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ЕЖЕМЕСЯЧНЫЙ НАУЧНЫЙ ЖУРНАЛ

Медицинские новости Грузии

საქართველოს სამედიცინო სიახლენი

GEORGIAN MEDICAL NEWS

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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 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.

GMN is indexed in MEDLINE, SCOPUS, PubMed and VINITI Russian Academy of Sciences. The full text content is available through EBSCO databases.

GMN: Медицинские новости Грузии - ежемесячный рецензируемый научный журнал, издаётся Редакционной коллегией 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.

ჟურნალი ინდექსირებულია MEDLINE-ის საერთაშორისო სისტემაში, ასახულია SCOPUS-ის, PubMed-ის და ВИНИТИ РАН-ის მონაცემთა ბაზებში. სტატიების სრული ტექსტი ხელმისაწვდომია EBSCO-ს მონაცემთა ბაზებიდან.

WEBSITE

www.geomednews.com

К СВЕДЕНИЮ АВТОРОВ!

При направлении статьи в редакцию необходимо соблюдать следующие правила:

1. Статья должна быть представлена в двух экземплярах, на русском или английском языках, напечатанная через **полтора интервала на одной стороне стандартного листа с шириной левого поля в три сантиметра**. Используемый компьютерный шрифт для текста на русском и английском языках - **Times New Roman** (**Кириллица**), для текста на грузинском языке следует использовать **AcadNusx.** Размер шрифта - **12**. К рукописи, напечатанной на компьютере, должен быть приложен CD со статьей.

2. Размер статьи должен быть не менее десяти и не более двадцати страниц машинописи, включая указатель литературы и резюме на английском, русском и грузинском языках.

3. В статье должны быть освещены актуальность данного материала, методы и результаты исследования и их обсуждение.

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).

5. Таблицы необходимо представлять в печатной форме. Фотокопии не принимаются. **Все цифровые, итоговые и процентные данные в таблицах должны соответствовать таковым в тексте статьи**. Таблицы и графики должны быть озаглавлены.

6. Фотографии должны быть контрастными, фотокопии с рентгенограмм - в позитивном изображении. Рисунки, чертежи и диаграммы следует озаглавить, пронумеровать и вставить в соответствующее место текста **в tiff формате**.

В подписях к микрофотографиям следует указывать степень увеличения через окуляр или объектив и метод окраски или импрегнации срезов.

7. Фамилии отечественных авторов приводятся в оригинальной транскрипции.

8. При оформлении и направлении статей в журнал МНГ просим авторов соблюдать правила, изложенные в «Единых требованиях к рукописям, представляемым в биомедицинские журналы», принятых Международным комитетом редакторов медицинских журналов - http://www.spinesurgery.ru/files/publish.pdf и http://www.nlm.nih.gov/bsd/uniform_requirements.html
В конце каждой оригинальной статьи приводится библиографический список. В список литературы включаются все материалы, на которые имеются ссылки в тексте. Список составляется в алфавитном порядке и нумеруется. Литературный источник приводится на языке оригинала. В списке литературы сначала приводятся работы, написанные знаками грузинского алфавита, затем кириллицей и латиницей. Ссылки на цитируемые работы в тексте статьи даются в квадратных скобках в виде номера, соответствующего номеру данной работы в списке литературы. Большинство цитированных источников должны быть за последние 5-7 лет.

9. Для получения права на публикацию статья должна иметь от руководителя работы или учреждения визу и сопроводительное отношение, написанные или напечатанные на бланке и заверенные подписью и печатью.

10. В конце статьи должны быть подписи всех авторов, полностью приведены их фамилии, имена и отчества, указаны служебный и домашний номера телефонов и адреса или иные координаты. Количество авторов (соавторов) не должно превышать пяти человек.

11. Редакция оставляет за собой право сокращать и исправлять статьи. Корректура авторам не высылается, вся работа и сверка проводится по авторскому оригиналу.

12. Недопустимо направление в редакцию работ, представленных к печати в иных издательствах или опубликованных в других изданиях.

При нарушении указанных правил статьи не рассматриваются.

REQUIREMENTS

Please note, materials submitted to the Editorial Office Staff are supposed to meet the following requirements:

1. Articles must be provided with a double copy, in English or Russian languages and typed or compu-ter-printed on a single side of standard typing paper, with the left margin of **3** centimeters width, and **1.5** spacing between the lines, typeface - **Times New Roman** (**Cyrillic**), print size - **12** (referring to Georgian and Russian materials). With computer-printed texts please enclose a CD carrying the same file titled with Latin symbols.

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).

7. Please indicate last names, first and middle initials of the native authors, present names and initials of the foreign authors in the transcription of the original language, enclose in parenthesis corresponding number under which the author is listed in the reference materials.

8. Please follow guidance offered to authors by The International Committee of Medical Journal Editors guidance in its Uniform Requirements for Manuscripts Submitted to Biomedical Journals publication available online at: http://www.nlm.nih.gov/bsd/uniform_requirements.html
http://www.icmje.org/urm_full.pdf
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.

10. Articles must be signed by all of the authors at the end, and they must be provided with a list of full names, office and home phone numbers and addresses or other non-office locations where the authors could be reached. The number of the authors (co-authors) must not exceed the limit of 5 people.

11. Editorial Staff reserves the rights to cut down in size and correct the articles. Proof-sheets are not sent out to the authors. The entire editorial and collation work is performed according to the author's original text.

12. Sending in the works that have already been assigned to the press by other Editorial Staffs or have been printed by other publishers is not permissible.

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

ავტორთა საყურადღებოდ!

რედაქციაში სტატიის წარმოდგენისას საჭიროა დავიცვათ შემდეგი წესები:

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.

3. სტატიაში საჭიროა გაშუქდეს: საკითხის აქტუალობა; კვლევის მიზანი; საკვლევი მასალა და გამოყენებული მეთოდები; მიღებული შედეგები და მათი განსჯა. ექსპერიმენტული ხასიათის სტატიების წარმოდგენისას ავტორებმა უნდა მიუთითონ საექსპერიმენტო ცხოველების სახეობა და რაოდენობა; გაუტკივარებისა და დაძინების მეთოდები (მწვავე ცდების პირობებში).

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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PREVALENCE, RISK FACTORS, AND STRUCTURAL CHARACTERISTICS OF DENTOALVEOLAR ANOMALIES IN THE SCHOOL-AGED POPULATION OF KUTAISI

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Abstract.

Background: Dentoalveolar anomalies represent a significant public health concern due to their high prevalence, multifactorial etiology, and impact on functional and aesthetic outcomes in children. The variability of prevalence and risk factors across regions highlights the need for localized epidemiological studies.

Aim: To investigate the prevalence, nosological structure, and risk factors of dentoalveolar anomalies in the school-aged population of Kutaisi, as well as to identify region-specific characteristics and potential preventive targets.

Methods: A cross-sectional study was conducted among 697 schoolchildren aged 7–14 years in Kutaisi using random sampling. Clinical examinations included anamnesis, visual inspection, and functional assessment, with classification based on ICD-10 criteria. In the second stage, a case–control study was performed including 154 children with dentoalveolar anomalies and 85 healthy controls. Associations between risk factors and outcomes were assessed using odds ratios (OR) with 95% confidence intervals (CI). Statistical analysis was performed using Pearson's χ^2 test, with significance set at $p < 0.05$.

Results: Dentoalveolar anomalies were identified in 56.1% of children. The most prevalent conditions were tooth position anomalies (52.4%), dental arch proportion anomalies (40.5%), and dentoalveolar functional anomalies (17.5%). Anomalies were more frequent in older age groups (10–15 years). Gender differences were not statistically significant, except for jaw size anomalies, which were more common in boys ($p < 0.05$). The most frequent occlusal forms were distal occlusion, crossbite, and deep bite. Among risk factors, statistically significant associations were identified for maternal history of dentoalveolar anomalies (OR = 1.99; $p = 0.038$), prematurity (OR = 3.85; $p = 0.024$), frequent respiratory infections in early childhood (OR = 4.78; $p < 0.001$), allergic rhinitis (OR = 3.20; $p = 0.031$), mouth breathing/adenoid hypertrophy (OR = 3.99; $p < 0.001$), and inappropriate introduction of soft foods (OR = 4.32; $p = 0.013$). Socio-economic factors were not significantly associated with the outcome.

Conclusions: Dentoalveolar anomalies are highly prevalent among schoolchildren in Kutaisi, with tooth position and dental arch anomalies being the most common. The findings confirm the multifactorial nature of these conditions, with both hereditary and modifiable risk factors playing significant roles. Early identification of at-risk children and implementation of preventive strategies, particularly targeting modifiable factors, are essential for reducing the burden of dentoalveolar anomalies.

Key words. Dentoalveolar anomalies, prevalence, risk factors, schoolchildren, epidemiology, Kutaisi.

Introduction.

Dentoalveolar anomalies represent a major global public health concern with a steadily increasing prevalence, affecting the health of approximately 3.5 billion people worldwide [1,2]. These anomalies are characterized by diverse clinical presentations, early onset, and a wide spectrum of aetiological factors [3,4].

The prevalence of dentoalveolar anomalies varies considerably across populations, ranging from 12% to 45%, and encompasses a broad array of disturbances, including alterations in tooth number, shape, and structure [5-7]. According to other authors, the prevalence of dentoalveolar anomalies in pediatric populations ranges from 5.46% to 74.7% [8,9].

Based on the Dental Aesthetic Index (DAI), a high frequency of various forms and severities of dentoalveolar anomalies has been reported in both children and adolescents (54% and 88%, respectively). In children under three years of age, prevalence rates range from 48.7% to 75.1%; among children aged 3–7 years, 59.3%; among school-aged children, 25%; and among adults, between 41.1% and 95.3% [10].

The structural distribution of dentoalveolar anomalies was investigated in a 2020 French study involving 551 children, where anomalies were identified in 61.3% of participants. The most frequently detected conditions included permanent tooth agenesis (29.3%), taurodontism (15.06%), and supernumerary teeth (6.4%). No statistically significant gender differences were observed [11]. In European countries, the most extensively documented anomalies are permanent tooth agenesis (5.5%–7%) and molar–incisor hypomineralization (MIH) (7.3%–21.8%) [12].

In Georgia, the prevalence of dentoalveolar (jaw–tooth) anomalies has been studied in the pediatric population of the city of Tbilisi. Among preschool-aged children, the prevalence of dentoalveolar anomalies was 55.1% [13]. According to data reported by Sabashvili M., malocclusion was observed in 69.3% of school-aged children between 6 and 15 years, with a predominance of Class II and Class III malocclusions [14]. In the Samegrelo region, 30% of patients were diagnosed with Class II malocclusion, 42% with Class I, and 9% with Class III malocclusion.

The prevalence of dental anomalies and the severity of their clinical manifestations vary across different geographical regions. According to World Health Organization (WHO) recommendations, taking into account the biogeochemical conditions of a specific region, the study of the epidemiology of dental anomalies and the dynamic updating of relevant data are considered essential prerequisites for planning optimal orthodontic care and preventive programs. Epidemiological studies provide valuable information on the prevalence of

dentoalveolar anomalies, triggering factors, as well as genetic and environmental characteristics [15].

The aim of the study was to investigate the prevalence, nosological structure, risk factors for the development, and regional characteristics of dentoalveolar anomalies in the school-aged pediatric population of Kutaisi (where no similar study has previously been conducted), as well as to develop indicative preventive measures.

Materials and Methods.

To assess the prevalence and structure of dentoalveolar anomalies, a cross-sectional study was conducted in a randomly selected, representative population of schoolchildren in the Kutaisi region. Schools were selected using a simple randomization method. Public schools were chosen for the study with consideration given to territorial, environmental, and socio-economic factors.

The study population consisted of children aged 7–14 years. Informed consent was obtained from the legal representatives of all participating minors. Ethical approval for the study was granted by the Ethics Committee (Protocol No. 2025-024).

Inclusion Criteria:

1. Children aged 7 to 14 years (inclusive)
2. Enrollment in a public school
3. Satisfactory general (somatic) health status
4. Written informed consent signed by the participant's parent or legal guardian.

Exclusion Criteria:

1. Participants with difficulty opening the oral cavity
2. Chronic diseases in the stage of exacerbation
3. Decompensated forms of dental caries
4. Inadequate oral hygiene and the presence of periodontal diseases
5. Presence of oral cavity infections
6. Participants whose parents or legal guardians declined participation in the study

The study was conducted among 697 schoolchildren. Dental status was assessed using clinical methods, including anamnesis (interview), inspection/visual examination, and clinical functional tests. Oral cavity screening included the identification of disorders of dental and/or oral development, disturbances in facial proportions, and the presence of asymmetry.

The correspondence between the number of teeth and the child's biological age, the sequence of tooth eruption, occlusal height and intermaxillary relationships, the anatomical form of the teeth and dental arches, the condition of the oral mucosa, as well as the size and position of the tongue were evaluated. When necessary, panoramic radiography was performed. Given the wide variety of classifications of dental anomalies, the ICD-10 classification was selected for use in this study.

In the second phase of the research, an observational case–control study was implemented. The study sample was selected through simple randomization from the previously examined population of children with maxillofacial anomalies. The case group comprised 154 children, whereas the control group included 85 practically healthy children exhibiting normal physical and psychological development and no evidence of dental pathology. During the selection process, the principle of homogeneity was ensured with respect to key characteristics, including age, sex, ethnicity, residential area, and other relevant factors.

To evaluate the associations between potential risk factors and the outcome, odds ratios (ORs) and corresponding 95% confidence intervals (CIs) were calculated. The interpretation of the ORs followed conventional criteria: OR = 1 indicated no association; OR < 1 suggested a reduced risk; and OR > 1 indicated an elevated risk. The reported odds ratios are based on univariate (crude) analyses, as the relatively small sample size of the case and control groups did not permit the application of multivariable (adjusted) logistic regression, nor did it ensure the stability of estimated parameters. Consequently, crude ORs provide an initial approximation of the associations under investigation.

Differences between variables were assessed using Pearson's χ^2 test. Statistical significance was defined as $p < 0.05$. Data processing was conducted using Microsoft Excel 2010, and statistical analyses were performed with the Statistical Package for the Social Sciences (SPSS), version 16.0.

Results.

A total of 697 schoolchildren aged 7–14 years were examined. Ethnic Georgians comprised 98.8% of the study population, with a mean age of 11.20 ± 2.38 years (median: 11 years). Taking into account the stages of occlusal development, the examined cohort was divided into three age groups. The distribution by age and sex is presented in Table 1.

In all age groups, girls predominated, accounting for 58% of the participants. Children aged 7–9 years comprised 29% of the cohort, those aged 10–12 years accounted for 36.9%, and children aged 13–15 years made up 34.2%.

Dentoalveolar anomalies were observed in 391 children (56.1%), while 306 children (43.9%) showed no signs of dentoalveolar pathology. Most commonly, a combination of two or more anomalies was detected, whereas isolated anomalies were relatively rare. In such cases, the primary anomaly was the most prominent.

According to ICD-10, the most common anomalies were tooth position disorders (52.4%). Anomalies of dental arch proportion were recorded in 40.5% of cases, dentoalveolar functional anomalies in 17.5%, and anomalies of tooth shape and size in 11.9% (see Figure 1).

Relatively lower frequencies were observed for temporomandibular joint anomalies (4.3%), adentia (2.3%), impacted teeth (2.7%), and jaw–cranial proportion anomalies (2.7%). In single cases, other dentoalveolar anomalies were recorded (0.14%), supernumerary (hypercomplex) teeth (0.9%), and disturbances in tooth eruption (0.6%).

Regarding jaw shape anomalies, 14.1% of children presented with V-shaped jaws (98 cases), 12% with trapezoid-shaped jaws (87 cases). Rarely, U-shaped jaws (1.0%), saddle-shaped jaws (0.57%), and Gothic palates (0.72%) were observed.

Analysis of the distribution of malocclusion types across age groups showed that anomalies were most frequently observed in children aged 13–15 years. Dental arch proportion anomalies, as well as tooth position anomalies, were twice as common in

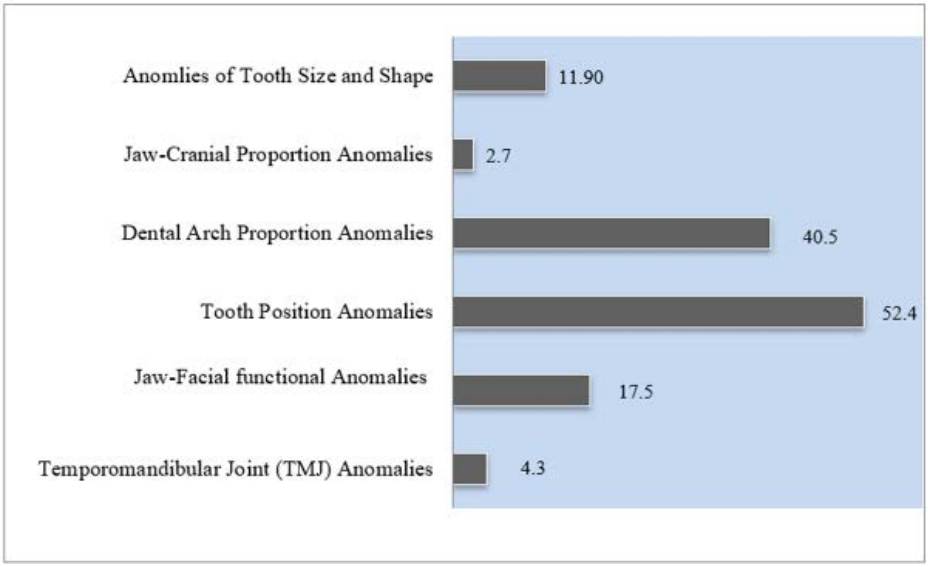

Figure 1. Distribution of Dentoalveolar Anomalies in the Examined Cohort (n = 697).

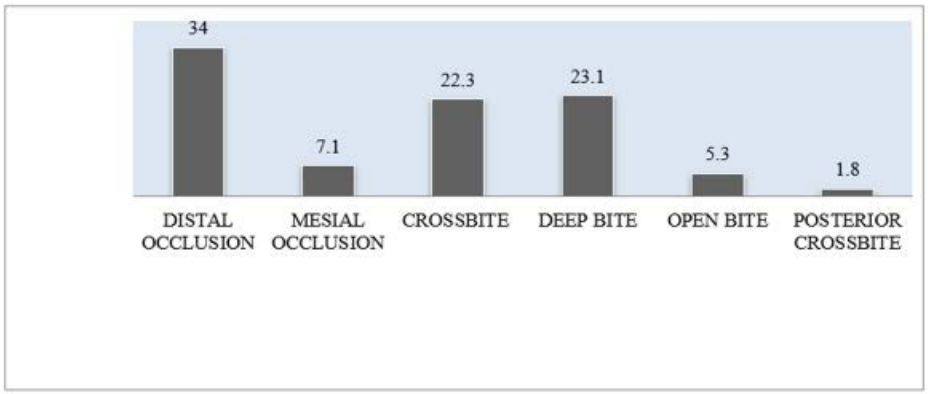

Figure 2. Nosological Structure of Dental Arch Proportion Anomalies (n = 697).

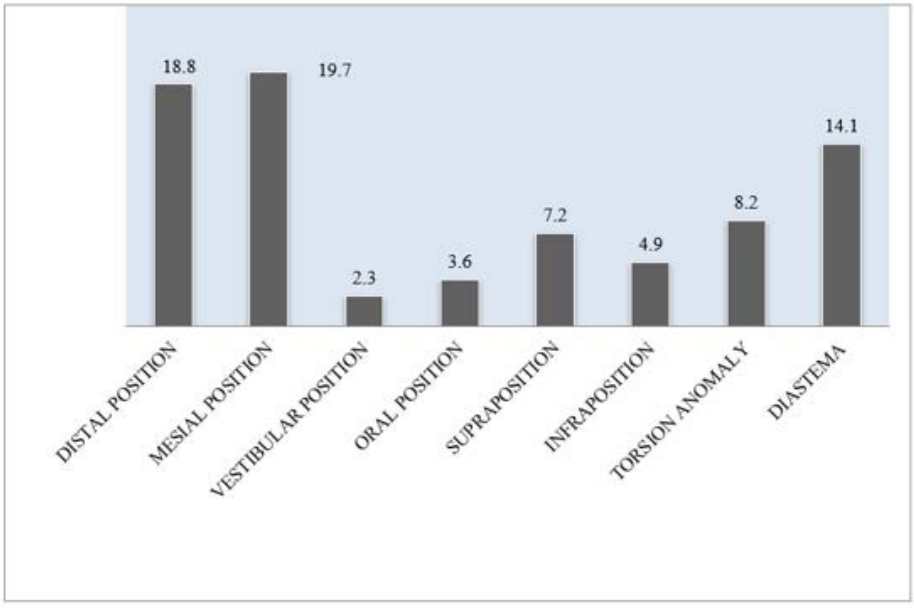

Figure 3. Nosological Structure of Tooth Position Anomalies (n = 697).

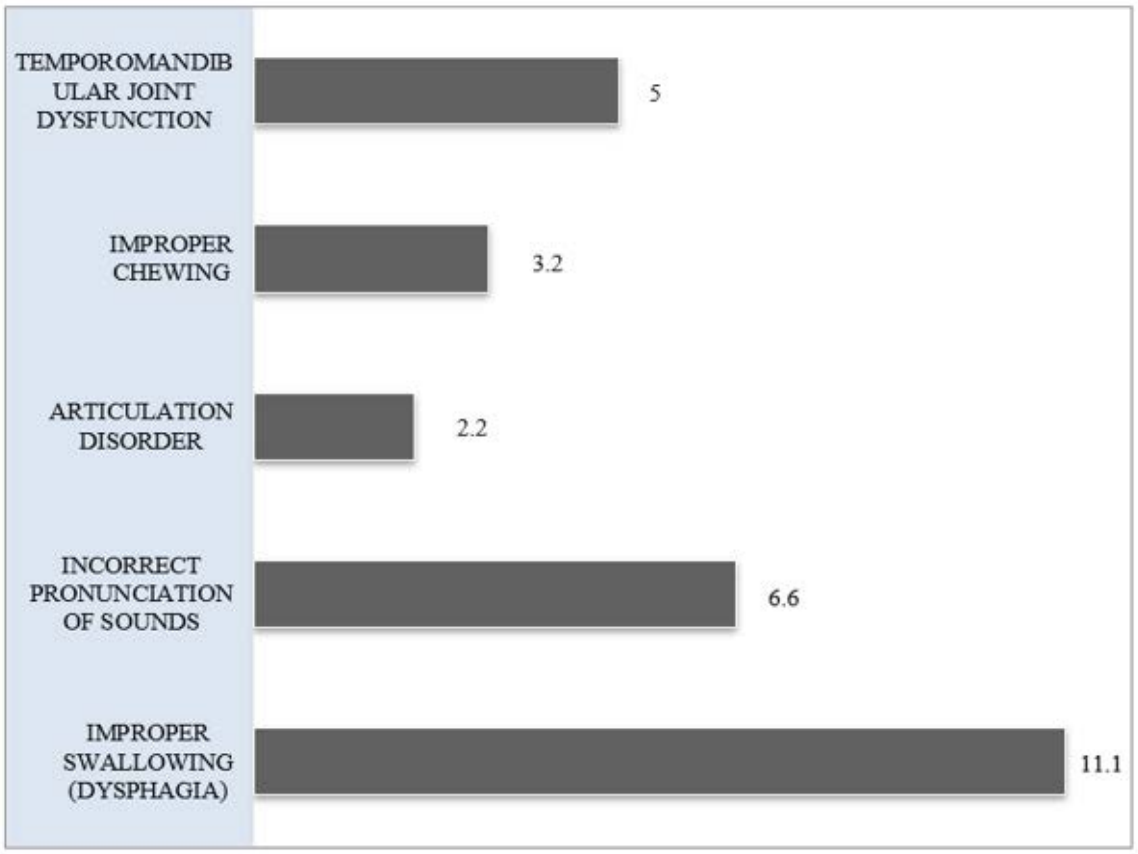

Figure 4. *Structure of Dentoalveolar Functional Anomalies (n = 697).*

Table 1. *Distribution of the Examined Cohort by Age and Sex (n = 697).*

Gender	**Age**			**Total**	
	7-9 Years	**10-12 Years**	**13- 15 Years**	**N**	**%**
Girls	117 (16,8%)	132 (18,9 %)	151(21.7%)	404	58 %
Boys	85 (12,2%)	125 (17,9 %)	87 (12.5%)	293	42 %
Total	202 (29%)	257 (36.9 %)	238 (34.2%)	697	100

Table 2. *Prevalence of Dentoalveolar Anomalies by Age Group (n/%).*

Code (ICD-10)	**Types of Anomalies**	**Age**			**Total (n = 697)**
		7 – 9 (n =202)	**10 - 12 (n= 257)**	**13 – 15 (n =238)**	
K00.2	Tooth Size and Shape Anomaly	21 (3.0%)	29 (4.2%)	28(4.0%)	78 (11.9%)
K07.0	Jaw Size Anomaly	44 (6.3%)	90 (12.9%)	67 (9.6%)	201 (28.8%)
K07.1	Jaw–Cranial Proportion Anomaly	5 (0.7%)	4 (0.8%)	10 (1.4%)	19 (2.7%)
KO7.2	Dental Arch Proportion Anomaly	49 (7.0%)	107(15.4%)	126(18.1%)	282 (40.5%)
K07.3	Tooth Position Anomalies	70 (10.0%)	134(19.2%)	161(23.1%)	365 (52.4%)
K07.5	Dentoalveolar Functional Anomaly	24(3.4%)	54 (7.8%)	44 (6.31%)	122(17.5%)
K07.6	Temporomandibular Joint (TMJ) Dysfunction	-	5 (0.7)	25 (3.6%)	30(4.3%)

Table 3. *Prevalence of Dentoalveolar Anomalies by Gender Groups.*

Code (ICD-10)	**Types of Anomalies**	**Total (n = 697)**	**Girls 404 (58%)**	**Boys 293(42%)**	**χ2**	**P**
K00.2	Tooth Size and Shape Anomaly	78 (11.9%)	42 (6.0%)	36 (5.2%)	0.611	0.434
K07.0	Jaw Size Anomaly	201 (28,8%	82(11.8%)	119(17.1%)	34. 16	0.000
K07.1	Jaw–Cranial Proportion Anomaly	19 (2.7%)	9 (1.3%)	10 (1.43%)	0.900	0.343
KO7.2	Dental Arch Proportion Anomaly	282 (40.5%)	168 (24.1%)	114(16.4%)	0.505	0.477
K07.3	Tooth Position Anomalies	365 (52.4%)	220 (31.6%)	145 (20.8%)	1.680	0.195
K07.5	Dentoalveolar Functional Anomaly	122(17.5%)	74 (10.6%)	48 (6.9%)	0.440	1.507
K07.6	Temporomandibular Joint (TMJ) Dysfunction	30(4.3%)	16 (2.3%)	14 (2.0%)	0.276	0.600

Table 4. *Family and Socio-Economic Factors in the Comparative Groups.*

Factors	Cases (n=154)	Control (n=85)	OR	CI	χ2	p
Low Household Income	13(8.4%)	3(2.5%)	2.520	0.69-9.11	2.116	0.146
Inadequate Living Conditions	109(70.8)	60(70.6%)	1.009	0.56-1.81	0.001	0.975
Single-Parent Family	23(14.9%)	9(10.6%)	1.483	0.65-3.37	0.892	0.345
Conflictual Family Environment	21(13.6)	6(7.06%)	2.079	0.81-5.37	2.365	0.124
Mother's Secondary Education	43(27.9%)	21(24.7%)	1.181	0.64-2.16	0.289	0.591
Father's Secondary Education	40(25.9%)	20(23.5%)	1.140	0.62-2.11	0.174	0.677

Table 5. *Hereditary Risk Factors in the Study Groups.*

variables	cases (n=154)	control (n=85)	OR	CI	χ2	p
Maxillofacial Anomalies in Mothers	46(29.8%)	15 (17.6%)	1.988	1.03-3.83	4.315	0.038
Maxillofacial Anomalies in Fathers	40 25.9%)	14 (16.5%)	1.779	0.90-3.50	2.828	0.093
Maxillofacial Anomalies in Siblings	9 (5.8%)	1(1.2%)	5.214	0.65-41.87	2.976	0.084
Maxillofacial Anomalies in Close Relatives	13(8.4%)	2 (2.6%)	3.826	0.84-17.37	3.452	0.063

Table 6. *Distribution of Postnatal Risk Factors in the Comparative Groups.*

Postnatal Period Characteristics	cases (n=154)	control (n=85)	OR	CI	χ2	P
Frequent Respiration in Early Age	41(26.6%)	6 (7.1%)	4.777	1.93-11.79	13.273	0.000
Food Allergy	19(12.3%)	7(8.2%)	1.568	0.63-3.89	0.951	0.330
Allergic Rhinitis	21(13.6%)	4(4.7%)	3.197	1.06-9.65	4.664	0.031
Mouth Breathing / Adenoid Hypertrophy	71(46.1%)	15(17.6%)	3.992	2.10-7.58	19.254	0.000
Introduction of Soft Foods Inappropriate for Age	21(13.6%)	3(3.5%)	4.316	1.25-14.92	6.193	0.013
Prolonged Use of Pacifier	37(24.03%)	15(17.6%)	1.476	0.76-2.88	1.309	0.253
Thumb Sucking / Fist Sucking	9 (5.8%)	6(7.1%)	0.817	0.28-2.38	0.137	0.711

Table 7. *Probable Risk Factors for the Development of Dentoalveolar anomaly.*

Risk Factors	Cases (n=154)	Control (n=85)	OR	95% CI	χ2	p
Low family income	13(8.4%)	3(2.5%)	2.52	0.69-9.10	2.116	0.146
Single-parent family	23(14.9%)	9(10.6%)	1.48	0.65-3.36	0.892	0.345
Conflictual family environment	21(13.6)	6(7.1%)	2.07	0.80-5.37	2.365	0.124
Dental anomalies in the mother	46(29.8%)	15(17.6%)	1.98	1.03-3.83	4.315	0.038
Dental anomalies in the father	40 25.9%)	14 (16.5%)	1.77	0.90-3.50	2.828	0.093
Spontaneous abortion	14 (9.1%)	3 (3.5%)	2.73	0.76-9.79	2.564	0.109
Premature birth (<37 weeks)	19(6.5%)	3(3.5%)	3.84	1.10-13.40	5.084	0.024
Frequent respiratory infections in early childhood	41(26.6%)	6 (7.1%)	4.77	1.93-11.7	13.273	0.000
Food allergy	19(12.3%)	7(8.2%)	1.56	0.63-3.89	0.951	0.330
Allergic rhinitis	21(13.6%)	4(4.7%)	3.19	1.06-9.64	4.664	0.031
Mouth breathing / Adenoid hypertrophy	71(46.1%)	15(17.6%)	3.99	2.10-7.58	19.254	0.000
Consumption of soft foods inappropriate for age	21(13.6%)	3(3.5%)	4.31	1.24-14.9	6.193	0.013
Prolonged use of a pacifier	37(24.0%)	15(17.6%)	1.47	0.75-2.88	0.137	0.711

children aged 10–12 and 13–15 years compared with those aged 7–9 years (see Table 2).

In children aged 7–9 years, the most common form of dentoalveolar anomaly was tooth position anomalies (10.0%). In the 10–12-year-old group, tooth position anomalies (19.2%) and dental arch proportion anomalies (15.4%) were most frequent. Among 13–15-year-olds, tooth position anomalies (18.1%) and dental arch proportion anomalies (23.1%) remained the most common.

Additionally, jaw size anomalies (12.9%) and dentoalveolar functional anomalies (7.8%) were most frequent in the 10–12-year-old group.

Regarding gender differences, the prevalence of dental arch proportion anomalies, tooth position anomalies, and dentoalveolar functional anomalies was higher among girls (see Table 3).

An exception was observed for jaw size anomalies, which were more frequent in boys ($\chi^2 = 34.16$, P = 0.000). For other anomalies, no statistically significant differences between gender groups were found. Temporomandibular joint anomalies and jaw–cranial proportion anomalies were equally rare in both groups.

Evaluation of the nosological structure of the main anomaly groups revealed that the most common forms of dental arch proportion anomalies were distal occlusion (34.0%), crossbite (22.3%), and deep bite (23.1%). Less frequent were mesial occlusion of the lower teeth (7.1%) and open bite (5.3%) (see Figure 2).

Among tooth position anomalies, the most frequent were distal tooth position (18.8%), mesial tooth position (19.9%), and diastema (14.1%), with their percentages being almost twice as high as those of other forms (see Figure 3).

Torsion anomalies were observed in 8.2% of cases, and supraposition in 7.2%. Overall, the combined prevalence of infraposition, vestibular position, and oral (lingual) position anomalies did not exceed 10.8%.

It is well known that anomalies of the dentoalveolar system can lead to significant functional impairments, including breathing, swallowing, chewing, and speech. The diagnosis of dentoalveolar functional disorders was made based on complaints, medical history (anamnesis), and physical examination of the children. Particular attention was paid to facial stigmas, nasal breathing disorders, and a visual assessment of the range and amplitude of temporomandibular joint movements.

Within the structure of functional anomalies, difficulty swallowing was most common. Less frequently observed were incorrect pronunciation of sounds and temporomandibular joint functional impairments (see Figure 4).

Thus, the study of the nosological structure of dentoalveolar anomalies in the examined cohort revealed that the most common forms of dental arch proportion anomalies were distal occlusion (34.0%), crossbite (22.3%), and deep bite (23.1%). Among tooth position anomalies, mesial position (19.7%) and distal position (18.8%) were most frequent, while among functional anomalies, the most common were difficulty swallowing, incorrect pronunciation of sounds, and temporomandibular joint functional impairments.

One of the objectives of the study was to identify risk factors for the development of dentoalveolar anomalies. The multifactorial origin of dentoalveolar anomalies determines the diversity of their pathogenetic mechanisms and risk factors [16,17]. The study examined the regional characteristics of risk factors for dentoalveolar anomalies. To identify risk factors, a case-control study was conducted. The case group included 154 patients with dentoalveolar anomalies, while the control group consisted of 85 age-matched, apparently healthy children without dental pathology.

A detailed assessment was conducted of family socio-economic status, parental education level, health status, and hereditary predisposition to dentoalveolar anomalies. In the child cohort, early feeding patterns, subsequent nutritional behaviors, and somatic health status during ontogenesis were evaluated (Tables 4-6).

None of the examined socio-economic or family-related factors demonstrated a statistically significant association with the development of maxillofacial anomalies (in all cases, $p > 0.05$; the 95% CIs included 1). Although low household income and a conflictual family environment showed a tendency toward increased risk (OR > 1), these associations did not reach statistical significance.

Analysis of hereditary factors revealed that the presence of maxillofacial anomalies in mothers was statistically significant (OR = 1.99; 95% CI: 1.03–3.83; $p = 0.038$), suggesting a potential influence of a hereditary component. In fathers, the OR was 1.78 (95% CI: 0.90–3.50; $p = 0.093$), indicating a trend toward increased risk, although this was not statistically significant. The ORs for siblings and close relatives were higher (OR = 5.21 and OR = 3.83, respectively), but due to the small number of cases, these results were not statistically reliable.

Most pregnancy complications occurred with similar frequency in both groups. An exception was preterm birth, which was statistically significantly associated with maxillofacial anomalies (OR = 3.85; 95% CI: 1.10–13.40; $p = 0.024$). The risk of pregnancy termination showed a trend toward increased risk (OR = 2.73; 95% CI: 0.76–9.79; $p = 0.109$), although this association did not reach statistical significance.

In the postnatal period, the main pathological conditions and behavioral factors potentially affecting the immunobiological reactivity of the child were examined. Particular attention was given to potentially modifiable harmful habits and environmental factors (Table 6).

According to the OR analysis, the following postnatal risk factors demonstrated statistically significant associations: frequent respiratory infections in early childhood (OR = 4.78; 95% CI: 1.93–11.79; $p < 0.001$), allergic rhinitis (OR = 3.20; 95% CI: 1.06–9.65; $p = 0.031$), mouth breathing/adeniod hypertrophy (OR = 3.99; 95% CI: 2.10–7.58; $p < 0.001$), and the introduction of soft foods inappropriate for age (OR = 4.32; 95% CI: 1.25–14.92; $p = 0.013$). These factors were identified as strong risk factors with reliable associations. In contrast, food allergy, prolonged use of a pacifier, and thumb/fist sucking did not show statistically significant associations with the main study outcome ($p > 0.05$).

Based on univariate (crude) analysis, potential risk factors associated with the development of maxillofacial anomalies were identified, among which 13 factors stood out due to their high odds ratios (ORs) (Table 7). Based on univariate analysis, six variables were found to be statistically significant risk factors for dentofacial anomalies: hereditary predisposition from the mother (dental anomalies in the mother) (OR = 1.99, 95% CI: 1.03–3.83, $p = 0.038$); premature birth (<37 weeks) (OR = 3.85, 95% CI: 1.10–13.40, $p = 0.024$); mouth breathing/adenoid hypertrophy (OR = 3.99, 95% CI: 2.10–7.58, $p < 0.001$); consumption of soft foods inappropriate for age (OR = 4.32, 95% CI: 1.24–14.90, $p = 0.013$); frequent respiratory infections in early childhood (OR = 4.78, 95% CI: 1.93–11.70, $p < 0.001$); and allergic rhinitis (OR = 3.20, 95% CI: 1.06–9.64, $p = 0.031$).

Discussion.

The study of global trends has shown that researchers most often assess the prevalence of dentoalveolar anomalies based on the need for orthodontic treatment, without considering etiological factors or regional characteristics of risk [18]. Most studies focus on only a few types or subtypes of anomalies. Particularly noteworthy are the variable results, which are likely influenced by the diversity of diagnostic criteria, methods, and indices used, as well as differing approaches.

To accurately assess the real prevalence in epidemiological studies, a standardized methodological approach is necessary—this includes the use of unified classification systems, correct sampling principles (size, age, sex, ethnicity, etc.), and evaluation of regional risk factor characteristics [19-21], which was the objective of our study.

According to the results of our study, dentoalveolar anomalies were observed in the majority of participants (56.1%). The

most common forms were tooth position anomalies (52.4%), dental arch proportion anomalies (40.5%), and dentoalveolar functional disorders (17.5%).

Most authors indicate that the prevalence of dental pathologies varies by age and gender [22]. In the present study, dental arch proportion anomalies and tooth position anomalies were observed twice as frequently in the 10–12 and 13–15-year-old groups compared to children aged 7–9 years. Notably, the prevalence of both types of anomalies gradually increased with age. This trend may be associated with the intensive growth phase of facial bones and the mixed dentition period in children aged 11–15 years, which facilitates the clinical manifestation of anomalies. Additionally, the insufficient level of early orthodontic monitoring and preventive interventions may play a significant role, reducing the opportunity for timely correction.

Regarding gender differences in prevalence, in our material, dental arch proportion anomalies (24.1% vs. 16.4%) and tooth position anomalies (31.6% vs. 20.8%) predominated in girls, which contrasts with some studies reporting a higher prevalence of dental anomalies in boys. The self-regulation process of the jaw bones, particularly the mandible, coincides with the peak growth period and corresponds to the peak of sexual maturation—on average, 12–13 years for girls and 14–15 years for boys.

The analysis of the structure revealed that the most common forms of dental arch proportion anomalies were distal occlusion (34.0%), crossbite (22.3%), and deep bite (23.1%). Among tooth position anomalies, mesial position (19.7%) and distal position (18.8%) were most frequent. Regarding functional anomalies, the most common were difficulty swallowing, incorrect pronunciation of sounds, and temporomandibular joint functional impairments.

The study confirmed the multifactorial nature of Dentoalveolar anomalies. Based on univariate analysis, 13 risk factors for dentoalveolar anomaly formation were identified, among which six variables were statistically significant: hereditary predisposition from the mother, prematurity, mouth breathing/adenoid hypertrophy, consumption of soft foods inappropriate for age, frequent respiratory infections in early childhood, and allergic rhinitis.

Based on these results, it can be concluded that a significant portion of the risk factors involved in the development of dentoalveolar anomalies are modifiable, providing an opportunity for timely and targeted preventive interventions. At the same time, uncontrollable risk factors are primarily associated with hereditary predisposition, highlighting the role of genetic background in anomaly formation. These findings emphasize the importance of early screening and monitoring of at-risk groups.

The results of the study indicate that regular medical and preventive dental examinations in the school-age population play a crucial role in the early diagnosis of dentoalveolar anomalies. This approach ensures the timely identification of orthodontic disorders and the organization of adequate orthodontic care during periods of active growth, which promotes harmonious development of the dentoalveolar system and reduces the need for complex and prolonged orthodontic treatment.

Accordingly, the integration of organized screening programs into the public health system for school-age children can be considered a strategically important step toward the prevention of dentoalveolar anomalies and the improvement of oral health in the population.

Conclusion.

The results of the study indicate that in the school-age population of Kutaisi, the most common dentoalveolar anomalies were tooth position anomalies, dental arch proportion anomalies, and dentoalveolar functional anomalies.

Regarding nosological structure, the most frequent forms of dental arch proportion anomalies were distal occlusion, crossbite, and deep bite. Among tooth position anomalies, mesial position and distal position predominated. In terms of functional anomalies, the most common were difficulty swallowing, incorrect pronunciation of sounds, and temporomandibular joint functional impairment.

Statistically significant risk factors included hereditary predisposition from the mother (dental anomalies), prematurity, mouth breathing/adenoid hypertrophy, consumption of soft foods inappropriate for age, frequent respiratory infections in early childhood, and allergic rhinitis.

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