

## Causes, Clinical Manifestations and Treatment Outcome of Maxillary Sinusitis of Dental Origin

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**ABSTRACT:** **OBJECTIVE :** The objective of the study is to find out the common causes, clinical manifestations and treatment outcome of maxillary sinusitis of dental origin in our region. **STUDY DESIGN:** Non-interventional, prospective and descriptive study. **PLACE AND DURATION OF STUDY:** This study was conducted at the departments of ENT, head & neck surgery of Dow University of Health Sciences and Civil Hospital Karachi, Hamdard University Hospital and Liaquat National Hospital, Karachi, over a period of two years from January 2011 to December 2012. **PATIENTS AND METHODS:** A total of 195 patients of chronic sinusitis were seen in the above centers during this period. Out of these, 18 patients were included in this study who were primarily sinusitis due to odontogenic cause. So the incidence of odontogenic sinusitis was found to be 18/195 or 9.2% in this study. **RESULTS:** There were 11 male and 7 female patients (1.6:1) with mean age incidence of 41.23 years ( $\pm$  3.4 years). Unilateral purulent or mucopurulent rhinorrhoea was the most common symptom in this series (13 patients or 76.5%). The most common odontogenic cause for sinusitis was found to be use of different dental implants (6 patients or 33.3%). Involvement of one sided maxillary sinus alone was seen in 13 out of 18 patients (72.2%). The most common tooth responsible for sinusitis was the 2nd molar tooth (8/18 or 44.5%). Endonasal endoscopic sinus surgery was found to be curative in 10 out of 18 patients (55.5%).

**Key Words :** Maxillary sinusitis, Dental root infection, Sinusitis of dental origin, Iatrogenic sinusitis.

**INTRODUCTION:** The origin of sinusitis is considered to be primarily of nasal or sinus origin but in some cases it could be of dental origin. Sinusitis with an odontogenic source accounts for 5-12% of all cases of maxillary sinusitis<sup>1,2,3</sup>. Sinusitis due to dental pathology occurs when the Schneiderian membrane is perforated as it can happen in patients with dental caries, dental trauma, placement of dental implants and tooth extraction<sup>4</sup>. Although odontogenic sinusitis is a relatively common condition, its pathogenesis is not clearly understood and there is lack of consensus concerning its clinical features, treatment, and prevention. An odontogenic source should be considered in patients with a history of dental pain or recent oral surgery and those with extended unilateral sinusitis or unilateral sinusitis resistant to conventional treatment<sup>5</sup>. The treatment of odontogenic sinusitis often requires management of the sinusitis as well as the treatment of primary dental pathology. Literature search in local journal revealed that very little work has been done on this important and relatively common condition. The purpose of this study is to determine the common causes of odontogenic maxillary sinusitis in our local setup. In addition to find out common clinical manifestations and the outcome of this condition after treating with the available modalities of treatment in our setup.

**PATIENTS AND METHODS:** This was a multicentric study, conducted at the departments of Ear, Nose, Throat, Head & Neck Surgery, Dow University of Health Sciences and Civil Hospital Karachi, Hamdard University Hospital and Liaquat National Hospital Karachi. This study was

conducted over a period of two years from January 2011 to December 2012. Inclusion criteria included all consecutive patients coming in these departments who have the diagnosis of chronic sinusitis of dental origin. Exclusion criteria included patients with concomitant nasal allergy, nasal polyp, deviated nasal septum or any growth in the nose, nasopharynx or paranasal sinuses. A detailed history was taken and a thorough ENT clinical examination was done in all the patients who have the provisional diagnosis of chronic sinusitis. History of any dental treatment was specifically asked and detailed clinical examination of the teeth was done in all the cases for any dental pathology. Routine baseline investigations, OPG and CT scan was done in all these cases. Diagnosis of sinusitis due to dental origin was made after this protocol and taking into consideration whether the patient fits in any of the exclusion criteria, remaining patients were included in the study. A total of 195 cases of chronic rhinosinusitis were seen during

Symptoms	No. of patients	Percentage
Unilateral purulent or mucopurulent rhinorrhoea	13	72.2
Nasal obstruction (mainly unilateral)	9	50.0
Offensive odor or smell from the nose or mouth	6	33.3
Unilateral facial pain	5	27.7
Swelling at upper gingival region	4	22.2
Post-nasal dripping	3	16.6
Pain in the region of upper teeth	3	16.6
Fever	1	5.5

Table 1 : Clinical presentation or symptoms of the patients.

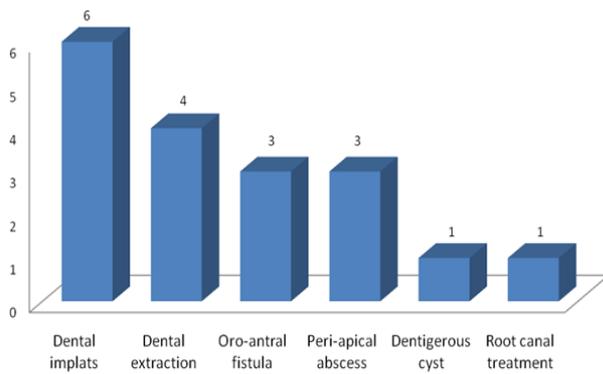


Fig 1 : Different causes of dental pathologies leading to sinusitis

the above mentioned period and out of these, 23 patients were diagnosed as sinusitis of dental origin after thorough history, clinical examination and investigations. Five patients out of 23 were excluded from the study because of nasal allergy (2 patients), nasal polyp (1 patient) and gross deviated nasal septum with spur (2 patients). So 18 patients were finally included in this study. All these patients were treated for the sinus disease as well as for dental disease. Sinus disease was dealt by the authors and for dental disease all patients were referred to the dental surgeon.

**RESULTS:** A total of 195 patients of chronic sinusitis were seen during this period and 18 patients were finally included in the study who were diagnosed as sinusitis due to dental pathology. So the incidence of sinusitis due to dental origin was found to be 18/195 or 9.2%. Out of the total 18 patients, there were 11 males and 7 female patients with male to female ratio of 1.6:1. The age ranges from youngest of 17 years and oldest of 58 years with mean age incidence of 41.23 years ( $\pm$  3.4 years). Table 1 shows the presenting and associated symptoms, where all of the symptoms are unilateral, limited to the site of dental pathology. Unilateral and purulent rhinorrhoea was the most common symptom in 13 patients (72.2%) out of total 18 patients. Second most common symptom was nasal obstruction which was mainly unilateral in 9 patients (50%). Fig. 1 depicts the different causes of dental pathologies, where dental implant related sinusitis was the most common cause and found in 6 patients (33.3%). The involvement of different sinuses as assessed by CT scan showed maxillary sinus alone in 13 patients (72.2%). Maxillary sinus along with ethmoidal sinuses of same side in 3 patients (16.6%), maxillary sinus along with ethmoidal and frontal sinuses in 1 patient (5.5%) and involvement of all the sinuses on one side in 1 patient (5.5%). Different teeth of the upper jaw can lead to sinusitis depending on its proximity to the maxillary sinus. In our series most commonly involved tooth was 2nd molar in 8 patients (44.4%). The other involved teeth are, 1st molar in 5 patients (27.7%), both 1st and 2nd molar in 2 patients (11.1%), 3rd molar in 1 patient (5.5%), 2nd premolar in 1 patient (5.5%) and both 2nd premolar and 1st molar in 1 patient (5.5%). Fig. 2 shows different treatment options employed in this series. In all these cases treatment of the dental pathology was dealt by the dental

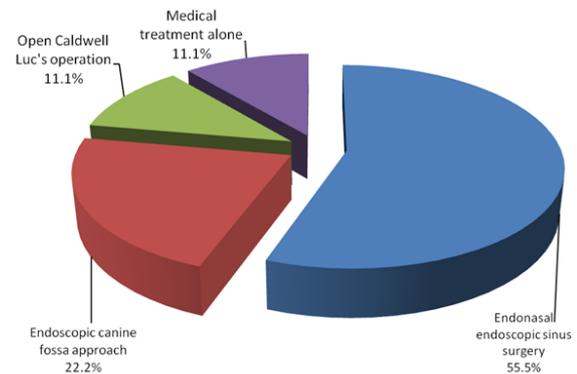


Fig 2 : Treatment modalities used for sinus diseases.

surgeon. For treatment of the sinus disease, endonasal endoscopic sinus surgery was done in 10 patients (55.5%), endoscopic canine fossa approach was utilized in 4 patients (22.2%), open Caldwell Luc's operation in 2 patients (11.1%) and medical treatment alone was given in 2 patients (11.1%). In three cases of oro-antral fistula closure of the fistula was done by local mucosal flap at the same time of surgery. All these patients were followed up for a period of two months to six months where all the patients were cured by the treatment. Revision surgery was not required in any of the case in this series. **DISCUSSION:** Frequency of maxillary sinusitis due to odontogenic origin is often under estimated<sup>6</sup>. Proper examination and investigations should be done to rule out dental origin specially in cases of unilateral sinusitis. Normally the roots of the maxillary premolar and molar teeth are separated from the sinus floor by a dense cortical bone with a variable thickness, but sometimes they are separated only by the mucoperiosteum. Clearly, this anatomical layout can explain the source and development of an inflammatory process. The otolaryngologist should suspect an odontogenic etiology of purulent chronic maxillary sinusitis in patients failing to improve with antibiotics, regardless of a negative dental workup<sup>10</sup>. In our series, overall incidence of sinusitis of dental origin was found to be 18/195 (9.2%). Male to female ratio in the present study is higher (1.6:1), which is similar to a previous study<sup>3</sup> but in contrast to another study<sup>2</sup>. With increasing awareness of odontogenic maxillary sinusitis, it is advised that CT scans should be reviewed carefully for the presence of periapical abscess and dental pathology. Unrecognized periapical abscess is often a cause of endoscopic sinus surgery failure and the radiological report frequently fail to note the periapical infection. Periapical abscess is sometimes difficult to recognize only with dental x-rays and examination. In patients with maxillary sinus disease, the teeth should be specifically examined as part of the radiological workup<sup>9</sup>. Dental pathology causing sinusitis is frequently missed on plain dental X-rays and CT scan reports. Dental pain and foul-smelling nasal discharge are present in less than one-half of patients and symptoms commonly persist for years. There must be a high index of suspicion for an odontogenic cause, in refractory maxillary sinusitis<sup>11</sup>. The tooth most frequently involved is the upper first molar, followed by the second molar

and second premolar<sup>12</sup>. In our series most commonly tooth responsible for maxillary sinusitis is 2nd molar (44.5%) followed by 1st molar (27.5%) and both 1st and 2nd molar in 11.1%, while the other teeth involvement is much less. In our series most common cause for sinus involvement due to dental pathology is found to be dental implant related complications. This is followed by dental extraction without oro-antral fistula. Oro-antral fistula is often a common cause of maxillary sinusitis and can account for upto 60% of the cases<sup>14</sup>. In our series there are only three cases of oro-antral fistula out of total 18 cases (16.6%). Successful closure of oro-antral fistula equally depends on complete elimination of sinus infection, excision of fistulous tract and proper post operative care<sup>13</sup>. Periapical abscess is the cause for sinusitis in three cases while dentigerous cyst is the cause in only one patient. The low incidence of sinusitis concerning cysts is mainly due to the fact that during their development, they push the sinus structures causing them no damage unless an infection accounts or the ostium obstructs preventing the natural drainage of the sinus. Sometimes excision of the cyst also causes oro-antral fistula formation leading to maxillary sinusitis. In two patients of this series, only medical treatment for the sinusitis was successful along with the treatment of his dental pathology by the dentist. Both of these patients have periapical abscess. While rest of the 16 patients required surgical treatment for the sinusitis. Endonasal endoscopic sinus surgery in the form of widening of the maxillary ostium along with clearance of disease from the ethmoid was successful in 10 patients. An endoscopic technique could be successfully used in patients with oroantral fistula causing chronic maxillary sinusitis of dental origin, instead of the Caldwell-Luc procedure<sup>7</sup>. Caldwell-Luc approach for the retrieval of a displaced root from the maxillary sinus is a safe, simple, and fast method with minimal complications<sup>8</sup>. We used endoscopic canine fossa approach to clear disease from the maxillary sinus in four patients. Open Caldwell Luc's operation was required in only two cases, both were having oro-antral fistula.

**CONCLUSION :** Among the different causes of sinusitis, dental pathology is often a cause and it should be suspected especially in refractory cases of sinusitis. In our series it was present in 9.2% of the cases of chronic rhino-sinusitis.

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