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ЕЖЕМЕСЯЧНЫЙ НАУЧНЫЙ ЖУРНАЛ

Медицинские новости Грузии

საქართველოს სამედიცინო სიახლენი

GEORGIAN MEDICAL NEWS

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

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

GMN: Медицинские новости Грузии - ежемесячный рецензируемый научный журнал, издаётся Редакционной коллегией с 1994 года на русском и английском языках в целях поддержки медицинской науки и улучшения здравоохранения. В журнале публикуются оригинальные научные статьи в области медицины, биологии и фармации, статьи обзорного характера, научные сообщения, новости медицины и здравоохранения. Журнал индексируется в MEDLINE, отражён в базе данных SCOPUS, PubMed и ВИНИТИ РАН. Полнотекстовые статьи журнала доступны через БД EBSCO.

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

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

WEBSITE

www.geomednews.com

К СВЕДЕНИЮ АВТОРОВ!

При направлении статьи в редакцию необходимо соблюдать следующие правила:

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

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

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

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

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

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

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

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

7. Фамилии отечественных авторов приводятся в оригинальной транскрипции.

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

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

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

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

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

При нарушении указанных правил статьи не рассматриваются.

REQUIREMENTS

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

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

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

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

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

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

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

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

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

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

8. Please follow guidance offered to authors by The International Committee of Medical Journal Editors guidance in its Uniform Requirements for Manuscripts Submitted to Biomedical Journals publication available online at: http://www.nlm.nih.gov/bsd/uniform_requirements.html
http://www.icmje.org/urm_full.pdf
In GMN style for each work cited in the text, a bibliographic reference is given, and this is located at the end of the article under the title "References". All references cited in the text must be listed. The list of references should be arranged alphabetically and then numbered. References are numbered in the text [numbers in square brackets] and in the reference list and numbers are repeated throughout the text as needed. The bibliographic description is given in the language of publication (citations in Georgian script are followed by Cyrillic and Latin).

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

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

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

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

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

ავტორთა საყურადღებოდ!

რედაქციაში სტატიის წარმოდგენისას საჭიროა დავიცვათ შემდეგი წესები:

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

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

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

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

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

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

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

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

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

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

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

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

აღნიშნული წესების დარღვევის შემთხვევაში სტატიები არ განიხილება.

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EVALUATING ORAL AND MAXILLOFACIAL HEALTH CHALLENGES IN INTRAVENOUS DRUG USERS: A CROSS-SECTIONAL STUDY OF DRUG REPLACEMENT THERAPY PARTICIPANTS AND NON-PARTICIPANTS

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Abstract.

Introduction: Intravenous drug use has a significant impact on oral and maxillofacial health, often resulting in complications like tooth loss and osteomyelitis. This study investigates the differences in oral health between drug users enrolled in replacement therapy and those not yet participating, with the goal of assessing the impact of structured treatment programs.

Aim: To evaluate and compare the prevalence of oral and maxillofacial complications among drug users involved in replacement therapy and those newly registering for treatment.

Methods: This cross-sectional study was conducted in Tbilisi, Georgia, at the Center for Mental Health and Prevention of Addiction. Participants were divided into two groups: 135 individuals registering for replacement therapy for the first time and 115 participants who had been enrolled for over a year. Data collection involved questionnaires and intraoral examinations, focusing on inflammatory signs, functional impairments, and complications like retained roots and signs of toxic osteomyelitis. Statistical analysis was performed using IBM SPSS Statistics version 23.

Results: The findings revealed that individuals without prior replacement therapy had significantly more severe inflammatory symptoms, including draining fistulas (12.6% vs. 3.5%, $\chi^2(2) = 8.61$, $p = 0.013$), exposed bone (12.6% vs. 0.9%, $\chi^2(1) = 13.74$, $p = 0.000$), and visualized sequestra (8.9% vs. 1.7%, $\chi^2(1) = 6.01$, $p = 0.014$). Functional impairments, such as difficulties in mouth opening (31.1% vs. 12.2%, $\chi^2(1) = 12.81$, $p = 0.000$) and tooth loosening (51.1% vs. 35.7%, $\chi^2(1) = 6.02$, $p = 0.014$), were also more prevalent in this group. Retained dental roots were notably higher in the posterior lower jaw among untreated individuals (72.6% vs. 53.9%, $\chi^2(1) = 9.41$, $p = 0.002$).

Conclusion: The findings suggest that drug replacement therapy plays a significant role in reducing severe oral and maxillofacial complications. Integrating dental care into addiction programs is essential for addressing untreated oral health issues and preventing severe outcomes such as osteomyelitis. Longitudinal studies are recommended to further evaluate the long-term benefits of replacement therapy and refine intervention strategies.

Key words. Intravenous drug use, oral health, drug replacement therapy, toxic osteomyelitis, maxillofacial complications, retained dental roots, harm reduction.

Introduction.

The opioid crisis remains a critical public health challenge worldwide. In the United States, it is characterized by widespread opioid misuse and a significant number of related fatalities. In Europe, however, the scale of the crisis has been less severe overall, with Scotland standing out as a notable exception. Scotland reports drug-related death rates that are markedly higher than those of other European nations, including its UK counterparts (Public Health Scotland, 2024) [1]. Intravenous drug use continues to be a significant public health concern in Europe, with over 500,000 people injecting illicit drugs annually [2]. While overall rates of injecting drug use have declined in recent years, as emphasized by the European Drug Report 2024, it still contributes disproportionately to health harms such as bloodborne infections and overdoses. The growing diversity of injected substances, including synthetic drugs and polydrug use, has increased risks like vascular damage and bacterial infections. Despite progress, harm reduction programs remain underutilized in some countries, highlighting the need for expanded interventions tailored to local trends (European Monitoring Centre for Drugs and Drug Addiction, 2024) [3].

Between 2020 and 2022, drug overdose deaths involving injection drugs declined by 29.1%, yet over 4,000 deaths still occurred in the latter half of 2022. This data underscores the critical need for continued harm reduction strategies such as syringe services, which help reduce the risks associated with IDU [4].

The World Drug Report 2024 offers a comprehensive analysis of global drug trends, noting the rise in synthetic drug use, unsupervised psychedelic consumption, and shifting patterns of drug abuse across different demographics. The report stresses the importance of global efforts to combat addiction and its associated consequences, providing valuable insights to inform policies and interventions (World Drug Report 2024) [5].

Injecting drug use is associated with severe oral health issues, such as tooth decay, periodontal disease, dry mouth, and infections like candidiasis. These complications are caused by the direct effects of drugs on oral tissues, poor hygiene, malnutrition, and limited dental care. The acidic nature of many drugs and reduced saliva flow accelerates dental deterioration. Additionally, the suppression of pain perception in drug users often delays treatment, allowing these issues to worsen. Dental professionals must identify and address these conditions early to prevent further complications [6].

Drug addiction is associated with significant oral health problems, including dental caries, periodontal diseases, mucosal dysplasia, xerostomia, bruxism, tooth wear, and tooth loss [7]. Studies have shown that drug addicts have higher DMFT scores, and poorer oral hygiene compared to healthy individuals [8,9]. The carious process in addicts develops rapidly, often affecting caries-immune areas [10]. Changes in oral fluid composition, including imbalances in macro- and microelements, contribute to these issues [10]. Insufficient oral hygiene and increased sugar

consumption among addicts exacerbate the problem [8,10]. Despite the prevalence of oral health issues in this population, there are barriers to providing adequate care, including lack of access, appropriate settings, and collaboration between dental and general healthcare sectors. Integrating oral health care into addiction treatment programs is crucial for comprehensive patient care [7].

Osteomyelitis, a severe bone infection affecting the jaws, is another serious complication associated with intravenous drug use [11].

Oral health-related quality of life (OHRQoL) among individuals undergoing methadone maintenance therapy (MMT) in Ahvaz, Iran, was significantly affected. Participants showed poor oral health, including dry mouth, plaque buildup, caries, and gingival issues. Many had poor hygiene, with 68% rarely brushing their teeth and almost 68% not visiting a dentist for over three years. Tooth loss was common, with nearly half of the participants missing more than five teeth. These findings emphasize the urgent need for targeted dental care and public health interventions for individuals in substance use treatment [12].

Opioid substitution therapy (OST), including methadone and buprenorphine, significantly improves antiretroviral therapy (ART) outcomes for people who inject drugs (PWID) living with HIV. A meta-analysis of 32 studies found that OST increased ART recruitment by 87%, improved adherence by twofold, and enhanced viral suppression by 45%. Additionally, OST reduced ART discontinuation by 23%. While its effect on mortality remains unclear, the findings emphasize the need to integrate OST with ART for better HIV treatment outcomes and advocate for policy reforms to support this integration [13].

In Georgia, intravenous drug use has been marked by polydrug use, particularly involving opioids like heroin and buprenorphine, alongside stimulants made from plants such as ephedra. A 2019 study by the Georgian Harm Reduction Network found the average duration of drug injection to be 9 years, with heroin and street buprenorphine being the most common substances. Cannabis use was also prevalent, with 62.6% of participants reporting usage. This highlights the need for ongoing public health interventions to address changing drug use patterns in Georgia [14].

The 2022 General Population Survey (GPS) in Georgia found higher drug use among men, especially those aged 18–34. Cannabis was the most common substance used (4.6%), with smaller percentages using other illegal drugs. Additionally, 2.1% of the population used sedatives or tranquilizers, slightly more among women. The survey highlighted concerns about the spread of HIV, hepatitis C, and hepatitis B. In 2022, Georgia reported 9,779 HIV cases, with 20.2% of those on antiretroviral therapy being intravenous drug users. Hepatitis C positivity was 8%, with 32.1% having active infections. The data underscores the need for targeted interventions to address drug-related health issues.

The National Drug Monitoring Center in Georgia reported 41 overdose-related deaths in 2022, indicating a slight increase from previous years, and is working to improve data collection to better manage the impact of drug addiction on public health [15].

Methadone maintenance therapy (MMT) is a well-established and effective treatment for opioid dependence, significantly reducing heroin use and improving patient retention compared to non-pharmacological approaches [16]. Opioid agonist treatment (OAT), including methadone and buprenorphine, is widely used for opioid use disorder (OUD). However, there are notable differences in OAT implementation across countries, especially in eligibility criteria, dosing practices, unsupervised dosing access, and urine drug screening (UDS) requirements. Despite OAT being available in 86 countries, inconsistent practices, particularly regarding dosing and unsupervised dosing, can limit its global effectiveness in managing OUD [17].

In Georgia, substitution therapy has been available since 2017, with methadone-based treatment programs for individuals aged 21 and older struggling with substance use disorders.

Despite the extensive body of research on drug addiction and drug replacement therapy, there remains a notable gap in the literature regarding oral and maxillofacial health in individuals with substance use disorders, both within and outside of drug replacement therapy programs. In the field of oral and maxillofacial surgery, we frequently encounter patients with severe complications, such as osteomyelitis of the jaws, induced by intravenous drug abuse. These conditions often require extensive surgical interventions, and the postoperative treatment is particularly challenging. Patients frequently lose significant portions of their jaws due to osteomyelitis and necrosis, and reconstruction in these cases is not always feasible. The healing process is further complicated by continued drug use, which impairs recovery and undermines the effectiveness of postoperative treatment, often preventing us from achieving the desired outcomes.

This situation prompted our interest in investigating individuals who inject drugs, with the aim of making early diagnoses and preventing severe complications.

In this study, we assessed the oral and maxillofacial health of drug users enrolled in a drug replacement therapy program and compared their health outcomes with those of drug users who had not yet participated in such programs. Our primary goal was to identify any symptoms or problems related to oral and maxillofacial health within these populations. Additionally, we sought to determine whether there were any differences between the oral and maxillofacial health of drug users who were engaged in drug replacement therapy and those who were not, in order to evaluate the potential benefits of controlled treatment in preventing complications. This comparison sought to determine if long-term participation in replacement therapy contributed to improved overall and oral health outcomes. We hypothesized that participants who had replaced intravenous drug use with replacement therapy, would exhibit fewer oral health issues compared to those who did not yet enroll in replacement therapy program.

Materials and Methods.

The study was conducted in Tbilisi, Georgia, at the Center for Mental Health and Prevention of Addiction, chosen due to its large population of individuals involved in replacement therapy and the high number of new patients registering for treatment. Two groups of participants were evaluated: the first group

consisted of individuals registering to initiate replacement therapy, while the second group comprised patients who had been enrolled in the drug replacement program for over one year. This cross-sectional study was designed to evaluate and compare the oral health status of the two groups. The study focused primarily on identifying inflammatory processes relevant to the field of maxillofacial surgery.

Data were collected using a structured questionnaire and an intraoral examination map. The questionnaire gathered demographic and clinical information, including age, sex, duration of drug addiction, and, for beneficiaries, the length of enrollment in replacement therapy. It also recorded self-reported complaints related to oral health, a history of bloodborne diseases, the frequency of dental visits, and any functional disorders such as difficulties with chewing, swallowing, mouth opening, or speech. The intraoral examination map documented clinical observations, including signs of infection such as draining fistulas, visualized sequestra, mucosal destruction, abnormal tissues in the oral cavity, signs of xerostomia, and extraoral findings like lymphadenitis or facial asymmetry. Dental conditions such as tooth mobility, spontaneous tooth loss, retained roots, and any social impacts of oral health on communication were also recorded.

The examination map was manually completed by the researcher, while the questionnaire was filled out by the participants themselves. Superficial examinations of the oral cavity, face, and neck were performed in an ambulatory room provided by the Center for Mental Health and Prevention of Addiction. Disposable gloves, mouth mirrors, probes, and retractors were used to ensure hygiene during the examinations.

Inclusion criteria for the first group required participants to be intravenous drug users registering for their first replacement therapy, while the second group included individuals enrolled in the program for more than one year. Exclusion criteria applied to those who had been in replacement therapy for less than one year or were registering for a second or subsequent enrollment.

The collected data were processed and analyzed using IBM SPSS Statistics version 23. Descriptive statistics were calculated, compare variables between the two groups Chi-squared test was conducted.

Results.

The study included 250 participants (N group 1 = 135, N group 2 = 115), aged 21 to 70 years (M= 45.3 years, SD=10.3 years), comprising 13 females and 237 males. Among the functional disorders, the most common in the total sample (reported by 88.8 % of the participants) was problems with chewing, followed by difficulties in opening the mouth (reported by 22.4 %). None of the participants had problems with speech or swallowing. Among other common symptoms were loosening of teeth (44 %) and teeth painful by palpation and percussion (16.4%). In terms of the frequency of tooth loss, based on our findings, 50.8 % of participants presented loss of 1 or more teeth in the posterior area, 24 % showed bilateral adentia, and only 12.8 % showed unilateral adentia posteriorly, and 52.4 % had a loss of teeth in the anterior area of the jaw. Based on this information, we may suggest that the chewing function in this specific sample is disrupted.

A significant number of patients were found to have retained dental roots in the alveolar sockets. This was more common for the posterior teeth area rather than the anterior teeth area in both upper and lower jaws. Specifically, for the upper jaw, 46.8 % had retained dental roots in the posterior area, while for the anterior area this was 24.8 %. Similarly, for the lower jaw, 64 % had retained dental roots in the posterior area and 25.2 % in the anterior area. This result indicates that many patients presented with retained root fragments in their alveolar sockets, mainly in the posterior area, necessitating surgical removal.

According to the inflammatory signs and symptoms, our results revealed that 8.4 % of participants present a draining fistula in the oral cavity. Exposed bone intraorally on the upper jaw was visualized in only 1.2 %, while this symptom on the lower jaw was present in 7.2 % of participants. In addition to these symptoms, other complications were present, such as: bony sequestrum in the oral cavity (5.6 %); open tooth sockets and open wounds intraorally (6.4 %); the lower jaw (14 %) and upper jaw (9.2 %) painful by palpation. Enlarged submandibular lymph nodes were detected in 12.8 %, while lymph nodes in the area of the neck were enlarged in 5.2 %. Face asymmetry was visible in 11.2%. These symptoms and complications are typical signs of toxic osteomyelitis of the jaws, which needs further examination, including laboratory imaging results, for a proper statement of diagnosis and treatment planning.

Considering these oral health complications, the frequency and quality of dental visits among participants become particularly relevant.

Among participants in Group 2, 20.9% reported visiting a dentist at least once during the year. While this percentage suggests some level of access to dental care, further investigation would be required to provide detailed insights into the nature and frequency of oral care received during opioid substitution therapy.

A statistically significant difference was observed between the two groups in several intraoral findings, including draining fistulas ($\chi^2(2) = 8.61$, $p = 0.013$), exposed bone($\chi^2(1) = 13.74$, $p = 0.000$), visualized bony sequestra($\chi^2(1) = 6.01$, $p = 0.014$), and mucosal destruction, such as open tooth sockets and intraoral wounds ($\chi^2(1) = 7.72$, $p = 0.005$). In the first group, intraoral draining fistulas were identified in 12.6% of participants, compared to only 3.5% in the second group. On the lower jaw, mucosal disruption with exposed bone was observed in 12.6% of participants in the first group, which was significantly higher ($\chi^2(1) = 12.77$, $p = 0.000$) than the 0.9% recorded in the second group. Visualized bony sequestra in the oral cavity were present in 8.9% of participants in the first group, compared to 1.7% in the second group. A detailed analysis comparing the groups is presented in Table 1.

Additional data revealed significant differences between the two groups in facial asymmetry($\chi^2(1) = 5.60$, $p = 0.018$), pain on palpation of the lower jaw lower($\chi^2(1) = 13.64$, $p = 0.000$) jaws, loosening of teeth($\chi^2(1) = 6.02$, $p = 0.014$), and retained dental roots($\chi^2(1) = 9.41$, $p = 0.002$). Facial asymmetry was observed in 15.6% of participants in the first group, compared to 6.1% in the second group. Pain on palpation of the lower jaw was reported in 21.5% of the first group and 5.2% of the second group.

Table 1. *Comparison of symptoms between two groups.*

Symptoms		Group 1	Group 2	Chi-square value	df	Asymptotic Significance (2-sided)
Functional disordes	Opening the mouth	31.1%	12.2%	12.81	1	0.000***
	Chewing	87.4%	90.4%	0.57	1	0.449
	Speech	0%	0%	NA	NA	NA
	Swallowing	0%	0%	NA	NA	NA
Loosening of teeth		51.1%	35.7%	6.02	1	0.014*
Tooth pain by palpation and percussion		21.5%	10.4%	5.53	1	0.019*
Tooth loss	Bilateral tooth loss in the posterior area	24.4%	25.2%	0.02	1	0.888
	Unilateral adentia in the posterior area	14.1%	11.3%	0.43	1	0.514
	Loss of 1 or more teeth in the posterior area	51.9%	49.6%	0.13	1	0.719
	Tooth loss in anterior area	57.0%	47.0%	2.53	1	0.112
Gingival hyperemia		67.4%	43.5%	14.46	1	0.000***
Bony sequestrum inspected or visualized in the oral cavity		8.9%	1.7%	6.01	1	0.014*
Retained dental roots in the alveolar sockets	Anterior teeth area in the upper jaw	28.1%	20.9%	1.76	1	0.184
	Posterior teeth area in the upper jaw	47.4%	46.1%	0.04	1	0.835
	Anterior teeth area in the lower jaw	25.2%	25.2%	0.00	1	0.995
	Posterior teeth area in the lower jaw	72.6%	53.9%	9.41	1	0.002**
The presence of a draining fistula		12.6%	3.5%	8.61	2	0.013*
Exposed bone in the oral cavity	Upper jaw	2.2%	0%	2.59	1	0.108
	Lower jaw	12.6%	0.9%	12.77	1	0.000***
	Not present	86.7%	99.1%	13.74	1	0.000***
Open wounds and abnormal tissue growths on oral mucosa	Open tooth sockets and intraoral wounds.	10.4%	1.7%	7.72	1	0.005*
	erosions and ulcers on mucosa.	7.4%	4.3%	1.03	1	0.310
	tumorous tissues.	0%	0%	NA	NA	NA
Dryness of the mouth (Xerostomia):	Dryness of oral mucosa	39.3%	32.2%	1.35	1	0.245
	Thick saliva	44.4%	54.8%	2.66	1	0.103
	Difficulty to swallow	0.7%	0%	0.86	1	0.355
	Multiple dental caries	33.3%	15.7%	10.30	1	0.001**
	Hyperemia of gums	65.9%	46.1%	9.96	1	0.002**
Gum recession	Anterior teeth on lower jaw	71.1%	69.6%	0.07	1	0.790
	Posterior teeth on lower jaw	28.9%	33.9%	0.73	1	0.393
	Anterior teeth on upper jaw	27.4%	20.9%	1.44	1	0.230
	Posterior teeth on upper jaw	26.7%	27.0%	0.00	1	0.959
Face asymmetry		15.6%	6.1%	5.60	1	0.018*
Lymphadenitis	Enlarged lymph nodes in submandibular area	16.3%	8.7%	3.21	1	0.073
	Enlarged lymph nodes of the neck	6.7%	3.5%	1.28	1	0.258
Pain on palpation	Discomfort and pain on palpation upper jaw	8.9%	9.6%	0.03	1	0.854
	Discomfort and pain on palpation lower jaw	21.5%	5.2%	13.64	1	0.000***

*Note: Significance levels: *p < 0.05, **p < 0.01, ***p < 0.001.*

These findings indicate that inflammatory processes and clinical signs consistent with toxic osteomyelitis of the jaws were significantly less prevalent in the second group, comprising beneficiaries actively involved in drug replacement therapy.

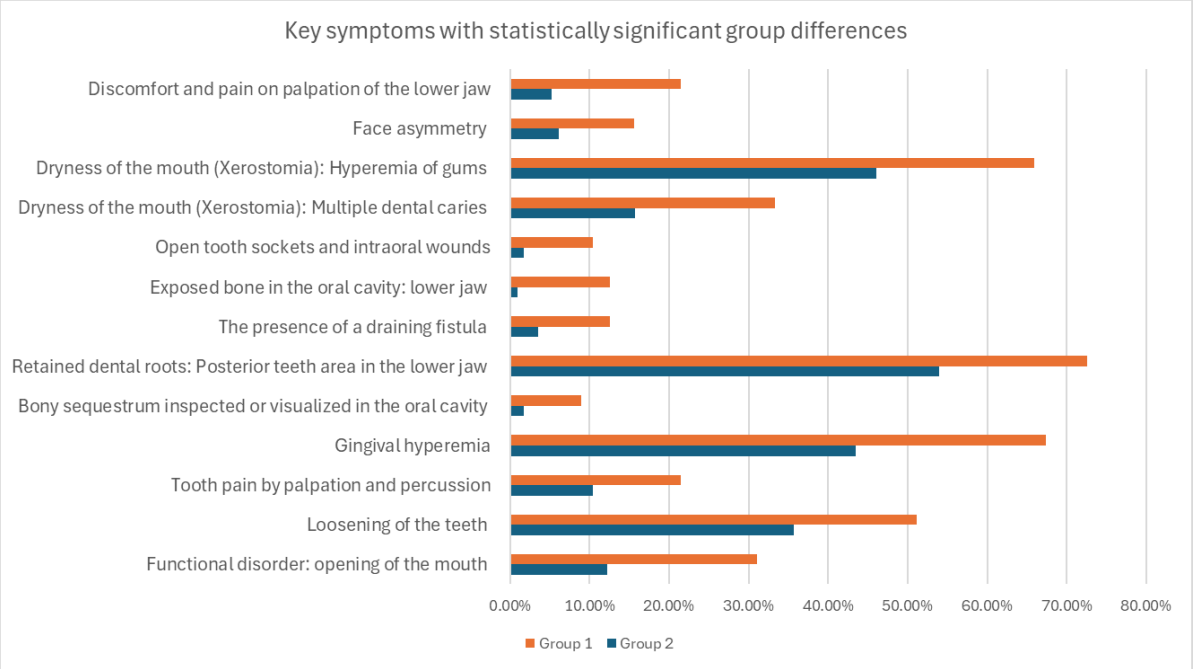

Figure 1. *Key symptoms with significant group differences.*

Loosening of teeth was noted in 51.1% of participants in the first group, compared to 35.7% in the second group. Additionally, teeth that were painful on palpation and percussion were reported in 21.5% of participants in the first group, compared to 10.4% in the second group. Retained dental roots in the posterior lower jaw were also significantly more prevalent ($\chi^2(1) = 9.41$, $p = 0.002$in the first group (72.6%) compared to the second group (53.9%). The visual representation of the statistically significant group differences is shown in Figure 1. This bar chart illustrates the prevalence of key symptoms with statistically significant differences between Group 1 and Group 2. Symptoms compared include discomfort and pain in the lower jaw, facial asymmetry, xerostomia (dryness of the mouth), multiple dental caries, and other clinical findings such as open tooth sockets, gingival hyperemia, and functional disorders affecting mouth opening. The data highlights a higher prevalence of certain symptoms, such as retained dental roots and bony sequestra, in one group compared to the other, emphasizing differences in clinical presentation.

Our final statistically significant results and the evaluation of differences between the two groups indicate that participants with no history of drug replacement therapy exhibit more severe intraoral and extraoral complications related to inflammatory processes compared to beneficiaries enrolled in drug replacement therapy. This disparity may be attributed to the fact that individuals not undergoing replacement therapy predominantly use uncontrolled, illegal substances, including street drugs, and often administer them intravenously with shared, non-sterile needles. Such practices substantially increase the risk of infections and bloodborne diseases.

Discussion.

To our knowledge, this is the first cross-sectional study conducted by maxillofacial surgeons in Tbilisi, Georgia, specifically focusing on oral and maxillofacial health among drug users involved in or newly enrolling in drug replacement therapy. This pioneering research addresses critical issues relevant to the field of maxillofacial surgery, providing valuable insights into the challenges faced by this population and laying the groundwork for further studies and targeted interventions.

Intravenous drug addiction significantly impacts general health, with oral and maxillofacial health being particularly affected. The literature highlights numerous complications faced by individuals with drug addiction, including oral health issues driven by stigma, limited awareness of the severity of the problem, the toxic effects of substances, and the modes of drug administration. These factors exacerbate the challenges of maintaining oral health in this vulnerable population.

Opioid agonist treatment (OAT) is the most common treatment for opioid use disorder in Europe, with methadone being the most widely prescribed. OAT improves treatment retention, reduces illicit opioid use, and decreases drug-related harm. However, access to OAT varies across countries, and the treatment population is aging, with over 60% of clients aged 40 or older. Despite challenges, some countries have expanded treatment coverage. Alternative treatments like medically assisted detoxification are less common but still available in all European countries [18].

As previously mentioned, narcotic substitution therapy has been available in Georgia since 2017, providing support for individuals aged 21 and older dealing with substance use disorders. Medications commonly used in opioid replacement therapy include methadone and buprenorphine, each with unique benefits. Methadone is a synthetic opioid agonist widely used in treatment. Available as tablets or a solution (syrup), the solution is preferred for easier supervision. Methadone prevents withdrawal symptoms in opioid-dependent patients without causing significant sedation or intoxication. It is classified under Schedule I of the 1961 Single Convention on Narcotic Drugs, emphasizing its medical value and need for regulation.

Buprenorphine, a partial opioid agonist, offers similar benefits to methadone but with a lower risk of misuse and overdose. It blocks additional opioid effects without inducing the same level of tolerance as methadone. Withdrawal symptoms with buprenorphine are milder, and it is listed under Schedule III of the 1961 Single Convention, reflecting its therapeutic value and lower abuse potential. The lack of data on the oral health of drug users in Georgia—both those undergoing drug replacement therapy and those not yet enrolled—highlights the necessity of research in this area. This study fills that gap by evaluating two distinct groups: individuals already enrolled in drug replacement therapy and those newly registering to begin treatment.

The majority of participants were within the age range of 35–55 years (71.2%), with 5.2% of the sample being female and 94.8% male. The analysis revealed a high prevalence of tooth mobility and eventual tooth loss among participants, resulting in significant disruptions in chewing function the most common in the total sample reported by 88.8 %. This progression aligns with findings by Debesh Nilendu [19] and Hossain KMS and colleagues [20], who noted the logical sequence of symptom severity within this population. Additionally, our data highlighted inflammatory signs and symptoms, including exposed bone in the oral cavity, mucosal disruption, visualized sequestra, and draining fistulas. These symptoms are indicative of toxic osteomyelitis of the jaws, a condition frequently observed among intravenous drug users.

Toxic osteomyelitis of the jaws is of particular concern for maxillofacial surgeons. This condition often results in extensive maxillofacial defects, posing significant challenges for treatment and reconstruction. The management of such cases is further complicated by the characteristics of drug addiction, including its impact on wound healing and the complex nature of postoperative care.

Early signs of Osteomyelitis of the jaws may include localized pain, fever, and elevated inflammatory markers. In drug users, osteomyelitis often presents atypically, such as emphysematous osteomyelitis with intraosseous gas visible on imaging [21]. The condition can affect various bones, including the femur and jaw, with Staphylococcus aureus being a common causative organism [22,23].

Treatment typically involves prolonged hospitalization for intravenous antibiotics, with drug users requiring significantly longer stays compared to other patient groups [11].

A study from 2013 to 2019 in Lviv, Ukraine, found that prolonged drug use, including "Screw," amphetamines, and Subutex, caused rapid bone destruction, resulting in swelling, pain, fistulas, and severe jawbone loss. Treating osteomyelitis requires a multidisciplinary approach, including surgery, antibiotics, immune modulation, detoxification, and addiction counselling. Early diagnosis and comprehensive care are essential, emphasizing the need to address drug addiction's impact on oral and maxillofacial health alongside its systemic effects [24].

In addition to the symptoms described above, a considerable proportion of participants presented with retained root fragments in the alveolar sockets, which serve as a potential source of infection and require surgical removal to prevent future complications. However, according to Shetty and colleagues [25] oral health issues among individuals with substance use disorders often remain untreated due to factors such as stigma, dental anxiety, and limited access to care. Integrating dental services into addiction treatment programs could help address this issue, as drug users often only seek care during emergencies, resulting in severe outcomes such as tooth loss and osteomyelitis. Emphasizing preventive care through regular dental check-ups can enable early detection and management of oral health problems, thereby reducing the risk of serious complications.

Overall, our results suggest that replacement therapy may serve as an effective risk mitigation strategy, aligning with findings in the literature. The importance of opioid substitution therapy (OST) as a harm-reduction measure was previously discussed by other authors [26,27].

The study by Mielau and colleagues [27] highlights the effectiveness of methadone, buprenorphine, slow-release morphine (SROM), and levomethadone in reducing illicit opioid use and improving treatment retention. The authors underscore the need to address barriers in OST accessibility and integrate psychological and social support for better outcomes. The study protocol by Brittany Burns Dennis and colleagues outlines a systematic review and meta-analysis designed to compare the effectiveness of various opioid substitution therapies (OSTs), including methadone, buprenorphine/naloxone, naltrexone, and heroin-assisted therapy, for treating opioid dependence. Key outcomes examined include treatment retention, reduction in opioid use, and associated health and social improvements [28].

The findings from the systematic review highlight the potential of opioid substitution therapies (OSTs) to improve treatment retention and reduce opioid use, which aligns with observations from our study.

Among participants in Group 2, 63.5% reported abstaining from the use of any illicit drugs, relying solely on medications provided by the replacement therapy program. This suggests that these individuals are less likely to engage in behaviors such as injecting morphine-like substances intraorally or intravenously, thereby reducing associated risks. In contrast, individuals not enrolled in drug replacement therapy may face a higher likelihood of engaging in such practices, which could exacerbate oral and maxillofacial complications.

Furthermore, 20.9% of participants in Group 2 reported visiting a dentist at least once a year, compared to 15.6% in Group 1. While these differences are not statistically significant, they suggest that individuals enrolled in replacement therapy may exhibit greater social engagement, which extends to maintaining dental care. This increased social integration may play a role in mitigating oral health risks associated with drug dependency.

Our findings indicate that the significant attention and the involvement of dental care and healthcare practitioners are needed. The overall results revealed numerous issues and symptoms in both groups that require timely management and treatment to prevent the development of more severe complications, which may become increasingly difficult to address in the future.

Limitations of the study.

This study was conducted in Tbilisi, Georgia, at the Center for Mental Health and Prevention of Addiction, a facility with a large population of individuals undergoing replacement therapy and a high number of new patients registering for treatment. While this setting provided a robust sample, the results may not be entirely generalizable to other populations or geographic regions.

Additionally, laboratory and imaging examinations were not performed in this study. The absence of radiographic evaluations limited our ability to detect certain symptoms or conditions that are not visible during a superficial clinical examination. Future studies should incorporate imaging techniques to provide a more comprehensive assessment of maxillofacial health in this population.

We would like to add, that in our study, participants in Group 2 were selected based on their enrolment in a drug replacement therapy program for no less than one year, ensuring that they were actively engaged in treatment during the study period. However, we did not directly measure or quantify their compliance with treatment protocols as part of our research.

It is worth noting that individuals enrolled in these programs typically have a strong motivation to adhere, driven by their dependency and the structured nature of the treatment (e.g., daily or regular supervised dosing). Missing a dose could lead to withdrawal symptoms, which patients would want to avoid, making non-compliance quite unlikely in this context. Additionally, patients enrolled in opioid substitution therapy programs are required to visit the treatment centers regularly to receive their medication, which inherently promotes adherence to the prescribed regimen.

Nevertheless, we acknowledge that exploring compliance in greater depth, including factors influencing adherence and its impact on outcomes, represents an important area for future investigation.

Finally, this study's cross-sectional design captured data at a single time point, limiting the ability to observe changes in symptoms or health outcomes over time. Future research should consider longitudinal studies to better understand the progression of symptoms and the long-term effects of replacement therapy on oral and maxillofacial health.

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Conflict of Interest.

None.

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