



Closure of oroantral fistula with nasal septal cartilage, bone and bone cement: An alternative technique

Oroantral fistülün nazal septum kıkırdağı, kemik ve kemik çimentosu ile kapatılması: Alternatif bir yöntem

Burak Kersin, MD., Erkan Soylu, MD.

Department of Otolaryngology, İstanbul Medipol University, İstanbul, Turkey

ABSTRACT

Oroantral fistula is an epithelialized communication between the oral cavity and the maxillary sinus, which occurs most commonly as a complication of molar or premolar tooth extraction. There are many techniques to repair oroantral fistula. In this article, we described an alternative technique for the closure of oroantral fistula with the use of nasal septal bone, cartilage, buccal flap, and bone cement.

Keywords: Maxillary sinus; nasal septum; oroantral fistula.

ÖZ

Oroantral fistül oral kavite ve maksiller sinüs arasında epiteliyalize olmuş iletişimdir; çoğunlukla molar veya premolar diş çekiminin bir komplikasyonu olarak gelişir. Oroantral fistülü onarmanın pek çok tekniği vardır. Bu yazıda, oroantral fistülün kapatılması için nazal septum kemiği, kıkırdak, bukkal flep ve kemik çimentosu kullanımı ile alternatif bir teknik açıklandı.

Anahtar Sözcükler: Maksiller sinüs; nazal septum; oroantral fistül.

An oroantral fistula (OAF) is an epithelialized communication between the oral cavity and the maxillary sinus resulting most commonly from extraction of an upper molar (incidence between 0.31% and 4.7%), followed by cysts, tumors, trauma, osteonecrosis and dehiscence following implant failure in atrophied posterior maxilla.^[1]

Many surgical techniques to close OAF have been reported in the literature, such as buccal flap, palatal flap, buccal fat pad and related modifications.^[2] Each has advantages and disadvantages depending on the case and defect size. Most rely on mobilizing tissue and

advancing the flap into the defect.^[3] If the OAF involves a large bone defect or recurrence, conventional techniques may not be adequate for closure. In this case we present an alternative surgical technique for OAF closure using septal cartilage, vomer, buccal flap and bone cement.

SURGICAL TECHNIQUE

A 39-year-old female patient was admitted to our department with a complaint of spontaneous intraoral drainage with bad odor for three years following traumatic extraction of upper left first three molar teeth. A Caldwell-Luc procedure

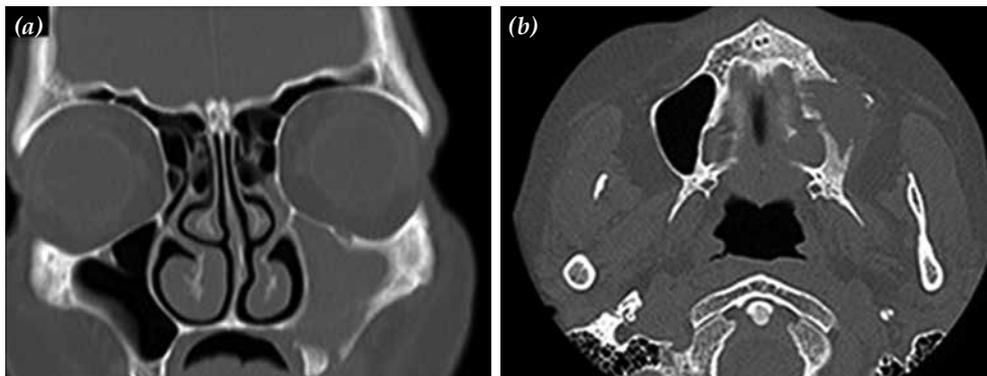


Figure 1. Paranasal Sinus computed tomography scan. (a) Coronal view, (b) Axial view showing large bony defect and accumulation of secretion in left maxillary sinus.

to treat this oroantral communication one year ago did not have a positive result. There was no history of systemic disease. Intraoral examination revealed a 5x4 mm mucosal opening in the region of the left first molar. Coronal and axial computed tomography (CT) scans revealed a larger 7x8 mm destruction of bone and accumulation of secretion and mucosal hypertrophy in the left maxillary sinus and a Caldwell-Luc operation defect at the base of the left maxilla (Figure 1). Preoperative multiple antimicrobial therapy was given to control infection, and surgery was scheduled.

Under general anesthesia, endoscopic surgery started with left uncinectomy, maxillary sinus antrostomy and cleaning of polypoid tissues and granulation from the left maxillary sinus. After that we performed routine septoplasty to gain cartilage and bone graft. After septoplasty, a mouth opener was attached intraorally, the fistula was exposed and epithelial lining of the fistula tract was excised circumferentially to vitalize the tissue. The harvested vomer and septal cartilage were formed into rectangular

shapes. The bone graft was inserted through the fistula and cartilage grafts were inserted around the bone graft due to their flexible structure, with bone cement plugged onto the grafts for anchoring.

For mucosal closure an approximately 3 cm arch-shaped incision was performed for a posteriorly-based buccal flap on the left side of the fistula. The flap was sutured circumferentially with 4.0 Vicryl onto the fistula opening (Figure 2). Routine postoperative instructions, including medications and avoidance of severe physical activities that may raise pressure in the sinuses were given for a week. The patient was called for regular follow-up and the wound epithelized successfully.

DISCUSSION

The maxillary sinus, also known as the Antrum of Highmore, is an air cavity that is part of the paranasal sinuses, internally invested by a (Schneiderian) membrane. It is known that the structure is responsible for heating inspired

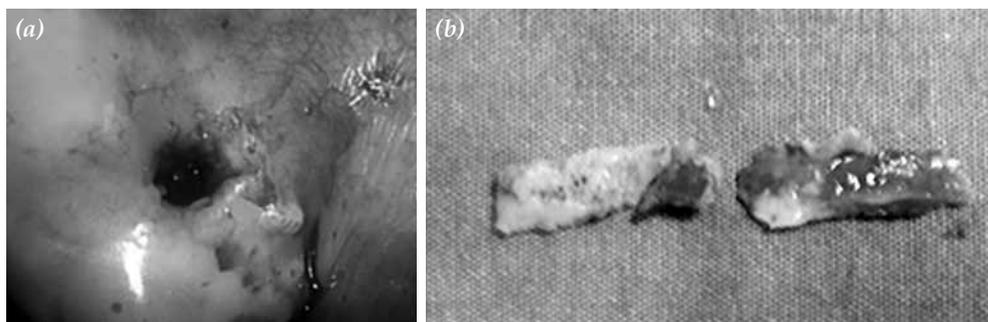


Figure 2. Intraoperative photos, showing (a) deepithelized fistula tract, and (b) harvested nasal septal cartilage and bone.

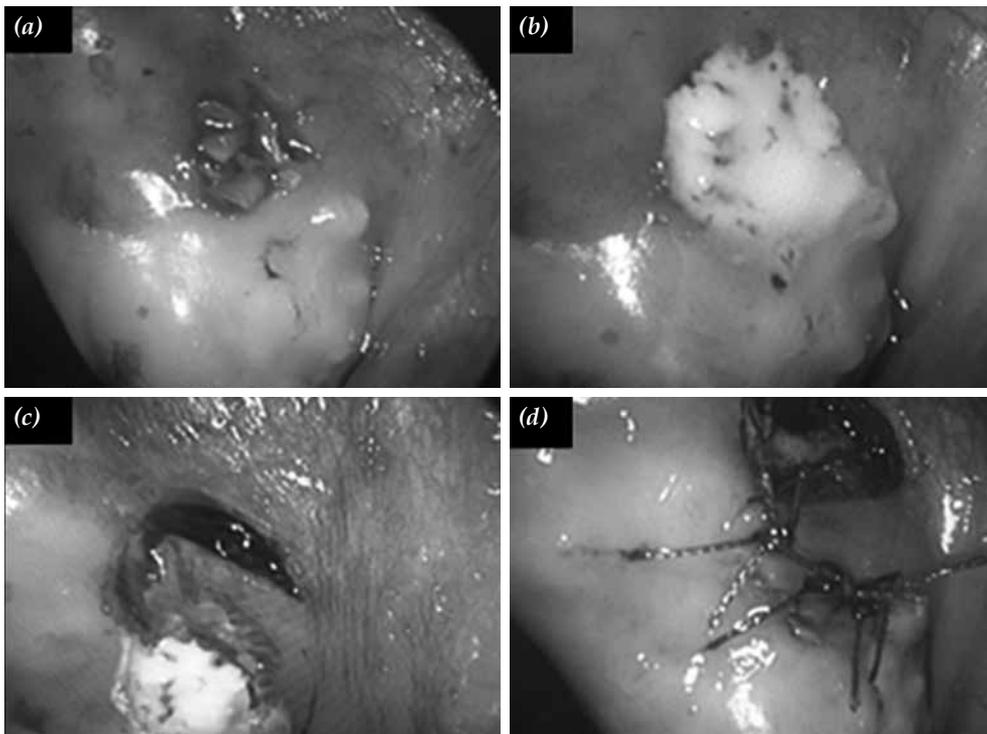


Figure 3. Intraoperative photos, showing (a) inserted grafts, (b) after obliteration with bone cement, (c) rotated flap, and (d) sutured flap.

air and drainage of secretions into the nasal cavity through the maxillary ostium. Due to its close relationship with upper posterior tooth roots, this site is often associated with oroantral communications.^[4]

In most cases of OAF, communication occurs due to extracting superior molars and premolar teeth.^[2] When these bony defects are less than 5 mm, spontaneous closure is possible. However non-spontaneously healing or untreated fistulas may cause speech and feeding problems, facial pain and chronic sinusitis.^[5]

Imaging studies should be always performed with CT, which may accurately analyze the size of the bone defect. Bone defects are generally bigger than soft tissue defects observed clinically and are an important variable to determine the adequate surgical option. This imaging method is also capable of analyzing maxillary sinus health and possible donor sites of autogenous bone.^[6]

Various techniques described include autografts,^[7] allografts (dura mater, fascia lata), synthetic materials (metal plates, gold foil) absorbable material (polyglactin, polydioxanon)

and the use of soft tissue advancement or rotation flaps.^[8] In this case, the choice for this specific technique was based on the size and location of the communication, the presence of sinus infection and the availability of soft tissues.

When using flap rotation, only soft tissue closure is achieved and supplemental techniques developed for bone closure include guided tissue regeneration with resorbable membrane and bone substitute on sandwich technique.^[9]

The buccal rotation flap consists of mucosal thickness flap release. The flap will fully cover the exposed communication, avoiding the edges of the flap being kept near the bone defect boundaries. The denuded buccal area will repair by secondary intention, during which time it may be covered with some sort of dressing.^[10]

One of the main causes of failure in the treatment of fistulae is continuous leakage due to inadequate closure. In our technique, the fistula tract was fully filled with cartilage and bone vertically, with potential minimal gaps between the grafts obliterated with bone cement (Figure 3). We did not encounter any postoperative problem.

In conclusion, the success of oroantral fistula treatment depends on efficient closure to prevent any leakage. At the same time, combined septal cartilage and bone, buccal flap and bone cement technique is an alternative and useful technique for closure of OAF with large bone defects, without requiring any other foreign graft material.

Declaration of conflicting interests

The authors declared no conflicts of interest with respect to the authorship and/or publication of this article.

Funding

The authors received no financial support for the research and/or authorship of this article.

REFERENCES

1. Abuabara A, Cortez AL, Passeri LA, de Moraes M, Moreira RW. Evaluation of different treatments for oroantral/oronasal communications: experience of 112 cases. *Int J Oral Maxillofac Surg* 2006;35:155-8.
2. Whaites E. *Essentials of Dental Radiography and Radiology*. Porto Alegre: Artmed; 2003.
3. Güven O. A clinical study on oroantral fistulae. *J Craniomaxillofac Surg* 1998;26:267-71.
4. Bureau S, Penko M, McFadden L. Speech outcome after closure of oronasal fistulas with bone grafts. *J Oral Maxillofac Surg* 2001;59:1408-13.
5. Watzak G, Tepper G, Zechner W, Monov G, Busenlechner D, Watzek G. Bony press-fit closure of oro-antral fistulas: a technique for pre-sinus lift repair and secondary closure. *J Oral Maxillofac Surg* 2005;63:1288-94.
6. Er N, Tuncer HY, Karaca C, Copuroğlu S. Treatment of oroantral fistulas using bony press-fit technique. *J Oral Maxillofac Surg* 2013;71:659-66.
7. Burić N, Jovanović G, Krasić D, Tijanić M, Burić M, Tarana S, et al. The use of absorbable polyglactin/polydioxanon implant (Ethisorb®) in non-surgical closure of oro-antral communication. *J Craniomaxillofac Surg* 2012;40:71-7.
8. Poeschl PW, Baumann A, Russmueller G, Poeschl E, Klug C, Ewers R. Closure of oroantral communications with Bichat's buccal fat pad. *J Oral Maxillofac Surg* 2009;67:1460-6.
9. Ogunsalu C. A new surgical management for oro-antral communication: the resorbable guided tissue regeneration membrane--bone substitute sandwich technique. *West Indian Med J* 2005;54:261-3.
10. Dym H, Wolf JC. Oroantral communication. *Oral Maxillofac Surg Clin North Am* 2012;24:239-47.