

GEORGIAN MEDICAL NEWS

ISSN 1512-0112

NO 5 (350) Май 2024

ТБИЛИСИ - NEW YORK



ЕЖЕМЕСЯЧНЫЙ НАУЧНЫЙ ЖУРНАЛ

Медицинские новости Грузии
საქართველოს სამედიცინო სიახლე

GEORGIAN MEDICAL NEWS

Monthly Georgia-US joint scientific journal published both in electronic and paper formats of the Agency of Medical Information of the Georgian Association of Business Press.
Published since 1994. Distributed in NIS, EU and USA.

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 ВИНТИ 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 ВИНТИ 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. Корректур авторам не высылаются, 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 computer-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 საქურაღებოლ!

რედაქციაში სტატიის წარმოდგენისას საჭიროა დაიცვათ 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 შედეგის 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 ფხიხლებში 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.

Andrii Proshchenko, Serhii Terekhov, Olena Vesova, Valery Kaminsky, Anna I. Kryvosheieva. UTILIZATION OF ARTIFICIAL INTELLIGENCE FOR PREDICTIVE MODELING IN DENTAL IMPLANTOLOGY.....	6-15
Tereza Azatyan, Lusine Stepanyan. EFFECT OF THE CORRECTIONAL APPROACH ON THE REGULATION OF NEURAL FUNCTIONS IN CHILDREN WITH MENTAL DISABILITIES WITH INTERHEMISPHERIC BRAIN ASYMMETRY.....	16-22
Nalikashvili Angelina Sh, Enokyan Viktoria A, Lysak Anastasia V, Ramazanov Magomed R, Meporia Gero G, Azadov Begli, Guseva Yulia A, Voitov Andrey V, Khuako Timur A, Andronova Ksenia D. ASEPTIC NECROSIS OF THE FEMORAL HEAD: WHAT DO WE KNOW ABOUT TREATMENT OPTIONS?	23-24
Moroka R.K, Povaliaiev V.V, Tkachenko I.G, Fomenko Yu.V, Babai O.M, Mikulinska-Rudich Yu.N, Iskorostenska O.V, Borisenko Ye.Ye, Nazaryan R.S, Gargin V.V. THE RELATIONSHIP BETWEEN THE CONDITION OF THE ORAL CAVITY AND THE USE OF TOBACCO PRODUCTS IN DIFFERENT AGE GROUPS.....	25-30
Israel Barrutia Barreto, Juan José Danielli Rocca, Ynes Eliana Solano Guilen, Cesar Castro Galarza, Felix Alberto Caycho Valencia. EPIDEMIOLOGY OF DEPRESSIVE STATES IN ACUTE AND CHRONIC CONDITIONS.....	31-35
Othman Q. Abdulhameed, Luay A. Al-Helaly. METHIONINE SULFOXIDE REDUCTASE A AND NEUROTRANSMISSION ENZYMES IN AUTISM SPECTRUM DISORDER AND DYSTOCIA RELATED AUTISTICS.....	36-41
Yuriko Tanabe, Takuma Hayashi, Mako Okada, Hiroyuki Aburatani, Susumu Tonegawa, Kaoru Abiko, Ikuo Konishi. POTENTIAL DIAGNOSTIC BIOMARKERS FOR HUMAN MESENCHYMAL TUMORS, ESPECIALLY LMP2/BII AND CYCLIN E1/ MIB1 DIFFERENTIAL EXPRESSION: PRUM-IBIO STUDY.....	42-48
Sosonna L, Yurevych N, LupyrM, Babiy L, Kysylenko K, Kachailo I, NarbutovaT, Borisenko Ye, Baiazitov D, Alekseeva V. VARIANT ANATOMY OF THE MAXILLARY SINUS BASED ON MULTISPIRAL COMPUTED TOMOGRAPHY DATA (MSCT).....	49-53
Bruk Georgiy M, Rostomov Faizo E, Tyulekbayeva Diana, Alexey Igorevich K, Nasirov Said Fadail Ogly, Almanova Ekaterina A, Sharipova Elvira R, Dzedaeva Amina Z. HYPERHOMOCYSTEINEMIA AS A CAUSE OF ERECTILE DYSFUNCTION.....	54-56
Myroslava Drohomiretska, Yuliia Tkachenko. THE METHOD OF ASSESSING THE DEGREE OF GLOSSOPTOSIS ACCORDING TO CLINICAL AND X-RAY ANTHROPOMETRICAL PREDICTORS: CLINICAL GUIDELINES.....	57-62
Mohammed Tariq, Feten Hachani. EFFECT OF A TRAINING PROGRAM ON REDUCING HEALTH COMPLICATIONS AFTER OPERATIONS OF PROXIMAL FEMORAL NAILING (PFN) TECHNIQUE.....	63-67
Mariam Shotadze, Lia Gumbaridze, Yuxian Cui, Levan Baramidze, Nino Kiladze, Lela Sturua, Carla J Berg. ATTITUDES AND BEHAVIORS RELATED TO REDUCING SECONDHAND SMOKE EXPOSURE AMONG MEDICAL UNIVERSITY STUDENTS IN THE COUNTRY OF GEORGIA.....	68-72
Sergey Apryatin, Alexander Lopachev, Ilya Zhukov, Evgeniya Efimova, Vera Apryatina. BEHAVIORAL AND NEUROCHEMICAL CHANGES DURING INTRANASAL ADMINISTRATION OF ALPHA-GLUTAMYL- TRYPTOPHAN AND CHELATE COMPLEX OF ZINC ARGINYL-GLYCINATE ON MONOAMINE SYSTEMS DYSFUNCTIONS KNOCK-OUT MODELS.....	73-81
Michael N. Gonevski. RATIONALE AND ANALYSIS OF THE EFFECT OF HBOT THERAPY IN THE RECOVERY OF LONG COVID PATIENTS.....	82-87
Gisnella María Cedeño Cajas, José Andrés Zaporta Ramos, Yisela Carolina Ramos Campi, Feliz Atair Falconi Ontaneda, Martha Cecilia Ramos Ramírez. DYNAMICS OF HPV GENOTYPES AND THE RESULTS FOUND IN CYTOLOGICAL LESIONS OF UNIVERSITY STUDENTS: A COMPARATIVESTUDY.....	88-94
Hind R. Toaama, Entedhar R. Sarhat, Husamuldeen S Mohammed. METFORMIN MODULATED ADIPOKINES BIOCHEMICAL MARKERS IN TYPE-2 DIABETES PATIENTS.....	95-97
Serik A. Baidurin, Farida K. Bekenova, Layila N. Baitenova, Aysha Zh. Darybaeva, Klara B. Kurmangalieva. TRANSFORMATION OF MYELODYSPLASTIC SYNDROME INTO ACUTE MYELOBLASTIC LEUKEMIA (CLINICAL CASE) ...	98-102
Nikolaishvili M.I, Andronikashvili G.T, Gurashvili T.T, Tarkhnishvili A.A, Dondoladze K.N. COMPARATIVE ANALYSIS OF MEMORY AND BEHAVIORAL CHANGES AFTER RADON-CONTAINED MINERAL WATER INHALATION THERAPY IN AGED RATS.....	103-109

Yu.V. Boldyreva, I.A. Lebedev, E.V. Zakharchuk, S.N. Lebedev, A.S. Zubareva. A CLINICAL CASE OF DIFFUSE TOXIC GOITER WITH ENDOCRINE OPHTHALMOPATHY AND MANIFESTATIONS IN THE DENTAL SYSTEM IN A 15-YEAR-OLD CHILD.....	110-112
Rouaa K. Obaees, Emad F. Alkhalidi, Suhad M. Hamdoon. PH VALUE AND ANTIBACTERIAL EFFECT OF ALKASITE RESTORATIVE MATERIALS.....	113-119
Lasha Gulbani, Lika Svanadze, Irma Jikia, Zanda Bedinashvili, Nana Goishvili, Tinatin Supatashvili, Tamar Turmanidze, Ketii Tsomaia, Vakhtang Goderdzishvili, Dimitri Kordzaia. HELICOBACTER PYLORI AND GALLBLADDER PATHOLOGIES: IS THERE A CAUSE-AND-EFFECT RELATIONSHIP?.....	120-126
Yaroslavska J.J, Hrechko N.B, Vlasov A.V, Smorodskyi V.O, Storozheva M.V, Skliar S.O, Lupyr M.V, Nazaryan R.S. ETIOLOGY, DIAGNOSIS AND TREATMENT OF MUSCLE-ARTICULAR DYSFUNCTION OF THE TEMPOROMANDIBULAR JOINT IN ADOLESCENCE.....	127-132
Shahad Wisam Ahmed, Shatha Hussein Ali. INVESTIGATING THE CORRELATIONS BETWEEN SUBSTANCE P, ANTIOXIDANT LEVELS, AND METABOLIC MARKERS IN NON-OBESSE TYPE 2 DIABETIC PATIENTS.....	133-137
N. A. Harutyunyan, E. D. Sargsyan, L. S. Stepanyan. COPING ARRANGEMENT OF SPOUSES WITH EMOTIONAL INTELLIGENCE IN FAMILY CONFLICTS.....	138-143
Shiyan D.M, Kysylenko K.V, Trach O.O, Yurevych N.O, Lupyr M.V, Alekseeva V.V. ANATOMICAL VARIABILITY OF THE ALVEOLAR PROCESS OF THE MAXILLA BASED ON MULTISLICE COMPUTED TOMOGRAPHY DATA.....	144-148

THE METHOD OF ASSESSING THE DEGREE OF GLOSSOPTOSIS ACCORDING TO CLINICAL AND X-RAY ANTHROPOMETRICAL PREDICTORS: CLINICAL GUIDELINES

Myroslava Drohomiretska¹, Yuliia Tkachenko^{2*}.

¹Head of Department of Orthodontics of the National University of Health Care of Ukraine named after P.L. Shupyk, Kyiv, Ukraine.

²Associate professor of the Department of Orthodontics of the National University of Health Care of Ukraine named after P.L. Shupyk, Kyiv, Ukraine.

Abstract.

Introduction: The article provides a description of the clinical application of the authors' method of quantitative assessment of the degree of severity of glossoptosis based on clinical and X-ray anthropometric indicators (predictors). In the presentation of the scale for assessing clinical predictors (head position, shape of the palate, frenulum of the tongue, posture of the tongue by dr. John Mew, size of the palate), functional predictors (functional test with a bucket of water, index of degree of difficulty of tracheal intubation by dr. Seshagiri Rao Mallampati, degree of tongue elevation impairment for dr. S. Zaghi), X-ray - anthropometric indicators, (assessment of the position of the hyoid cyst along the C3-RGn line, type of slit growth). Each predictor was assessed by the number of scores. The sum of points according to all criteria indicated the level of importance of glossoptosis: mild severity – 0-20 points; moderate severity – 21-48 points; severe – 49 – 76 points. The algorithm for assessing the stage of glossoptosis is illustrated with a clinical case.

The aim of the study: to improve the diagnosis of glossoptosis by determining clinical and X-ray anthropometric predictors of quantitative assessment of its severity.

Results and their discussion: As a result of the analysis of literature data and our own clinical studies, we have developed a methodology for the quantitative assessment of glossoptosis based on clinical and X-ray anthropometric predictors, namely: clinical predictors (head position, palate shape, tongue frenulum, tongue posture according to John Mew, the size of the palatine tonsils), functional predictors (functional test with a sip of water, the difficulty index of tracheal intubation according to Mallampati, the degree of tongue elevation according to S. Zaghi), X-ray - anthropometric predictors (estimation of the position of the hyoid bone relative to the C3-RGn line, type jaw growth)

Conclusions: As a result of the analysis of special literature over the last 10 years and the conducted own clinical and additional examinations of 168 patients, a method of quantitative assessment of the severity of glossoptosis based on clinical and X-ray anthropometric indicators (predictors) was developed. It allows not only to detect the presence of glossoptosis, but also to quantitatively assess its severity: light – 0-20 points; average – 21-48 points; difficult - 49 - 76 points. What will allow us to plan orthodontic treatment, individualize myofunctional correction programs and motivate parents for successful cooperation with the doctor during the active period and during the retention period.

Key words. Hyoid bone posture, tongue posture, tongue tie, tongue elevation scale, lateral cephalometry, Mallampati index, hypertrophy of the palatine tonsils.

Introduction.

Dento-oro-facial anomalies are one of the common dental diseases with a steady growth trend [1]. Functional disorders contributing to their occurrence and strengthening are extremely diverse [2]. Abnormally occurring functions of the oral cavity should be included here: swallowing [3], chewing [4], breathing [5].

Glossoptosis, in some cases, is a consequence, in others, a cause of the formation of abnormal types of maxillofacial growth [6], the development of pathological types of bite [7], anomalies of the shape and size of the tooth rows [8].

Based on the analysis of the literature available to us, insufficient attention has been paid to the development of an algorithm for assessing the position of the tongue based on clinical and X-ray anthropometric predictors, such as: type of jaw growth, degree of restriction of tongue elevation, abnormalities of the tongue frenulum, position of the hyoid bone, position of the tongue at rest.

The aim of this study: to improve the diagnosis of glossoptosis by determining clinical and X-ray anthropometric predictors of quantitative assessment of its severity.

Materials and Methods.

We conducted a clinical and additional examination of 168 patients who applied for consultation at the Department of Orthodontics of the National University of Health Care of Ukraine named after P.L. Shupyk (head of the Department of Medical Sciences, Prof. Drohomiretska M.S., clinical base - National Children's Specialized Hospital of the Ministry of Health of Ukraine (consultative and diagnostic polyclinic)). The distribution of patients by age is shown in Figure 1.

When conducting the study, we used measurement tools and methods, as well as the patient's informed consent form for conducting the study, which corresponded to the main provisions of the Law of Ukraine No. 2801-XII "Basics of the Legislation of Ukraine on Health Care", ICH GSR (1996-2016), the Helsinki Declaration of the World Medical Association on Ethical Principles of Scientific Medical Research with Human Participation (1964-2013), the Council of Europe Convention on Human Rights and Biomedicine (from 04.04.1997), Order of the Ministry of Health of Ukraine № 690 from 2009.

Characteristics regarding oral health measures (Angle's classification of the malocclusion, overjet, overbite, posterior crossbite and respiratory mode) were also assessed. Total of 168 children were evaluated. Patients who had a vertical type of facial growth (52%) more often had oral/oral-nasal breathing. Patients who had a horizontal type of facial growth (34%) had an incorrect position of the tongue in the form of passing it

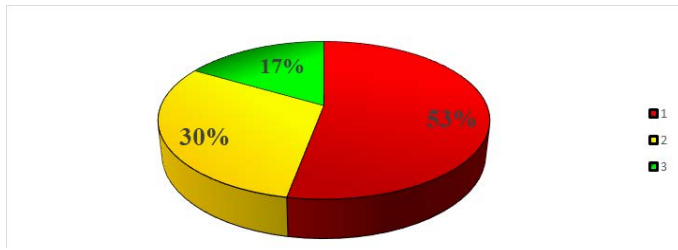


Figure 1. Distribution of patients by age: 1) early variable bite of 6-8 years; 2) late variable bite 9-12 years; 3) permanent bite - 13 years and older.

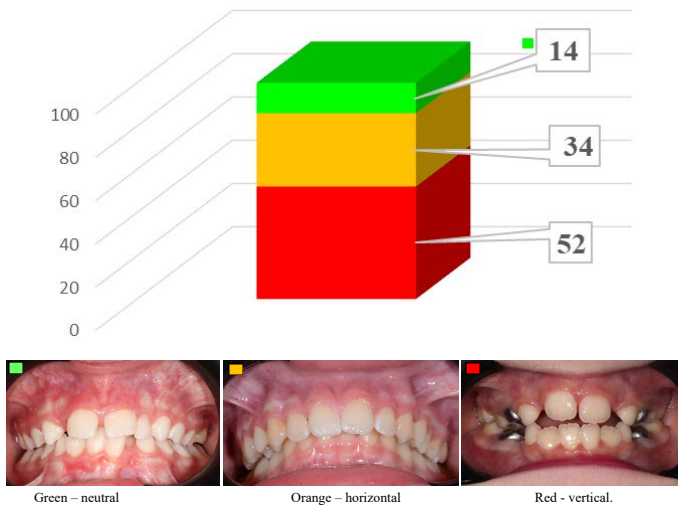


Figure 2. Distribution of patients by type of facial growth: green - neutral; orange - horizontal; red - vertical.

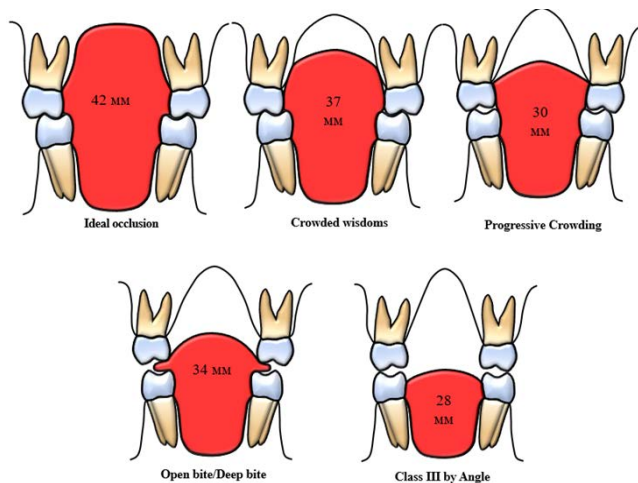


Figure 3. Types of tongue posture for various malocclusions (by John Mew).

through the posterior teeth. Patients with a neutral type of jaw growth (14%) had different tongue placement options: from touching the upper teeth and alveolar processes to touching the lower teeth (Figure 2).

The studies (Figure 3) carried out coincided with the data from many years of clinical studies of John Mew (John Mew Tongue Posture, Journal of Orthodontics Volume 8, Issue 4 <https://doi.org/10.1179/bjo.8.4.203>).

When analyzing lateral cephalograms (the patient's head was fixed in the fixing device in a natural position - natural head posture) [9].

The position of the hyoid bone was assessed on lateral cephalograms using the integral method [10]. The position of the tongue was assessed clinically during intraoral examination according to John Mew [11] and on lateral cephalograms [12].

The tone of the muscles of the hypoglossal group and the position of the tongue were clinically evaluated according to the index of difficulty of tracheal intubation Mallampati [13]. Tongue frenulum was assessed by absolute length in millimeters [14]. Elevation of the tongue was assessed according to the scale of S. Zaghi [15]. Quantitative assessment of the degree of hypertrophy of the palatine tonsils was carried out according to Brodsky [16].

Results.

As a result of the analysis of literature data and our own clinical studies, we have developed a method of quantitative assessment of glossoptosis based on clinical and X-ray anthropometric predictors (Table 1).

The quantitative assessment algorithm is as follows:

1. During an extraoral examination, assess the position of the head (in a natural position) and evaluate it according to the points proposed in Table 1.
2. During an intraoral examination, evaluate the shape of the palate, the condition of the frenulum of the tongue, and the posture of the tongue; the size of the palatine tonsils and evaluate them according to the points proposed in Table 1.
3. During functional studies, conduct a test with a sip of water, the Mallampati test, the degree of tongue elevation and evaluate them according to the points proposed in Table 1.
4. When analyzing lateral cephalograms, evaluate the type of facial growth; assess the position of the hyoid bone according to M. Rokabado and evaluate them according to the points proposed in Table 1.

As an example, we cite a clinical case. Patient A., 6 years old. She turned to an orthodontist with complaints about the incorrect position of her teeth.

Body type is asthenic; Posture type according to Staffel – flat back round-concave back; the head is lowered and tilted to the side (to the left shoulder); the face is narrow (Figure 4); disproportionate: deficiency of the middle zone of the face and an increase in the lower third; the zygomatic area is underdeveloped; dark "circles" under the eyes; the bridge of the nose is wide; nose - labial furrows are pronounced; the red border of the lips is dry; lips closed with tension); the center of the chin is shifted to the right; suprmental furrow smoothed; facial profile is moderately convex; the lips are correlated with the positive step of Korghaus; the nasolabial angle is slightly increased; the chin in the sagittal plane is slanted distally; the angle of the lower jaw is increased.

Shallow vestibule of the oral cavity (Figure 5); thin phenotype of periodontal tissues; the mucous membrane of the alveolar process is pale with areas of ischemia; prominence of the roots of the frontal teeth; early variable bite; shortening of the tooth row in the frontal area of the upper and lower tooth row;

Table 1. Quantitative evaluation of the severity of glossoptosis according to clinical and X-ray anthropometric criteria (predictors).

CLINICAL EXAMINATION			
Head position	correct	0 points	<input type="checkbox"/>
	forward Head position	1 point	<input type="checkbox"/>
	the head is lowered	2 points	<input type="checkbox"/>
	head thrown back	3 points	<input type="checkbox"/>
The shape of the palate	dome-shaped	0 points	<input type="checkbox"/>
	high palate	1 point	<input type="checkbox"/>
	gothic palate	2 points	<input type="checkbox"/>
Tongue tie	normal dimensions and place of attachment	0 points	<input type="checkbox"/>
	tongue tie abnormalities	1 point	<input type="checkbox"/>
	ankylosis of tongue tie	2 points	<input type="checkbox"/>
Tongue posture according to John Mew	against palate, the tongue touches the alveolar processes and teeth	0 points	<input type="checkbox"/>
	the tongue touches only the upper posterior teeth	1 point	<input type="checkbox"/>
	the tongue touches only the lower posterior teeth	2 points	<input type="checkbox"/>
	the tongue is placed between the side teeth	3 points	<input type="checkbox"/>
	the tongue is placed between the front teeth	4 points	<input type="checkbox"/>
	the tongue touches only the lower front teeth	5 points	<input type="checkbox"/>
The size of the palatine tonsils (Brodsky L., 1989)	the tonsils are completely within the palatal arches or have been removed previously	0 points	<input type="checkbox"/>
	the tonsils occupy less than 25% of the transverse dimension of the oropharynx between the anterior palatal arches	1 point	<input type="checkbox"/>
	tonsils occupy from 26 to 50% of the transverse size of the oropharynx	2 points	<input type="checkbox"/>
	tonsils occupy from 51 to 75% of the transverse size of the oropharynx	3 points	<input type="checkbox"/>
	tonsils occupy more than 75% of the transverse size of the oropharynx	4 points	<input type="checkbox"/>
FUNCTIONAL EXAMINATION			
Functional test with a sip of water	absence of tension of facial muscles	0 points	<input type="checkbox"/>
	tension of only the circular muscle of the mouth	1 point	<input type="checkbox"/>
	tension of the circular muscle of the mouth and chin muscle	2 points	<input type="checkbox"/>
	tension of the circular muscle of the mouth, the chin muscle and the circular muscle of the eye	3 points	<input type="checkbox"/>
	tension of the circular muscle of the mouth, chin muscle, circular muscle of the eye and neck muscles	4 points	<input type="checkbox"/>
Mallampati Index	Class I. The soft palate, pharynx, tonsils and uvula are visualized	0 points	<input type="checkbox"/>
	Class II. The soft palate, pharynx and uvula are visualized	1 point	<input type="checkbox"/>
	Class III. The soft palate and the base of the tongue are visualized	2 points	<input type="checkbox"/>
	Class IV. Only the hard palate is visualized	3 points	<input type="checkbox"/>
The degree of tongue elevation according to S. Zaghi, 2017	there is no limitation of tongue mobility	0 points	<input type="checkbox"/>
	mobility restriction of the 1st degree – the tongue reaches the upper incisors ($\geq 80\%$)	1 point	<input type="checkbox"/>
	mobility restriction of the 2nd degree - the tongue does not reach the upper incisors (50 - 80%)	2 points	<input type="checkbox"/>
	restriction of mobility of the 3rd degree - the tongue is located in the middle between the incisors of the upper and lower jaw ($\geq 50\%$)	3 points	<input type="checkbox"/>
	mobility restriction of the 4th degree – the tongue is located at the bottom of the oral cavity ($\geq 25\%$)	4 points	<input type="checkbox"/>
X-RAY ANTHROPOMETRIC INDICATORS OF LATERAL CEPHALOGRAMS			
assessment of the position of the hyoid bone relative to the C3-RGn line (according to M. Rocabado, 1984)	4 mm below the C3 line – RGN	0 points	<input type="checkbox"/>
	below C3 line – RGN from 2 to 3 mm	1 point	<input type="checkbox"/>
	below C3 line - RGN from 1 to 0 mm	2 points	<input type="checkbox"/>
	above line C3 – RGN from 0 to 2 mm	3 points	<input type="checkbox"/>
	above the C3 line - RGN from 3 to 5 mm	4 points	<input type="checkbox"/>
	above the C3 line – RGN from 6 to 8 mm	5 points	<input type="checkbox"/>
	below the C3 line - RGN by more than 4 mm	6 points	<input type="checkbox"/>
	Type of facial growth	neutral	0 points
horizontal		1 point	<input type="checkbox"/>
vertical		2 points	<input type="checkbox"/>
Degree of severity of glossoptosis	light	0-20 points	<input type="checkbox"/>
	middle	21-48 points	<input type="checkbox"/>
	severe	49-76 points	<input type="checkbox"/>

Table 2. Quantitative evaluation of the severity of glossoptosis according to clinical and X-ray anthropometric criteria (predictors) of a patient A., 6 years old.

CLINICAL EXAMINATION			
Head position	the head is lowered	2 points	<input type="checkbox"/>
The shape of the palate	gothic palate	2 points	<input type="checkbox"/>
Tongue tie	tongue tie abnormalities	1 point	<input type="checkbox"/>
Tongue posture according to John Mew	the tongue touches only the lower front teeth	5 points	<input type="checkbox"/>
The size of the palatine tonsils (Brodsky L., 1989)	tonsils occupy more than 75% of the transverse size of the oropharynx	4 points	<input type="checkbox"/>
FUNCTIONAL EXAMINATION			
Functional test with a sip of water	tension of the circular muscle of the mouth, chin muscle, circular muscle of the eye and neck muscles	4 points	<input type="checkbox"/>
Mallampati Index	Class II. The soft palate, pharynx and uvula are visualized	1 point	<input type="checkbox"/>
The degree of tongue elevation according to S. Zaghi, 2017	restriction of mobility of the 3rd degree - the tongue is located in the middle between the incisors of the upper and lower jaw ($\geq 50\%$)	4 points	<input type="checkbox"/>
X-RAY ANTHROPOMETRIC INDICATORS OF LATERAL CEPHALOGRAMS			
assessment of the position of the hyoid bone relative to the C3-RGn line (according to M. Rocabado, 1984)	above the C3 line - RGN from 3 to 5 mm	4 points	<input type="checkbox"/>
Type of facial growth	vertical	2 points	<input type="checkbox"/>
Degree of severity of glossoptosis	light	0-20 6	<input type="checkbox"/>
	middle	21-48 6	<input type="checkbox"/>
	severe	49-72 6	<input type="checkbox"/>

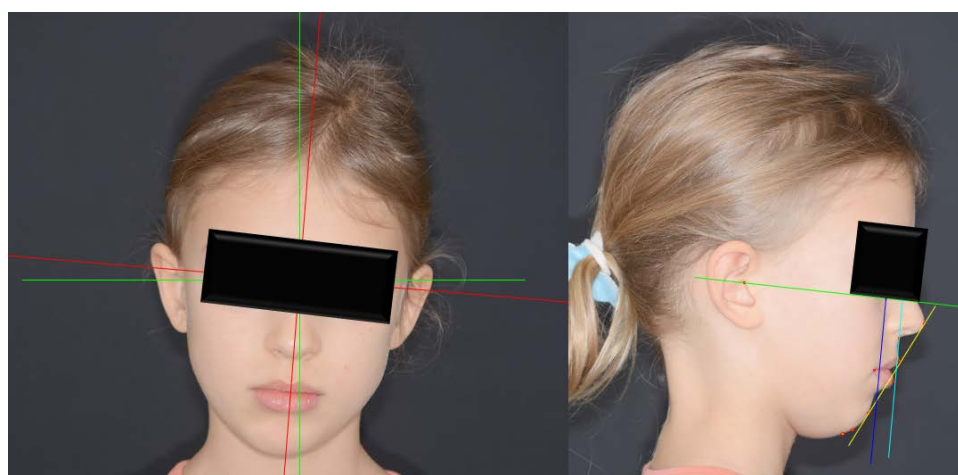


Figure 4. Facial photometry of patient A.

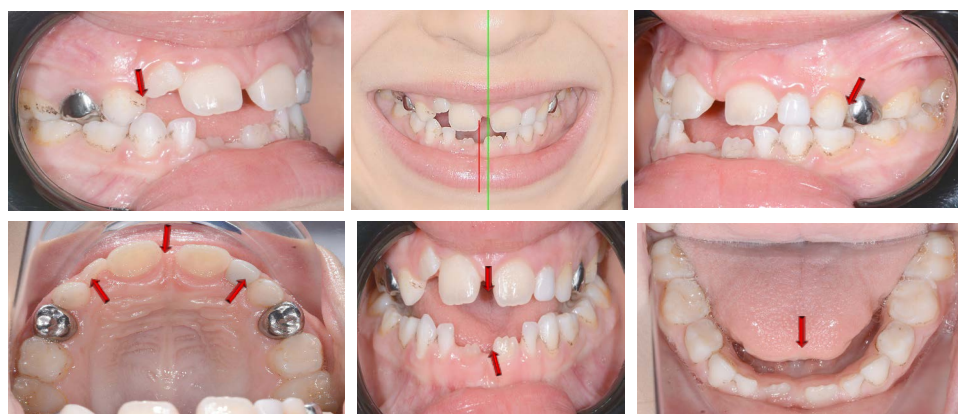


Figure 5. Intraoral photometry of patient A.

narrowing of the upper and lower tooth row; dento-alveolar shortening in the frontal area of the upper and lower tooth row and lengthening in the lateral areas; vertical slit in the frontal area; temporary canines and first permanent molars close on both sides according to Engle class 3.

The middle line of the lower tooth row is shifted from the median plane of the face to the right; the middle line of the upper dentition is shifted to the right; high palate; the tongue between the front teeth; condition after frenuloplasty (in history 1 year ago); the tip of the tongue is forked.

Limitation of mobility of the 3rd degree - the tongue is located in the middle between the incisors of the upper and lower jaw; tonsils occupy more than 75% of the transverse size of the oropharynx; Class II according to Mallampati: visualization of the soft palate, pharynx and uvula (Figure 6).



Figure 6. Examination of the tongue and oropharynx of patient A.

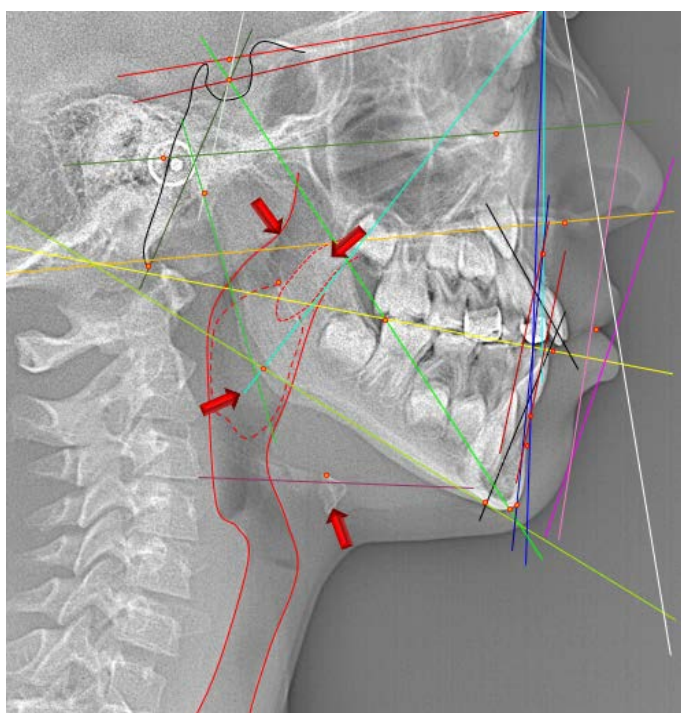


Figure 7. Fragment of the lateral cephalogram of patient A.

The analysis of TRG (Figure 7) revealed: extreme vertical type of maxillo-facial growth (out of seventeen quantitative and qualitative indicators - 12); micrognathia of the lower jaw (- 3

mm), retroinclination of the lower jaw, micrognathia of the upper jaw (- 7 mm), retroinclination of the upper jaw, retroinclination of the occlusal plane, dento-alveolar elongation in the lateral areas of the upper and lower tooth row, mesial position of the alveolar process of the lower jaw to upper; vestibular inclination of the upper incisors and oral inclination of the lower incisors; stage of ossification of cervical vertebrae - CS 1.

Mediated signs of glossoptosis are identified; violation of the tone of the soft palate, adenoid vegetations of the 1st -2nd degree; hypertrophy of palatine tonsils of the 4th degree. According to the method of quantitative assessment of the degree of glossoptosis developed by us on the basis of clinical and X-ray anthropometric signs, the patient has an average degree of glossoptosis.

Conclusion.

As a result of the analysis of special literature over the last 10 years and the conducted own clinical and additional examinations of 168 patients, a method of quantitative assessment of the severity of glossoptosis based on clinical and X-ray anthropometric indicators (predictors) was developed. It allows not only to detect the presence of glossoptosis, but also to quantitatively assess its severity: light – 0-20 points; average – 21-48 points; difficult - 49 - 76 points. What will allow us to plan orthodontic treatment, individualize myofunctional correction programs and motivate parents for successful cooperation with the doctor during the active period and during the retention period.

Prospects for future research: The results of this study can be used in the creation of algorithms for the quantitative assessment of myofunctional disorders, which are the cause of dento-maxillofacial anomalies, for the planning of therapeutic and preventive measures, the assessment of their severity and the prediction of the duration of treatment.

Conflict of interest: The authors declare no conflict of interest.

Funding: There are no funding sources

Author Contributions:

M.S. Drohomiretska - analysis of results, editing of work, conclusions.

Yu.V. Tkachenko – idea, literature review, analysis of results, design and diagnostic work, analysis.

REFERENCES

1. Lesytskiy MJu, Fuhr NB, Mashkarynets OO. Frequency of malocclusions among schoolchildren. *Visnyk stomatolohii*. 2021;111:61-66.
2. Gesch D, Bernhardt O, Kirbschus A. Association of malocclusion and functional occlusion with temporomandibular disorders (TMD) in adults: a systematic review of population-based studies. *Quintessence International*. 2004;35:211-21.
3. Priede D, Roze B, Parshutin S, et al. Association between malocclusion and orofacial myofunctional disorders of pre-school children in Latvia. *Orthodontics and Craniofacial Research*. 2020;23:277-283.
4. Ristya WEY. The relationship between chewing food and sleeping disorders caused by dental and oral diseases to preschool children's food intake. *Journal MKMI*. 2016;12:181-184.

5. Duman S, Vural H. Evaluation of the relationship between malocclusions and sleep-disordered breathing in children. *Cranio*. 2022;40:295-302.
6. Espada De-La-Cruz MJ, Soldevilla Galarza LC, Mattos-Vela MA. Hyoid bone position, tongue position, and pharyngeal airway dimension according to skeletal malocclusion. *Odontostomatología*. 2021;23:2-9.
7. Iwasaki T, Suga H, Minami A, et al. Relationships among tongue volume, hyoid position, airway volume and maxillofacial form in paediatric patients with Class-I, Class-II and Class-III malocclusions. *Orthod Craniofac*. 2019;22:9-15.
8. Diasamidze ED, Tkachenko YuV, Zhukov KV. Assessing the relationship between tongue volume and mandibular incisor crowding using 3D cone beam computed tomography. *Problemy bezpererivnoi medychnoi osvity ta nauky*. 2017;3:29-33.
9. Meiyappan N, Tamizharasi S, Senthilkumar KP, et al. Natural head position: An overview. *J Pharm Bioallied Sci*. 2015;7:424-427.
10. Soares MM, Romano FL, Dias FV. Association between the intensity of obstructive sleep apnea and skeletal alterations in the face and hyoid bone. *Brazilian Journal of otorhinolaryngology (BJORL)*. 2022;88:331-336.
11. Mew M. Orthodontics: Causes of malocclusion. *British dental journal official journal of the British Dental Association: BDJ online*. 2015;218:319.
12. Primozic J, Farčnik F, Perinetti G, et al. The association of tongue posture with the dentoalveolar maxillary and mandibular morphology in Class III malocclusion: a controlled study. *European Journal of Orthodontics*. 2013;35:388-393.
13. Mallampati SR, Gatt SP, Gugino LD, et al. A clinical sign to predict difficult tracheal intubation: a prospective study. *Can Anaesth Soc J*. 1985;32:429-434.
14. Kotlow LA. Ankyloglossia (tongue-tie): A diagnostic and treatment quandary. *Pediatric Dentistry Quinlence Ini*. 1999;30:259-262.
15. Zaghi S, Shamtoob Sh, Peterson C, et al. Assessment of posterior tongue mobility using lingualpalatal suction: Progress towards a functional definition of ankyloglossia. *Journal of oral rehabilitation*. 2021;00:1-9.
16. Brodsky L. Modern assessment of tonsils and adenoids. *Pediatr. Clin. North Am*. 1989;36:1551-1569.