



## A Combined Endoscopic and Intraoral Approach for the Removal of a Dentigerous Cyst Associated with an Ectopic Wisdom Tooth in the Maxillary Sinus: A Case Report

Giuseppe Pio Patianna<sup>1,2\*</sup>, Michele Lanzilotti<sup>2</sup>, Greta Toma<sup>3</sup>, Gian Luca Pancrazi<sup>3</sup>, Raffaele Vinci<sup>2,3,4</sup>

<sup>1</sup>Adjunct Professor, Oral Surgery Postgraduate School, Vita-Salute San Raffaele University, Milan, Italy

<sup>2</sup>Department of Dentistry, IRCCS San Raffaele Hospital and Dental School, Vita-Salute San Raffaele University, Italy

<sup>3</sup>Oral Surgery Postgraduate School, Vita-Salute San Raffaele University, Milan, Italy

<sup>4</sup>Associate Professor, Dental School, Vita-Salute San Raffaele University and IRCCS San Raffaele, Milan, Italy

\*Corresponding Author: Giuseppe Pio Patianna, Department of Dentistry, IRCCS San Raffaele Hospital and Oral Surgery Postgraduate School, Vita-Salute San Raffaele University, Milan, Italy.

DOI: 10.31080/ASDS.2024.08.1814

Received: March 20, 2024

Published: March 28, 2024

© All rights are reserved by Giuseppe Pio Patianna., et al.

### Abstract

A Case report showing the removal of a dentigerous cyst associated with an ectopic wisdom tooth in the maxillary sinus combining endoscopic and intraoral approach is presented.

A woman aged 30 sought care at San Raffaele Hospital's Dentistry Department in Milan, Italy. She presented with a one-year history of nasal congestion, frequent runny nose, and sinusitis. Rigid nasal endoscopy revealed a sizable, irritated mass extending into the right maxillary sinus. A subsequent computed tomography scan confirmed the presence of a substantial soft-tissue density housing a tooth within the right maxillary sinus. Under general anesthesia, by means of endoscopic and intraoral approach it was possible to remove the dentigerous cyst associated to the ectopic wisdom tooth. The postoperative course was uneventful.

This case report suggests that in case of dentigerous cyst associated to wisdom teeth into the maxillary sinus cavity, combined trans-nasal endoscopy and intraoral approach may represent a valid alternative to more demolishing traditional surgeries.

**Keywords:** Dentigerous Cyst; Ectopic Third Molar; Maxillary; Surgical Approach; Endoscopic Approach; Wisdom Tooth

### Introduction

Tooth formation arises from an ongoing, intricate interplay between mesenchymal tissue and the oral epithelium above it. If this tissue interaction goes awry during development, it can potentially give rise to abnormal tooth development and eruption [1]. Ectopic eruption may result owing to one of these 3 processes: iatrogenic activity, developmental disturbance, or pathologic process, such as a tumor or a cyst [2].

Dentigerous cysts, also referred to as follicular cysts, represent the most prevalent form of developmental odontogenic cysts originating from the crowns of teeth that are impacted, embedded, or have not erupted.

Approximately 70% of dentigerous cysts manifest in the mandible, while the remaining 30% occur in the maxilla. Among these

cases, the maxillary canine and the mandibular third molar are the teeth most commonly involved [3]. Dentigerous cysts associated with ectopic wisdom teeth displaced in the maxillary sinus are rarely reported. Most of the cases are asymptomatic, may exist for several years without being noticed and are occasionally diagnosed, thanks to routine radiographic investigations [4].

The most-effective approach for treating a dentigerous cyst involves the removal of the cyst along with the impacted or unerupted tooth, typically through enucleation and extraction [5]. When there is sinus obliteration or nasal blockage, the Caldwell-Luc procedure is often employed to facilitate the removal of both the dentigerous cyst and the associated impacted tooth [6]. In cases where the cyst is exceptionally large, a recommended course of action involves initial marsupialization to reduce the size of the bone defect, followed by enucleation and tooth extraction [7].

In some cases, a functional endoscopic sinus surgery approach may be useful and less invasive [8]. Some authors indeed emphasize the advantages of improved visualization and minimal tissue disruption of endoscopic approach. Their findings highlighted reduced postoperative morbidity and shorter recovery periods compared to conventional surgical methods [9]. Some potential complications associated with endoscopic removal of maxillary sinus dentigerous cysts were discussed by Allen, *et al.* [10] such as injury to the maxillary sinus mucosa or adjacent structures. They stressed the importance of surgeon expertise and careful preoperative planning.

In the present paper, we report a case of a combined endoscopic and intraoral approach for the removal of a dentigerous cyst associated with an ectopic wisdom tooth in the maxillary sinus.

### Case Report

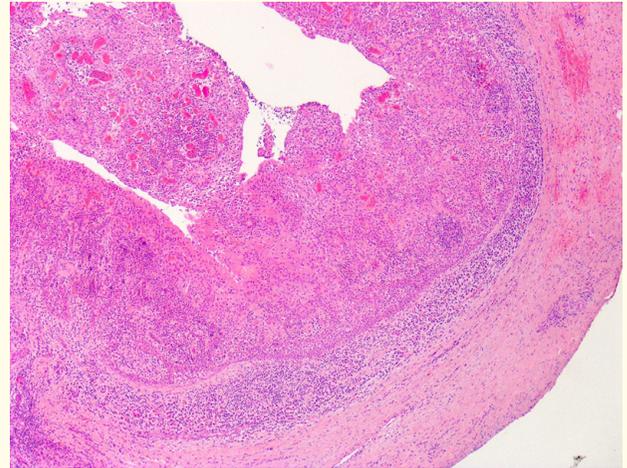
A 30-year-old female patient sought care at San Raffaele Hospital's Dentistry Department in Milan, Italy, due to a persistent year-long history of nasal congestion, recurrent rhinorrhea, and sinusitis. She reported no cough, hoarseness, fever, or weight loss and had no prior history of spontaneous or medically-induced trauma to her ear, nose, or throat regions. Physical examination did not reveal any swelling in the right maxilla, but intraoral examination indicated the absence of the right upper third molar. Subsequently, a computed tomography (CT) scan confirmed the presence of a sizeable radiolucent tissue density with a tooth located within the right maxillary sinus (Figure 1).



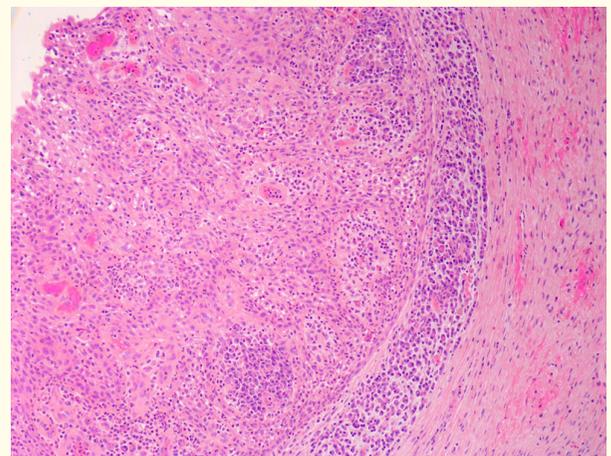
**Figure 1:** The image shows the complete obliteration of the right sinus cavity.

The patient was informed for the need of intervention and informed consent was obtained prior to any surgery. During the rigid nasal endoscopy, a substantial excoriated mass on the right side was observed into the maxillary sinus and an incisional endoscopic biopsy was executed under local anesthesia. Histopathological examination confirmed the suspect of a dentigerous cyst, by the presence of a dense inflammatory infiltrate in the cyst wall, a thin layer

of stratified squamous epithelium (Figure 2-3). So the patient was scheduled for the excision of the dentigerous cyst and the associated ectopic tooth using a combined endoscopic and transoral approach.



**Figure 2:** The images show at two different magnification (40x and 100x) the inflammatory infiltrate in the cyst wall.



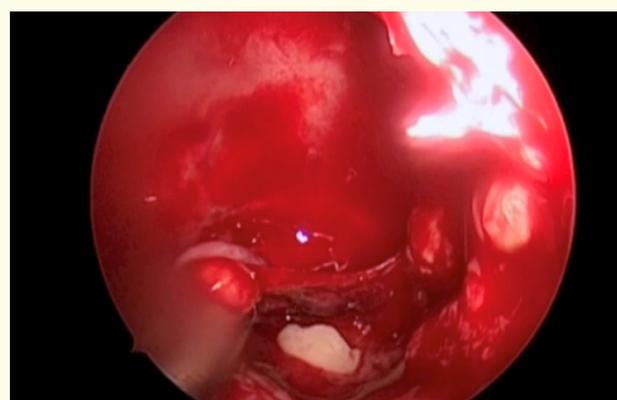
**Figure 3:** The images show at two different magnification (40x and 100x) the inflammatory infiltrate in the cyst wall.

The treatment was provided under general anesthesia, beginning with an endoscopic procedure. This involved performing a partial uncinectomy followed by creating a middle meatal antrostomy and enlarging the maxillary sinus ostium (Figure 4-5).

By doing this, the entire cystic lesion was enucleated starting from the right maxillary sinus and it was possible to localize the ectopic wisdom tooth in the most distal part of the maxillary sinus floor (Figure 6-8). After the removal of the odontogenic cyst it was stated under endoscope magnification that no residual cyst was noted.



**Figure 4:** Partial uncinectomy provided with a middle meatal antrostomy in order to enlarge the maxillary sinus ostium.



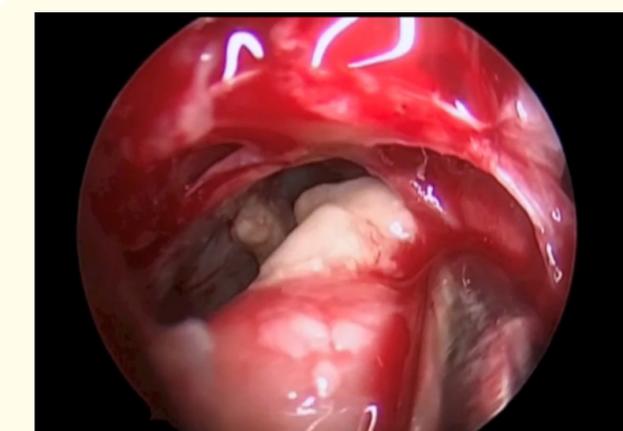
**Figure 7:** Enucleation of the dentigerous cyst almost completed.



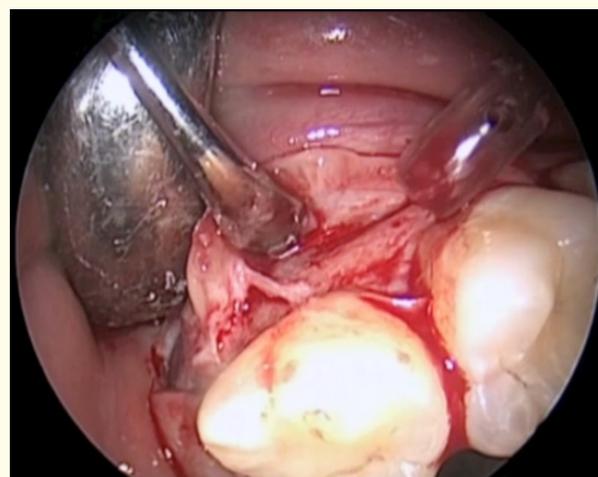
**Figure 5:** Partial uncinectomy provided with a middle meatal antrostomy in order to enlarge the maxillary sinus ostium.



**Figure 8:** Ectopic Wisdom tooth exposed in the distal portion of the maxillary sinus floor



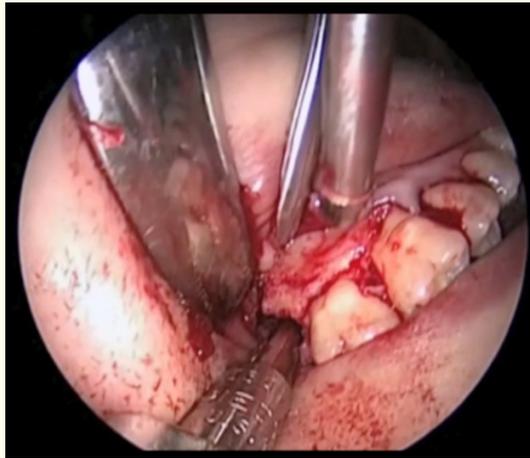
**Figure 6:** Dentigerous Cyst was emptied from inside in order to allow its entire enucleation.



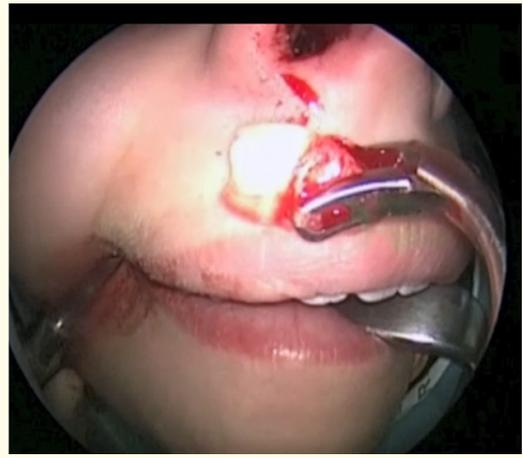
**Figure 9:** Full thickness Muco-periosteal flap to access to the wisdom tooth area.

Subsequently, through the intraoral approach, the ectopic wisdom tooth was carefully removed. This involved elevating a full-thickness muco-periosteal flap to expose the posterior wall of the sinus. The ectopic tooth was then located and dislocated using a dental elevator within the maxillary sinus (Figure 9). Later, an endoscopic procedure was employed for the extraction of the ectopic wisdom

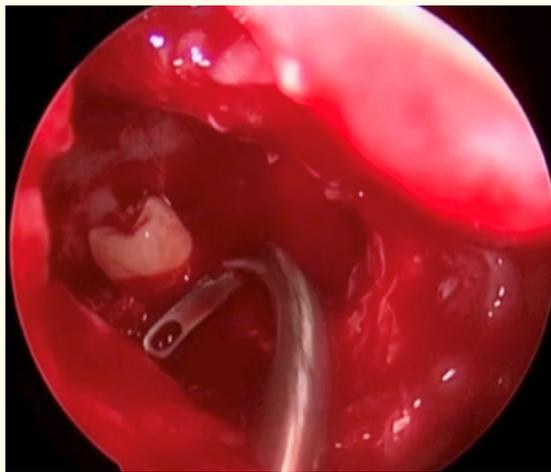
tooth (Figure 10-13). Following this, the mucosa of the nasal floor was sutured with a resorbable 6/0 material, and a pad was inserted into the right nostril. A specimen was sent for histopathologic examination, revealing a cystic fluid-filled structure containing keratin, lined by a stratified squamous epithelium, consistent with a diagnosis of a dentigerous cyst (Figure 14). No signs of malignancy were detected.



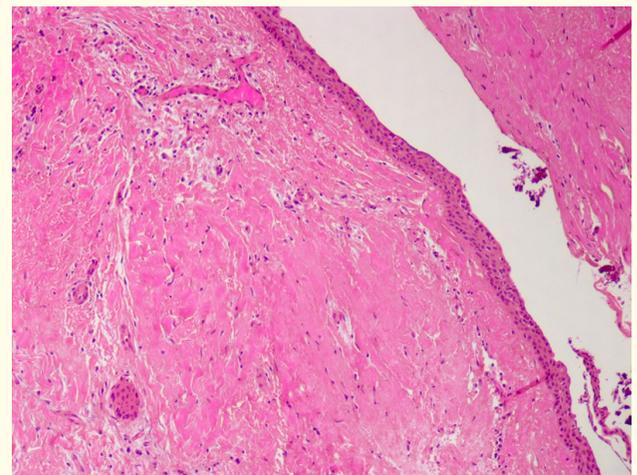
**Figure 10:** Lever used in order to push and dislocate the wisdom tooth into the maxillary sinus cavity.



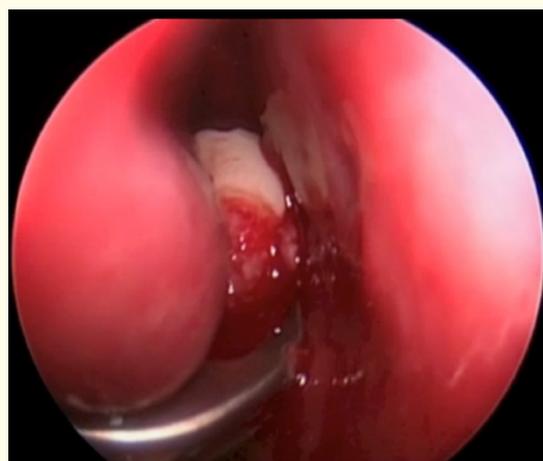
**Figure 13:** Ectopic wisdom tooth extracted through the nose.



**Figure 11:** Endoscopic view of the wisdom tooth dislocated into the maxillary sinus cavity.



**Figure 14:** The final histopathological analysis confirmed the diagnosis of follicular cyst, with the typical stratified squamous epithelium surrounding the cystic lesion.



**Figure 12:** Final process of the endoscopic extraction.

Amoxicillin 1 gr. twice/day for 6 days, dexamethasone 4 mg. was done IM postoperatively and paracetamol 1gr when needed was prescribed. Four days later the pad was removed. The postoperative course was uneventful and the patient 2 days after surgery was able to perform any activity in his ordinary life. The patient was kept on regular follow-up for 18 months when there were no signs of recurrence.

### Discussions

Maxillary dentigerous cysts associated with ectopic teeth within the maxillary sinus are relatively rare, and the existing literature on effective surgical and minimally invasive treatments is primarily limited to case reports and small case series [8].

The precise cause of ectopic tooth eruption into the maxillary sinus remains unclear, although factors such as trauma, infection,

pathological conditions (such as tumors or dentigerous cysts), crowding, and developmental anomalies have been proposed as potential contributors [11].

Specifically, ectopic teeth within the maxillary sinus can be permanent, deciduous, or supernumerary, with third molars being the most frequently encountered type of ectopic tooth in the maxillary sinus [11].

In our case, no history of trauma or infection was referred. The patient complained only with nasal obstruction with recurrent rhinorrhea and sinusitis over a year. Therefore, the cause of the ectopic tooth in the maxillary sinus seemed to be idiopathic.

In the literature, documented cases of ectopic teeth have been linked to a diverse range of clinical symptoms, including facial pain, purulent nasal discharge, headaches, snoring, facial swelling, chronic sinusitis, excessive tearing, numbness, and obstruction of the nasolacrimal duct [12].

Ectopic teeth in the maxillary sinus are usually discovered on routine dental radiographic examinations, such as panoramic radiography. On radiographic examination, dentigerous cysts appear as unilocular radiolucent cysts of varying sizes, with well defined sclerotic borders, associated with the crown of an unerupted tooth.

In certain instances, additional imaging methods like sinus CT scans are essential to precisely pinpoint the location of the ectopic tooth and to formulate an appropriate treatment plan [11,12].

The management of this lesion depends on the age of the patient, site and extension of the cyst. Various treatment modalities have been proposed. The standard treatment for a dentigerous cyst is enucleation and extraction of the cyst-associated impacted or unerupted tooth. In case of obliterated sinus and/or nasal obstruction, dentigerous cyst and the associated impacted tooth are often easily removed via a Caldwell-Luc procedure [6]. In cysts with huge dimensions, an initial marsupialization to reduce the size of the osseous defect, followed by enucleation and tooth extraction, has been suggested [13].

Although the traditional Caldwell-Luc procedure provides a direct view into the maxillary sinus, it is associated with more morbidity than transnasal endoscopy, with the risk of loss of involved adjacent teeth, oro-antral communication and chronic sinusitis [13].

Some authors have proposed marsupialization and cyst resection through a transnasal endoscopic approach as an alternative method to mitigate the morbidity associated with the transoral route [9,10,13,14].

In a systematic review by Marino, *et al.* which included 45 patients treated for various odontogenic cysts using different endonasal endoscopic techniques, no recurrences were reported during an average follow-up period of 29.2 months. Furthermore, no major complications were associated with any of the employed techniques [15].

Seno, *et al.* detailed a series of 13 patients with maxillary odontogenic cysts, comprising 10 radicular cysts and 3 dentigerous cysts, all treated through the transnasal endoscopic approach. Their surgical procedure involved creating an inferior meatal antrostomy by raising a mucosal flap from the medial maxillary wall lateral to the inferior turbinate, followed by opening the bony wall. The cyst was meticulously dissected and removed, and the mucosal flap was then repositioned to cover the maxillary sinus floor. Complete removal of cyst walls was achieved in all three dentigerous cysts and in five of the 10 radicular cysts. The mean follow-up duration was 42 months, with no reported instances of recurrence [16].

Therefore in this case report we proposed a combined endoscopic and transoral approach for the removal of the dentigerous cyst associated with an ectopic wisdom tooth in the maxillary sinus, in order to take advantage of both surgical procedures.

#### **Brief summary of the case report**

In this case report, we presented a successful removal of a dentigerous cyst associated with an ectopic wisdom tooth located within the maxillary sinus. The procedure involved a combination of endoscopic and intraoral approaches. A 30-year-old female patient sought treatment at the Dentistry Department of San Raffaele Hospital in Milan, Italy, due to a year-long history of nasal congestion, recurrent rhinorrhea, and sinusitis. Rigid nasal endoscopy revealed a prominent excoriated mass extending into the right maxillary sinus. Computed tomography confirmed the presence of a sizable soft-tissue mass with the tooth occupying the right maxillary sinus. Under general anesthesia, a collaborative endoscopic and intraoral technique facilitated the successful removal of the dentigerous cyst along with the ectopic wisdom tooth. The postoperative recovery was uneventful.

#### **Conclusion**

This case report highlights a unique approach to extracting a maxillary third molar situated in an ectopic position within the maxillary sinus roof, accompanied by a dentigerous cyst that entirely filled the maxillary sinus. Instances of this nature are exceedingly rare in the existing literature. Given the potential consequences of an untreated cyst, which include facial asymmetry, infection, nasal obstruction, and even metaplastic and dysplastic alterations, accurate diagnosis and minimally invasive treatment are of utmost importance. Consequently, clinicians must judiciously select the optimal treatment approach to ensure both complete cyst removal and the extraction of the ectopic tooth.

## Bibliography

1. Srinivasa Prasad T, et al. "Dentigerous cyst associated with an ectopic third molar in the maxillary sinus: a rare entity". *Indian Journal of Dental Research* 18 (2007): 141-143.
2. Bodner L, et al. "Teeth in the maxillary sinus— imaging and management". *Journal of Laryngology and Otology* 111 (1997): 820-826.
3. Tournas AS, et al. "Multiple unilateral maxillary dentigerous cysts in a nonsyndromic patient: a case report and review of the literature". *International Journal of Pediatric Otorhinolaryngology Extra* 1 (2006): 100-106.
4. Di Pasquale P and Shermetaro C. "Endoscopic removal of a dentigerous cyst producing unilateral maxillary sinus opacification on computed tomography". *Ear Nose Throat Journal* 85 (2006): 747-748.
5. Courtot R, et al. "Surgical approach of ectopic maxillary third molar avulsion: Systematic review and meta-analysis". *Journal of Stomatology, Oral and Maxillofacial Surgery* 122.1 (2021): 77-82.
6. Barzilai G, et al. "Indications for the Caldwell-Luc approach in the endoscopic era". *Otolaryngology-Head and Neck Surgery* 132.2 (2005): 219-220.
7. Aoki N, et al. "Multidisciplinary approach for treatment of a dentigerous cyst - marsupialization, orthodontic treatment, and implant placement: a case report". *Journal of Medical Case Reports* 12.1 (2018): 305.
8. Nahajowski M, et al. "Factors influencing an eruption of teeth associated with a dentigerous cyst: a systematic review and meta-analysis". *BMC Oral Health* 21.1 (2021): 180.
9. Iwai T, et al. "Safe method of extraction to prevent a deeply impacted maxillary third molar being displaced into the maxillary sinus". *British Journal of Oral and Maxillofacial Surgery* 51 (2013): e75-76.
10. Allen DZ, et al. "Presentation of an iatrogenically displaced third molar into the maxillary sinus in a 14-year-old patient successfully removed with an endoscopic approach: a case report and a review of the literature". *Journal of Surgery Case Reports* 17.10 (2020).
11. Lamb JF, et al. "Ectopic molar in the maxillary sinus precipitating a mucocele: a case report and literature review". *Ear Nose Throat Journal* 88.8 (2009): e6-e11.
12. Buyukkurt MC, et al. "Dentigerous cyst associated with an ectopic tooth in the maxillary sinus: a report of 3 cases and review of the literature". *Oral Surgery, Oral Medicine, Oral Pathology, Oral Radiology, and Endodontology* 109.1 (2010): 67-71.
13. Barry JY, et al. "Endoscopic resection of maxillary sinus keratocystic odontogenic tumors". *Laryngoscope* 126 (2016): 2216e2219.
14. Jain K and Goyal P. "Endoscopic surgical treatment of maxillary odontogenic cysts". *International Forum Allergy Rhinology* 5 (2015): 602e604.
15. Marino MJ, et al. "Management of odontogenic cysts by endonasal endoscopic techniques: a systematic review and case series". *American Journal of Rhinology and Allergy* 32 (2018): 40e45.
16. Seno S, et al. "Endoscopic sinus surgery for the odontogenic maxillary cysts". *Rhinology* 47 (2009): 305.