

Journal section: Oral Surgery  
 Publication Types: Research

doi:10.4317/medoral.16.e215  
<http://dx.doi.org/doi:10.4317/medoral.16.e215>

## Use of Bichat's buccal fat pad for the sealing of orosinusal communications. A presentation of 8 cases

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Abad-Gallegos M, Figueiredo R, Rodríguez-Baeza A, Gay-Escoda C.  
 Use of Bichat's buccal fat pad for the sealing of orosinusal communications. A presentation of 8 cases. Med Oral Patol Oral Cir Bucal. 2011 Mar 1;16 (2):e215-9.  
<http://www.medicinaoral.com/medoralfree01/v16i2/medoralv16i2p215.pdf>

Received: 28/02/2010  
 Accepted: 27/06/2010

Article Number: 16908 <http://www.medicinaoral.com/>  
 © Medicina Oral S. L. C.I.F. B 96689336 - pISSN 1698-4447 - eISSN: 1698-6946  
 eMail: [medicina@medicinaoral.com](mailto:medicina@medicinaoral.com)  
**Indexed in:**  
 Science Citation Index Expanded  
 Journal Citation Reports  
 Index Medicus, MEDLINE, PubMed  
 Scopus, Embase and Emcare  
 Indice Médico Español

### Abstract

**Objectives:** To determine the efficacy of the pediculate flap with the buccal fat pad in the sealing of orosinusal communications, describe the surgical technique used, and report the main complications.

**Patients and method:** A retrospective study was made of 8 patients seen in the Service of Oral Surgery of the University of Barcelona Dental Clinic (Spain) for the treatment of orosinusal communications between the years 2007 and 2009. In all cases a pediculate flap with the buccal fat pad was used to solve the problem.

**Results:** All of the orosinusal communications were successfully resolved with this technique. The immediate postoperative complications were pain (37.5%), inflammation (37.5%), edema (32.5%), trismus (37.5%), halitosis (14.3%), suppuration (12.5%) and rhinorrhea (12.5%).

**Conclusions:** The use of Bichat's buccal fat pad is not regarded as the technique of choice for sealing small to medium sized orosinusal communications. However, in the case of large communications, it is a good option, and the results obtained are optimum.

**Key words:** Buccal fat pad, orosinusal communications.

### Introduction

An orosinusal communication is a pathological condition characterized by the presence of a communication between the oral cavity and the maxillary sinus secondary to loss of the normally separating soft and hard tissues (1). Orosinusal communications are relatively common in dentoalveolar surgery of the upper molars and

premolars, though they also may be caused by cystic disease, infections, tumors or trauma (2). The treatment strategy depends on a range of factors, including the location of the defect, its cause and size (3).

The appearance of an orosinusal communication can give rise to signs and symptoms of sinus disease that always require prior medical-surgical treatment (4).

The literature describes different techniques for repairing orosinus communications, such as the use of local flaps (vestibular and/or palatine) or distant flaps (tongue, temporal muscle, or the pediculate flap of Bichat's buccal fat pad, among others)(1,3).

In 1977, Egyedi (5) was the first to propose the use of the buccal fat pad for sealing orosinus communications, and posteriorly Tideman et al. (6) studied its anatomical characteristics and blood supply, described the surgical technique, and presented the clinical results of 12 cases of surgical defect reconstructions of the oral cavity.

Anatomically, the buccal fat pad is an encapsulated, rounded and biconvex, mainly adipose structure with an excellent blood supply from the maxillary, superficial temporal and facial arteries (5,7). This triple irrigation system is what makes it possible to use this tissue without much risk of necrosis (2). The fat pad is delimited by the buccinator muscle, the masseter muscle and the ascending mandibular ramus and zygomatic arch (5,7)(Fig. 1).



**Fig. 1.** Anatomical preparation in the cadaver, showing Bichat's fat pad and its main anatomical relations.

The advantages of the technique are the observation that age does not appear to be a determining factor in the selection of cases, and that postoperative radiotherapy would exert no negative effects upon survival of the flap. However, it is best to postpone irradiation until full epithelization of the flap has been completed (8).

In order to minimize the incidence of postoperative complications such as necrosis or infection, the flap must adequately cover the entire defect and should be sutured without tension (2).

The present study examines the efficacy of the pediculate flap with the buccal fat pad in the sealing of orosinus communications, describes the surgical technique used, and reports the main per- and postoperative complications observed.

## Patients and Methods

A retrospective observational study was made of 8 patients seen in the Service of Oral Surgery of the University of Barcelona Dental Clinic (Spain) for the treatment of orosinus communications between the years 2007 and 2009. In all cases a pediculate flap with the buccal fat pad was used to solve the problem. In 5 cases the underlying cause of the communication was the extraction of impacted upper third molars. In two cases the problem was attributable to the extraction of erupted upper molars that had previously suffered periapical infection, and in one case the communication was produced as a result of the removal of a residual cyst in the upper maxilla.

Sealing of the communication was carried out immediately after it was produced, except in two patients: (a) Case 1, in which simple monitoring was decided to see if spontaneous resolution occurred. Since the defect failed to seal spontaneously, reintervention was later decided, using the pediculate flap with the buccal fat pad; (b) Case 4, where guided bone regeneration was carried out following creation of the communication. Due to persistence of the defect, a pediculate flap with the buccal fat pad was subsequently raised to resolve the problem.

The study variables comprised patient age and gender, the cause of the communication, its location, size, treatment and the per- and postoperative complications. We also evaluated the possible persistence of the communication after reparatory surgery, and whether another technique was needed to definitively seal the defect.

The SPSS version 15.0 statistical package (SPSS Inc., Chicago, IL, USA; University of Barcelona license) was used for the descriptive statistical analysis of the variables.

### *-Surgical technique*

In order to gain access to the buccal fat pad, a mucoperiosteal flap is raised, performing a 1-cm horizontal incision in the periosteum in the upper zone of the tuberosity of the upper maxilla, followed by location of the pad and traction towards the oral cavity (1). Stajčić (7) recommends limiting the incision to no more than 5 mm in size, in order to prevent excessive adipose tissue emergence and herniation in the postoperative period. The buccal fat pad is sutured to the palatine mucosa, and the previously raised flap is repositioned over it, with closure in two layers. If despite attempting to seal the defect by first intention with the mentioned mucoperiosteal flap a portion of the buccal fat pad is exposed within the oral cavity, complete healing of the wound can be observed within three weeks – with the appearance of fibrous connective tissue covered by an immature and non-keratinized squamous epithelial layer (6).

## Results

The mean patient age was 34.9 years (range 23-50), with a clear female predominance (85.7%, n=6). The dimensions of the orosinus communications are reported in table 1. The maximum defect size in our series was 1 cm (case 4), and was the result of residual cyst removal in the upper maxilla.

Table 1 shows the treatment used in each of the cases. In case 1 simple monitoring was decided to see if spontaneous resolution of the defect occurred. Since the communication failed to seal spontaneously, reintervention was decided, using the pediculate flap with the buccal fat pad. In cases 2 and 3 textured collagen dressing was placed (Lyostip®, B. Braun, Tuttlingen, Germany) prior to sealing of the communication using un pediculate flap with the buccal fat pad. Case 4 corresponded to an orosinus communication produced by the removal of a residual cyst, and the defect was initially regenerated using Bio-Oss® (Geistlich Pharma AG, Wolhusen, Switzerland), with the placement of a reabsorbable collagen membrane (BioGide®, Geistlich Pharma AG, Wolhusen, Switzerland). In this patient a pediculate flap with the buccal fat pad was used in second step treatment due to persistence of the communication. Lastly, in cases 5, 6, 7 and 8 (representing 42.9% of the total series), a pediculate flap with the buccal fat pad was used

as immediate treatment due to observed herniation of the latter in the same surgical step, or to deliberate exposure of the fat pad for use in sealing the communication.

No second operation proved necessary in the cases where textured collagen dressing was used and/or a pediculate flap with the buccal fat pad was employed, since satisfactory sealing of the communication was observed (cases 2, 3, 5, 6, 7 and 8). In the case of the upper maxillary cyst (case 4), and following guided bone regeneration (GBR), the patient developed symptoms, surgical wound suppuration and fenestration of the membrane over a zone measuring about 1 cm in size. As a result, second step surgery was decided, using a pediculate flap with the buccal fat pad. Antibiotics, analgesics and antiinflammatory drugs were prescribed in all patients, and regular postoperative controls were programmed until complete resolution of the cases.

There were no peroperative complications in our series. The most relevant immediate postoperative complications were pain (37.5%), inflammation (37.5%), edema (32.5%) and trismus (37.5%). Less frequent problems were halitosis (14.3%), suppuration (12.5%) and rhinorrhea (12.5%). The mean duration of postoperative follow-up was 7.5 weeks (range 4-18). In no case was persistence of the orosinus communication observed.

**Table 1.** Study variables.

| Case | Age | Gender | Etiology                           | Location            | Size   | Immediate treatment                                                  | Posterior treatment                   | Peroperative complications | Postoperative complications                                                                |
|------|-----|--------|------------------------------------|---------------------|--------|----------------------------------------------------------------------|---------------------------------------|----------------------------|--------------------------------------------------------------------------------------------|
| 1    | 35  | Female | Extraction of 1.8                  | Tuberosity zone     | 2.5 mm | Control                                                              | Pediculate flap with Bichat's fat pad | None                       | Pain<br>Suppuration of nose and mouth<br>Infraorbital inflammation<br>Halitosis<br>Trismus |
| 2    | 24  | Female | Extraction of 2.8                  | Tuberosity zone     | 4 mm   | Textured collagen (Lyostip®) + pediculate flap with Bichat's fat pad | ---                                   | None                       | Trismus<br>Edema<br>Inflammation                                                           |
| 3    | 47  | Female | Extraction of root fragment of 1.6 | Zone of first molar | 3.5 mm | Textured collagen (Lyostip®) + pediculate flap with Bichat's fat pad | ---                                   | None                       | Rhinorrhea                                                                                 |
| 4    | 41  | Female | Removal residual cyst              | Zone of first molar | 10 mm  | Guided bone regeneration (*)                                         | Pediculate flap with Bichat's fat pad | None                       | Pain<br>Suppuration                                                                        |
| 5    | 29  | Male   | Extraction of 1.8                  | Tuberosity zone     | 2 mm   | Pediculate flap with Bichat's fat pad                                | ---                                   | None                       | None                                                                                       |
| 6    | 27  | Female | Extraction of 1.8 and a distomolar | Tuberosity zone     | 4 mm   | Pediculate flap with Bichat's fat pad                                | ---                                   | None                       | Trismus<br>Edema                                                                           |
| 7    | 41  | Female | Extraction of 2.8                  | Tuberosity zone     | 2 mm   | Pediculate flap with Bichat's fat pad                                | ---                                   | None                       | Inflammation<br>Pain                                                                       |
| 8    | 28  | Male   | Extraction of 1.8                  | Tuberosity zone     | 2 mm   | Pediculate flap with Bichat's fat pad                                | ---                                   | None                       | None                                                                                       |

(\*) Bio-Oss® was used, and a reabsorbable BioGide® collagen membrane was placed

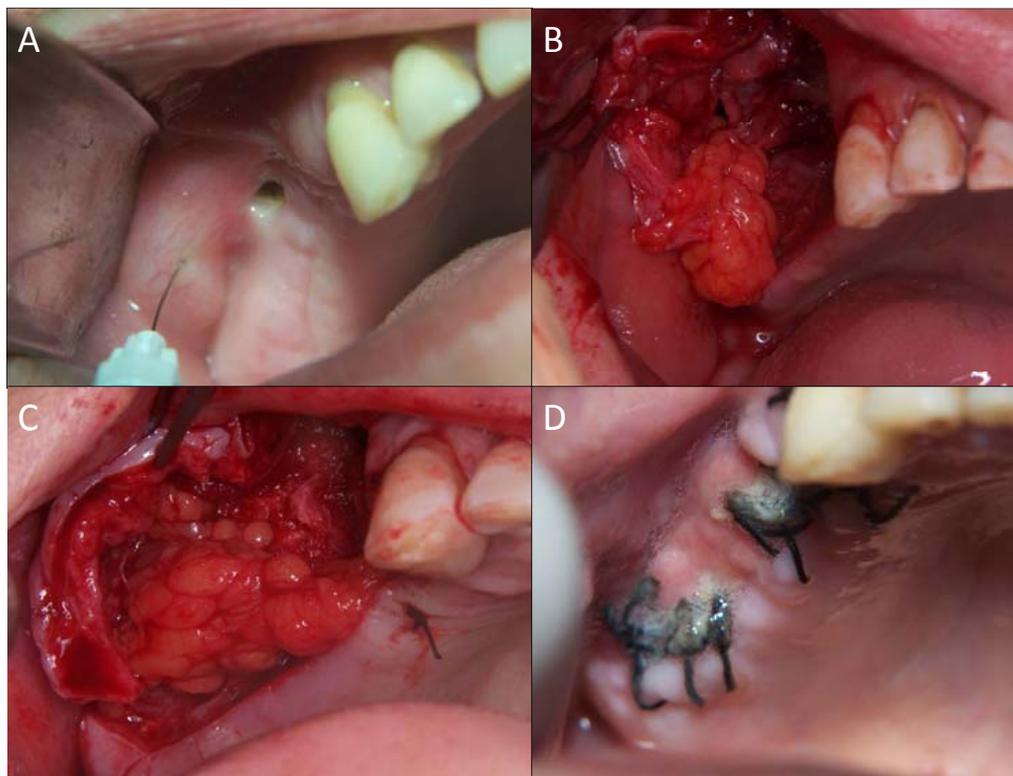
## Discussion

The buccal fat pad is an easily accessible adipose tissue used for the reconstruction of oral defects. The raising of a mucoperiosteal flap, performing a horizontal incision in the periosteum in the upper-posterior zone of the tuberosity of the upper maxilla, usually suffices to gain access to the adipose pad. Stajčić (7), who successfully used this technique in 56 orosinus communications, offers a number of recommendations: firstly, the periosteal incision may be unnecessary in cases where there is vertical laceration of the vestibular periosteum. Secondly, on raising the flap, the periosteal incision should be no greater than 5 mm in size, since in some cases excessive adipose tissue may emerge from the incision and complicate visualization of the surgical field. In turn, from the moment in which the fat pad becomes visible within the oral cavity, aspiration of the surgical zone should be performed intermittently, in order to prevent aspiration of the adipose tissue – with the resulting damage to the blood supply. Lastly, care is required in maneuvering the adipose mass, in order to avoid damaging the blood vessels; in particular, applying forceps to the proximal portion of the capsule is to be avoided, since necrosis of the distal adipose lobes could result (8).

Hao (9) considered the ideal defects for reconstruction with this technique to be those located in the upper

maxilla, due to the anatomical proximity of the fat pad. However, this author also pointed out that the buccal fat pad can be used for reconstruction in more distant zones such as the retromolar trigone and palate. Neder (10) published two cases in which the buccal fat pad was used as a free graft to seal intraoral defect, with good results. According to Stajčić (7), the technique of choice in the case of orosinus communications secondary to tooth extractions is the straight advancement flap. However, he commented that the use of Bichat's fat pad in cases where the vestibular or palatine alveolar periosteum is very damaged constitutes a very valid option – since the success rate is very high, and this technique moreover does not alter the vestibular depth.

As regards the size of the communication, Tideman et al. (6) concluded that the maximum defect size amenable to reconstruction without affecting the blood supply is 3 mm in height x 5 mm in width. This coincides with the observations in our own series, where the mean defect size was 3.7 mm. The mentioned authors also reported that the buccal fat pad exposed within the oral cavity undergoes epithelization within 2-3 weeks; as a result, total covering with the flap is not necessary to ensure treatment success (6). Such epithelization occurs in both the oral and in the sinusal zones (1,4). In our study, the buccal fat pad was exposed in three cases, and epithelization occurred within 1-2 weeks (Figure 2).



**Fig. 2.** Pediculate flap with Bichat's buccal fat pad used for sealing an orosinus communication at right upper first molar level. (A) Preoperative view of the defect. (B) Bone defect of the communication. (C) Mobilized fat pad covering the surgical defect, with sealing of the communication. (D) View of the surgical zone 7 days after the operation.

A number of authors such as Rapidis et al. (11) or Alkan et al. (12) have described the successful use of this technique for the reconstruction of medium to large size defects (up to 5 cm), thus exceeding the limits proposed by Tideman et al. (6). De Moraes (13) described a case in which the fat pad technique was used to seal an orosinus communication in the same surgical step used for zygomatic implant placement. The data obtained in our series coincide with the results of the above authors, since all the orosinus communications were successfully resolved after using a pediculate flap with Bichat's buccal fat pad.

The most frequent complications described in the literature with this technique are infection, necrosis or partial rupture of the flap (6,11). None of these problems were recorded in our series, however. Pain and trismus lasting up to several weeks have been described (8). We observed these complications in our patients, along with inflammation, edema, rhinorrhea, suppuration and halitosis in the immediate postoperative period. All these problems resolved within two weeks.

It is important to ensure complete covering of the surgical defect, suturing without tension, and providing the patients with strict postoperative instructions until total healing of the wound has been achieved, in order to minimize the incidence of such complications (12). The patients should be instructed to avoid all forms of Valsalva's maneuver (involving negative pressure) in the first postoperative weeks. If this surgical technique fails to resolve the defect – normally due to the reasons already commented above – more aggressive treatments are required, such as distant tongue or temporal muscle flaps, etc. (11). The vestibular or palatine advancement flap is one of the most commonly used options, but usually proves insufficient in the case of medium to large defects (1,8).

The use of a pediculate flap with the buccal fat pad is a simple and rapid technique that can be used to seal defects measuring up to 5 cm in diameter, with no changes in patient anatomy or function (11,12). The literature shows that this technique can be successfully used to cover defects in the palatine region or oral mucosa, to seal oronasal fistulas, cover bone graft surfaces, and reconstruct posttraumatic defects (8,11). Additional advantages are the great elasticity and excellent blood supply of this anatomical structure, which thus appears as a good treatment option, affording optimum results (2).

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### Acknowledgments

This study has been carried out by the research group in "Dental and Maxillofacial Pathology and Treatment" of the Institut d'Investigació Biomèdica de Bellvitge (IDIBELL), with financial support from the oral surgery teaching-healthcare agreement among the University of Barcelona, the Consorci Sanitari Integral and the Servei Català de la Salut of the Generalitat de Catalunya.