Clinical and Radiological Diagnosis of Oroantral Communication: A Retrospective Outpatient Study

Dumitru Hîțu , Nicolae Chele , Victoria Ciobanu , Mihaela Dandara , Vasile Cabac , Sergiu Parii *

Posted Date: 26 March 2026

doi: 10.20944/preprints202603.2062.v1

Keywords: oroantral communication; diagnosis; outpatient surgery; maxillary sinus

 doi:10.20944/preprints202603.2062.v1

Article

Clinical and Radiological Diagnosis of Oroantral Communication: A Retrospective Outpatient Study

Dumitru Hîțu [1], Nicolae Chele [1], Victoria Ciobanu [1], Mihaela Dandara [1], Vasile Cabac [2] and Sergiu Parii [3,*]

[1] Faculty of Stomatology, Department of Oral-Maxillo-Facial Surgery "Arsenie Guțan" Nicolae Testemițanu State University of Medicine and Pharmacy, Chisinau, Republic of Moldova, Municipal Dental Center in Chisinau

[2] Department of Otorhinolaryngology, Nicolae Testemițanu State University of Medicine and Pharmacy, Chisinau, Republic of Moldova

[3] Scientific Center of Medicines, Nicolae Testemițanu State University of Medicine and Pharmacy, Chisinau, Republic of Moldova

* Correspondence: sergiu.parii@usmf.md; Tel.: +373 69616999

Abstract

Background: Oroantral communication (OAC) represents an accidental opening of the maxillary sinus during oral surgery in the absence of pre-existing inflammation. Despite being considered a rare complication; however, it remains clinically significant due to the risk of chronic sinus pathology. **Methods:** This study was conducted within the "Arsenie Guțan" Department of Oral and Maxillofacial Surgery at "Nicolae Testemițanu" State University of Medicine and Pharmacy. We evaluated a cohort of 31 patients with OAC treated in an outpatient setting at the Municipal Dental Center in Chișinău during 2022. **Results:** The first molar was the most frequently involved tooth (45.16%), with molars accounting for 83.88% of cases. Immediate post-extraction diagnosis was achieved in 90.32% of patients. Imaging was required in selected cases, with orthopantomography (OPG) used in 83.87% and computed tomography (CT) in 9.67% of patients. **Conclusions:** Early diagnosis based on combined clinical and radiographic assessment remains essential for successful management of OAC. Prompt intervention reduces the risk of maxillary sinus infection and chronic fistula formation.

Keywords: oroantral communication; diagnosis; outpatient surgery; maxillary sinus

1. Introduction

Oroantral communication (OAC) is defined as an unnatural pathological connection between the maxillary sinus (MS) and the oral cavity [4]. This condition represents a significant challenge in oral and maxillofacial surgery, as its incidence and the severity of the MS floor trauma are influenced by a complex interplay of demographic, socioeconomic, and racial factors, as well as the specific therapeutic approach and the quality of initial care provided [1]. When the lesion complexity involves adjacent anatomical structures, interdisciplinary collaboration between oral and maxillofacial (OMF) surgeons and ENT specialists becomes essential [1,10,11,15,16,19,31,37]. A precise understanding of this pathology, particularly its relationship with the respiratory system and "border zone" pathologies, is crucial for establishing an accurate diagnostic and therapeutic protocol [1].

The anatomical proximity of the maxillary posterior teeth roots to the sinus floor is the primary predisposing factor for OAC. Typically, these roots are separated from the MS floor by a dense cortical bone of varying thickness; however, in certain clinical cases, they are only delimited by the thin mucoperiosteum [6,7,9,15–18,31,37,40].

V. Topalo (2008) highlighted that the anatomical peculiarities of the posterior maxillary sectors—characterized by low bone density (D3, D4) and alveolar bone volume reduction due to tooth loss

 doi:10.20944/preprints202603.2062.v1

and subsequent sinus pneumatization—pose significant difficulties in maintaining or restoring dental arch integrity [33].

In terms of local epidemiology and clinical trends, the incidence of these conditions has shown a notable evolution in recent years. In 2017, these affections accounted for 5.43% of the total patients treated in the OMF Surgery department. Subsequent years recorded 5.54% in 2018, 3.92% in 2019, 2.58% in 2020, 2.50% in 2021, 1.62% in 2022, 1.66% in 2023, 1.96% in 2024, and 1.19% in 2025. Consequently, the incidence of inflammatory processes of the maxillary sinus decreased significantly from 5.54% to 1.19% ($t=14.64$; $p<0.001$) registering a total reduction of 4.29%.

The etiology of OAC is predominantly iatrogenic, often resulting from alveolar process trauma during dental extractions, endodontic treatments, or surgical maneuvers involving the upper teeth [9,15–18,31]. While OAC is considered a relatively rare complication, literature reports varying incidence rates ranging from 0.31% to 13%, with the occurrence frequency depending heavily on the specific tooth type being removed [25,26]. Despite the wide variety of surgical plastic methods available, the management of OAC remains a subject of intense debate among specialists. Recent studies indicate that 20% of OAC cases are misdiagnosed, and only 33% achieve successful healing after the initial treatment [30].

The clinical diagnosis of OAC must be established promptly during the examination of the post-extraction socket. Pathognomonic signs include the passage of air between the MS and the oral cavity, rhinolalia, and unilateral fluid reflux through the nasal cavity. Diagnostic maneuvers such as the Valsalva test and careful probing with a buttoned stylus remain gold standards, though they must be performed with caution to prevent sinus infection or further tissue damage [9,12,15,28]. Modern imaging, including Computed Tomography (CT) and Cone Beam Computed Tomography (CBCT), has become an essential adjuvant tool for identifying OAC and assessing the state of MS soft tissues [21,22,27].

The aim of this study was to evaluate the clinical and paraclinical diagnostic protocols of oroantral communication in an outpatient setting and to identify key risk factors associated with its occurrence. [1,8,9,15–18].

2. Materials and Methods

2.1. Study Design and Setting

This retrospective study was conducted at the "Arsenie Guțan" Department of Oral and Maxillofacial Surgery and Oral Implantology of the "Nicolae Testemițanu" State University of Medicine and Pharmacy [1,9,32]. Clinical data were collected from patients treated within the surgical department of the Municipal Dental Center in Chișinău during the year 2022 [15,16,23]. Data normality was assessed prior to statistical testing to ensure the validity of parametric analyses.

2.2. Patient Selection and Data Collection

A total of 31 patients diagnosed with accidental oroantral communication (OAC) were included in the study. Data were extracted from the patients' medical observation charts, focusing on several key clinical and demographic parameters [12,24].

Demographics and Social Status: Age, sex, environment (urban/rural), and educational level, number of children [11,19,34].

Clinical Profile: Primary diagnosis, etiology of the communication, the specific causal tooth involved, and the presence or absence of foreign bodies within the maxillary sinus [1,38,40,41].

Paraclinical Examinations: Analysis of radiographic findings and other diagnostic imaging used during the treatment process [2,3,35].

To ensure a comprehensive theoretical framework, a systematic review of the literature was performed using international medical databases, including PubMed, Medline, and general academic search engines, targeting recent scientific advancements in OMF surgery [7,20,25,27].

 doi:10.20944/preprints202603.2062.v1

2.3. Statistical Analysis

Data processing was performed using Microsoft Excel (Microsoft Office 2010 package). Descriptive statistics were calculated, and results were expressed as percentages and mean values ± standard deviation. Quantitative results were evaluated and presented in the form of descriptive tables and comparative diagrams [8,30]. Statistical significance was determined using the t-Student test, ensuring the accuracy of the comparative findings presented in the results section [22,26,29,31].

3. Results

3.1. Analysis of Demographic and Socio-Economic Determinants

The study involved 31 patients, where a statistically significant prevalence of the female sex was recorded, representing 67.75% (±8.98; n=21) of the total sample, compared to 32.25% (±8.98; n=10) for males (t=2.80, p<0.01). When analyzing the age distribution, the decade 31–40 years showed the highest susceptibility, accounting for 51.6% (n=16) of cases. Interestingly, over 60% of patients with OAC were aged between 30 and 60 years, with a calculated mean age of 42.94 years.

Regarding the residential environment, a significant difference was observed: 87.1% (±5.95) of subjects were from the urban sector (Chișinău), while only 12.9% (±5.84) resided in rural areas (t=9.41, p<0.001). Socio-economic status, evaluated through education and family structure, showed that 83.87% of patients had completed formal education, and 71% were parents, suggesting that family budget constraints and educational levels are indirect predictors of dental health and the urgency of surgical interventions.

Table 1. Demographic and Socio-Economic Characteristics of the Study Group.

Characteristic	Category	Frequency (n)	Percentage (%)	Statistical Significance
Gender*	Female	21	67.75%±8.98	t=2.80; p<0.01
	Male	10	32.25%±8.98	
Age group	<20 years	2	6.45%	Mean Age: 42.94
	21-30 years	9	29.00%	
	31-40 years	16	51.60%	
	41-50 years	3	9.70%	
	>51 years	1	3.25%	
Residence	Urban (Chișinău)	27	87.1%±5.95	t=9.41; p<0.001
	Rural	4	12.9%±5.84	
Education	Higher/Vocational	26	83.87%±7.37	t=6.16 p<0.001
	Secondary/Incomplete	5	16.13%±7.36	
Family status	With children	22	71.0%±8.69	t=3.48; p<0.001
	Without children	9	29.0%±8.69	

3.2. Topography of "Sinus Teeth" and Clinical Manifestations

All patients presented with chronic periodontitis prior to the OAC incident [9,15]. The first molar (M1) was identified as the most frequent causal tooth in 45.16% of cases, followed by the second molar (22.58%) and the third molar (16.13%). Collectively, molars accounted for 83.88% of the total communications, while premolars represented only 16.12% (t=6.37 p<0.001) (see Figure 1).

 doi:10.20944/preprints202603.2062.v1

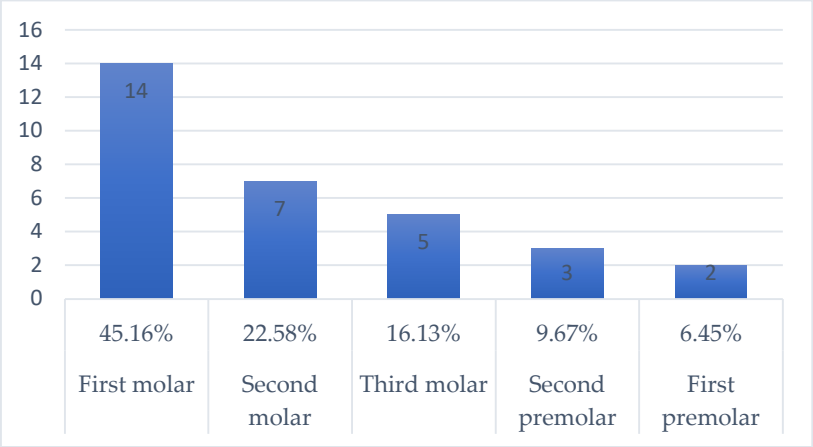

Figure 1. Distribution of teeth associated with oroantral communication in the study.

3.3. Diagnostic Protocols and Paraclinical Findings

According to the Kruchinsky and Filippenko classification [38], the clinical diagnosis of acute OAC was established in 90.32% of cases immediately post-extraction. However, in 9.68% (n=3) of patients, the communication was complicated by the propulsion of foreign bodies (roots or dental fragments) into the maxillary sinus.

High-performance imaging was mandatory for these cases; Orthopantomography (OPG) was the primary tool for 26 patients (83.87%), while Computed Tomography (CT) was utilized for 3 patients (9.67%) (see Figure 2). Only 6.45% of cases were assessed using traditional periapical radiography ($t=12.22$; $p<0.001$).

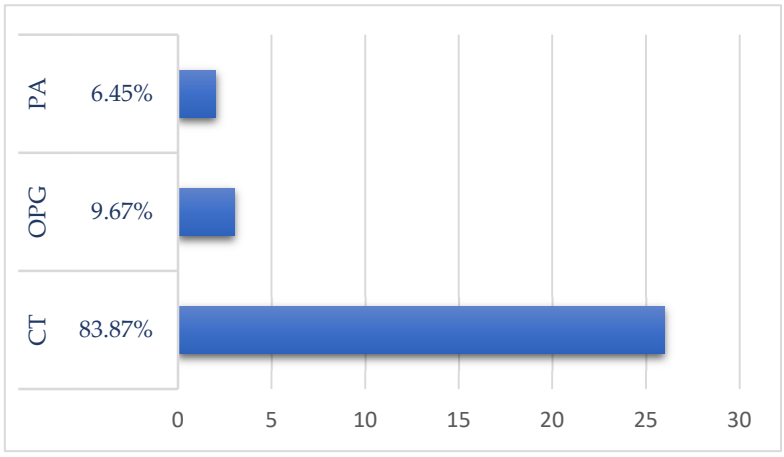

Figure 2. Imaging methods used for the diagnosis of oroantral communication in the study group.

4. Discussion

The clinical and socioeconomic dynamics of oroantral communications (OAC) analyzed in this study highlight the complex nature of this complication. Our findings provide a deeper understanding of why certain patient groups are more vulnerable and how diagnostic protocols must adapt to prevent chronicity.

4.1. Epidemiological Evolution and Demographic Trends

The significant decrease in the incidence of inflammatory processes of the maxillary sinus observed in our data—from 5.54% in 2018 to 1.19% in 2025 ($t=14.64$; $p<0.001$)—reflects a positive trend in the prevention and management of oral complications within the OMF department.

 doi:10.20944/preprints202603.2062.v1

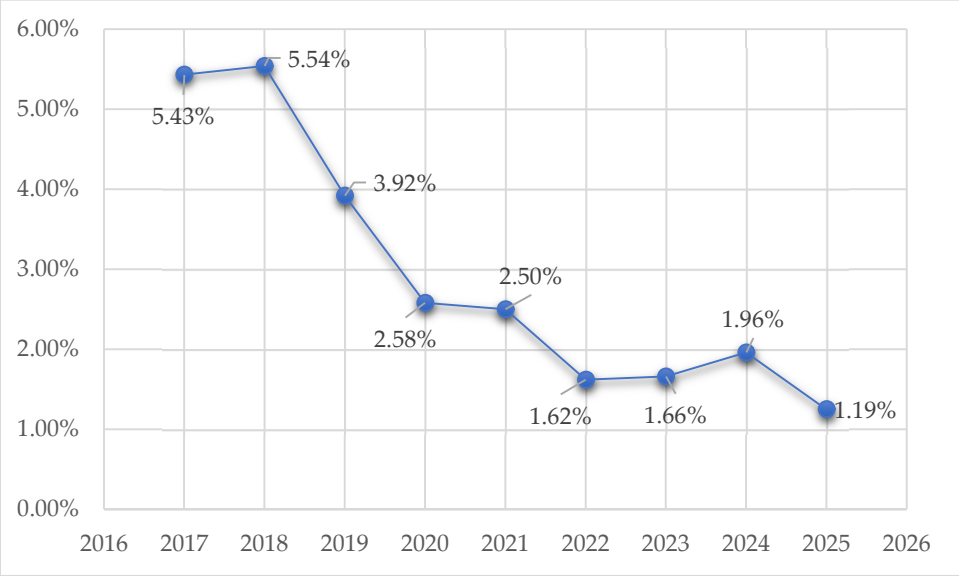

Figure 3. Evolutionary trend of maxillary sinus inflammatory processes incidence at the OMF Surgery Department (2017–2025).

Regarding gender distribution, our study recorded a notable female prevalence (67.75%), aligning with reports by Sencu, who suggests that women undergo dental surgical maneuvers more frequently [1,15,16]. However, this remains a point of academic debate, as other literature indicates a slight male predilection with a ratio of 1:1.52 [27], suggesting that local health-seeking behaviors and gender-specific bone density patterns may influence these statistics.

4.2. Socio-Economic Determinants of Dental Morbidity

A notable finding of this study is the association between socioeconomic factors and the risk of oroantral communication (OAC). Our data indicate that 87.1% of patients originated from urban areas, which may reflect greater access to specialized dental services compared with rural regions [18,31].

In addition, our findings suggest a relationship between financial constraints and dental morbidity. Previous studies have reported that lower educational levels and economic pressures are associated with reduced tooth retention [19]. Although 83.87% of the patients in our cohort had completed formal education, the financial demands associated with larger families (71% of patients had children) may influence both the timing and quality of dental care.

Delayed treatment frequently results in the extraction of severely compromised posterior maxillary teeth (“sinus teeth”), increasing the risk of accidental perforation of the sinus floor during surgical procedures.

4.3. The “Sinus Tooth” Concept and Anatomical Risk

The anatomical proximity of the maxillary sinus floor to the posterior maxillary teeth remains the primary risk factor for the development of oroantral communication. In our study, the first molar was identified as the most frequent causal tooth (45.16%), confirming the hierarchy of “sinus teeth” (6, 7, 5, 8, 4, 3) described by Topalo [1].

The predominance of molars (83.88%) compared with premolars (16.12%) ($t = 6.37$; $p < 0.001$) highlights the vulnerability of the posterior maxillary region, where low bone density (D3/D4) and sinus pneumatization are most pronounced [34]. These findings are consistent with previous studies demonstrating that the roots of maxillary molars and premolars are often separated from the sinus floor by a thin bony plate or may even protrude into the sinus cavity, significantly increasing the risk of oroantral communication following extraction [42].

 doi:10.20944/preprints202603.2062.v1

In these high-risk anatomical areas, pre-operative imaging—such as orthopantomography (OPG) or cone-beam computed tomography (CBCT)—plays a crucial role in assessing the thickness of the bone septa separating the oral cavity from the maxillary sinus and in reducing the risk of accidental oroantral communication [9]. In addition, recent studies highlight the value of computed tomography, which provides a more detailed evaluation of sinus floor integrity, detection of retained root fragments, and assessment of associated maxillary sinus pathology [43].

4.4. Transition to Chronicity: From OAC to OAF

The distinction between a primary oroantral communication (OAC) and a secondary oroantral fistula (OAF) represents an important clinical consideration supported by our findings. As reported by Timofeev (2007), an OAC typically persists as a simple communication for approximately 7–10 days before epithelialization leads to the formation of a chronic fistulous tract [40]. Other authors, including Szabo, suggest that this transition may occur even more rapidly, with epithelial migration beginning within 48–72 hours and complete epithelialization occurring by day 7–8 [36]. Recent studies further support this rapid progression, emphasizing that early epithelialization significantly increases the risk of chronic fistula formation if the communication is not managed promptly [44].

In our study, foreign bodies were detected in 9.68% of cases, a finding of particular clinical concern. The presence of root fragments or endodontic materials may prevent spontaneous closure and often requires immediate surgical intervention to avoid the development of chronic maxillary sinusitis. The extensive use of high-performance imaging in our protocol (93.55%) proved essential for the early detection of such complications, enabling timely management before the establishment of permanent pathological tracts.

5. Conclusions

The results of this study highlight the importance of early identification and prompt management of oroantral communications (OAC) following dental extractions in the posterior maxillary region. Our analysis of current literature suggests that evolving diagnostic methods are essential to address the limitations of traditional protocols and to resolve existing clinical challenges. The close anatomical relationship between the maxillary sinus and posterior teeth remains the principal risk factor, particularly in molar extractions where bone density is reduced and sinus pneumatization is common.

Effective diagnosis relies on a synergy between pre-operative radiographic evaluation and careful post-extraction clinical assessment, including meticulous exploration of the socket with a buttoned stylus and a gentle Valsalva maneuver. Early detection allows for immediate surgical management, which is vital to prevent maxillary sinus infection and the subsequent development of chronic, epithelialized oroantral fistulas.

Ultimately, the integration of systematic imaging protocols (OPG/CT) and standardized clinical examination in outpatient oral surgery will significantly improve patient outcomes and minimize long-term complications associated with accidental OAC.

5.1. Study Limitations

This study has several limitations. The relatively small sample size and the retrospective design may limit the generalizability of the results. Additionally, the data were collected from a single center, which may introduce selection bias. Further multicenter studies with larger patient cohorts are needed to confirm these findings.

Author Contributions: D.H. was responsible for data collection, clinical investigation, and surgical procedures. V.Cabac contributed to data collection and provided methodological supervision of the study. V.C. performed the data analysis and was primarily responsible for manuscript preparation and writing of the original draft. N.C. supervised the study and critically revised the manuscript. S.P. contributed to manuscript editing,

 doi:10.20944/preprints202603.2062.v1

correspondence, and final approval of the submitted version. All authors have read and agreed to the published version of the manuscript.

Funding: This research received no external funding.

Institutional Review Board Statement: The study was conducted in accordance with the Declaration of Helsinki and approved by the local Ethics Committee of the "Nicolae Testemițanu" State University of Medicine and Pharmacy (approval number not applicable due to retrospective anonymized data analysis).

Informed Consent Statement: Patient consent was waived by the Institutional Review Board due to the retrospective and anonymized nature of the study.

Data Availability Statement: The datasets used and analyzed during the current study are available from the corresponding author upon reasonable request, subject to privacy and ethical restrictions.

Conflicts of Interest: The authors declare no conflicts of interest.

Abbreviations

The following abbreviations are used in this manuscript:

OAC	Oroantral communication
OAF	Oroantral fistula
MS	Maxillary sinus
OMF	Oral and maxillofacial
OPG	Orthopantomography
CT	Computed tomography
CBCT	Cone-beam computed tomography
PA	Periapical radiography

References

1. Ababii, I.; Maniuc, M.; Sandul, A.; Popa, V.; Danilov, L.; Cabac, V.; Ababii, P.; Diacova, S.; Vetrician, S.; Gagauz, A.; et al. Otorinolaringologie; Centrul Editorial-Poligrafic „Medicina": Chişinău, Moldova, 2019; p. 430.
2. Azzouzi, A.; Hallab, L.; Chbicheb, S. Diagnosis and Management of oroantral fistula: Case series and review. Int. J. Surg. Case Rep. 2022, 97, 107436.
3. Fatani, B.; Fatani, A.; Alomar, A. Oroantral Communication and Fistula: A Review of the Literature. Saudi J. Oral Dent. Res. 2020, 5(12), 575–581.
4. Bolintineanu, S.; Monica, V.; Şişu, A.; Pop, E.; Roşu, L.; Stoican, L.; Pustai, A.; Matu, C.; Petrescu, C. Anatomia omului. Volumul VI: CAP ŞI GÂT, Revised Ed.; Editura „Victor Babeș": Timișoara, Romania, 2018; p. 32.
5. Bucur, A. Managementul afecțiunilor chirurgicale oro-maxilo-faciale; Editura Didactică și Pedagogică: București, Romania, 2012; p. 264.
6. Burlibaşa, C. Chirurgie orală şi maxilofacială; Editura Medicală: Bucureşti, Romania, 2007; pp. 653–697.
7. Bereczki-Temistocle, D.L.; Gurzu, S.; Jung, I.; Cosarca, A.; Beresescu, G.; Golu, V.; Petrovan, C.; Ormenisan, A. Selecting the Best Surgical Treatment Methods in Oroantral Communications. Int. J. Environ. Res. Public Health 2022, 19, 14543.
8. Cabac, V. Incidența sinuzitei cronice. In Analele ştiinţifice, Ediția XII-a, Volumul 4, Probleme clinico-chirurgicale; Zilele Universității: Chişinău, Moldova, 2011; pp. 285–289.
9. Chele, N.; Motelica, G.; Zănoagă, O.; Slabari, E. Extracția Dentară – Tehnici, Accidente și Complicații; Chișinău, Moldova, 2022; p. 188.
10. Chouikh, F.; Dierks, E.J. The Buccal Fat Pad Flap. Oral Maxillofac. Surg. Clin. 2021, 33, 177–184.
11. Duzh, A.N.; Aliamovskii, V.V.; Sokolova, O.R. Influence of oral health literacy of parents on the dental status of children. J. New Med. Technol. 2019, 5, 66–71.
12. Ionescu, E. Manual pentru Rezidențiat. In: Stomatologie vol.2; Editura Universitară "Carol Davila": București, Romania, 2021; pp. 623–625.

 doi:10.20944/preprints202603.2062.v1

13. Fronie, A. Curs de chirurgie maxilo-facială: traumatismele și supurațiile în regiunea OMF; Craiova, Romania, 2014; pp. 193–199.
14. Gundy, S. Etiology and Management of Oroantral Fistula. Ann. Otolaryngol. Rhinol. 2016, 3(7), 1122.
15. Hîțu, D. Sinuzita Maxilară Odontogenă Perforativă. Med. Stomatol. 2014, 20–27.
16. Hîțu, D. Oroantral communication (Theoretical course). Med. Stomatol. 2014, 3(32), 103–107.
17. Hîțu, D.; Chele, N.; Cabac, V.; Mighic, A.; Bădărău, L. Maxillary Sinusitis of Odontogenic Origin. Eur. Online J. Complement. Altern. Med. 2021, 6(1).
18. Hîțu, D.; Chele, N.; Șcerbatiuc, D.; Cabac, V.; Bădărău, L.; Mogîldea, M. Maxillary sinusitis of tumor origin. Bull. Acad. Sci. Mold. Med. Sci. 2021, 1(29), 148–154.
19. Jalilova, G.I. Socio-demographic status of patient with secondary partial edentulism. Bull. Contemp. Clin. Med. 2020, 13(1), 22–26.
20. Khandelwal, P.; Hajira, N. Management of Oroantral Communication and Fistula: Various Surgical Options. World J. Plast. Surg. 2017, 6(1), 3–8.
21. Mighic, A.; Sîrbu, D.; Ghețiu, A.; Țiple, T. Treatment of Maxillary Sinusitis of odontogenic origin. Med. Stomatol. 2019, 36.
22. Martu, C.; Martu, M.-A.; Maftei, G.-A.; Diaconu-Popa, D.A.; Radulescu, L. Odontogenic Sinusitis: From Diagnosis to Treatment Possibilities—A Narrative Review of Recent Data. Diagnostics 2022, 12, 1600.
23. Negru, N.; Hîțu, D.; Zugrav, V.; Carajeleascov, V.; Juc, D.; Gatman, D. Management of oro-maxillofacial conditions associated with endocrine pathologies in outpatient surgery. Rev. Sci. Health Mold. 2022, 29(3), 519.
24. Nistor, A.M.; Diaconeasa, M.A.; Julea, I.; Nicoale, T.; Cuculici, G.P.; Ghiorghiu, A. Manual de chirurgie orală, anatomie, patologie și tehnici chirurgicale; București, Romania, 2017.
25. Parvini, P.; Obreja, K.; Begic, A.; Schwarz, F.; Becker, J.; Sader, R.; Salti, L. Decision-making in closure of oroantral communication and fistula. Int. J. Implant Dent. 2019, 5, 13.
26. Pawlik, P.; Stanek, A.; Wyganowska-Świątkowska, M.; Błochowiak, K. The epidemiological pattern of oroantral communication – a retrospective study. Eur. J. Clin. Exp. Med. 2019, 17(1), 38–44.
27. Shahrour, R.; Shah, P.; Withana, T.; Jung, J.; Syed, A.Z. Oroantral communication, its causes, complications, treatments and radiographic features: A pictorial review. Imaging Sci. Dent. 2021, 51, 307–311.
28. Resende, R.; et al. Oroantral communication closure through Bichat ball technique: A literature review. Braz. J. Surg. Clin. Res. 2018, 23(1), 97–99.
29. Sencu, E.; Enachi, V.; Cernei, V. Epidemiological, bacteriological and clinical conditions in odontogenic maxillary sinusitis. Arta Med. 2020, 14–18.
30. Salian, K.K.K.; Eachempati, P.; Kumbargere, N.S.; Shetty, N.; Soe, M.; Aggarwal, H.; Mathew, R.J. Interventions for treating oroantral communications and fistulae due to dental procedures. Cochrane Database Syst. Rev. 2018, 8, CD011784.
31. Saibene, A.M.; Pipolo, C.; Borloni, R.; Felisati, G. ENT and dentist cooperation in the management of odontogenic sinusitis. A review. Acta Otorhinolaryngol. Ital. 2021, 41, S116.
32. Timoşca, G.; Burlibaşa, C. Chirurgie oro-maxilofacială; Universitas: Chişinău, Moldova, 1992; pp. 265–298.
33. Topalo, V.; Atamni, F.; Sîrbu, D.; Gumeniuc, A.; Dobrovolschi, O.; Suharschi, I. Maxillary sinus floor elevation via crestal approach with simultaneous dental implant installation. Bull. Acad. Sci. Mold. 2008, 2(16), 90–94.
34. Tintiuc, D.; Negară, A.; Grejdian, T.; Blaja-Lisnic, N.; Celac, A.; Marjine, L.; Lavric, A.; Bădan, V. Opinions regarding the lifestyle and health status of long-lived people. Bull. Acad. Sci. Mold. Med. Sci. 2011, 2(30), 212–215.
35. Ebenezer, V.; Balakrishnan; Rakeshmohan; Asir, V.D. Management Of Oro Antral Communication: A Review. Eur. J. Mol. Clin. Med. 2020, 7(2), 6382.
36. Afanasyev, V.V.; et al. Surgical Stomatology; Moscow, Russia, 2019; p. 398.
37. Bernadskiy, Y.I. Fundamentals of Surgical Stomatology; Medical Literature: Moscow, Russia, 2003; pp. 58–60, 160–162.
38. Kruchinskiy, G.V.; Filippenko, V.I. Odontogenic Maxillary Sinusitis; Vysheyshaya Shkola: Minsk, Belarus, 1991; p. 167.

 doi:10.20944/preprints202603.2062.v1

39. Mukhin, P.N. Plastic surgery of oroantral communication. Ph.D. Thesis Abstract, Moscow, Russia, 2012; p. 2.
40. Timofeev, A. Fundamentals of Maxillofacial Surgery and Surgical Stomatology; Medical Information Agency: Moscow, Russia, 2007; pp. 274–293.
41. Exodontia.info. Oroantral Communication. Available online: www.exodontia.info (accessed on 16 March 2026).
42. Alomari, F.; Kota, M.Z.; Khan, A.A.G.; Alshowail, L.Y.M.; Alamer, S.S.; Alshahrani, S.A.; Alasmari, N.A.; Alwan, S.H.H.; Alqahtani, A.M. Oroantral communication and fistula: Diagnosis and management. *Saudi Dent. J.* 2025, 37, 59. https://doi.org/10.1007/s44445-025-00065-4
43. Oliva, S.; Lorusso, F.; Scarano, A.; D'Amario, M.; Murmura, G. Imaging in oroantral communication and fistula: Diagnostic considerations. *Dent. J. (Basel)* 2024, 12, 147. https://doi.org/10.3390/dj12050147
44. Verma, R.R.; Verma, R. Oro-Antral Fistulas and Their Management: Our Experience. *Indian J. Otolaryngol. Head Neck Surg.* 2021, 74 (Suppl 2), 1576–1583. https://doi.org/10.1007/s12070-021-02739-x