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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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ANATOMICAL FEATURES OF THE OSTIOMEATAL COMPLEX AND THEIR IMPACT ON COMPLICATIONS IN DENTAL IMPLANTATION

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Abstract.

The anatomical structure of the ostiomeatal complex (OMC) plays a crucial role in the success of dental implantation procedures, particularly in the maxillary region. This study examines the anatomical variations of the OMC and their impact on postoperative complications in dental implantation. A total of 400 spiral computed tomography (CT) scans of patients aged 18 to 95 years were analyzed to assess key anatomical structures, including the maxillary sinus, concha bullosa, uncinate processes, and sinus ostium dimensions. Findings revealed significant anatomical variability, with concha bullosa observed in 33.2% of cases, uncinate process variations in 31.6%, and a narrowed maxillary sinus ostium in 6.25% of cases. These structural differences were found to influence sinus ventilation and drainage, thereby increasing the risk of postoperative complications such as sinusitis and impaired osseointegration. Statistical analysis highlighted strong correlations between sinus volume, bone thickness, and OMC components, reinforcing the need for thorough preoperative assessment. The study underscores the importance of personalized surgical planning and advanced imaging techniques in mitigating complications and optimizing dental implantation outcomes.

Key words. Computer tomography, ostiomeatal complex, dental implantation, anatomical variability.

Introduction.

The structure of the paranasal sinuses plays a crucial role in the success of surgical interventions in dentistry and maxillofacial surgery [1]. One of the major challenges in modern dentistry is the implantation of teeth, particularly in the maxillary region, due to the anatomical complexities of the maxillary sinus [2].

The proximity of the maxillary sinus floor to the alveolar ridge, variations in sinus morphology, and the presence of anatomical anomalies can significantly affect the success of dental implant placement [3]. In some cases, insufficient bone volume or sinus pneumatization necessitates additional surgical procedures, such as sinus lifting, to ensure implant stability [4].

A thorough understanding of the relationship between the maxillary sinus anatomy and potential complications in dental implantation is crucial for optimizing treatment planning and minimizing postoperative risks [5]. A particularly important factor post-surgery is the structure of the ostiomeatal complex (OMC), a key anatomical region of the skull responsible for the physiological ventilation of the paranasal sinuses [6]. Its structural characteristics significantly influence the likelihood of postoperative complications [7]. The contribution of each OMC component to sinus ventilation remains uncertain and unproven. Some studies have focused on the density of the uncinate process in recurrent rhinosinusitis, but the question of this parameter in the absence of pathology remains unexplored.

During surgical treatments, the goal is usually to expand the area of the semilunar hiatus as much as possible to maximize sinus ventilation efficiency [8]. However, it is known that when the semilunar hiatus becomes too wide, turbulent airflow disappears, and sinus ventilation efficiency progressively decreases. Therefore, the question arises about determining the physiological dimensions of the semilunar hiatus and even identifying the critical upper limits that would still ensure adequate ventilation.

Given these considerations, the objective of our study was to examine the anatomical features of the ostiomeatal complex and their impact on complications in dental implantation.

Materials and Methods.

This study was conducted based on the analysis of 400 spiral computed tomography (CT) scans of men and women aged 18 to 95 years. The participants were divided into groups according to the World Health Organization classification. None of the participants reported complaints related to the ear, nose, and throat (ENT) organs, and the CT scans were performed for reasons unrelated to ENT pathology (e.g., suspected stroke, which was later ruled out). Cases were excluded from the study if there was evidence of pathological changes in the paranasal sinuses (PNS), as well as in cases of childhood or pregnancy.

Data collection was conducted at the Kharkiv Research Institute of General and Emergency Surgery and the Merefa Central District Hospital, in accordance with a scientific and practical cooperation agreement (No. 173/10 18, dated October 18, 2018).

The study adhered to the ethical standards of the World Medical Association's Declaration of Helsinki on medical research involving human subjects. All participants were fully informed about the study and provided written informed consent. The research protocol was approved by the Bioethics Committee of Kharkiv National Medical University (Protocol No. 5, dated November 11, 2018).

Imaging and Data Analysis: Computed tomography was used not only to visualize the anatomical structures but also to analyze the spatial relationships between various elements of the PNS, the osteomeatal complex (OMC), and adjacent regions. Additionally, CT scans enabled measurements of bone thickness and density. Bone density was assessed using the Hounsfield scale [9], which allows modern CT devices to differentiate 4,096 shades of gray, representing different density levels in Hounsfield units (HU). According to this scale, water is assigned a value of 0 HU, while air is -1000 HU.

The study was conducted using a Toshiba Aquilion 64 [10] computed tomography scanner (Japan), a multi-slice CT scanner capable of simultaneously acquiring data from four 0.5 mm slices. This scanner is known for its high performance, featuring a full rotation time of up to 0.4 seconds. To ensure high-resolution imaging while minimizing radiation exposure, a 0,5 mm slice thickness was used for examining the paranasal sinuses. The device's advanced technology optimizes X-ray using, providing high-quality images with a reduced radiation dose.

For image analysis, the Radiant DICOM Viewer software (version 4.6.9, 64-bit) was used [11]. This software offers a user-friendly interface and high-performance capabilities for viewing medical images in DICOM PACS format.

Statistical Analysis:

Statistical analysis was performed using methods of variational statistics. The normality of data distribution was assessed using the Shapiro-Wilk test. The prevalence of different anatomical variants of the PNS and OMC was calculated as a percentage of the total study population.

The range of individual variability in PNS and OMC structure was assessed using the following statistical parameters:

- M – average value.
- σ – standard deviation.
- Cv – coefficient of variation.
- mCv – standard error of the coefficient of variation.
- Min – minimum value in the sample.
- Max – maximum value in the sample.

A correlation analysis was also conducted. The Pearson correlation coefficient (r) was used to examine the relationship between Haller's cell dimensions and the width of the semilunar hiatus. The statistical significance of the correlation was determined using Student's t-test.

Morphometric Analysis:

Several morphometric parameters were measured, including:

- The longitudinal and transverse dimensions of the middle turbinate.
- Spatial orientation and attachment level of the middle turbinate.
- Volume and dimensions of the uncinate process.
- Bone density of the uncinate process.
- Distance between the middle turbinate and the semilunar hiatus.

Additionally, the spatial arrangement of the semilunar hiatus and its potential connections with the sinuses were analyzed. These anatomical features are critical, as they may contribute to the chronicity of inflammatory conditions and influence the surgical approach in functional endoscopic sinus surgery.

Results and Discussion.

Paradoxal deviation of the middle turbinate was observed in 19 patients (7.6%). A pneumatized middle turbinate (concha bullosa) was detected in 83 patients (33.2%), accounting for 3.25% of cases, resulting from the early development of an air cell within the anterior ethmoid labyrinth.

Among these, a multichambered concha bullosa (see Figure 1) was found in 14 individuals (5.6%).

Figure 1. *CT. Coronal reconstruction. Bulla of the middle turbinate on both sides, on the left – two-chamber concha bullosa.*

In 39 patients (15.6%), the concha bullosa was significantly enlarged, completely obstructing the middle nasal passage. It extended toward the uncinate process and the ethmoid bulla, effectively blocking the communication between the paranasal sinuses and the nasal cavity.

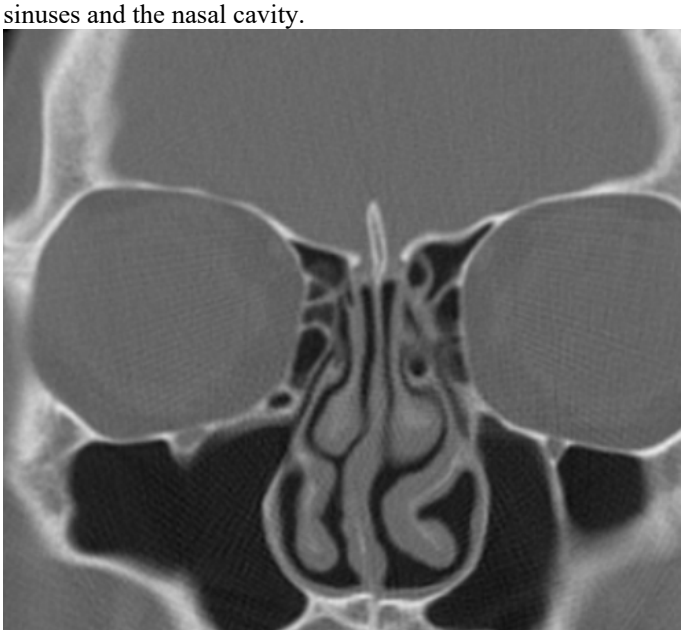

Figure 2. *Pneumatization of the uncinate process on the left. SCT. Coronary reconstruction.*

Borderline anatomical variants (see Figure 2) of the uncinate process were identified in 57 patients (31.6%) on CT scans. These included:

- Pneumatization in 18 patients (7.2%).
- Hyperplasia in 22 patients (8.8%).
- Paradoxical bending and displacement into the depth of the middle nasal meatus in 17 patients (6.8%).
- Hypoplasia 0,8%.

Asymmetry in the superior portions of the Uncinate processes was noted in 22.8% (57 patients), with variations in attachment sites. Agger nasi cells were hypertrophied in 9.6% (24 patients), always appearing as unilocular structures.

Haller cells were present in 1.75% (7 patients) and were associated with a narrower maxillary sinus ostium, increasing the risk of obstruction.

Narrowing of the natural ostium (<4 mm) was found in 6.25% (25 patients), which could impair sinus ventilation and drainage, thereby increasing the risk of postoperative complications.

The correlation between these parameters was also calculated. The highest degree of correlation was found between the thickness of the upper walls and the volume of the sinuses (r = 0.96).

The dimensions of the middle turbinate are shown in Figure 3.

Dimensions of the uncinate process, distance from the gray turbinate to the semilunar foramen.

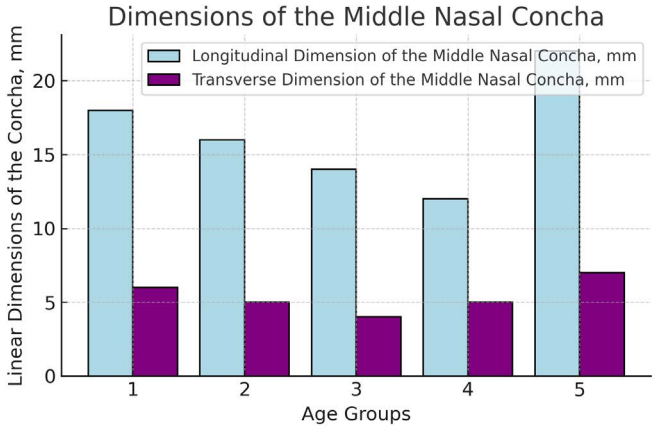

Figure 3. *Dimensions of the middle turbinate in different age groups.*

The physiological function of the paranasal sinuses, particularly the maxillary sinuses, is closely dependent on the size and efficiency of their natural openings (Figure 4), all of which drain into the middle nasal passage. In 0.5% of cases, the presence of an additional opening was observed, which can significantly disrupt normal maxillary sinus function.

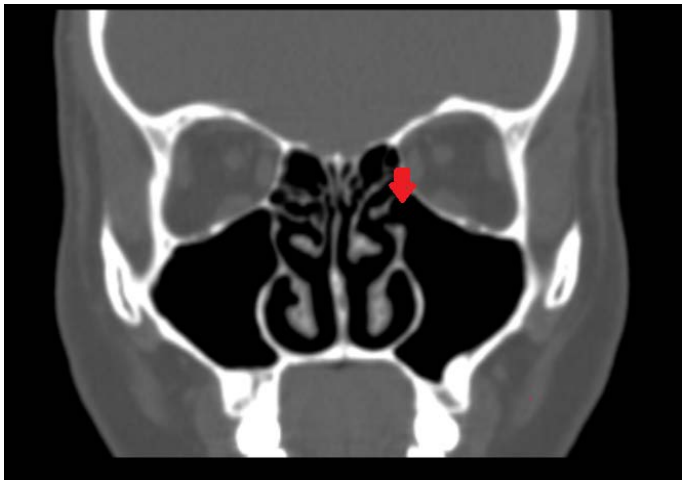

Figure 4. *4 CT of the paranasal sinuses. Coronal projection (the arrow indicates the semilunar hiatus).*

The size of these openings plays a crucial role, ranging from 3 to 10 mm. Notably, 87% of subjects had a semilunar hiatus larger than 4 mm, with the most common size being 5 mm [12].

Our study revealed significant anatomical variability in the osteomeatal complex (OMC) and its potential impact on complications during dental implantation [13]. Anatomical variations such as paradoxical curvature of the middle turbinate, concha bullosa, hyperplasia and pneumatization of the uncinate process, as well as differences in the size of the natural ostium, can significantly influence nasal aerodynamics, paranasal sinus ventilation, and the functional state of the mucosa [14].

Concha bullosa was observed in 33.2% of cases, with larger formations contributing to obstruction of the middle nasal passage and impaired maxillary sinus drainage [15]. This obstruction may increase the risk of inflammatory complications following dental implantation, including chronic sinusitis and acute sinus infections. Additionally, hyperplasia or pneumatization of the uncinate process, detected in 16% of participants, can further disrupt normal OMC function. This is supported by a significant negative correlation (-0.59) between the size of the uncinate process and the width of the semilunar hiatus.

One of the most critical factors influencing complication risk is the individual anatomical variability of the semilunar hiatus width [16]. In 6.25% of cases, this width was less than 4 mm—a threshold considered critical for proper sinus drainage [17]. Patients with a narrower semilunar hiatus are at a higher risk of inflammatory complications post-implantation. Furthermore, Haller cells were identified in 1.75% of cases, correlating with a reduction in the natural maxillary sinus ostium size, potentially leading to sinus obstruction [18].

Our findings also demonstrated a strong correlation between paranasal sinus volume, sinus wall thickness, and OMC parameters [19]. Notably, a high correlation (r = 0.96) between sinus volume and upper wall thickness highlights the potential risks associated with sinus lift procedures. This emphasizes the necessity of preoperative bone density assessment before implantation [20,21].

One of important conclusion of described work is one more emphasis about common work of different specialist (dentist, radiologist, morphologist) even in period of wide digital medicine using [22-25] with start of implementation of artificial intelligence.

Clinical Implications.

From a clinical perspective, our findings suggest several key considerations:

1. **Preoperative Evaluation:** Patients with pronounced anatomical variations (e.g., uncinate process hyperplasia, concha bullosa, or a narrow semilunar hiatus) require thorough pre-implantation assessment.

2. **Comprehensive Planning:** Preoperative planning should extend beyond bone volume analysis to include an evaluation of OMC ventilation and drainage function.

3. **Advanced Imaging:** The use of spiral computed tomography (SCT) should be a standard diagnostic tool for identifying anatomical variations and determining optimal surgical strategies.

Conclusion.

Understanding the anatomical features of the ostiomeatal complex is essential for predicting and minimizing complications

Table 1. *Anatomical variability of the components of the osteomeatal complex in people of different ages and sexes.*

Indicator	More than 90 years old		75-89 years		60-74 years		45-59 years		18-44 years	
	Male	**Female**	**Male.**	**Female.**	**Male**	**Female**	**Male.**	**Female**	**Male.**	**Female**
Volume of the uncinate process, x10^{-9} m^3	11940±810	9533±110	9870±930	8331±976	12468±1125	11876±639	13113±1125	13111±1212	14890±979	15111±2311
Density of the uncinate germ, Hu	139±21	115±21	147±18,9	101±71	199±25	116±12	154±57	160±71	183±22	192±12
Longitudinal size of the middle turbinate, x10^{-3} m	16,4 ±2,9	13,1±1,99	13,5±2,1	12,07±2,2	10,1±3	14,01±2,3	10,8±2,98	11,022±3,04	12,11±2,2	11,9±3,1
Transverse size of the middle turbinate x10^{-3} m	5,47±1,2	3,65±1,87	2,88±0,61	4,9±1,2	4,96±0,88	4,12±0,29	4,41±2,02	3,346±0,79	6,08±0,99	4,33±0,93
Dimensions of the hiatus semilunaris x10^{-3} m	4,99±1,01	4,41±0,9871	4,56±1,06	5,01±0,77	4,54±0,8	3,99±0,97	5,14±1,4	6,02±1,8	7,6±1,28	4,54±0,5

in dental implantation. Patients with pronounced anatomical variations, such as hyperplasia of the Uncinate process, concha bullosa, or a narrow sinus ostium, require more thorough preoperative evaluation. Treatment planning should incorporate both bone volume analysis and an assessment of the ventilation and drainage functions of the ostiomeatal complex.

Future research should focus on refining imaging techniques and developing tailored surgical approaches to mitigate the risks associated with anatomical variations in the ostiomeatal complex.

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