

# GEORGIAN MEDICAL NEWS

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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 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](http://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](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. Корректуре 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.nlm.nih.gov/bsd/uniform_requirements.html)  
[http://www.icmje.org/urm\\_full.pdf](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.

Yevchuk YuI, Rozhko MM, Pantus AV, Yarmoshuk IR, Pantus PV. ANALYSIS OF THE CLINICAL EFFECTIVENESS OF USING THE CREATED COMBINED FIBRIN-BONE SCAFFOLD FOR THE RECONSTRUCTION OF BONE TISSUE DEFECTS OF THE JAWS.....	6-13
Anton Yu. Postnov, Tatiana V. Kirichenko, Yuliya V. Markina, Petr V. Chumachenko, Andrey V. Suslov, Alexandra G. Ivanova, Eduard R. Charchyan, Alexander M. Markin. INFLAMMATORY FACTORS IN DISSECTION OF THORACIC AORTIC ANEURYSM.....	14-17
Gohar Arajyan, Qristine Navoyan, Nvard Pahutyanyan, Hovhannes Hunanyan, Anahit Pogosyan, Hrachik Gasparyan. COMPREHENSIVE STUDY OF ANTIOXIDANT ACTIVITY OF OXALIC ACID DIAMIDE DERIVATIVES AND THEIR EFFECT ON THE CONCENTRATION OF MALONIC DIALDEHYDE IN THE BRAIN AND LIVER TISSUES OF WHITE RATS.....	18-23
Nino Abesadze, Jenaro Kristesashvili, Arsen Gvenetadze. LOW 25OHD IN ENDOMETRIOSIS- RISK FACTOR OR CONSEQUENCE?!.....	24-31
Stepanyan L, Lalayan G. STRESS RESILIENCE AND DECISION-MAKING UNDER PRESSURE: ENHANCING ATHLETIC PERFORMANCE IN COMPETITIVE SPORTS.....	32-37
Hasan M. Abed, Abdulameer M. Hussein, Sabah N. Jaber. ENDOVASCULAR INTERVENTIONS: A NEW INSIGHTS AND CLINICAL PRACTICE.....	38-46
Changsheng He, Jian Liu, Linhai Xu, Fanhua Sun, Yan Wang, Jia Lou. THE RELATIONSHIP BETWEEN SERUM INFLAMMATORY CYTOKINES AND HYPERLIPIDEMIC ACUTE PANCREATITIS.....	47-49
Artemov O.V, Lytvynenko M.V, Chumachenko I.V, Bondarenko A.V, Dotsenko N.V, Ostapchuk K.V, Koshelnyk O.L, Gargin V.V. THE INFLUENCE OF THE DEMODEX MITE ON THE MORPHOLOGICAL PICTURE OF EYELID PAPILOMA.....	50-54
Othman K.M. Al-Sawaf, Mahmoud AM Fakhri. CHARACTERIZATION OF SERUM SERINE PROTEASE BIOCHEMICAL PROFILE IN PATIENTS WITH RENAL FAILURE.....	55-58
Sergey Lee, Marat Assimov, Yuriy Ignatiev, Fatima Bagiyarova, Gulbanu Absatarova, Aizhan Kudaibergenova, Sholpan Mardanova, Tatyana Tsapenko, Baimakhan Tanabayev, Assel Ibrayeva, Anel Ibrayeva, Ildar Fakhradiyev. PREVALENCE AND FACTORS OF PROFESSIONAL BURNOUT AMONG PRIMARY HEALTHCARE WORKERS IN THE REPUBLIC OF KAZAKHSTAN: RESULTS OF A NATIONAL STUDY.....	59-68
I.A. Yusubov. RESULTS OF PERCUTANEOUS TREATMENT OF LIMITED FLUID FORMATIONS AFTER ABDOMINAL SURGERY.....	69-74
Nawar M. Abd-alaziz, Ammar L. Hussein, Mohammed M Abdul-Aziz. STUDY THE RELATIONSHIP BETWEEN OSTEOPROTEGERIN AND KIDNEY INJURY MOLECULE-1 AND SOME BIOCHEMICAL VARIABLES IN PATIENTS WITH KIDNEY STONES.....	75-78
Tsisana Giorgadze, Tinatin Gognadze. SUBSTRATE SPECIFICITY OF $\beta$ -GLUCOSIDASE FROM <i>YUCCA GLORIOSA</i> LEAVES.....	79-82
Sheishenov Zhalil, Kemelbekov Kanatzhan, Joshibaev Seitkhan, Turtabaev Baglan, Zhunissov Bakhytzhani. COMPARATIVE ANALYSIS OF THE CLINICAL RESULTS OF PATIENTS WITH ASD OPERATED VIA RIGHT ANTERIOR MINITHORACOTOMY AND MEDIAN STERNOTOMY.....	83-88
Sosonna L, Ohurtsov O, Piriatska N, Vdovitchenko V, Seleznova R, Kolba O, Gryzodub D, Rozhkova O, Shevtsov O. INDIVIDUAL ANATOMICAL VARIABILITY OF THE SKULL'S FACIAL SECTION CONSIDERING GENDER AND CRANIOTYPE BASED ON COMPUTED TOMOGRAPHY DATA.....	89-95
Osminina M.K, Aslamazova A.E, Podchernyaeva N.S, Khachatryan L.G, Velikoretskaya M.D, Chebysheva S.N, Polyanskaya A.V. SYSTEMIC OR LIMITED IS HEMISCLERODERMA OF FACE IN A PERSON WITH UVEITIS? EXPERIENCE OF 10 CASES OF UVEITIS IN HEMISCLERODERMA OF FACE FROM ONE RHEUMATOLOGY CENTER.....	96-100
F.T. Khalilova, A.A. Kerimov. CLINICAL AND LABORATORY CHARACTERISTICS OF THE LATENT FORM OF POLYCYTHEMIA VERA.....	101-105
Ahlan S. Ibrahim, Sukayna H. Rashed. ISOLATION AND PURIFICATION OF TRANSGLUTAMINASE 1 USING BIOCHEMICAL TECHNIQUES.....	106-111
Tingting Li, Xu Zhang, Baohong Xue, Lianping He, Qiaoqiao Chen, Dexun Zhao. THE RELATIONSHIP BETWEEN MENTAL HEALTH AND PHYSICAL ACTIVITY AMONG STUDENTS FROM A PRIVATE UNIVERSITY: A CROSS-SECTION STUDY.....	112-117
Narkhojayev Nurgali, Turmetov Ibadulla, Kemelbekov Kanatzhan, Bektayev Erkebai, Akhmetov Almasbek, Zhunissov Bakhytzhani. RESULTS OF SURGICAL TREATMENT OF PECTUS EXCAVATUM IN CHILDREN AND ADOLESCENTS.....	118-122

Krushelnyska HL, Batryn OV, Ryzhenko LM, Lytvyn NA, Dobrianska NV, Lyga AI. INFORMATION FACTORS OF MEDIA INFLUENCE ON THE FORMATION OF STATE POLICY IN THE FIELD OF LEGAL REGULATION OF BIOMEDICAL TECHNOLOGIES.....	123-129
Vahe Ashot Ter-Minasyan. EVALUATION OF KNOWLEDGE AND ATTITUDE REGARDING CERVICAL CANCER SCREENING PRACTICE: A MULTICENTER REGIONAL STUDY.....	130-136
Muhsin S.G. Almozic'1, Abbas A. Khudhair, Falah Hassan Shari. REMEDIAL INTERVENTION OF FERTILITY AGENT AND GENE 35 ON INDUCED CYSTIC OVARY IN RATS.....	137-141
Rongzheng Yuan, Hui Wang, Jing Chen. THE EFFECT OF LOW MOLECULAR WEIGHT HEPARIN SODIUM IN THE TREATMENT OF ACUTE EXACERBATION OF CHRONIC OBSTRUCTIVE PULMONARY DISEASE COMORBID WITH PULMONARY HEART DISEASE ON PROMOTING THE BALANCE OF BLOOD VESSELS.....	142-146
Arailym Maikenova, Alexander Nersesov, Elmira Kuantay, Mukhtar Kulimbet, Massimo Giuseppe Colombo, Chavdar Pavlov, Yerkezhan Yerlanova. EVALUATION OF PREDICTORS OF INEFFECTIVENESS OF ANTIVIRAL THERAPY FOR CHRONIC HEPATITIS C IN THE REPUBLIC OF KAZAKHSTAN: A MATCHED CASE-CONTROL STUDY.....	147-154
Ahmed N. Ali, Muna A. Kashmoola. EVALUATION OF PROTEIN C AND S IN $\beta$ -THALASSEMIA MAJOR.....	155-160
Sh.Tsiklauri, N.Nakudashvili, M.Lomaia. EFFECT OF INTRANASAL ELECTROPHORESIS WITH 5% POTASSIUM IODATE SOLUTION ON CLINICAL OUTCOME OF PATIENTS WITH HYPERTROPHIC RHINITIS.....	161-164
Fang Xu, Zhijuan Xu, Ming Li. INTRAVITREAL INJECTION CONBERCEPT IMPROVES THE BEST-CORRECTED VISUAL ACUITY IN PATIENTS WITH WET AGE- RELATEDMACULAREDEMA.....	165-167
Lilit Darbinyan, Margarita Danielyan, Vergine Chavushyan, Karen Simonyan, Michael Babakhanyan, Lilia Hambardzumyan, Larisa Manukyan, Kristine Karapetyan, Lusya Hovhannisyan. THE PROTECTIVE EFFECTS OF SELENIUM-ENRICHED HYDROPONIC RADISH ON PARACETAMOL-INDUCED LIVER DAMAGE IN RATS.....	168-172
Grygorova A.O, Grygorov S.M, Yaroslavska Yu.Yu, Mykhailenko N.M, Demyanyk D.S, Steblianko A.O, Rak O.V, Voloshan O.O, Nazaryan R.S. SIGNS OF ORAL CAVITY MICROCIRCULATORY DISORDERS IN ADOLESCENTS WHO SMOKE.....	173-177
Ali H. Kadhim, Nihad N. Hilal, Taghreed AH. Nassir. A COMPARATIVE STUDY ON THE VARIABLE EFFECTS OF ALCOHOL AND NON-ALCOHOL-RELATED FATTY LIVER DISEASE ON METABOLIC AND INFLAMMATORY BIOMARKERS.....	178-182
Papoyan Varduhi, Galstyan Alina, Sargsyan Diana. FACTOR ANALYSIS OF THE COMPETENCIES OF PERSONAL RESOURCES OF SPECIALIST.....	183-189
Chulpanov Utkir, Turdaliyeva Botagoz, Buleshov Myrzatai, Zhanabaev Nurlan, Kanatzhn Kemelbekov. COMPARATIVE EVALUATION OF THE EFFECTIVENESS OF INNOVATIVE HIGH-TECH CARDIAC SURGERY IN PATIENTS WHO HAVE SUFFERED AN ACUTE MYOCARDIAL INFARCTION.....	190-195
Tea Charkviani, Jenara Kristasashvili, Tamar Barbakadze, Mariam Gabadze, Tamar Kbilashvili, Mariam Makharadze. THE RELATIONSHIP BETWEEN FOLLICLE SIZE, OOCYTE MATURATION, BLASTOCYST FORMATION, BLASTOCYST PLOIDY, AND PREGNANCY OUTCOMES IN YOUNG WOMEN UNDERGOING IVF.....	196-203
Yunfei Wu, Koulong Wu, TianhuaDu. STUDY ON THE EFFECTS OF ART PAINTING COMBINED WITH SPORTS ON MYOPIA PREVENTION AND VISION IMPROVEMENT.....	204-207
Lulëjeta Ferizi-Shabani, Shefqet Mrasori, Valbona Ferizi, Gonxhe Barku, Milazim Gjocaj, Blerim Krasniqi, Basri Lenjani. EVALUATION OF DENTAL AND PERIODONTAL STATUS IN CHILDREN WITH TYPE 1 DIABETES MELLITUS.....	208-212
Rana Dawood Salman Al-kamil, Mustafa Ragheb Abed, Sanaryh Mohammed Al-awad, H. N. K. AL-Salman, Hussein H. Hussein, Dawood Chaloob Hilyail, Falah Hassan Shari. ISOLATION, CHARACTERIZATION, AND ANTIHYPERTENSIVE ACTIVITY ALKALOIDS EXTRACTED FROM THE LEAVES OF THE ALSTONIA SCHOLARIS PLANT.....	213-217
Tchernev G, Broshtilova V, Kordeva S. SHARK PEDICLE ISLAND FLAP FOR BASAL CELL CARCINOMA OF THE PERIALAR ZONE OF THE NOSE: PHOTOTOXICITY AND PHOTOCARCINOGENICITY MEDIATED BY POTENTIALLY NITROSAMINE CONTAMINATED DRUG INTAKE -A NEW EXPLANATION FOR THE SKIN CANCERS PATHOGENESIS? .....	218-222

Meruert T. Orazgalieva, Meyrbek J. Aimagambetov, Zhanna D. Bryzhakhina, Serik D. Zhanybekov, Ainash S. Orazalina. RISK FACTORS FOR THE DEVELOPMENT OF COAGULOPATHY DURING SURGERY IN MECHANICAL JAUNDICE.....	223-228
Noor N. Noori, Nawal A. Murtafha. UNCONTROLLED TYPE 2 DIABETES MELLITUS MODULATED PLASMA LEVELS OF LIPID CATABOLIC PROTEINS.....	229-233
Ling-Ling Zhou, Zhou-Zhou Lin, Lian-Ping He. PREVALENCE OF DEPRESSION AMONG UNIVERSITY STUDENTS IN CHINA: A PROTOCOL FOR A SYSTEMATIC REVIEW AND META-ANALYSIS.....	234-236
Nadine Khayyat, Sima Kalalfeh, Suha Khalifa. OPTIMISING THE CLINICAL ASSESSMENT OF CHILDHOOD AND ADOLESCENT OBESITY IN JORDAN.....	237-241
Shuasheva Y.A, Buleshov M.A, Kemelbekov K.S. CLINICAL, IMMUNOLOGICAL AND THESIOGRAPHIC CHARACTERISTICS RHEUMA-TOID ARTHRITIS AND CHRONIC RHEUMATICHEARTDISEASE.....	242-248
Sana A. Abdulmawjood, Eman S. Mahmoud, Rana T Altaee. ASSESSMENT OF CIPROFLOXACIN EFFECTS ON SOME CHICKS' ORGANS: A COMPREHENSIVE BIOCHEMICAL AND HISTOLOGICALSTUDY.....	249-254
Knarik V. Kazaryan, Naira G. Hunanyan, Margarita H. Danielyan, Rosa G. Chibukchyan, Yulia Y. Trofimova, Arus V. Mkrtychyan, Kristine V. Karapetyan, Karwan H. Syan, Tatevik A. Piliposyan. REGULATION OF SPONTANEOUS ELECTRICAL ACTIVITY IN THE ORGANS OF RE-PRODUCTIVE SYSTEM BY OXYTOCIN.....	255-259
Lantukh I.V, Kucheriavchenko V.V, Yurko K.V, Bondarenko A.V, Merkulova N.F, Mohylenets O.I, Gradil G.I, Bondar O.Ye, Bodnia I.P, Burma Ya.I, Tsyko O.V, Tkachenko V.G. PSYCHOLOGICAL FEATURES OF REHABILITATION OF HIV-INFECTED PATIENTS.....	260-264
Serikbayeva Saltanat, Shaimerdenova Gulbanu, Ormanov Namazbai, Ormanov Talgat, Abuova Gulzhan, Kaishibayeva Gulnaz, Kemelbekov Kanatzhan. PEROXIDATION OF SALIVA LIPIDS IN PATIENTS WITH POSTCOVID SYNDROME DURING HIRUDOTHERAPY.....	265-269
M.V. Poghosyan, H.Y. Stepanyan, Avetisyan Z.A, J.S. Sarkissian. THE EFFECTS OF HYDROCORTISONE ON SYNAPTIC PROCESSES IN PARKINSON'S DISEASE UNDERLYING THE POTENTIAL THERAPEUTICSTRATEGIES.....	270-277
Changsheng He, Jian Liu, Linhai Xu, Fanhua Sun. THE EFFECT OF PERCUTANEOUS CATHETER DRAINAGE COMBINED WITH SOMATOSTATIN ON INFLAMMATION AND PLASMA THROMBOXANE 2, PROSTACYCLIN I2 LEVELS IN PATIENTS WITH SEVERE PANCREATITIS.....	278-283
Tea Chitadze, Nino Sharashidze, Tamar Rukhadze, Nino Lomia, Giorgi Saatashvili. EVALUATION OF LEFT VENTRICULAR SYSTOLIC FUNCTION IN POSTMENOPAUSAL WOMEN WITH BREAST CANCER RECEIVING ADJUVANT ANTHRACYCLINE AND TRASTUZUMAB THERAPY: A 2-YEAR FOLLOW-UP STUDY.....	284-293



## EVALUATION OF DENTAL AND PERIODONTAL STATUS IN CHILDREN WITH TYPE 1 DIABETES MELLITUS

Lulëjeta Ferizi-Shabani<sup>1,2</sup>, Shefqet Mrasori<sup>1,3\*</sup>, Valbona Ferizi<sup>4</sup>, Gonxhe Barku<sup>5</sup>, Milazim Gjocaj<sup>6</sup>, Blerim Krasniqi<sup>6</sup>, Basri Lenjani<sup>6,7</sup>.

<sup>1</sup>Department of Dentistry, Alma Mater Europaea Campus College "Rezonanca", Prishtina, Kosovo.

<sup>2</sup>Department of Pediatric and Preventive Dentistry, University Dentistry Clinical Center of Kosovo, Prishtina, Kosovo.

<sup>3</sup>Department of Endodontic and Dental Pathology, University Dentistry Clinical Center of Kosovo, Prishtina, Kosovo.

<sup>4</sup>Obstetrics and Gynecology Clinic, University Clinical Center of Kosovo, Prishtina, Kosovo.

<sup>5</sup>Department of Pediatric and Preventive Dentistry, School of Dentistry, University of Prishtina, Kosovo.

<sup>6</sup>Alma Mater Europaea Campus College "Rezonanca", Prishtina, Kosovo.

<sup>7</sup>Emergency Clinic, University Clinical Center of Kosovo, Prishtina, Kosovo.

### Abstract.

Diabetes mellitus is a well-known predisposing factor for oral diseases.

**Aim:** To evaluate dental caries and periodontal status of children with type 1 diabetes mellitus (T1DM).

**Materials and methods:** Eighty children with type 1 diabetes mellitus (age 10-15 years) have received a comprehensive oral health examination, that included the DMFT index for permanent teeth, plaque index (PI), gingival index (GI), and stimulated salivary flow rate (SSFR).  $P < 0.05$  was considered significant.

**Results:** HbA1c values indicated poor metabolic control of diabetes in children, which also adversely affected their oral health ( $9.45 \pm 2.87$ ). The mean DMFT index in children with type 1 diabetes mellitus was notably higher at  $6.56 \pm 3.56$ . Similarly, the plaque index (PI) and gingival index (GI) were significantly higher ( $2.04 \pm 0.39 / 1.18 \pm 0.63$ ). In contrast, the stimulated salivary flow rate (SSFR) was observed to be lower ( $0.86 \pm 0.16$ ). There was significant positive correlation between DMFT index and PI ( $p < 0.01$ ).

**Conclusion:** Children with T1DM exhibit poor oral health conditions related to the level of metabolic control. Maintenance of toothbrushing habits and regular dental check-ups recommended to manage and prevent these complications. Additionally, proper management of metabolic control can also help mitigate the adverse effects on oral health.

**Key words.** Type 1 diabetes mellitus, DMFT index, Plaque index, Gingival index, Stimulated salivary flow rate.

### Introduction.

Diabetes mellitus (DM) is a chronic disease caused by insulin dysfunction and deficiency, characterized by chronic hyperglycemia, which causes complications in different body parts like the nervous system, eyes, kidneys, and cardiovascular system [1,2]. This is considered one of the most serious chronic diseases, causing life-threatening complications as well as reducing life expectancy [3,4]. Diabetes can be classified into the following general categories: type 1 diabetes mellitus (T1DM), type 2 diabetes mellitus (T2DM), gestational diabetes mellitus (GDM), and specific types of diabetes due to other causes, e.g., monogenic diabetes syndromes [5]. T1DM occurs as a result of autoimmune destruction of  $\beta$ -cells, that usually leads to absolute insulin deficiency. It frequently appears during

childhood or adolescence; symptoms can sometimes develop much later [6,7].

The data show that until 2045, approximately 783.2 million people worldwide will have diabetes mellitus [3]. On the other hand, annual estimates of the incidence of T1DM worldwide were 98 200 (with a range of 128 900) new cases, while prevalence estimates were 600 900 (with a range of 1 110 100) existing cases [8].

The relationship between oral health and diabetes mellitus is undeniable. Several studies consider that oral health complications, including xerostomia, dental caries, bone loss and periodontal disease may be a consequence of diabetes mellitus [2,9,10]. It is suggested that the age of puberty, 12-15 years, is important to monitor the oral health condition of children with T1DM because, as a result of hormonal changes, there is also an increase in the level of glycated hemoglobin (HbA1c) [10].

People with diabetes mellitus experience salivary dysfunction manifested by xerostomia and low buffering capacity of saliva, accompanied by an increase in glucose levels in saliva, oral yeasts, streptococcus mutans and lactobacilli, which ultimately can lead to an increase in the incidence of tooth decay [11,12]. Diabetes mellitus can be associated with the progression of gingivitis and periodontitis. Several risk factors have been reported, that make these patients more susceptible to the development of periodontal disease including poor oral hygiene, poor metabolic control and longer duration of diabetes [12-14].

Henceforth, the aim of this study was to evaluate the dental and periodontal status of children with T1DM.

### Materials and Methods.

#### Study sample:

This was a cross-sectional study developed in the Department of Pediatric and Preventive Dentistry, University Dentistry Clinical Center of Kosovo (UDCCCK). The study population consisted of 80 children affected by T1DM, aged 10-15 years. These children, characterized by an average duration of diabetes of  $3.89 \pm 2.68$  years, had been diagnosed and were undergoing treatment at the Pediatric Clinic, University Clinical Center of Kosovo (UCCK). The information regarding glycated hemoglobin over the past six months was retrieved from their medical records.

The inclusion criteria established for the children were as follows: diabetes must have been diagnosed at least 10 years prior to the examination; there must be the absence of other systemic diseases; children must not have received any additional pharmacological treatments, including antibiotics, within the previous 3-month period, except for those deemed essential for the treatment of diabetes mellitus.

This study was performed in full accordance with the World Medical Association Declaration of Helsinki. Ethical approval was obtained by the Ethical Committee of Medical Faculty of the University of Prishtina, Kosovo, with Reference Number 4000/2016. All children were included in the study after the written informed consent had been signed by their parents.

#### Clinical oral examination:

A calibrated pediatric dentist conducted a clinical intraoral examination of diabetic children under standardized conditions in the dental chair at the University Dentistry Clinical Center of Kosovo (UDCCCK).

Dental caries was assessed by the Decayed, Missing, and Filled Teeth (DMFT) index for permanent teeth according to WHO criteria [15]. Each child was given unscented paraffin wax to chew for 5 minutes to stimulate the salivary glands, and the secreted saliva was collected in a sterile scaled container. The quantity of saliva was recorded and divided by five to obtain the flow rate of saliva per minute. The amount of stimulated saliva was expressed with the following values: normal salivary secretion, more than 1.1 ml/min; low salivary secretion, of 0.7-1.0 ml/min; very low salivary secretion, less than 0.7 ml/min [16]. The presence of dental plaque was scored using the plaque index (PI) of Silness and L oe. The mean PI for each patient was calculated by summing the values obtained for each tooth and calculating the averages [17]. To determine the gingival index (GI) of the patients, gingival bleeding caused by running a Williams periodontal probe inside the pocket on

the mesial, distal, buccal, and gingival/palatal surfaces of all teeth was evaluated. The GI of an individual was obtained by summing the values determined for each tooth and calculating the averages [18].

#### Data Analysis.

The statistical analysis was carried out using MS Excel (Microsoft Corporation, Redmond, WA, USA) and SPSS 17 (SPSS Inc., Chicago, Illinois, USA) software. Participant characteristics were described using mean and standard deviation for continuous variables. The difference in the values of D, M, F and DMFT index for permanent teeth in relation to the age of the children was tested with Kruskal-Wallis ANOVA by Ranks (H) / Multiple Comparisons p values (2-tailed). The correlation between a dependent variable and several independent variables was examined using Multiple linear regression. Differences were set to be statistically significant at  $p < 0.05$ .

#### Results.

A total of 80 children with T1DM, aged 10-15, participated in the study. Children aged 13 years exhibited a higher mean of the D component and the DMFT index ( $6.54 \pm 3.64 / 8.54 \pm 3.89$ ), followed by 15 years old children with a higher mean of the M and F components of the DMFT index ( $1.50 \pm 2.74 / 2.14 \pm 1.96$ ). Nonetheless, the mean of DMFT index of all children was quite high ( $6.56 \pm 3.56$ ) (Table 1).

The results presented in table 2 show the multiple comparisons of p-values, referring to the mean value of the DMFT index by rank for all age groups (10-15 years old). The mean DMFT index for ages 13 and 15 years was significantly higher than the mean DMFT index for age 10 years ( $p < 0.05$ ). For the other age groups, there was no significant difference between the mean DMFT index values (Table 2).

All diabetic children who have suffered from T1DM for 1 to 10 years, had a mean of  $3.89 \pm 2.68$  years since their diagnosis,

**Table 1.** Distribution of DMFT index by age of the children.

Age	N	Mean $\pm$ SD			
		D	M	F	DMFT
10 years	15	4.33 $\pm$ 4.06	0.07 $\pm$ 0.26	0.33 $\pm$ 0.82	4.73 $\pm$ 4.45
11 years	11	2.64 $\pm$ 1.86	0.36 $\pm$ 0.50	1.36 $\pm$ 1.43	4.36 $\pm$ 2.11
12 years	14	4.71 $\pm$ 2.46	0.64 $\pm$ 0.74	1.29 $\pm$ 1.44	6.64 $\pm$ 2.90
13 years	13	<b>6.54<math>\pm</math>3.64</b>	1.00 $\pm$ 1.47	1.00 $\pm$ 1.63	<b>8.54<math>\pm</math>3.89</b>
14 years	13	5.77 $\pm$ 1.83	0.31 $\pm$ 0.63	0.77 $\pm$ 1.17	6.85 $\pm$ 1.72
15 years	14	4.43 $\pm$ 3.41	<b>1.50<math>\pm</math>2.74</b>	<b>2.14<math>\pm</math>1.96</b>	8.07 $\pm$ 3.58
<b>Total</b>	<b>80</b>	<b>4.78<math>\pm</math>3.19</b>	<b>0.65<math>\pm</math>1.42</b>	<b>1.14<math>\pm</math>1.52</b>	<b>6.56<math>\pm</math>3.56</b>

**Table 2.** Multiple comparison of p-value of DMFT index.

Multiple comparison of p-value (2-tailed); DMFT index / Dependent variable: Age						
DMFT index	10 R:24.30	11 R:26.18	12 R:42.21	13 R:52.34	14 R:46.77	15 R:50.39
10		1.00	0.57	<b>0.02</b>	0.16	<b>0.03</b>
11	1.00		1.00	0.08	0.46	0.15
12	0.57	1.00		1.00	1.00	1.00
13	<b>0.02</b>	0.08	1.00		1.00	1.00
14	0.16	0.46	1.00	1.00		1.00
15	<b>0.03</b>	0.15	1.00	1.00	1.00	

**Table 3.** Mean and standard deviation of HbA1c, plaque index (PI), gingival index (GI) and stimulated salivary flow rate (SSFR).

Variable	N	Mean ± SD
The average time with Type 1 Diabetes Mellitus (year)	80	3.89±2.68
HbA1c	80	9.45±2.87
Stimulated salivary flow rate (SSFR) (ml/min)	80	0.86±0.16
Plaque index (PI)	80	2.04±0.39
Gingival index (GI)	80	1.18±0.63

**Table 4.** Correlation between DMFT index with plaque index (PI) and gingival index (GI).

Independent Variables	Unstandardized coefficients		Standardized coefficients	t	Sig.	95.0% Confidence interval for B		p value
	B	Std. error				Beta	Lower Bound	
(Constant)	-3.43	2.21		-1.56	.12	-7.83	.96	
Plaque index (PI)	4.44	1.44	.48	3.08	.003	1.57	7.31	p<0.01
Gingival index (GI)	.81	.88	.14	.91	.37	-.95	2.56	p>0.05

a. Dependent variable: DMFT index

$R=0.60$  ( $p<0.001$ ) / Durbin-Watson=1.79

while the mean of their HbA1c was 9.45±2.87. Unfortunately, these children also showed a high mean of PI (2.04±0.39), GI (1.18±0.63), whilst the mean of stimulated salivary flow rate was low (SSFR=0.86±0.16) (Table 3).

The results presented in table 4 indicate the correlation between the DMFT index, as the dependent variable, and both the plaque index (PI) and the gingival index (GI) as independent variables. In the analysis according to Durbin Watson=1.79 a strong correlation was established between the DMFT index and the PI, but not between the DMFT index and the GI (Table 4).

### Discussion.

DM affects millions of people worldwide. The prevalence of diabetes among children is rising globally, because of changes in lifestyle. Consequently, this escalating prevalence is expected to impose substantial economic burdens worldwide, particularly in developing nations [19,20].

Children with T1DM not only contend with numerous health issues but also experience a higher occurrence of dental and oral diseases. The current research evaluates the overall oral health through clinical oral examinations. The results indicate a significant severity of dental caries in the permanent teeth of children with T1DM, which has been confirmed in previous studies on this population [7,14,21-23].

The level of metabolic control may play a crucial role in the high incidence of dental caries in children with T1DM. Several researchers have observed that dental caries is more frequent in children with T1DM and poor metabolic control [24,25]. However, Edblad E et al. found no association between the degree of glycemic control and the occurrence of dental caries [26].

The high risk of dental caries is also attributed to the xerostomia, or decreased saliva flow, found in these children. Among the factors that influence the reduced amount of saliva is hyperglycemia and glucosuria [27,28]. Moreover, the lack of application of preventive care and regular dental visits are considered favourable factors in increasing the level of dental caries in T1DM. These findings underscore the need for targeted dental health interventions in diabetic children to mitigate the compounded risks they face.

One of the easiest ways to prevent caries is by maintaining proper oral hygiene. In the present study, the level of oral hygiene was evaluated using the PI index, where the values were quite high. The current study also shows the effect of metabolic control of diabetes on higher PI values. Similar results were obtained from other studies [7,21,29,30]. Nevertheless, the obtained results reflect the average oral hygiene, testifying the need to implement intensive educational activities to widely improve oral hygiene.

Periodontal disease includes various disorders that impact the structures supporting the teeth, such as the gingiva, periodontal ligament, cementum, and alveolar bone. Gingivitis is the most common form of periodontal disease in both children and adults with T1DM, which may alter the host environment and enhance a patient's susceptibility to gingivitis due to modifications in the inflammatory response to microorganisms [29]. Furthermore, multiple clinical studies have shown that diabetes in childhood is a significant risk factor for developing periodontal diseases [7,29]. The GI was found to be higher in children with T1DM which is in line with studies done by Orbak R et al [30] and Awad M et al [31].

The associations between PI, GI, and dental caries are attributable to similar behaviors, for instance: inadequate oral hygiene practices and unhealthy dietary intake. The observed correlations between the DMFT index, as well as PI and GI, draw attention to the necessity of early oral health counselling. These findings further emphasize the importance of regular dental visits, particularly for children with T1DM, who constitute a high-risk population for adverse oral health outcomes.

This study has a few limitations. It has a small sample size, and a larger sample size with control group could be more representative of the population. Also, the age of the participants in the study was limited to children 10-15 years old, only with permanent dentition. Therefore, that information should be considered in future research.

Despite these limitations, the study has notable strengths. We analyzed some important components of the oral health of children with type 1 diabetes mellitus. Moreover, this study provides an important overview of the oral health status of these children.

## Conclusion.

Children with T1DM exhibit unfavorable oral health profiles characterized by a higher DMFT index, fair oral hygiene, moderate gingivitis, and low stimulated salivary flow rate. These oral health issues are strongly associated with the duration of diabetes and the level of metabolic control. Effective care for these children necessitates a multidisciplinary team approach, accentuating the importance of consistent brushing habits and regular dental checkups.

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## Conflicts of interest.

There are no conflicts of interest.

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