key cytokine that induces the development of a cascade of other proinflammatory cytokines. This leads to glomerular and tubulointerstitial damage and stimulates the fibrogenesis of nephrons. IL -1β is considered to be one of the factors of progression of chronic glomerulonephritis. Balance between the production, expression and inhibition of the synthesis of proteins of the IL-1 family play the main role in the development of any inflammatory process. It was known that a higher level of IL-1 was determined in part of the patients, even before identifying the association of increased