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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 ბაზებშიდან.

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 საყურადღებო!

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, შემავსებელი და პროცენტული მონაცემები უნდა შეესაბამებოდეს ტექსტში მოყვანილს.

6. ფოტოსურათები უნდა იყოს კონტრასტული; სურათები, ნახაზები, დიაგრამები - დასათაურებული, დანომრილი და სათანადო ადგილას ჩასმული. რენტგენოგრაფიის ფოტოსურათები წარმოადგინეთ პოზიტიური გამოსახულებით **tiff** ფორმატში. მიკროფოტოსურათების წარწერებში საჭიროა მიუთითოთ ოკულარის ან ობიექტივის საშუალებით გადიდების ხარისხი, ანათალების შედეგების 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.

E. Tsitlidze, I. Rukhadze, I. Verulashvili, Derry Minyao NG. CEREBROVASCULAR EVENTS AND NEUROCOGNITIVE IMPAIRMENTS WITH ALTERATIONS IN POLYSOMNOGRAPHIC INDICATORS FOLLOWING CARDIAC SURGERY.....	6-15
Saleh Alsuwaydani. TRENDS IN GENERAL SURGERY PROCEDURE TYPES AND THEIR OUTCOMES FOR A NEWLY COMMISSIONED HOSPITAL.....	16-20
Maltsev Dmytro. BEYOND THE GENETIC CODE: SYSTEMIC REGULATORY MELTDOWN AS A FRAMEWORK FOR PRIMARY EPIGENETIC DISEASES.....	21-42
David Malidze, Lasha Dolidze, Natia Jojua, Tinatin Gognadze, Ana Jabauri, Eka Kokhraidze, Larisa Melia, Tamar Chanturia, Tamar Chkoidze, Stephen Charles Jones. STANDARDIZED PATIENT-BASED TRAINING AND CLINICAL DIAGNOSTIC COMPETENCE AMONG MEDICAL STUDENTS: A RANDOMIZED COMPARATIVE STUDY.....	43-50
Ghukasyan Norayr, Melik-Andreasyan Marine, Sahakyan Lusine. HODGKIN LYMPHOMA DIAGNOSED DURING THE SECOND TRIMESTER OF PREGNANCY AND TREATED WITH ABVD CHEMOTHERAPY WITH FAVORABLE MATERNAL AND NEONATAL OUTCOMES: A CASE REPORT.....	51-54
Tchatchia Gr, Chelishvili I, Chutkerashvili G, Inauri N, Mermanishvili T. THE EFFECTIVENESS OF INTRAOPERATIVE ULTRASOUND IN GLIAL TUMOR SURGERY.....	55-62
Rakhmetullina A.K, Alimbayeva A.R, Orekhov A.Yu, Dairbekov Ye.Ye, Rakhmetullin A.B. COGNITIVE IMPAIRMENT AFTER CORONARY ARTERY BYPASS GRAFTING: THE ROLE OF MEDICAL REHABILITATION — A LITERATURE REVIEW.....	63-72
N.G. Alibeyli, N.M. Amiraliyev, H.K. Muradov, N.V. Kerimova, K.N. Amiraliyev, A.T. Iskenderova, E.N. Mekhtiyeva, S.D. Huseynova. GIANT CUTANEOUS HORN OF THE CHEEK: A CLINICAL CASE REPORT.....	73-76
Samara S. Yonus, Shamil H. Othman, Salah Yousif, Marwan Merkhani. NEUROPROTECTIVE FITNESS OF LOSARTAN AGAINST DOXORUBICIN INDUCED NEUROTOXICITY IN WHITE ALBINO RATS.....	77-83
Kurbanov Anvar Alamovich, Abdullaeva Yayra Davronovna, Matluba Badritdinova, Abdullaeva Vasila Karimbekovna, Khalimova Fariza Tursunbaevna, Marwan Ismail. DYNAMIC BIOMARKERS FOR PREDICTING POST-TRAUMATIC EPILEPSY AFTER TRAUMATIC BRAIN INJURY.....	84-89
J. Orozco Pilco, C. Calderón Cabezas, L. Santander Samaniego, G. Damián Sinchiguano A COMPARATIVE ANALYSIS OF TRENDS IN CERVICAL CANCER MORTALITY AMONG MESTIZO AND INDIGENOUS WOMEN IN ECUADOR, 2010–2024.....	90-95
Ling-Ling Zhou, Lian-Ping He. DUAL-SOFTWARE INTEGRATION IN MEDICAL STATISTICS TEACHING: A CASE-BASED APPROACH TO F-DISTRIBUTION WITH DOUBAO AI AND R.....	96-99
Essmat J. Jamel, Ayoub Ali Hussein Al-bayti, Alaa E. Jamal, Asmaa E. Jamal. ASSESSMENT OF VITEX AGNUS-COSTES PLANT EXTRACT ON THE HEART OF MICE EXPOSED TO OXIDATIVE STRESS.....	100-110
Nana Chikladze, Salome Kordzaia, Lika Svanadze, Tamar Rukhadze, Carlos Centeno. CRYOTHERAPY FOR THE PREVENTION OF TAXANE-INDUCED PERIPHERAL NEUROPATHY IN BREAST CANCER: A PROSPECTIVE MULTICENTER STUDY.....	111-117
Saipudinkyzy A, Yessirkepov Assilbek, Aitbayev Zhanabay, Laktionova M, Baimuratova M. PSYCHOMETRIC ASSESSMENT OF AN ADAPTED BILINGUAL (RUSSIAN–KAZAKH) VERSION OF THE UW-QOL V4.1 QUESTIONNAIRE AND ANALYSIS OF FUNCTIONAL REHABILITATION OUTCOMES IN PATIENTS OF THE REPUBLIC OF KAZAKHSTAN.....	118-127
Andriy Kyrylyuk, Mykola Rozhko, Mykola Kyrylyuk, Liubow Kyryliuk, Olena Rozhko. EFFECTIVENESS OF STANDARD AND INDIVIDUALIZED MARPE DEVICES IN ADULT PATIENTS BASED ON CONE BEAM COMPUTED TOMOGRAPHY DATA.....	128-137
Issametov Davran Rashitovich, Gantsev Kamil Shamilevich, Arybzhonov Dauranbek Tursunculovich, Osman Kostek, Kemelbekov Kanatzhan Saukhanbekovich, Balakhnin Pavel Vasilyevich, Saburov Alisher Radzhapbaevich, Saburova Saidokhon Alisherovna. SELECTIVE BRONCHIAL ARTERY CHEMOINFUSION IN NSCLC: CURRENT STATE OF REGIONAL THERAPY AND ITS ROLE IN MULTIMODAL APPROACHES.....	138-146
Rasha A.H. Alathary, Nawal Khintee Jabbar, Sundus K. Hamzah. ASSESSMENT OF SUBCLINICAL RENAL INSULT IN SHORT - AND LONG-TERM UNCONTROLLED HYPERTENSION USING INTEGRATED MOLECULAR INDEX OF NGAL AND KIM-1.....	147-152

Olena Kozeratska, Adelina Gutnitska, Oksana Vdovichenko, Vitalii Spivak, Alisa Kabesheva. MENTAL HEALTH IN THE MODERN WORLD: THE PROBLEM AND SOLUTIONS.....	153-160
Zurab S. Khabadze, Magomed-Ali A. Gasbanov, Nasrula R. Akhmedov, David A. Babakhanov, Khamzat A. Umarov, Nikita A. Dolzhikov, Eliso M. Kakabadze, Nadezhda A. Khachatryan, Veranika M. Slonova. MANAGEMENT OF CHRONIC APICAL PERIODONTITIS WITH FURCATION INVOLVEMENT USING HIGH-TEMPERATURE SODIUM HYPOCHLORITE IRRIGATION: A CASE REPORT.....	161-165
Hafiza S. Zhetpisbayeva, Karashash M. Askarova, Aigerim E. Tolendiyeva, Kalima T. Kupenova, Baglan O. Zharmagambetova, Nurzhamal D. Imambayeva, Zhaniya I. Zhakypova. CLINICAL CHARACTERISTICS AND RISK FACTORS FOR ADVERSE OUTCOMES IN ELDERLY PATIENTS WITH SEVERE COVID-19.....	166-174
Lavdie Leci, Berat Lenjani, Ilijana Muratovska. VOLUMETRIC AND RADIOGRAPHIC OUTCOMES OF BONE REGENERATION AFTER APICOECTOMY WITH PRF-BASED THERAPIES - A PRELIMINARY STUDY.....	175-182
María Evelyn Alviárez, Mario Alexander Aguilar Balseca, Ana Carolina González Romero, Betzabeth Thayin Guillen Armijo, Eva Iralic Quiñonez Ruiz. ANTIMICROBIAL SUSCEPTIBILITY PATTERNS OF <i>ESCHERICHIA COLI</i> AND <i>ENTEROBACTER SPP.</i> CAUSING COMMUNITY-ACQUIRED INFECTIONS IN MÉRIDA, VENEZUELA.....	183-188
Nino Totadze, Nino Adamia, Manana Kobakhidze, Irine Kekelidze, Julieta Kikvadze, Lasha Tchelidze. SKIN-TO-SKIN CONTACT IN NEONATAL CARE: CLINICAL SIGNIFICANCE, IMPLEMENTATION CHALLENGES, AND LONG-TERM OUTCOMES IN GEORGIA.....	189-198
L. Stepanyan, E. Asrian, G. Lalayan, N. Harutyunyan. ACADEMIC ENGAGEMENT AS A CONTEMPORARY CHALLENGE IN HIGHER EDUCATION: TOWARD A FUNCTIONAL INTEGRATIVE MODEL.....	199-206
Guranda Okropiridze, Arsen Gvenetadze, Revaz Sulukhia, Rusudan Gvenetadze, Diana Chanukvadze, Lela Iremadze, Ana Gvenetadze, Maka Gegechkori, Nino Kikvadze. IMPACT OF THE FIRST TRIMESTER PREECLAMPSIA SCREENING TEST ON THE OUTCOME OF PREGNANCY BETWEEN THE PATIENTS WITH OR WITHOUT THE DIAGNOSIS OF INFERTILITY.....	207-211
Yerlan A. Salmenbayev, Yessengazy O. Massalimov, Altai A. Dyussupov, Nazarbek B. Omarov, Assem D. Kazangapova. PREVENTION OF LOCAL POSTOPERATIVE COMPLICATIONS IN THE SURGICAL TREATMENT OF CHRONIC VENOUS INSUFFICIENCY OF THE LOWER EXTREMITIES (CEAP C3–C5).....	212-221
Aws S. Sheet, Mohammed KJ. Alnori. SAFETY OF TAMSULOSIN ALONE OR IN COMBINATION WITH 5 α -REDUCTASE INHIBITORS ON LIPID PROFILE, RENAL FUNCTION, AND LIVER PARAMETERS.....	222-229
Zeyad Hussain Althumali, Jumana Hamed Khouja, Reem F Alnemari, Moteab Sayer Alotaybi, Fawziah Roublah, Asma M. Alahmari, Abdullah H. Jabbar, Adeeb A Almohammadi, Hatem mazen Alsolami. ASSESSING THE EFFECTIVENESS OF LIFESTYLE CLINIC INTERVENTIONS ON CARDIOMETABOLIC RISK FACTORS: A RETROSPECTIVESTUDY.....	230-237
Natia Nazghaidze, Rusudan Agladze, Zviad Kereselidze, Nika Kuridze, Sophio Ungiadze, Shalva Petriashvili. EFFICACY OF PERINDOPRIL IN PATIENTS WITH HEART FAILURE AND REDUCED EJECTION FRACTION (HFrEF)	238-247

MANAGEMENT OF CHRONIC APICAL PERIODONTITIS WITH FURCATION INVOLVEMENT USING HIGH-TEMPERATURE SODIUM HYPOCHLORITE IRRIGATION: A CASE REPORT

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Abstract.

Furcation involvement in multirooted teeth represents a significant challenge for endodontic treatment due to anatomical variability, the presence of accessory canals, and limited accessibility for adequate disinfection. This article presents a clinical case of non-surgical single-visit endodontic treatment of chronic apical periodontitis associated with furcation involvement in tooth 4.7. Root canal disinfection was performed using 3.25% sodium hypochlorite with intracanal heating up to 150 °C plugger. After chemo-mechanical preparation, definitive root canal obturation was carried out using the warm vertical compaction technique. A review of contemporary literature regarding the efficacy and safety of high-temperature irrigation protocols in endodontics was also performed. The presented clinical case demonstrates the potential for successful resolution of inflammatory lesions and promotion of bone healing in both periapical and furcation regions without additional surgical intervention. The obtained findings support the application of high-temperature sodium hypochlorite irrigation protocols for improving disinfection efficiency in complex root canal systems associated with chronic apical periodontitis and furcation involvement.

Key words. Chronic apical periodontitis, furcation defect, endodontic treatment, sodium hypochlorite, high-temperature irrigation, NaOCl, warm vertical compaction, endo-periodontal lesions, mandibular molars.

Introduction.

Morphological variations in the anatomical structure of maxillary and mandibular molars, including the presence of furcation portals, represent a relevant issue from both clinical and research perspectives [1]. One of the main loci of functional resistance in a multirooted tooth is the furcation area. Involvement of the root separation zone leads to furcation defects: bifurcation defects when the furcation of a two-rooted tooth is involved in the pathological process, and trifurcation defects when a three-rooted tooth is affected [2]. The presence of furcation portals facilitates the penetration of bacterial agents and their metabolic by-products from the pulp chamber into the periodontal tissues, thereby complicating the course, treatment, and prognosis of chronic apical periodontitis [3]. Furcation defects represent a challenge for clinicians due to their anatomical variability, limited accessibility, and impaired healing potential. The main clinical problem in the treatment of furcation defects lies in the morphological variability of their topography, which complicates adequate debridement and instrumentation. Studies have shown that multirooted teeth with chronic apical periodontitis involving the furcation demonstrate

a higher frequency of tooth loss compared with teeth without furcation defects [4]. It has been reported that pathological processes in the furcation area result in tooth loss in 31.4% of cases [5]. The prevalence of accessory canals in the furcation area of molars is 28.4%. Among all examined specimens, accessory canals in the furcation area were identified in 29.4% of mandibular molars and 27.4% of maxillary molars [6]. The objective of the present case report is to describe the management and subsequent healing of a chronic apical periodontitis case accompanied by localized destruction of both the furcation and apical bone regions.

Clinical Case.

A 49-year-old patient presented to the dental clinic with complaints of a defect in the coronal portion of a tooth.

Examination findings: the coronal portion of tooth 4.7 was destroyed by more than 70% according to the index of coronal tooth structure destruction. A carious cavity communicating with the pulp chamber was observed. Superficial and deep probing were painless; percussion was painless. The oral mucosa in the projection area of the root apices of tooth 4.7 was cyanotic, with the presence of a sinus tract. Palpation was painless, and the vasoparesis symptom was negative. Thermal testing of tooth 4.7 revealed no response to thermal stimuli.

Additional examination findings: an intraoral periapical diagnostic radiograph revealed an area of bone rarefaction with indistinct, irregular margins in the periapical region of the mesial root and in the furcation area of tooth 4.7. Electric pulp testing of tooth 4.7 showed a value of 130 μ A.

Diagnosis: Tooth 4.7 K04.5. Chronic apical periodontitis.

Treatment method: single-visit endodontic treatment of tooth 4.7, followed by build-up fabrication and prosthetic rehabilitation with a temporary provisional crown. In the present case, a root canal irrigation protocol involving heating of the sodium hypochlorite solution was selected.

1. Irrigation with NaOCl heated with plugger to 150 °C.
2. Three exposures of 10 seconds each.
3. Immediate final obturation.

During the first visit, at the preparatory stage, local anesthesia was administered, including topical anesthesia using a gel based on 12% lidocaine and infiltration anesthesia with 4% articaine. Root canal instrumentation included the creation of a glide path using manual endodontic instruments K-files with a 0.02 taper. The working length was determined using an electronic apex locator (Apex 03s Geosoft, Geosoft Endoline, Russia), and the apex locator measurements were confirmed by obtaining a control periapical radiograph.

Subsequently, mechanical preparation of the root canals was performed using rotary nickel-titanium instruments FlexMaster

(VDW, Munich, Germany), ISO sizes 15–30, with a 4% taper. Final root canal preparation was completed with a FlexMaster 30.04 file to the full working length. When necessary, during the stages of mechanical preparation, an endodontic lubricant based on 15% EDTA - RC-Prep (Premier, USA) - was used. In parallel with instrumentation, after the use of each instrument, chemical treatment of the root canals was performed using standard agents, namely irrigation solutions -3.25% sodium hypochlorite (Hypochloran-3, Omega-Dent, Russia) and endodontic syringes (Estade-Servicegroup, Russia). Sodium hypochlorite was used without any activation; heating, ultrasonic activation, or sonic agitation of the solution was not performed. The total exposure time in the root canal was at least 30 minutes. The root canal was then rinsed with distilled water to remove the solution. A 17% EDTA-based solution (MD-Cleanser, Meta, South Korea) was used as the final irrigant, with an exposure time of at least 2 minutes. This was followed by rinsing with distilled water and subsequent application of 3.25% sodium hypochlorite solution (Hypochloran-3, Omega-Dent, Russia). Sodium hypochlorite

has a boiling point of 96 - 120 °C. A heating plugger (System-B or an equivalent device) was used. The temperature was set at 150 °C. A plugger tip with a size of 30/.04 was used. The root canal and pulp chamber were filled with sodium hypochlorite through an endodontic needle. The plugger was inserted to the level of the root canal orifices, followed by activation. Each activation cycle lasted 5 seconds, with subsequent 5-second intervals over a total period of 30 seconds, and the solution was replaced between intervals. Subsequently, the sodium hypochlorite solution was used for passive ultrasonic activation with an endochuck and a U-file (MANI, Japan) for 1 minute, followed by rinsing of the root canal with distilled water.

At the final stage, the root canals were thoroughly dried using paper points (Dispodent, USA). Subsequently, root canal obturation was performed using the vertical compaction technique with gutta-percha (Figure 3).

The patient was recommended definitive post-endodontic prosthetic rehabilitation of tooth 4.7 with an artificial crown after positive healing dynamics of the periapical bone lesion had been achieved, which was planned at 6 months (Figure 4).



Figure 1. Initial clinical situation: two-dimensional intraoral periapical radiograph of tooth 4.7.



Figure 2. Intraoperative periapical radiograph showing endodontic instruments positioned within the root canals of tooth 4.7 for working length verification.



Figure 3. Postoperative periapical radiograph showing obturated root canals of tooth 4.7 and coronal build-up restoration.



Figure 4. Periapical radiograph in 6 months showing fircation lesion healing.

Discussion.

The primary objective at the initial stage of treatment of combined periodontal and periapical tissue lesions, regardless of which lesion served as the source of infection, is to control or completely eliminate the inflammatory process both within the tooth and in the surrounding tissues. The literature describes classifications of periradicular lesions intended to guide the selection of the most effective treatment approaches [7-9]. Scientific publications by various authors present conclusions regarding the management of combined endodontic-periodontal lesions. For optimal healing of the affected area, preservation of the buccal cortical bone plate is necessary. When resorption extended to the level of the root apices, an unfavorable treatment outcome was observed. Tunnel defects demonstrated favorable healing outcomes [10,11]. Alshawwa H. et al. presented a clinical case describing the successful treatment of a patient with chronic periodontitis complicated by bone resorption in the furcation area. Endodontic treatment of the tooth was performed, followed by obturation of the root canals with a permanent filling material. No direct intervention in the area of bone resorption was carried out. The authors reported healing of the lesion and concluded that high-quality endodontic treatment promotes healing of perio-endo lesions [12]. Yoneda M. et al. also described the treatment of periodontitis with interradicular bone resorption using endodontic treatment alone. At the 3-month follow-up, bone regeneration in the interradicular area was observed. The authors concluded that reduction of the bacterial load in the root canals is a key factor for successful treatment [13].

Heating of irrigation solutions, particularly sodium hypochlorite (NaOCl), is increasingly considered a method for enhancing biofilm removal and organic tissue dissolution. In recent years, several studies have evaluated the use of NaOCl at temperatures with 150 °C plugger, typically achieved using intracanal heating devices, and have compared these protocols with more conventional temperature regimens of 45–60 °C.

The available data indicate that increasing the temperature significantly improves biofilm removal from complex anatomical areas of the root canal system, such as isthmuses, while the temperature of the external root surface remains within safe limits. Nevertheless, concerns remain regarding the potential risk of thermal injury to periodontal tissues, particularly in teeth with thin dentinal walls or when heated irrigation is combined with other heat-generating procedures.

The literature also emphasizes the rapid cooling of preheated irrigation solutions within the canal and the insulating effect of dentin, which helps maintain the temperature of the external root surface within safe limits [14]. In the present literature review, we summarize current evidence regarding the efficacy and safety of high-temperature irrigation protocols in endodontics.

Efficacy of high-temperature irrigation up to 150 °C.

A recent study using a 3D-printed tooth model demonstrated that sodium hypochlorite (NaOCl) heated to 45 °C, 60 °C, and 150 °C provided significantly more effective removal of *E. faecalis* biofilm compared with a room-temperature solution; with increasing temperature, an additional increase in the area of cleaned surfaces was observed [15].

The 150 °C protocol involved introducing a heated heat carrier set to this temperature for short intervals of 10 seconds, repeated three times in each canal.

Other studies also confirm that NaOCl at 60–66 °C improves organic tissue dissolution and smear layer removal compared with lower temperatures [16].

Temperature transmission and safety.

Intracanal heating devices set at 150 - 180 °C increase the temperature inside the canal; however, the rise in temperature on the external root surface remains below the critical threshold capable of causing periodontal tissue damage, namely an increase of less than 10 °C or an absolute temperature below 47 °C [17]. Preheated NaOCl at 45–66 °C rapidly reaches thermal equilibrium with body temperature, approximately 35 - 37 °C, within several minutes after introduction into the canal; the temperature of the external root surface rarely exceeds approximately 42 °C [18]. Ultrasonic or sonic activation of a preheated irrigant may increase the temperature in the apical part of the canal above 50 °C; however, the external root surface remains within ≤ 42 °C due to the thermal insulating properties of dentin [19-22].

Thus, heated irrigation using device tip temperature settings of up to 150 °C increases the cleaning efficacy of the root canal system without exceeding safe thermal thresholds when performed under controlled conditions.

Conclusion.

Thus, the presented clinical case demonstrates the possibility of successful treatment of chronic apical periodontitis involving the furcation area using an exclusively endodontic approach, without additional surgical intervention in the interradicular defect area. The application of a root canal irrigation protocol using heated sodium hypochlorite solution enabled effective disinfection of the complex anatomy of the root canal system and created favorable conditions for reparative processes in the periapical and furcation regions.

The literature data and the results of the performed treatment confirm that high-temperature NaOCl irrigation contributes to more effective removal of biofilm and organic remnants from hard-to-reach areas of the root canal system, while, when the protocol is properly followed, it does not lead to exceeding safe temperature values on the root surface.

High-quality mechanical and chemical preparation of the root canals followed by hermetic obturation is a key factor for the successful treatment of perio-endo lesions, including cases with furcation involvement. The presented protocol may be considered a promising and clinically justified approach for the treatment of similar forms of chronic apical periodontitis.

A limitation of the present case report is the absence of long-term follow-up data at the time of manuscript submission. Therefore, the presented findings should be interpreted as documentation of the treatment protocol and immediate clinical outcome rather than definitive evidence of long-term bone healing. Confirmation of complete periapical and furcation bone regeneration requires extended radiographic and clinical follow-up. This limitation has been considered when formulating the conclusions of the present report.

Conflict of interest.

The authors declare no conflict of interests.

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