Ectopic Teeth in the Maxillary Sinus: A Case Report and Literature Review

Abstract
Ectopic eruption of teeth is a rare phenomenon although there have been reports of teeth in the nasal septum, mandibular condyle, and maxillary sinus. This impaction can present itself in a variety of ways such as chronic or recurrent sinusitis, sepsis, and facial numbness and can also be asymptomatic. The aim of this study was to describe, by means of research literature and by a case report, the characteristics and occurrence of ectopic eruption in the maxillary sinus. We have analyzed and compared clinical cases of ectopic teeth in the maxillary sinus with a search on PubMed utilizing keywords such as “ectopic,” “teeth,” “sinus,” “maxillary,” and Boolean operators “or” and “and” up until 2016. Fifty-one cases were found, of which 53% were female. The age ranged between 3 and 72 years, with an average age of 28.36 years. The higher prevalence of ectopic teeth is the 3rd molars. Ten of these teeth are associated with a dentigerous cyst, 1 by an osteoma, and 2 by soft tissue. Standard treatment for an ectopic tooth is extraction, but for other patients, treatment of choice in asymptomatic ectopic tooth cases is continued observation. Ectopic teeth tend to form a cyst or tumor if not managed.

Keywords: Cone-beam computerized tomography, ectopic teeth, maxillary sinus

Introduction
Tooth eruption is a process whereby the forming tooth migrates from its intraosseous location in the jaw to its functional position within the oral cavity.[1] The correct development of teething, the right place at the right time, involves many interacting cellular and molecular processes:[2] a complicated multistep interaction between the oral epithelium and the underlying mesenchymal tissue.[3]

Before permanent teeth erupt into the oral cavity, they move through the bone along their “path of eruption.”[4] In certain cases, the process of eruption presents variations, which entails the development of an ectopic tooth. The etiology behind this event is considered multifactorial.

Suggested etiology includes developmental disturbances such as cleft palate, trauma, rhinogenic or odontogenic infection, genetic factors, and crowding or dentigerous cysts surrounding impacted tooth.[5] Ectopic teeth occur in a wide variety of sites. Those that have been reported include the mandibular condyle, coronoid process, orbit, palate, nasal cavity, and the maxillary antrum.[6,7] Ectopic tooth eruption in a nondental area is a rare entity, whereas in dental localization, it is most common. Occasionally, a tooth may erupt in the maxillary sinus. This condition can be asymptomatic or not. Some authors report nasal obstruction, facial fullness, headache, and hyposmia. In some cases, such teeth are often discovered serendipitously on radiographs of the skull or teeth[3] and present themselves with local sinonasal symptoms attributed to chronic sinusitis.[8] A recent review by Saleem et al. reports that Lamb et al. (2009) identified only 35 reported cases of this phenomenon in English language medical literature since 1927.[9] The aim of this study was to describe, by means of bibliography research and by a case report, the presentation characteristics and occurrence of ectopic eruption in the maxillary sinus.

Case Report
In June 2016, a 37-year-old woman attended an otolaryngologist for a routine checkup. She had no previous history of trauma, dental treatment, infection, and no evidence of developmental disorders. She reported chronic nasal obstruction and moderate bilateral rhinorrhea. She was initially subjected to nasal endoscopy; following this, a marked septal deviation was found that did not report pathologic secretion in both nasal cavities. The nasopharynx was found

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to be normal. The inspection of the oral cavity showed the absence of the left maxillary third molar. The patient had always been aware of this situation and reported that she had never undergone dental extraction. We decided to refer the patient to a cone-beam computed tomography (CBCT) of the maxillary sinus (Galileos GAX9, Sirona Dental Systems GmbH, Bensheim, Germany), and images were analyzed by Sidexis XG software (Sirona X-ray Imaging Next-Generation System, Sirona Dental Systems GmbH, Bensheim, Germany). An ectopic molar in the left maxillary sinus over the first molar, fully formed and surrounded by bone tissue [Figures 1 and 2] could be seen on the CBCT. The crown–root position is reversed. While on the right side, the third molar is present, the left molar is absent. We observed a slight maxillary sinus mucosal thickening. The patient being asymptomatic and the tooth being merged to a more defined bone structure and deeply rooted, we decide not to proceed with surgery, but we opted for radiology follow-up. We also recommended prolonged nasal decongestion treatment for nasal obstruction and mild chronic rhinosinusitis.

Results

The results of the literature review are reported in Table 1.

Discussion

The tooth formation occurs in the 6th-week intrauterine with interaction between the oral epithelium and mesenchymal tissue. Normally ectopic eruption rarely happens in positions such as nasal septum, in coronoid processes, in the palate, in condyle, and finally, in the maxillary sinus due to difficulty for abnormal interaction of tissues during development. The higher prevalence of ectopic teeth is found in the third molar and the canines, teeth that normally take more time to erupt.\[1-4\]

In this review, 51 patients were observed, with higher prevalence of ectopic teeth in the third molars, 21 cases, followed by molars unspecified. The lowest prevalence of ectopic teeth is found in the 1st molar,\[10\] the 2nd premolar,\[10\] and the 1st incisor,\[11\] presents only once in each case. Eleven of these teeth are associated with a dentigerous cyst,\[8,11-16\] by an osteoma,\[17\] and 2 by soft tissue,\[16,18\]

Factors that may favor the formation of ectopic teeth can be embryological, genetic and other origin factors, such as underdeveloped maxilla premature loss of deciduous or primary teeth, and mouth breathers, as for this type of breathing, maxilla can be narrowed, factors that may favor the formation of ectopic teeth can be embryological, genetic and others, such as underdeveloped maxillary, premature loss of deciduous or primary teeth, and mouth breathers. Also systemic factors, such as osteoporosis, or metabolic disorders, such as rickets, patients suffering from Down syndrome, favor bad teeth or dental ectopic position,\[2,4,5\]

The position of ectopic crown/root teeth is that of a normal tooth, in only 1 patient,\[19\] the molar’s shape is inverted compared to normality. Based on the data, we collected that this case is the second in medical literature which is characterized by an inverted intermaxillary molar position. Our case report is the 52nd case in literature of an ectopic tooth in the maxillary sinus.

The structure is morphologically identical to normal teeth, and the only case that reports an abnormality of structure is in the case of Lai et al.\[19\]

Compared to the position in maxillary sinus, 19 cases were on the right and 18 on the left. They occupied different areas of the sinus: antrum, floor, roof, orbital floor, superomedial and anterosuperior aspects, and posterior and anterolateral walls.\[8-36\] We described the 19th case of ectopic molar located in the left maxillary sinus near the alveolar process of the maxilla.

The ectopic teeth may or may not have symptoms. In this review, only 4 did not report symptoms.\[13,19,33\] The majority...
### Table 1: Ectopic teeth described in the literature

| Author and year | Age | Sex | Teeth | Symptom | Localization | Diagnostic methods | Treatment |
|-----------------|-----|-----|-------|---------|--------------|-------------------|-----------|
| S. Mohan and cols, 2011 | 28 | Female | 3rd molar + cyst | Purulent rhinorrhea | Superomedial aspect of the right maxillary antrum | OPG | Enucleation |
| S. Ramanojam and cols, 2013 | 21 | Female | Molar + cyst | Pain + swelling | Entire left maxillary sinus | OPG | Enucleation |
| | 48 | Female | 3rd molar + cyst | Hypoesthesia of infraorbital nerve | Right maxillary sinus | CT | Caldwell-Luc |
| | 22 | Male | 3rd molar | No symptom | Posterior wall of the left sinus | CT | Surgical removal |
| | 26 | Male | Molar inverted | No symptom | Left sinus | CBCT | - |
| | 24 | Male | Canine | Pain | Left antrum | PSN view radiograph | - |
| | 32 | Female | 3rd molar | Dull pain | Right anterolateral wall | CT | Surgical removal |
| G. K. Beriat and cols, 2011 | 24 | Female | 3rd molar | Pain | Floor-septal nasal at the left nasal cavity | CT | Caldwell-left |
| T. Saleem and cols, 2010 | 45 | Male | Molar | Hemoptysis | Right antrum | CT | Surgical removal |
| L. Nisa and cols, 2011 | 15 | Male | Molar | Pain + purulent oral discharge | Right floor sinus | CT | Endoscopic surgery |
| S. A. Bello, 2014 | 17 | Male | 3rd molar | Pain + swelling | Right antrum | CT | Caldwell-Luc |
| E. Sogur and cols, 2015 | 24 | Male | 3rd molar + cyst | Pain | Right sinus roof | CBCT | Surgical removal |
| | 19 | Male | 2nd premolar + dentigerous cyst | Pain | Left sinus roof | CBCT | Surgical removal |
| G. Kayabasoglu and cols, 2013 | 46 | Female | Molar | Purulent rhinorrhea + pain + swelling | Right base sinus | CT | Caldwell-Luc |
| S. Kumar and cols, 2014 | 23 | Female | Molar | Oraoantral fistula + headache | Right sinus | CT | Sublabial approach |
| M. Mermod and cols, 2014 | 74 | Male | 3rd molar | Pain with CPAP mask | Left sinus floor | CT | Surgical removal |
| N. Erkmen and cols, 1996 | 11 | Male | Molar | Pain + purulent rhinorrhea occasionally | Left sinus | OPG | - |
| M. C. Buyukkurt and cols, 2005 | 31 | Male | Molar | Oraoantral fistula + headache + chronic sinusitis | Left sinus | CT | Caldwell-Luc |
| T. S. Prasad and cols, 2007 | 45 | Male | Molar + dentigerous cyst | Recurrent purulent rhinorrhea + pain + swelling | Perforation medial and posterior right wall | CT | Caldwell-Luc |
| B. A. Mohamed and cols, 2016 | 24 | Female | 3rd molar | Headache + facial fullness + purulent discharge | Right sinus | OPG | Caldwell-Luc |
| A. J. Shankar and cols, 2015 | 20 | Male | 1st molar | Discharge from nose | Right sinus | OPG | Caldwell-Luc |
| G. Alexandrakis, 2000 | 3 | Female | 2 bony structure + canine + vestigial | Epiphora + recurrent dacryocystitis of the right eye + swelling | Right nasal cavity | CT | Caldwell-Luc |
| | 32 | Female | Canine | Eye pain + epiphora + low vision | Right orbital floor | CT | Caldwell-Luc |
| A. Rai and cols, 2013 | 46 | Female | 3rd molar | Pain + swelling + watering of the eye | Left maxillary antrum and posteroinferior to the floor of orbit | CT | Surgical removal |
| V. O. Kasat and cols, 2012 | 22 | Male | 3rd molar + cyst | Discharge from nose + swelling | Right maxillary sinus | CT | Caldwell-Luc |
| K. S. Kim and cols, 2012 | 57 | Female | Ectopic tooth | Left-side headache + continuous deep pressure-like | Posterior wall of the left sinus | CT | Refused treatment |
of patients presented sinusitis or purulent rhinorrhea that could not be treated with antibiotic prophylaxis. In addition to sinusitis, patients often report swelling, pain, and headache. We find cases with hypoesthesia of infraorbital nerve, facial fullness, epiphora, and hemoptysis. With regard to possible infections, there are reported cases of oroantral fistulas and purulent discharge. In the case presented by us, the patient showed only nasal obstruction.
and mild rhinorrhea (on the right side as on the left), which we believe are attributed to a deviated septum (meanwhile, we consider our case to be a rare asymptomatic condition). The imaging revealed a moderate thickening of the bilateral maxillary sinus mucosa layer.

Whenever an ectopic tooth is found by an orthopantomography, a computed tomography is considered fundamental before treating.

Ectopic teeth tend to form a cyst or tumor if not managed.

For choice of treatment, the removal of the foreign body is performed in 84% of cases. The choice to not intervene with surgical treatment is mainly for asymptomatic patients, preferring periodic checks every 6–8 months.[13,19,26,33] In agreement with the patient, observation only was the preferred treatment and the tooth was left untouched.

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Conflicts of interest
There are no conflicts of interest.

References

1. Yaseen SM, Naik S, Ulloopi KS. Ectopic eruption – A review and case report. Contemp Clin Dent 2011;2:3-7.
2. Teaford MF, Smith MM, Ferguson MW, editors. Development, Function and Evolution of Teeth. United States, New York: Cambridge University Press; 2007.
3. Dived C, Dived S, Chaturvedi T, Sharma N. Maxillary astral mucocoele caused by ectopic canine tooth in maxillary sinus. Eur J Gen Dent 2013;2:83-5.
4. Ashcraft D. “Ectopic Eruption”. DMD Pediatric and Adolescent Dentistry; 2009;16:132-40
5. Cohn C. Diagnosis and Treatment of Ectopic Eruption of Permanent Molars. DMD Oral Health 2014;1:3.
6. Abdollahi-fakhim S, Mousavi-agdas M. Ectopic molar with maxillary sinus drainage obstruction and ooranal fistula. Iran J Otorhinolaryngol 2013;25:187-92.
7. Pracy JP, Williams HO, Montgomery PQ. Nasal teeth. J Laryngol Otol 1992;106:366-7.
8. Srinivasa Prasad T, Sujatha G, Niazi TM, Rajesh P. Dentigerous cyst associated with an ectopic third molar in the maxillary sinus: A rare entity. Indian J Dent Res 2007;18:141-3.
9. Saleem T, Khalid U, Hameed A, Ghaffar S. Supernumerary, ectopic tooth in the maxillary antrum presenting with recurrent haemotysis. Head Face Med 2010;6:26.
10. Biyukkurt MC, Tozoglu S, Aras MH, Yolcu U. Ectopic eruption of a maxillary third molar tooth in the maxillary sinus: A case report. J Contemp Dent Pract 2005;6:104-10.
11. Baykul T, Dogru H, Yasan H, Cina Aksoy M. Clinical impact of ectopic teeth in the maxillary sinus. Auris Nasus Larynx 2006;33:277-81.
12. Mohan S, Kankariya H, Harjani B, Sharma H. Ectopic third molar in the maxillary sinus. Natl J Maxillofac Surg 2011;2:222-4.
13. Ramanojam S, Halli R, Heballe M, Bhardwaj S. Ectopic tooth in maxillary sinus: Case series. Ann Maxillofac Surg 2013;3:89-92.
14. Sogur E, Ozden M, Gungbay T, Tugsel Z. Cone beam computed tomography findings of ectopic tooth in the maxillary sinus associated with dentigerous cyst: A report of two cases and review of the literature. J Oral Maxillofac Radiol 2015;3:70-5.
15. Guruprasad Y, Chauhan DS, Kura U. Infected dentigerous cyst of maxillary sinus arising from an ectopic third molar. J Clin Imaging Sci 2013;3:37.
16. Buyukkurt MC, Omezli MM, Miloglu O. Dentigerous cyst associated with an ectopic tooth in the maxillary sinus: A report of 3 cases and review of the literature. Oral Surg Oral Med Oral Pathol Oral Radiol Endod 2010;109:67-71.
17. Aydn U, Asik B, Ahmedov A, Durnaz A. Osteoma and ectopic tooth of the left maxillary sinus: A unique coexistence. Balkan Med J 2016;33:473-6.
18. Goh YH. Ectopic eruption of maxillary molar tooth – An unusual cause of recurrent sinusitis. Singapore Med J 2001;42:80-1.
19. Lai YT, Luk YS, Fung KH. Anomalous morphology of an ectopic tooth in the maxillary sinus on three-dimensional computed tomography images. J Radiol Case Rep 2013;7:11-6.
20. Beriat GK, Beriat NC, Yalcinkaya E. Ectopic molar tooth in the maxillary sinus: A case report. Clin Dent Res 2011;35:35-40.
21. Nisa L, Giger R. Images in clinical medicine. Ectopic tooth in the maxillary sinus. N Engl J Med 2011;365:1232.
22. Bello SA, Oketade JO, Osunde OD. Ectopic 3rd molar tooth in the maxillary antrum. Case Rep Dent 2014;2014:620741.
23. Kayabasoglu G, Karaman M, Kaymaz R, Nacar AA. Rare entity causing chronic sinusitis: Ectopic tooth in maxillary sinus. Eur J Gen Med 2015;12:86-9.
24. Kashyap SK, Kumar R, Kumar S. An ectopic unerupted tooth in maxillary sinus. J Evol Med Dent Sci 2014;3:446-9.
25. Mermod M, Broome M, Hoarau R, Zweifel D. Facial pain associated with CPAP use: Intra-sinusal third molar. Case Rep Otolaryngol 2014;2014:837252.
26. Erkmen N, Olmez S, Onereci M. Supernumerary tooth in the maxillary sinus: Case report. Aust Dent J 1998;43:385-6.
27. Mohamed BA, Said BM, Awooda EM. Successful surgical removal of an ectopic erupted third molar in maxillary sinus: A case report. Int J Med Pharm 2016;7:1-4.
28. Shankar AJ, Prabu GV. Tooth in maxillary sinus. SRM J Res Dent Sci 2015;6:57-9.
29. Alexandrakis G, Hubbell RN, Aitken PA. Nasolacrimal duct obstruction secondary to ectopic teeth. Ophthalmology 2000;107:189-92.
30. Rai A, Rai NJ, Rai MA, Jain G. Transoral removal of ectopic maxillary third molar situated superiorly to maxillary antrum and posteroinferiorly to the floor of orbit. Indian J Dent Res 2013;24:756-8.
31. Kasat VO, Karjodkar FR, Laddha RS. Dentigerous cyst associated with an ectopic molar in the maxillary sinus: A case report and review of literature. Contemp Clin Dent 2012;3:373-6.
32. Kim KS, Hong JH. Headache induced by an ectopic tooth. Headache 2012;52:307-8.
33. Kemaloglu CA, Yucek E. A case presentation of a rhinolith and ectopic teeth. Acta Med 2016;5:30-3.
34. Kamei T, Iniu M, Nakamura S, Tagawa T. Bony ossicle in the maxillary sinus arising from an ectopic third molar. J Clin Imaging Sci 2013;3:7.
35. Touiheme N, Messary A. Anomalous morphology of an ectopic tooth in maxillary sinus. Natl J Maxillofac Surg 2014;5:35-40.
36. Altun H, Teker AM, Ceran M, Gedikli O. Ectopic molar tooth in the maxillary sinus. Kulak Burun Bogaz Ihtis Derg 2007;17:237-8.