

## CASE REPORT

# Combined approach by middle and inferior antrostomy for endosinusal inclavated tooth root

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## ABSTRACT

In the recent years, the development of stomatology with emphasis on dental implants procedures has led to an increase in the number of sinonasal complications. Sinonasal complications of dental disease and treatment are an important cause of sinus pathology, being responsible for 10-12% of all causes of chronic maxillary rhinosinusitis.

The main etiological factors involved in odontogenic sinusitis are represented by dental fillings, tooth roots in traumatic extraction, dental implants displacement and parts of broken instruments. The diagnostic work-up includes evaluation of the symptoms, history of dental treatment, dental examination, CT scan and nasal endoscopy.

The treatment is surgical and can be represented by transnasal endoscopic technique performed by the otorhinolaryngologist or a transoral technique performed by the maxillofacial surgeon when oro-antral fistulas are present. The endoscopic approach is preferred but has its limits when the tooth root is placed in the alveolar recess, or at the level of the anterior, medial and lateral wall of the maxillary sinus. Concurrent middle and inferior antrostomy provides a better view of the sinus and increases effectiveness of the surgical treatment with minimal physiological damage.

**KEYWORDS:** functional endoscopic sinus surgery, tooth root, antrostomy.

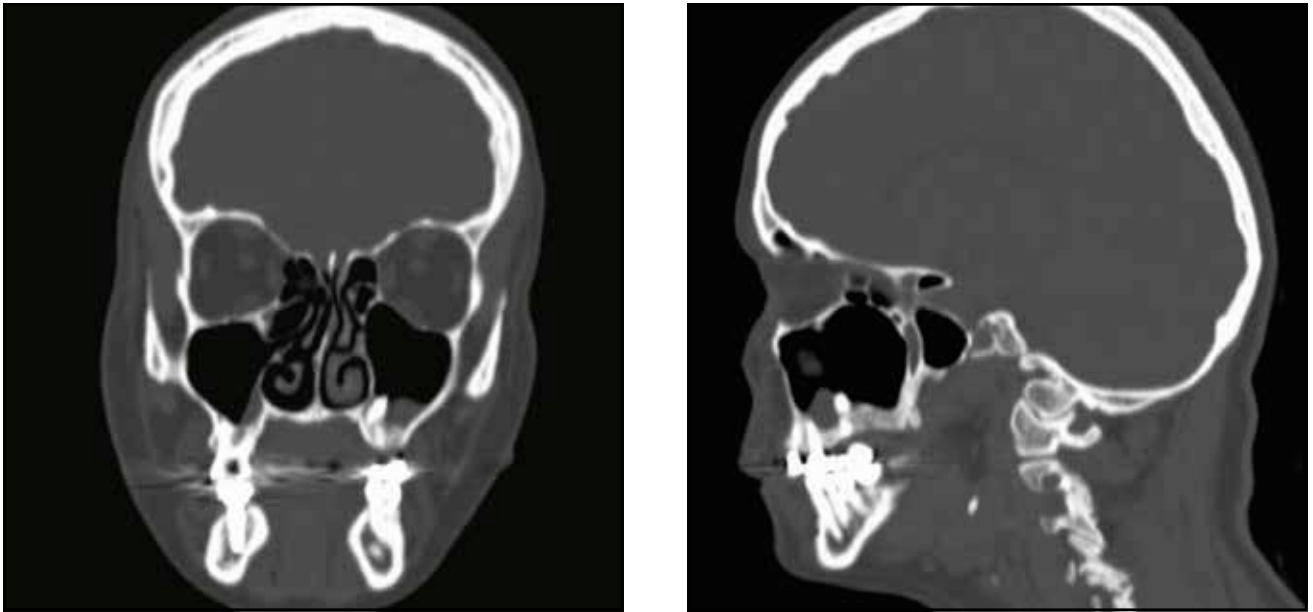
## INTRODUCTION

Surgical procedures for the superior dental arch may lead to different complications. The most frequent etiological factors for sinonasal complications of dental disease and treatment are represented by dental fillings, tooth roots in traumatic extractions and broken instruments. Disruption of the maxillary sinus membrane during sinus lift can cause local inflammation, but rhinosinusitis can develop even if the membrane remains intact<sup>1</sup>.

The diagnostic work-up for chronic maxillary sinusitis of dental origin requires evaluation of symptoms, history of dental procedures and treatment, dental and rhinological findings and a CT scan evaluation.

CT imaging is a key investigation for the diagnosis, being able to identify the foreign body in the maxillary sinus. Foreign bodies located in the alveolar recess are one of the most difficult pathologies to treat because the alveolar recess is the most inferior part of the maxillary sinus and in direct contact with the upper dental arch. Migrated implants, tooth roots from extractions, molar tooth migrated through erosion of the maxillary floor and ectopic teeth can be found in the recess<sup>2</sup>.

The therapeutic approach for foreign bodies located in the maxillary sinus consists in removing the body, either by transnasal or transoral technique. Endoscopic transnasal approach, by inferior, middle or combined antrostomy, is recommended in case of dental material in the



**Figure 1.** Cranio-facial CT scan, coronal and sagittal sections - a tooth in the left maxillary sinus.

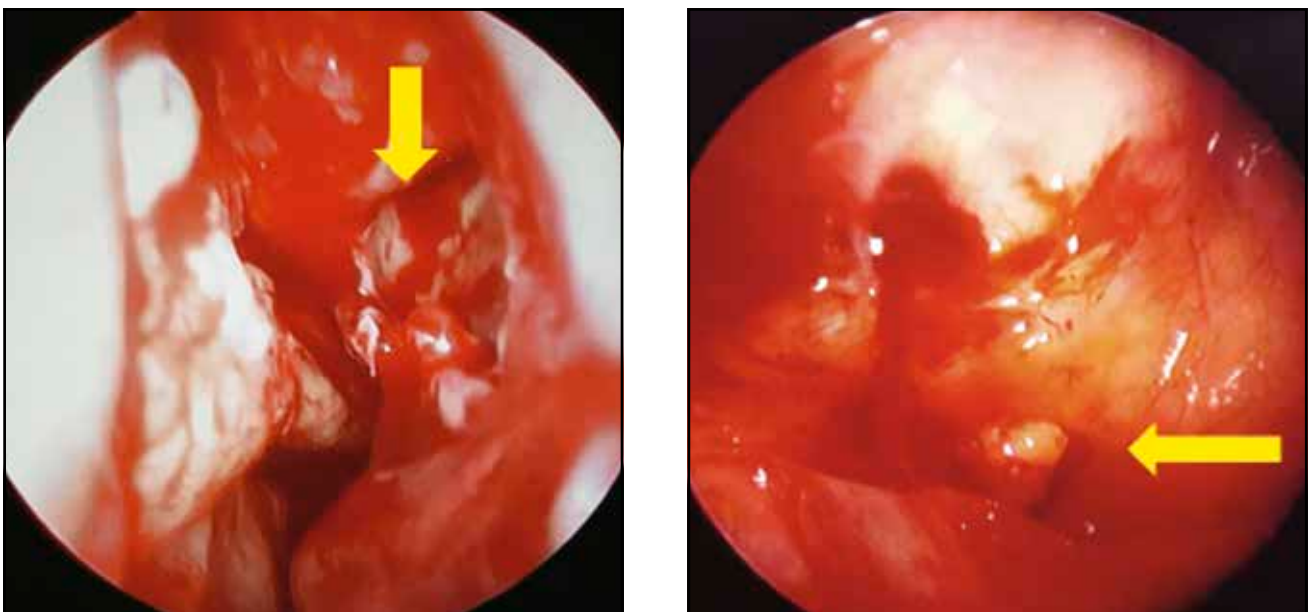
maxillary sinus. In case of oro-antral fistulas, the transoral approach, performed by the maxillofacial surgeon, is preferred.

## CLINICAL CASE

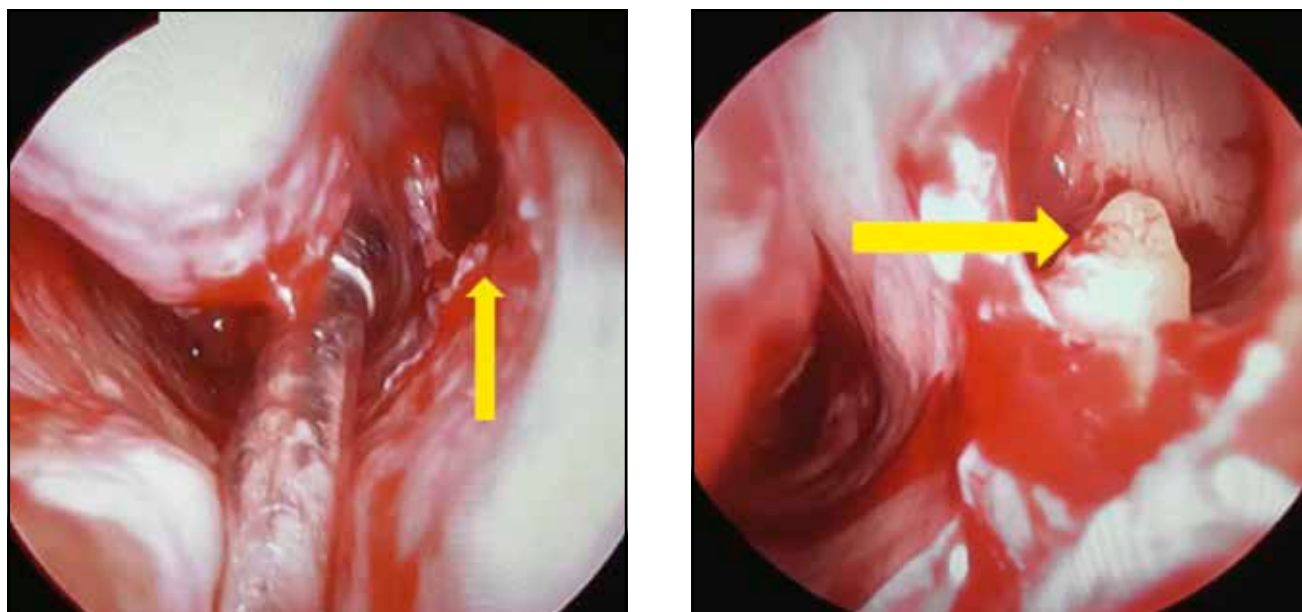
The clinical case that we are presenting details the surgical technique used for the treatment of an antral tooth. A dental implant surgical proce-

dure was recommended to our patient for a missing tooth in the upper dental arch. After performing an orthopantomography, the dental surgeon decided to postpone the surgical procedure due to the maxillary sinus pathology revealed on the panoramic X-ray and recommended an ENT exam, even if the patient had no sinus symptoms and complaints.

The golden standard investigation in rhinology is CT imaging. In our patient, the CT scan identi-



**Figure 2.** Middle antrostomy- intraoperative endoscopic view of the antral tooth.



**Figure 3.** Inferior antrostomy – intraoperative endoscopic view of the antral tooth.

fied a tooth in the alveolar recess of the left maxillary sinus and the inflamed perilesional mucosa (Figure 1). The local inflammation can lead to postoperative complications of dental surgery, endangering the stability of the dental implant.

The treatment for sinonasal complications of dental disease consists in endoscopic middle antrostomy. In this case, due to the presence of the antral tooth in the alveolar recess, we decided on a more complex approach, a simultaneous middle and inferior antrostomy<sup>3</sup>.

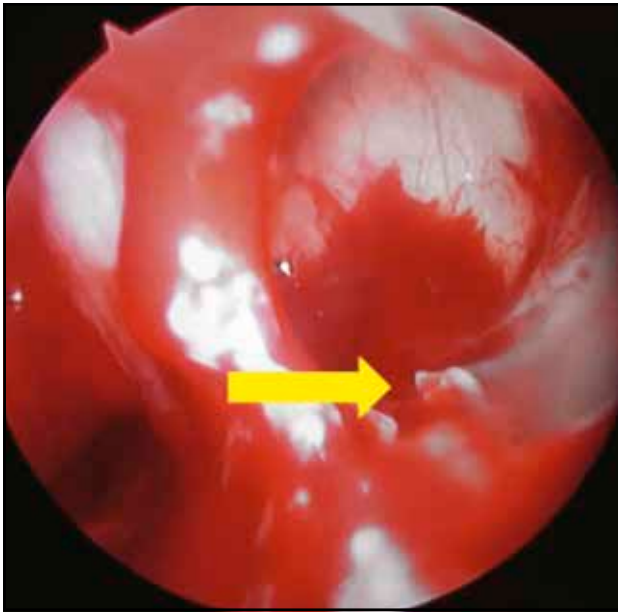
The endoscopic middle antrostomy respects the normal physiology of the maxillary sinus and maintains the sinusal ventilation and drainage. This approach is limited for the pathology of the alveolar recess because of the angulated instruments used during surgery (Figure 2). Uncinectomy and resection of the ethmoidal bulla are necessary in order to expose the maxillary sinus ostium. Viewing of the antral tooth may require the enlargement of the ostium, but care should be taken, because a large antrostomy may not be able to maintain its physiological drainage function. Enlargement of the ostium may cause other complications such as lesion of the nasolacrimal duct (if the antrostomy is performed too anteriorly), lesion of the sphenopalatine artery (posteriorly) or injury of the lamina papyracea (superiorly)<sup>4</sup>.

Endoscopic inferior antrostomy is associated with a low complication rate, and it is less invasive compared to the middle antrostomy. This technique is used when the antral tooth cannot be reached through the middle antrostomy be-

cause it is situated in the maxillary recesses. The inferior nasal turbinate is dislocated medially so that the valve of Hasner can be identified at the junction of the anterior third with the middle third part of the lateral nasal wall. Inferior antrostomy is performed at half the distance between the inferior nasal wall and the insertion of the inferior nasal turbinate<sup>5</sup>.

In the recent years, inferior antrostomy is less performed due to the disadvantages of this technique, namely the disruption of the maxillary sinus physiologic drainage, which is achieved by mucociliary clearance through the natural ostium, and not by declivity. Other disadvantages are represented by the risk of damaging the valve of Hasner and the difficulty in performing the antrostomy by penetrating the hard bone of the inferior nasal lateral wall (Figure 3).

The advantage of the simultaneous inferior and middle antrostomy is having a better view of the ectopic tooth and the possibility of a more efficient manipulation of the surgical instruments. This technique requires placing the 0° endoscope through the middle antrostomy and the mobile instruments through the inferior antrostomy<sup>6</sup>. The concurrent approach increases the efficiency of the surgery, offers a better surgical prognosis and avoids the local complications, such as fibrosis, caused by the intraoral technique. When surgery is completed, an inferior antrostomy will persist (Figure 4), but will not endanger the natural drainage of the maxillary sinus because of the small size<sup>7</sup>.



**Figure 4.** Postoperative result – inferior anastomy, antral tooth resected.

## DISCUSSIONS

Eruption of teeth in a non-dental area, like the maxillary sinus, is a rare occurrence. In most cases, retention cysts are also reported in patients with antral teeth. The cysts may spontaneously regress, may increase in size or may have no significant change from one evaluation to another. Their diagnosis is usually an incidental finding on a radiographic examination, most being asymptomatic.

The development of dental surgical techniques has brought benefits in the treatment and quality of life for patients, but has also led to an increase in the complications rate. The diagnosis of odontogenic rhinosinusitis is suspected in patients with unilateral maxillary rhinosinusitis with a history of dental interventions for the superior arch dentition. These patients may be asymptomatic or may experience facial pressure. The stomatologist can diagnose the patient during follow-ups or, as in this case, at the time of dental evaluation before procedures.

Treatment options for sinonasal complications of dental disease are endoscopic techniques performed by the ENT specialist or transoral techniques performed by the maxillofacial surgeon. Both specialists have the skills needed to perform the surgery and their cooperation is recommended when deciding the approach.

The most successful technique depends on the etiology of the foreign body and its position inside the maxillary sinus. From our point of view, the presence of a foreign body in the alveolar

recess of the maxillary sinus is best approached by combined endoscopic inferior and middle anastomy. It allows a better view of the maxillary sinus and its extensions. The simultaneous anastomy approach allows the surgeon to place the 0° endoscope through the middle anastomy and place the surgical instruments through the inferior anastomy, thus increasing the possibility of manoeuvring the endoscope and providing a better image.

The transoral approach is preferred when endoscopic techniques fail (dental material in the anterior recess of the maxillary sinus), when it is necessary to remove necrotic bone tissue, to perform a periapical surgery or close an oroantral fistula<sup>8</sup>.

## CONCLUSIONS

The endoscopic transnasal technique is minimally invasive and has the advantage of maintaining physiological rhinosinusal drainage, avoiding injury of healthy mucosa and subsequent fibrous tissue formation. In our case, the presence of the antral tooth in the alveolar recess of the maxillary sinus has highlighted the limitations of the endoscopic approach when only middle anastomy has been performed.

The combined endoscopic approach, concurrent middle and inferior anastomies, has led to a successful surgery. This technique increases surgical efficiency and has very good results in maintaining the physiology of the sinus.

Endoscopic surgical techniques have replaced the classic approach in recent years, being preferred for both surgeons and patients. The constant evolution of functional endoscopic sinus surgery has revealed new techniques to address rhinosinusal disorders, while classical techniques remain a choice only for the patients with complications.

**Conflict of interest:** The authors declare that there is no conflict of interest.

**Contribution of authors:** All authors have equally contributed to this work.

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