

Odontogenic Maxillary Sinusitis: A Multidisciplinary Approach

¹Dr. Harshini Ganesan, ²Dr. Dinakar. J, ³Dr. Gowri. S, ⁴Dr D Swathi, ⁵Dr. A. Arun Prasath

¹Senior lecturer, Dept. of Oral pathology and Microbiology, Sri Ramakrishna Dental college and Hospital, Coimbatore, Tamil Nadu, India.

²Principal, Sri Ramakrishna Dental college and Hospital, Dept. of Oral Pathology and Microbiology, Coimbatore, Tamil Nadu, India.

³Professor and HOD, Dept. of Oral Pathology and Microbiology, Sri Ramakrishna Dental college and Hospital, Coimbatore, Tamil Nadu, India.

^{4,5}Senior lecturer, Oral medicine and Radiology, Sri Ramakrishna Dental College and Hospital, Coimbatore, Tamil Nadu, India.

Citation of this Article: Dr. Harshini Ganesan, Dr. Dinakar. J, Dr. Gowri. S, Dr D Swathi, Dr. A. Arun Prasath, "Odontogenic Maxillary Sinusitis: A Multidisciplinary Approach" IJDSR – June – 2026, Vol. – 8, Issue - 3, Page No. 61-66.

Copyright: © 2026, Dr. Harshini Ganesan, et al. This is an open access journal and article distributed under the terms of the creative common attribution noncommercial License. This allows others to remix, tweak, and build upon the work non commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.

Corresponding Author: Dr. Harshini Ganesan, Senior lecturer, Dept. of Oral pathology and Microbiology, Sri Ramakrishna Dental college and Hospital, Coimbatore, Tamil Nadu, India.

Type of Publication: A Review Article

Conflicts of Interest: Nil

ABSTRACT

Background

Odontogenic maxillary sinusitis (OMS) is inflammation of the maxillary sinus secondary to dental infection or iatrogenic dental causes. OMS is increasingly recognized as a major aetiology of unilateral maxillary sinusitis, yet it remains underdiagnosed because clinical symptoms overlap with rhinogenic rhinosinusitis. ¹

Objective

To review current evidence on OMS pathogenesis, diagnostic methods, multidisciplinary management, clinical complications, and strategies to standardize diagnosis and treatment.

Methods

A narrative review was prepared focusing on PubMed-indexed consensus statements, systematic reviews, and recent clinical literature addressing OMS epidemiology, microbiology, imaging, and management pathways.

Results

OMS most commonly arises from periapical and periodontal infections, extractions, implants, and sinus augmentation procedures.^{2,3,8} Diagnosis requires integration of dental examination, nasal endoscopy, and imaging, with cone beam computed tomography (CBCT) providing high diagnostic yield for odontogenic foci.^{3,8} Successful treatment depends on elimination of the dental source combined with restoration of sinus drainage; many patients benefit from coordinated dental treatment and endoscopic sinus surgery (ESS).¹

Conclusion

OMS should be considered in all cases of unilateral or treatment-resistant maxillary sinusitis. Multidisciplinary protocols and standardized diagnostic criteria improve outcomes and reduce recurrence.^{1,3}

Keywords

Odontogenic sinusitis; Maxillary sinusitis; CBCT; Endoscopic sinus surgery; Oroantral fistula; Dental implants; Multidisciplinary care.

INTRODUCTION

Maxillary sinusitis of odontogenic origin represents a distinct clinical entity in which inflammatory disease of the maxillary sinus is initiated and maintained by dental infection or iatrogenic dental pathology.¹ In contemporary practice, OMS accounts for a substantial proportion of unilateral maxillary sinusitis and is increasingly recognized by both dental and otolaryngology specialties.¹⁻³ Despite this recognition, OMS remains underdiagnosed because symptoms overlap with rhinogenic rhinosinusitis and dental symptoms may be absent or subtle.^{1,3} Failure to identify the dental focus can lead to prolonged

disease, repeated antibiotic courses, and recurrence after sinonasal surgery.²

A multidisciplinary approach involving dental specialists and otolaryngologists is increasingly recommended.^{2,3} Recent consensus statements emphasize standardized diagnostic criteria and coordinated treatment planning to improve outcomes and reduce recurrence.^{1,3,8}

ETIOLOGY AND PATHOGENESIS: FROM DENTAL LESIONS TO SINUS INFECTION

The anatomical proximity of maxillary posterior teeth to the sinus floor provides a direct pathway for odontogenic infection to extend into the sinus cavity.² Periapical pathology of molars and premolars, advanced periodontal disease, and endodontic failure are frequent non-iatrogenic causes of OMS.^{2,6} Iatrogenic causes include extractions, dental implants, sinus lift procedures, and displacement of dental materials into the sinus.^{1,5,8}

Microbiologically, OMS differs from rhinogenic sinusitis because it is commonly polymicrobial with a predominance of anaerobic oral flora.^{2,3,6} This has implications for antibiotic selection and explains why standard regimens used for rhinogenic sinusitis may be ineffective when the odontogenic source is not eliminated.^{2,3,6,8}

MULTIDISCIPLINARY MANAGEMENT BETWEEN DENTAL AND OTOLARYNGOLOGY SERVICES

OMS is best managed through collaborative pathways between dentistry and otolaryngology.¹⁻³ Dental specialists are responsible for identifying and eliminating odontogenic sources through endodontic therapy, extraction of non-restorable teeth, periodontal treatment, and closure of oroantral communication or

fistula (OAC/OAF).¹⁻³ Otolaryngologists contribute by evaluating sinonasal anatomy, assessing the osteomata complex, and restoring sinus ventilation through ESS when indicated.^{1,3,4}

Evidence from multidisciplinary protocols suggests that coordinated management reduces recurrence and improves symptom resolution, particularly in chronic or refractory cases.^{2,3} the treatment sequence is individualized and depends on the severity of sinus obstruction, the dental aetiology, and the presence of complications such as OAF or foreign bodies.^{1,3,5}

CLINICAL MISDIAGNOSIS AND DIAGNOSTIC PITFALLS

Misdiagnosis is a central clinical problem in OMS. Many cases are initially labelled as chronic rhinosinusitis because patients present with nonspecific symptoms such as unilateral nasal obstruction, facial pressure, postnasal drip, purulent

discharge, and halitosis.¹⁻³ the absence of toothache is a frequent diagnostic trap; periapical lesions may remain clinically silent for prolonged periods, and chronic periodontal infection may not be perceived as painful by the patient.^{2,6}

OMS should be suspected in unilateral disease that is recurrent, refractory to antibiotics, or persists after ESS.^{1,3} Failure to evaluate the dental etiology can lead to repeated medical therapy with only transient improvement. Another pitfall is reliance on panoramic radiographs alone, which may miss subtle periapical disease or sinus floor defects.^{2,3}

Table 1: Clinical and Radiologic Features Differentiating Rhinogenic Maxillary Sinusitis from Oms

Laterality	Often bilateral/diffuse; may involve multiple sinuses	Typically unilateral maxillary disease; may extend to ethmoid/frontal
Common history	URTI, allergic rhinitis, nasal polyposis, anatomical obstruction	Caries, failed endodontics, periodontal disease, extraction, implant, sinus lift, foreign body
Dental symptoms	Absent	Often absent; toothache not required
Nasal discharge	Mucous/purulent; usually not foul	Purulent discharge common; foul odour suggestive
Response to antibiotics alone	Partial/temporary	Poor/transient without source control
Endoscopy findings	Diffuse oedema; polyps may be present	Unilateral purulence from middle meatus
Imaging pattern (CT/CBCT)	Diffuse mucosal thickening; OMC obstruction	Opacification adjacent to diseased tooth; periapical lesion, bone loss, sinus floor discontinuity, OAC/OAF
Definitive treatment	Medical ± ESS	Dental source control + ESS when indicated
Recurrence after ESS if source untreated	Less typical	Common

CLINICAL DIAGNOSTIC METHODS

Accurate diagnosis requires integration of clinical history, dental examination, nasal endoscopy, and imaging.^{1,3,5} A detailed history should include prior endodontic therapy, recent extraction of maxillary posterior teeth, dental implants, and sinus augmentation procedures.^{1,3,5} Clinically, OMS frequently presents as unilateral disease; bilateral sinusitis is less common and should prompt consideration of alternative etiologist.^{2,3}

Dental examination should include inspection for caries, defective restorations, periodontal probing, mobility assessment, and pulp vitality testing. Percussion tenderness and localized vestibular swelling may suggest periapical infection. Evaluation for OAC/OAF is critical after extraction or implant surgery.^{2,5,6}

ENT examination includes nasal endoscopy to assess purulence in the middle meatus, mucosal oedema, and obstruction of the osteomata complex. Endoscopy helps guide medical therapy and surgical planning but cannot by itself identify the odontogenic source.^{1,3}

Cross-sectional imaging is essential. CBCT is increasingly considered the imaging modality of choice in dental practice because it provides high-resolution visualization of periapical lesions, periodontal bone loss, sinus floor discontinuity, OAC/OAF, and foreign bodies.^{2,3,8} Conventional CT of the paranasal sinuses remains the standard in ENT practice for mapping sinus involvement and assessing extension beyond the maxillary sinus.^{1,3}

CLINICAL COMPLICATIONS AND DISEASE PROGRESSION

OMS is not a benign condition. Persistent infection may lead to chronic maxillary sinusitis with mucosal remodelling, polypoid degeneration, and impaired mucociliary clearance.²⁻⁴ In chronic cases, osteitis of the sinus wall may occur, contributing to refractory disease and reduced responsiveness to medical therapy.^{2,4}

OMS can extend beyond the maxillary sinus through the osteomata complex, resulting in ethmoid involvement and, less commonly, frontal or sphenoid sinus disease.^{2,3} This pattern is clinically important because it may mimic primary chronic rhinosinusitis and increases surgical complexity.^{2,3}

OAC and OAF represent major complications, most commonly after extraction of maxillary molars or following sinus lift procedures.^{3,5} These defects allow continuous contamination of the sinus with oral flora and are strongly associated with chronicity and recurrence unless surgically repaired.^{3,5}

Implant-related OMS may occur due to Schneiderian membrane perforation, graft infection, implant protrusion into the sinus, or foreign body reaction.^{1,5} Such cases often require combined dental management and ESS, and early diagnosis is associated with better outcomes.^{1,5}

Severe complications are rare but potentially life-threatening, including orbital cellulitis, cavernous sinus thrombosis, intracranial spread, and osteomyelitis.^{2,3} These events emphasize the importance of early recognition and definitive source control.^{2,3}

TREATMENT STRATEGIES AND STANDARDIZATION

Effective OMS therapy requires elimination of the odontogenic source combined with restoration of

sinus drainage.^{1-3,5,6} Dental source control may include endodontic retreatment, extraction, periodontal therapy, and closure of OAC/OAF.^{1-3,5,6} Adjunctive pharmacotherapy may include antibiotics targeting oral anaerobes and aerobes, saline irrigation, and intranasal corticosteroids when indicated; however, antibiotics alone rarely provide durable cure without dental intervention.^{2,3}

ESS is indicated when there is obstruction of the osteomata complex, chronic mucosal disease, spread beyond the maxillary sinus, retained foreign bodies, or failure of dental treatment alone.^{1,3,4} Multidisciplinary consensus statements recommend individualized sequencing: in mild cases with patent drainage, dental therapy may be performed first; in advanced disease with significant obstruction, combined or staged dental treatment and ESS is often necessary.^{1,3,4,8}

Standardization of OMS diagnosis and management is increasingly advocated.^{1,3} Proposed criteria include unilateral maxillary sinusitis on imaging, a clear odontogenic source, and temporal or anatomical correlation between the dental lesion and sinus inflammation. Implementation of shared referral pathways and combined case discussions improves diagnostic accuracy and reduces recurrence.^{1,3}

FUTURE DIRECTIONS

Future progress in OMS management is expected through improved interdisciplinary referral pathways, earlier use of CBCT in suspected cases, and development of validated clinical scoring systems that integrate dental and sinus findings.^{1,3,8} Microbiome-based characterization and targeted antimicrobial strategies may improve treatment personalization. Large multicentre studies remain necessary to define

optimal sequencing of dental and ESS interventions and to establish standardized reporting outcomes.^{1,3}

CONCLUSION

Odontogenic maxillary sinusitis is a distinct and increasingly recognized cause of unilateral maxillary sinusitis.^{1,8} Misdiagnosis remains common due to symptom overlap with rhinogenic disease and frequent absence of dental pain.^{1,3} Accurate diagnosis depends on integration of dental and ENT evaluation, with CBCT providing high diagnostic yield for odontogenic pathology.^{3,8} Definitive management requires elimination of the dental source and, when indicated, endoscopic restoration of sinus drainage.^{1,3,4} Standardized multidisciplinary protocols improve outcomes and reduce recurrence.^{1,3}

REFERENCES

1. Lin J, Wang C, Wang X, et al. Expert consensus on odontogenic maxillary sinusitis multidisciplinary treatment. *Int J Oral Sci.* 2024; 16:11.
2. Psillas G, Papaioannou D, Petsali S, Dimas GG, Constantinidis J. Odontogenic maxillary sinusitis: A comprehensive review. *J Dent Sci.* 2021;16(1):474-481.
3. Craig JR, Tataryn RW, Aghaloo TL, et al. Management of odontogenic sinusitis: multidisciplinary consensus statement. *Int Forum Allergy Rhinol.* 2020;10(7):901-912.
4. Fadda GL, Rosso S, Aversa S, et al. Multiprofessional approach in odontogenic sinusitis: a retrospective study and proposal of a management protocol. *Acta Otorhinolaryngol Ital.* 2016;36(4):304-310.
5. Alrmali AE, Wang HL. Dental pathophysiology of odontogenic sinusitis: Oral surgical

- complications. *Otolaryngol Clin North Am.* 2024;57(6):977-989.
6. Silva EJM, Pinto KP, Versiani MA, Sassone LM. Dental pathophysiology of odontogenic sinusitis: Endodontic infections. *Otolaryngol Clin North Am.* 2024;57(6):941-955.
7. Zirk M, Dreiseidler T, Pohl M, et al. Odontogenic sinusitis maxillaris: A retrospective study of 121 cases with surgical intervention. *J Craniomaxillofac Surg.* 2017;45(4):520-525.
8. Ünver T, Alagöz E, Yalın MH, et al. CBCT-based differentiation of odontogenic and non-odontogenic maxillary sinus pathology: A retrospective imaging study. *Dentomaxillofac Radiol.* 2025.