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Closure of Oroantral Communication Using a Pedicled Buccal Fat Pad Flap: A Case Report

Bahizi W.J.J., MD[1*], Harmali K., MD[1], Bouksirat M., MD[1], Dikhaye M., MD[1], Boulaadas M., Pr[1]

[1]Mohamed VI University Hospital, Rabat, Morocco

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***Corresponding author:** Bahizi WJJ (Dr)
Mohamed VI University Hospital, Rabat, Morocco

Abstract | **Case Report**

Oroantral communications (OACs) are frequently iatrogenic, most commonly occurring after the extraction of maxillary posterior teeth in close proximity to the maxillary sinus. They may also result from tumor surgery, implant placement, trauma, or orthognathic surgery involving the maxilla. An untreated OAC creates a pathological communication between the oral cavity and the maxillary sinus, often leading to maxillary sinusitis and a significant deterioration in the patient's quality of life. Numerous surgical techniques have been described for the management of OACs, ranging from mucosal flap procedures to the use of bone substitutes or highly conservative alternative methods. However, recurrence after treatment has been reported, and selecting the most appropriate technique according to the clinical situation remains challenging. This study aims to highlight the usefulness of a pedicled buccal fat pad flap in the reconstruction of oroantral communications.

Keywords : oroantral communication ; maxillary sinus ; oral cavity; buccal fat pad.

INTRODUCTION

Oroantral communication (OAC) is defined as a pathological discontinuity between the maxillary sinus and the oral cavity. If left untreated, it may evolve into an oroantral fistula and lead to maxillary sinusitis [1]. OACs are most often iatrogenic, occurring after the extraction of maxillary posterior teeth. They may also be caused by tumor surgery, implant surgery, trauma, or orthognathic procedures involving the maxilla [2].

The buccal fat pad (BFP), also known as the Bichat fat pad, is an adipose structure of the maxillofacial region whose anatomical, embryological, physiological, and functional characteristics were recognized relatively late, along with its surgical relevance [3].

The anatomy of the pedicled buccal fat pad flap was first described by Stajčić and later by Rapidis and Tideman. A 2–3 cm incision is made in the mucosa, positioned at least 2 cm inferior to Stensen's duct, followed by careful blunt dissection to allow natural herniation of the fat pad while preserving its capsule [4].

This technique requires complete mucosal coverage. However, according to the literature, an uncovered BFP generally undergoes complete epithelialization within four to six weeks [5]. Rapid epithelialization of the exposed adipose tissue is a distinctive feature of the pedicled BFP flap and has been confirmed by histopathological studies.

Surgical management of OACs should be performed as early as possible. The choice of treatment depends on the size of the communication, the time elapsed since diagnosis, and the presence or absence of infection. In addition, the availability and condition of locaux tissus, as well as future implant placement, must be considered [6]. Therefore, closure of a long-standing OAC requires prior evaluation and treatment of the maxillary sinus.

Imaging studies, preferably computed tomography (CT) or dental cone-beam CT, are recommended to assess the extent of the communication and accurately measure the size of the bony defect [7]. In a healthy sinus, OACs smaller than 5 mm may close spontaneously. However, accurate clinical assessment of the diameter of an OAC is often difficult, making surgical intervention necessary in most cases. Several surgical techniques have been described, including the use of surrounding soft tissues such as vestibular flaps, palatal flaps, and the buccal fat pad [8].

The aim of this study is to present the value of the pedicled buccal fat pad flap (Bichat's fat pad) in the autoplastic closure of oroantral communications.

Case Report

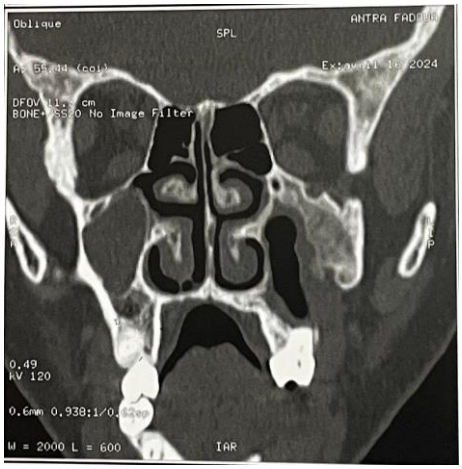
We report the case of a 19-year-old female patient with no significant medical history, presenting with left maxillomandibular odontogenic cysts evolving over nine years. In 2021, she underwent cyst enucleation with dental extractions (teeth 35–37) and osteotomy of the anterior wall of the left maxillary sinus, followed by left mandibular osteotomy with cyst excision and closure using a full-thickness flap.

In 2023, the patient developed intraoral fistulization at the surgical site, which progressed to an oroantral communication. Immediate closure using a mucoperiosteal flap was attempted, combined with antibiotic therapy consisting of a beta-lactam (amoxicillin–clavulanic acid 1 g, three times daily for 10 days), a fluoroquinolone (500 mg twice daily for 8 days), and a level I analgesic (paracetamol 1 g, three times daily for 5 days).

Postoperatively, the oroantral communication persisted with sinus fistulization into the oral cavity. Hemostasis assessment revealed no bleeding disorders, which was consistent with the absence of perioperative and postoperative bleeding.

Extraoral examination of the maxillofacial region revealed no abnormalities. Intraoral examination showed adequate mouth opening, poor oral hygiene, carious teeth (26–28, 37–38), absence of teeth 35–37, and a gingival fistula approximately 1 cm in diameter in the left maxillary region adjacent to tooth 24, without purulent discharge or food reflux. The gingivovestibular mucosa appeared healthy (Fig. 1).

A facial CT scan confirmed the presence of an oroantral communication (Fig. 2).



The diagnosis of a large alveolar-type oroantral communication was established. After identification of the left parotid duct orifice, a vestibular incision was made around the communication and extended by intrasulcular incisions. A full-thickness mucoperiosteal flap was elevated, and the edges of the communication were refreshed with curettage of granulation tissue.

A second incision was made in the depth of the left vestibule to access the buccal fat pad. The fat pad was gently mobilized using atraumatic forceps, the fascia was dissected, and the fat pad was advanced without excessive traction to cover the defect. It was sutured directly to the mucosal margins and covered with the mucoperiosteal flap.

Postoperatively, antibiotic therapy with amoxicillin–clavulanic acid and oral corticosteroids was prescribed. Corticosteroids were discontinued after 48 hours, while antibiotics were continued for 10 days. Paracetamol was administered for postoperative pain management. The patient was instructed to maintain strict oral hygiene with frequent mouth rinses.

Discussion

Oroantral communications are complications of oral and maxillofacial surgery that may result from anatomical factors or iatrogenic events. If not promptly managed, they can lead to unpleasant complications such as nasal leakage of fluids, sinusitis, rhinosinusitis, and cacosmia. Numerous surgical techniques for OAC closure have been described in the literature [8–12].

In the present case, a pedicled buccal fat pad flap was chosen for the management of the oroantral communication. The primary goal of treatment is eradication of infection and complete closure of the communication without recurrence. Treatment options depend on the size and location of the defect, the availability of keratinized tissue, and the presence or absence of adjacent teeth.

The combined use of a pedicled buccal fat pad flap and a vestibular mucoperiosteal flap was selected to enhance the airtightness of closure. This approach was particularly suitable due to the posterior location of the defect near tooth 24 and the high survival rate of these pedicled flaps. Our technique is consistent with those reported in the literature [10,11]. Denes et al. described a similar approach in the management of an oroantral communication following sequestrectomy in a 70-year-old woman receiving bisphosphonate therapy [10].

Our findings confirm previous literature regarding the etiology and consequences of oroantral communications. Extraction of posterior maxillary teeth remains the leading cause, accounting for approximately 76% of cases, followed by cystectomy (12%) and implant placement failure (6%). Postoperative edema and pain are potential complications of this technique. In most cases, the vestibular sulcus returns to its original shape within 4 to 8 weeks, although up to 40% of patients may experience permanent vestibular shortening.

The buccal fat pad is widely recognized as a reliable option for OAC closure, with one of the lowest recurrence rates reported. However, its successful use depends largely on the surgeon's experience. Various techniques for covering the buccal fat pad have been described, including partial mucosal coverage [8,13–17]. Owing to its rich vascular supply, the buccal fat pad promotes rapid healing and re-epithelialization [4].

Preoperative medical management with macrolide antibiotics and corticosteroids initiated 72 hours before surgery, and continued postoperatively, contributed to complete wound healing. This approach is consistent with published data [1,2,9–11,18].

Conclusion

Postoperative oroantral communication is a significant complication encountered in maxillofacial surgery, particularly in the management of maxillary tumors. Its treatment should be performed in the presence of a healthy sinus, following thorough sinus evaluation. Closure using a pedicled buccal fat pad flap is especially indicated for large oroantral communications and is widely supported by the literature.

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