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Case Report

Closure of Oroantral Communication with a Palatal Flap: A Case Report

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Abstract.

Sinus augmentation and tooth extraction are routine procedures in dentistry. Sometimes, it can result in oroantral communication (OAC), posing a relevant clinical challenge and requiring a systematic and individualized approach. OAC, if untreated, may evolve into a chronic fistula. The objective of this clinical report was to describe a successful clinical closure of a persistent OAC, using a palatal rotation-advancement flap. A 24-year-old male presented with a chronic OAC following the extraction of the left maxillary first molar, reporting nasal fluid regurgitation and mild facial swelling. Cone beam computed tomography confirmed a persistent 1-cm communication between the oral cavity and maxillary sinus, without clinical or radiographic signs of sinusitis. Surgical closure was performed using a pedicled palatal rotational flap under local anesthesia. The flap provided tension-free closure while preserving vestibular depth and keratinized tissue. Postoperative follow-up at 7, 14, and 21 days showed uneventful healing with no signs of infection or dehiscence. A complete closure and no recurrence were observed after a 45-day follow-up. The technique provided well-vascularized, keratinized tissue with minimal donor-site morbidity and maintained vestibular depth, allowing long-term functional and esthetic stability. Postoperative follow-up of this clinical case demonstrated complete healing and absence of sinus complications, confirming the palatal flap as a predictable and conservative alternative for oroantral closure in posterior maxillary defects.

1. Introduction

Oroantral communication (OAC), or an oroantral fistula, is a relatively common complication following maxillary molar extractions, periapical surgeries, cyst removals, and implant procedures. Some studies stated an incidence of approximately 0.31% for OAC after extractions, particularly in older or specific patient cohorts; this figure appears in case-series and retrospective analyses emphasizing the rarity yet clinical significance of OAC.[1,2] Other sources cite a higher incidence of around 5% for OAC following maxillary posterior extractions, especially considering the anatomical proximity of molar roots to the sinus; imaging assessments and case compilations confirm this upper-bound figure.[3,4]

When left unmanaged, OAC may progress to a chronic oroantral fistula (OAF), characterized by epithelialization and persistent sinus pathology, with associated recurrent sinus infections and discomfort. OAC continues to be a common, iatrogenic complication of maxillary molar and premolar extractions whose management is based on prompt diagnosis, management of sinus pathology, and choice of a sound closure method that minimizes morbidity and the chance of progression to an OAF.[5,6] Current evidence suggests that chronic sinus inflammation significantly impairs outcomes and requires complete resolution of sinus disease before definitive closure, using methods from buccal fat pad flaps to mucoperiosteal advancement and sinus membrane–protective approaches to prevent recurrence.[7,8]

Treatment thus primarily aims to reestablish the anatomical separation between the oral cavity and the maxillary sinus, eliminate sinus infection, and preserve soft tissue architecture for potential prosthetic or implant-supported rehabilitation. Several case series and reviews advocate the buccal fat pad (BFP) as a reliable vascular flap for large (>5 mm) communications, given its favorable blood supply, simplicity, and high success rates; however, defect size, tissue quality, and preservation of vestibular depth remain critical determinants of success.[7,9] In scenarios with concomitant pathology such as zygomatic implants or complex intra-sinus lesions, adjunctive regenerative and reconstructive strategies (e.g., pedicled buccal fat pad use, simultaneous sequestrectomy, and careful management of infection) may reduce sinusitis-related complications and improve functional outcomes over extended follow-ups.[10,11]

When infection or epithelialization has progressed or been neglected, secondary procedures become necessary, underscoring the need for early recognition, multidisciplinary assessment, and a tailored, staged approach to OAC/OAF management that prioritizes infection control, sinus protection, and durable defect closure.[6,12] Thus, the contemporary paradigm advocates prompt, infection-controlled closure using well-validated local flap techniques (notably BFP) for sizable defects, with consideration of endoscopic-assisted strategies in selected cases to optimize healing, preserve vestibular architecture, and maintain long-term oral-sinus continence.[13,14]

Current guidelines and systematic reviews highlight that treatment decisions should be based on defect size, duration, and sinus health status.[7,15] Defects smaller than 5 mm may heal spontaneously or with conservative approaches, whereas larger or chronic defects require surgical intervention using local flaps, grafts, or combined techniques. Although multiple methods have been described for OAC closure, there is limited detailed reporting on the decision-making process for flap selection in chronic, medium-sized defects without associated sinus pathology, particularly

in young patients with future rehabilitative needs. The goal of this case report was to demonstrate a palatal flap technique for treating OAC, highlighting its utility in managing moderate-to-large OACs, particularly when vestibular preservation and tissue quality are priorities. This case is clinically relevant because it documents the successful management of a long-standing (7-month) 1-cm OAC, highlighting that predictable closure can be achieved with a local palatal flap without adjunctive sinus surgery. It contributes to the literature by reinforcing that defect chronicity and size, when combined with favorable sinus conditions, do not necessarily mandate more invasive approaches.

2. Case Report

2. 1 Case Presentation

This case report was exempt from IRB approval, and before beginning treatment, the patient signed the informed consent form. A 24-year-old male patient with melanoderma was referred to the Oral Surgery Clinic of the School of Dentistry (Rio de Janeiro, Brazil) for evaluation of a possible OAC. The patient reported liquid passage through the nasal cavity during drinking and mild swelling of the left midface for two weeks. The medical history was non-contributory, but he had undergone extraction of the left maxillary first molar seven months earlier due to a crown-root fracture.

Based on the clinical history, posterior maxillary location, and symptomatology, an oroantral communication was considered the primary diagnosis. Other potential causes, such as nasopalatine fistula or primary odontogenic sinusitis without communication, were considered less likely and excluded because of the absence of anterior palatal involvement and the clear evidence of a direct communication on imaging.

Cone Beam Computed Tomography (CBCT) (Figure 1) revealed a 1-cm communication between the maxillary sinus and oral cavity, confirming a persistent OAC. The CBCT examination did not show signs of acute sinus pathology, such as air-fluid levels, total sinus opacification, or pronounced mucosal thickening. Clinically, the patient did not present symptoms suggestive of active maxillary sinusitis, including purulent nasal discharge, facial pain, or fever. These findings supported proceeding with surgical closure without prior sinus intervention.

CBCT was performed using a limited field of view (8×8 cm) and a voxel size of 0.2 mm, providing adequate spatial resolution for evaluation of the maxillary sinus and the oroantral defect. Defect size was determined using multiplanar reconstructions, and the maximum linear diameter measured on CBCT images was approximately 1 cm.

Figure 1. CBCT showing oroantral communication on slice 10 (tooth #26 – 1st left maxillary molar).

2. 2 Procedure

Local anesthesia was achieved using a combination of left infraorbital nerve block (0.9 mL), posterior superior alveolar nerve block (1.8 mL), greater palatine nerve block (0.6 mL), and nasopalatine nerve block (0.6 mL), totaling 3.9 mL of 4% articaine with 1:100,000 epinephrine (DFL®, Rio de Janeiro, Brazil) delivered with a short 30G dental needle (DFL®, Rio de Janeiro, Brazil). After 10 minutes, an additional 0.9 mL was infiltrated to ensure adequate hemostasis (Figure 2).

Figure 2. Achievement of hemostasis (anesthesia) before the surgical incision in the affected region.

Following intraoral antisepsis with 0.12% chlorhexidine mouthwash and extraoral preparation with 2% chlorhexidine soap, sterile draping was performed. Anesthesia was administered using an aspirating dental syringe (Rhosse®, Ribeirão Preto, Brazil). After confirming anesthesia, a palatal incision in a 'racket-shaped' design was made with a No. 15 blade (Descarpack®, São Paulo, Brazil), extending from anterior to posterior to provide a wide, flexible, and well-vascularized flap (Figure 3).

Figure 3. Delineation of the surgical flap design.

The choice of a palatal rotational flap was based on the presence of thick, well-keratinized palatal tissue, its robust blood supply from the greater palatine artery, and the need to preserve the buccal vestibular depth for future prosthetic or implant rehabilitation. Alternative techniques, such as buccal advancement flaps or the use of the buccal fat pad, were considered less favorable in this case because they could reduce vestibular depth and because the adequacy of local palatal tissue for tension-free closure was uncertain. Thus, the palatal flap represented the most conservative and biologically favorable option for achieving stable closure in this specific clinical scenario.

Mucoperiosteal dissection was performed using a Molt No. 9 periosteal elevator (Rhosse®, Ribeirão Preto, Brazil), allowing full exposure of the osseous defect (Figure 4). The defect presented well-defined margins and satisfactory surrounding tissue quality, enabling stable flap repositioning.

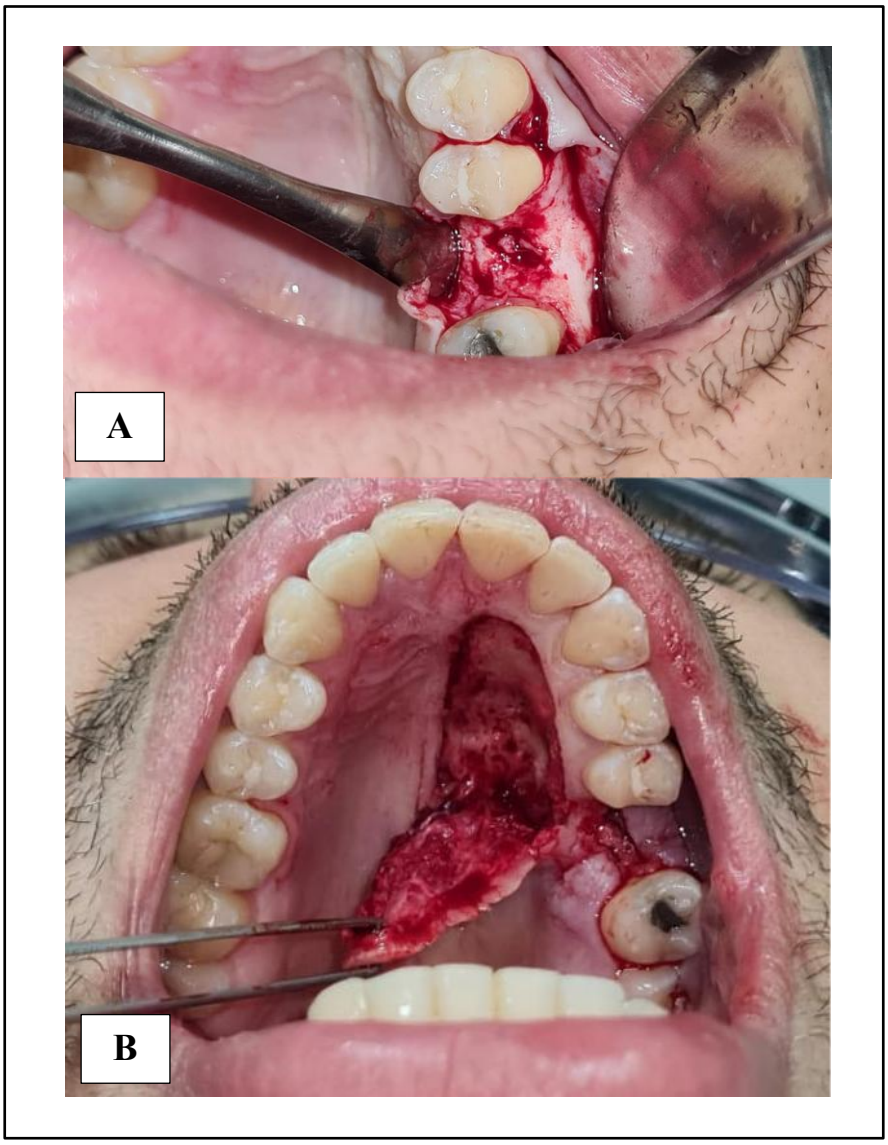

Figure 4. A) Exposure of the oroantral communication site. B) Palatal tissue exposure along with visualization of the greater palatine artery.

The flap was then repositioned and sutured with simple interrupted 5-0 nylon sutures (Ethicon®, Johnson & Johnson, São Paulo, Brazil) (Figure 5).

Figure 5. Placement of simple interrupted sutures for stabilization of the surgical flap.

No surgical dressing was used; instead, a preoperatively fabricated thermoplastic acetate plate was used to protect the surgical site and ensure flap stability (Figure 6). It was kept for 14 days to support initial healing. Postoperatively, the patient was prescribed systemic antibiotics (Amoxicillin/Clavulanate 875/125 mg orally every 12 hours for 7 days) and anti-inflammatory medication (Ibuprofen 600 mg orally every 8 hours for 3 days) according to standard protocols for OAC management, despite the absence of clinical or radiographic signs of active infection.

Oral hygiene instructions were rinse gently with 0.12% chlorhexidine mouthwash 2–3 times daily for 7–10 days, avoiding vigorous rinsing during the first week; use a soft toothbrush near the surgical site; prevent trauma to the flap. Maintain usual oral hygiene in non-surgical areas to prevent secondary infections. No additional laboratory tests, such as microbial culture or antibiogram, were deemed necessary. The patient was also instructed to follow standard sinus precautions, including avoidance of nose blowing, sneezing with a closed mouth, and actions that could increase intra-sinus pressure.

2. 3 Postoperative Outcome and Evaluation

Postoperative follow-up at 7, 14, and 21 days showed uneventful healing with no signs of infection, flap viability, donor-site healing, or dehiscence. At each visit, flap stability, mucosal color, absence of inflammation, and integrity of the surgical closure were confirmed.

After 45 days of follow-up, the patient remained asymptomatic, with complete sinus integrity and no recurrence of communication (Figure 7). Although the short-term outcome was favorable, a longer follow-up is desirable for defects of this size.

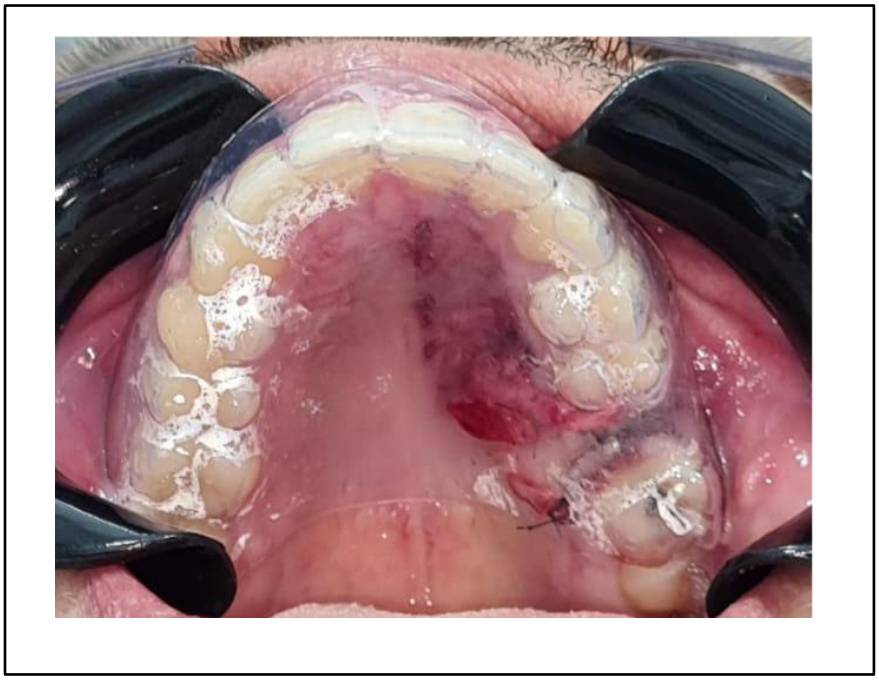

Figure 6. Immediate placement of the protective plate over the surgical site.

Figure 7. Clinical photograph showing healing at 45 days postoperatively.

The patient reported normal chewing function, absence of nasal regurgitation, and no sinus-related symptoms such as facial pressure, nasal discharge, or congestion throughout the follow-up period. Subjective comfort was rated as satisfactory, with only mild and transient palatal discomfort during the first postoperative week, which resolved spontaneously.

3. Discussion

Sinus augmentation is a routine procedure for many dentists that involves various techniques and biomaterials.[16-19] Therefore, oroantral communication following sinus procedures or extractions remains a relevant clinical challenge at that site, requiring a systematic and individualized approach.

In the present case, a 24-year-old male patient presented with a chronic OAC measuring approximately 1 cm in diameter, persisting for seven months after extraction of the left maxillary first molar. Despite the chronicity and size of the defect, no clinical or radiographic signs of active maxillary sinusitis were detected, which allowed for primary surgical closure without prior sinus intervention.

Parvini et al. [7] highlighted that the size of the oroantral defect and the duration of communication are critical determinants in selecting the most suitable surgical approach. Small, recently formed fistulas may heal and resolve spontaneously or respond favorably to conservative management; however, chronic or extensive fistulas generally require surgical closure with well-vascularized flaps. Given the chronic nature and 1-cm size of the defect in this patient, spontaneous closure was unlikely, reinforcing the indication for surgical management.

In this context, the palatal flap has been recognized as typically predictable and effective, particularly for posterior maxillary defects, because it maintains vestibular depth and provides keratinized mucosa. These features are advantageous for subsequent implant-supported rehabilitation.[20] In the present case, the palatal flap was specifically selected due to the presence of thick, well-keratinized palatal tissue, the robust vascular supply from the greater palatine artery, and the need to preserve the buccal vestibule for potential future prosthetic or implant therapy.

The effectiveness of the palatal flap is fundamentally related to its predictable vascular anatomy. The flap is primarily supplied by the greater palatine artery, which provides robust, consistent blood flow through its pedicled design. This vascularization is critical for maintaining flap viability, supporting rapid revascularization of the recipient site, and reducing the risk of ischemia and wound breakdown. From a biomechanical perspective, the thickness and keratinized nature of the palatal mucosa confer increased resistance to mechanical stress during mastication and speech, allowing the flap to withstand functional loading during the early phases of healing. Together, these physiological characteristics explain the high success rates reported for palatal flaps in the closure of chronic oroantral communications, particularly in posterior maxillary regions where tensile forces are greater.

Despite its biological advantages, the palatal flap is not devoid of potential complications. Intraoperative bleeding may occur due to the palatal mucosa's rich vascular supply, necessitating careful flap elevation and meticulous hemostasis. Postoperatively, patients may experience donor-site discomfort, delayed palatal epithelialization, or transient speech alterations. Partial flap

necrosis, although uncommon, may occur if excessive tension or pedicle compromise is present. Additionally, temporary or, more rarely, persistent sensory alterations related to the greater palatine nerve have been reported. Proper flap design, preservation of the vascular pedicle, tension-free suturing, and the use of protective palatal appliances are essential measures to minimize these risks and optimize clinical outcomes.

Ibraheim et al. [21] demonstrated high success rates and low donor-site morbidity with the use of pedicled palatal flaps, thereby reinforcing their reliability in clinical practice. Tanabe et al.[22] further expanded on the versatility of the island flap modification, enabling coverage of larger defects while minimizing distortion of the surrounding anatomy. Complementarily, Dipalma et al.[15] emphasized the importance of addressing associated sinus pathology, suggesting that flap closure should be performed in conjunction with endoscopic sinus management to optimize long-term outcomes. In contrast, the absence of sinus infection or mucosal disease in this patient supported an isolated intraoral surgical approach. Similarly, Oliva et al.[6] have shown that palatal flaps achieve comparable or superior success rates to buccal advancement flaps while maintaining vestibular depth, a significant advantage for future prosthetic reconstruction.

Visscher et al.[23] reported that, despite the efficacy of buccal fat pad flaps in managing large oroantral defects, their continued use may reduce vestibular height, thereby compromising prosthetic rehabilitation. In contrast, a study focused on the biological advantages of palatal keratinized tissue: notably high mechanical resilience and favorable esthetic integration, both of which further support its indication for defect closure in the posterior maxilla.[24] These biological advantages were particularly relevant in the present case, given the posterior location of the defect and the patient's young age.

Despite these advantages, palatal flaps are not free of limitations. Potential drawbacks include intraoperative bleeding due to the vascular nature of the flap, postoperative discomfort at the donor site, transient speech alteration, and delayed palatal healing. Careful flap design, meticulous hemostasis, and the use of a protective palatal plate were employed in this case to mitigate these risks. Although short-term healing was uneventful, the relatively limited follow-up period represents a limitation. Longer-term follow-up is desirable to confirm sustained closure and absence of recurrence, particularly in defects of this size.

4. Conclusion

Palatal flap closure of OACs has shown minimal donor site morbidity and preservation of buccal depth. The palatal flap offers considerable advantages over buccal advancement when future implant placement is planned. Treatment must be individualized, but in most clinical situations involving oroantral communications, the palatal flap can be considered a first-line option. Nevertheless, as a single case report, these findings have limited generalizability and should be interpreted with caution, highlighting the need for further studies with larger samples and longer follow-up.

Abbreviation	Full Form
OAC	oroantral communication
OAF	oroantral fistula
BFP	buccal fat pad
IRB	Institutional Review Board
CBCT	cone beam computed tomography

DECLARATIONS

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