



Vestibular Flap for Oroantral Fistula Closure: A Report of Two Cases and Review of the Literature

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Abstract

Oroantral communication (OAC) is a common complication of maxillary posterior tooth extraction that, if untreated beyond two to three weeks, epithelializes into an oroantral fistula (OAF) predisposing to chronic maxillary sinusitis. We report two adult patients with persistent buccal fistulae after extraction of maxillary molars. Case 1, a 33-year-old woman, presented three weeks after extraction of tooth 26 with a fistula and an associated periapical radiolucency; management comprised cystic enucleation, extraction of teeth 24 and 25, and closure with a vestibular (buccal) advancement flap. Case 2, a 35-year-old man, presented with a six-month fistula at the site of tooth 16 and radiographic loss of the sinus floor cortical plate, closed with the same technique. Both patients healed uneventfully with complete closure at six months. The vestibular advancement flap is a simple, reliable first-line option for small-to-moderate oroantral defects, though technique selection should be individualized.

Keywords: Oroantral fistula; oroantral communication; buccal advancement flap; vestibular flap; maxillary sinus; case report.

1. Introduction

Oroantral communication (OAC) is defined as an abnormal, non-epithelialized opening between the oral cavity and the maxillary sinus. If it is not closed within roughly two to three weeks, the tract becomes lined by epithelium and constitutes an oroantral fistula (OAF), a chronic condition that rarely resolves spontaneously [1,2].

Extraction of the maxillary premolars and molars is by far the leading cause, accounting for close to half of all cases, because of the intimate anatomical relationship between these root apices and the sinus floor, which may be as thin as 1–7 mm [2,3]. Reported incidence after posterior maxillary extraction ranges widely, from under 1% to as high as 11%, depending on the series and diagnostic criteria used [4,5]. Other, less frequent causes include periapical and periodontal infection, removal of cysts or tumours of the maxilla, trauma, complications of implant placement or sinus-lift procedures, osteoradionecrosis, and the Caldwell–Luc approach [4,5].

Left untreated, an open communication allows oral flora, food debris, and saliva to seed the maxillary sinus, producing odontogenic maxillary sinusitis, which is now recognised as one of the most common causes of unilateral chronic sinusitis referred to otolaryngology [6]. Diagnosis relies on the history (fluid regurgitation into the nose, altered nasal resonance, whistling sound), a positive nose-blowing or Valsalva test, direct probing, and imaging orthopantomogram, periapical films, or cone-beam CT when the extent of bony destruction needs to be assessed [4,6].

Once the indication for surgical closure is established, the surgeon can choose among a wide range of local flaps and graft materials, most of which fall into three families: buccal (vestibular) flaps, palatal flaps, and buccal fat pad flaps, sometimes combined with bone or membrane grafts [2,3,7]. The vestibular advancement flap described by Rehrmann in 1936 remains the most widely taught and used technique because of its simplicity and reliability, but it has recognized anatomical and functional trade-offs that are still debated in the recent literature [1,2,8]. We report two cases of oroantral communication managed with this technique and use them as a basis to review, and compare in tabular form, the surgical alternatives currently described for OAC/OAF closure.

2. Case Presentation

2.1 Case 1

A 33-year-old woman in good general health was referred three weeks after extraction of the maxillary left first molar (tooth 26) by a private practitioner, for a persistent fistula at the extraction site. Clinical examination confirmed a patent buccal fistulous tract communicating with the maxillary sinus (Fig. 1). A panoramic radiograph showed a well-circumscribed radiolucent lesion related to the region of teeth 24–25, radiographically consistent with a residual/radicular cyst (Fig. 2). No signs of acute sinus infection were present.

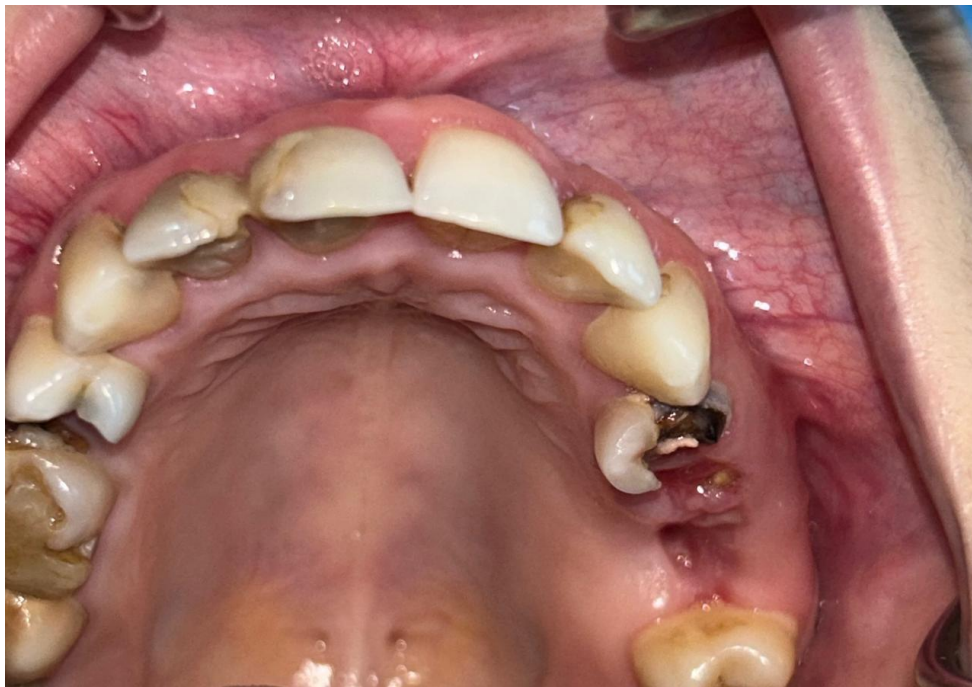


Figure 1: Preoperative clinical view showing the persistent oroantral fistula at the extraction site of tooth 26.

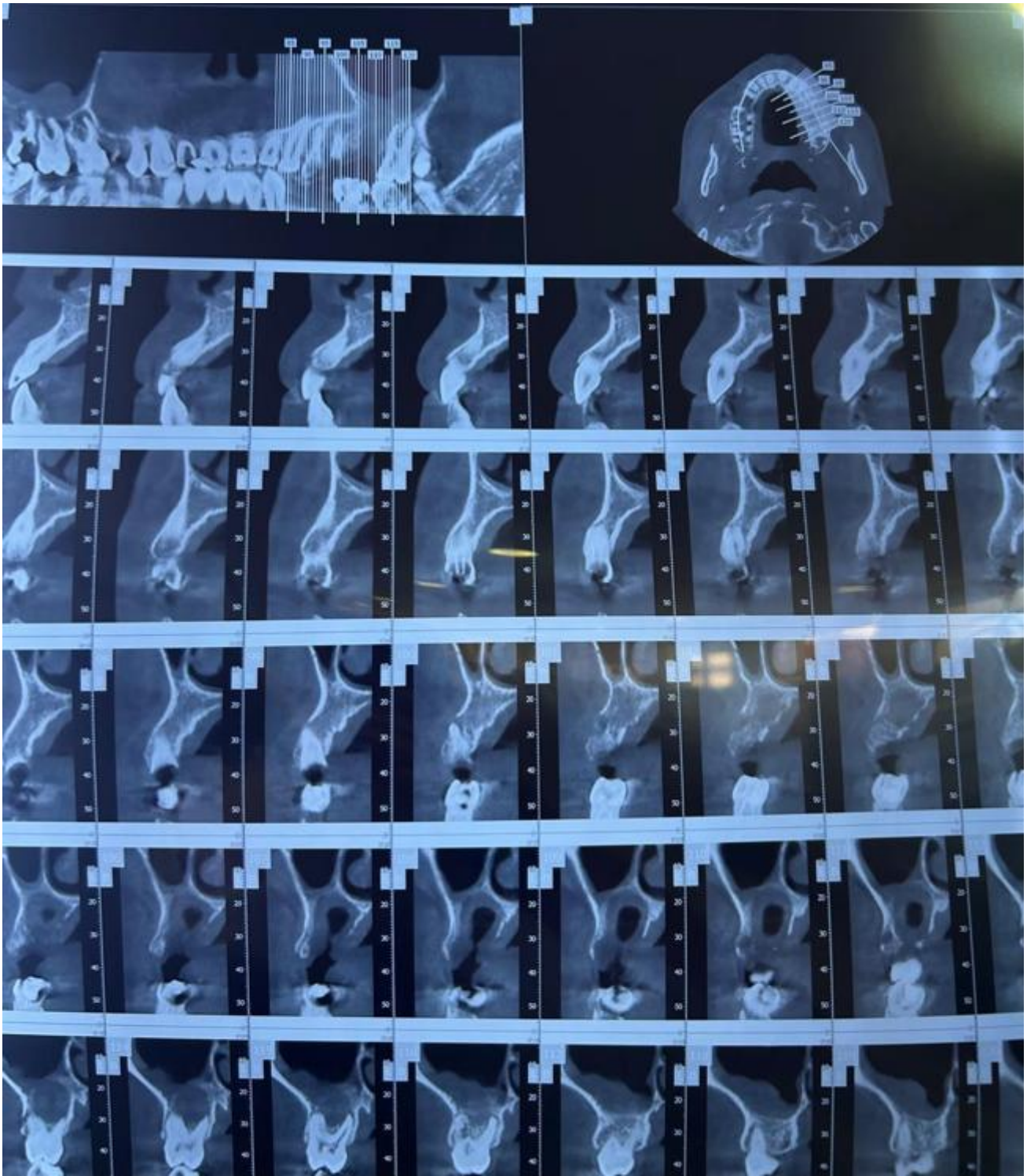


Figure 2: Preoperative panoramic radiograph showing a well-defined periapical radiolucency in relation to teeth 24–25.

Under local anaesthesia, the cystic lesion was enucleated, teeth 24 and 25 judged non-restorable were extracted, and the resulting bony and mucosal defect was closed in a single stage with a trapezoidal vestibular (buccal) advancement flap: two divergent releasing incisions were made mesial and distal to the defect, a mucoperiosteal flap was raised, the periosteum on the undersurface of the flap was incised to gain passive length, and the flap was advanced palatally over the defect and secured with tension-free interrupted sutures (Fig. 3). Standard postoperative instructions were given (avoidance of nose-blowing, sneezing with the mouth closed, use of a straw, and forceful spitting for two weeks), together with antibiotics, a decongestant, and analgesics.

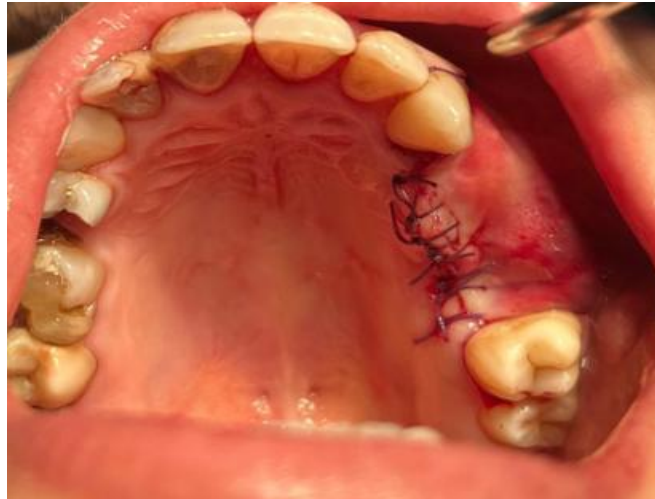


Figure 3: Immediate postoperative view: buccal advancement flap closure of the oroantral communication (Case 1).

At the 6-month review the fistula was completely closed, with no clinical or radiographic evidence of residual communication or sinus disease, and a stable, though slightly shallower, buccal sulcus (Fig. 4).



Figure 4: Six-month postoperative clinical view of Case 1 showing complete closure of the fistula.

2.2 Case 2

A 35-year-old man in good general health presented with a fistula at the site of the extracted right maxillary first molar (tooth 16), persisting for more than six months despite the absence of pain or purulent discharge (Fig. 5). Radiographic examination showed loss of continuity of the sinus floor cortical plate with a direct osseous communication between the oral cavity and the maxillary sinus, confirming a chronic oroantral fistula (Fig. 6).



Figure 5: Preoperative clinical view showing the persistent oroantral fistula six months after the extraction of tooth 16 (Case 2).

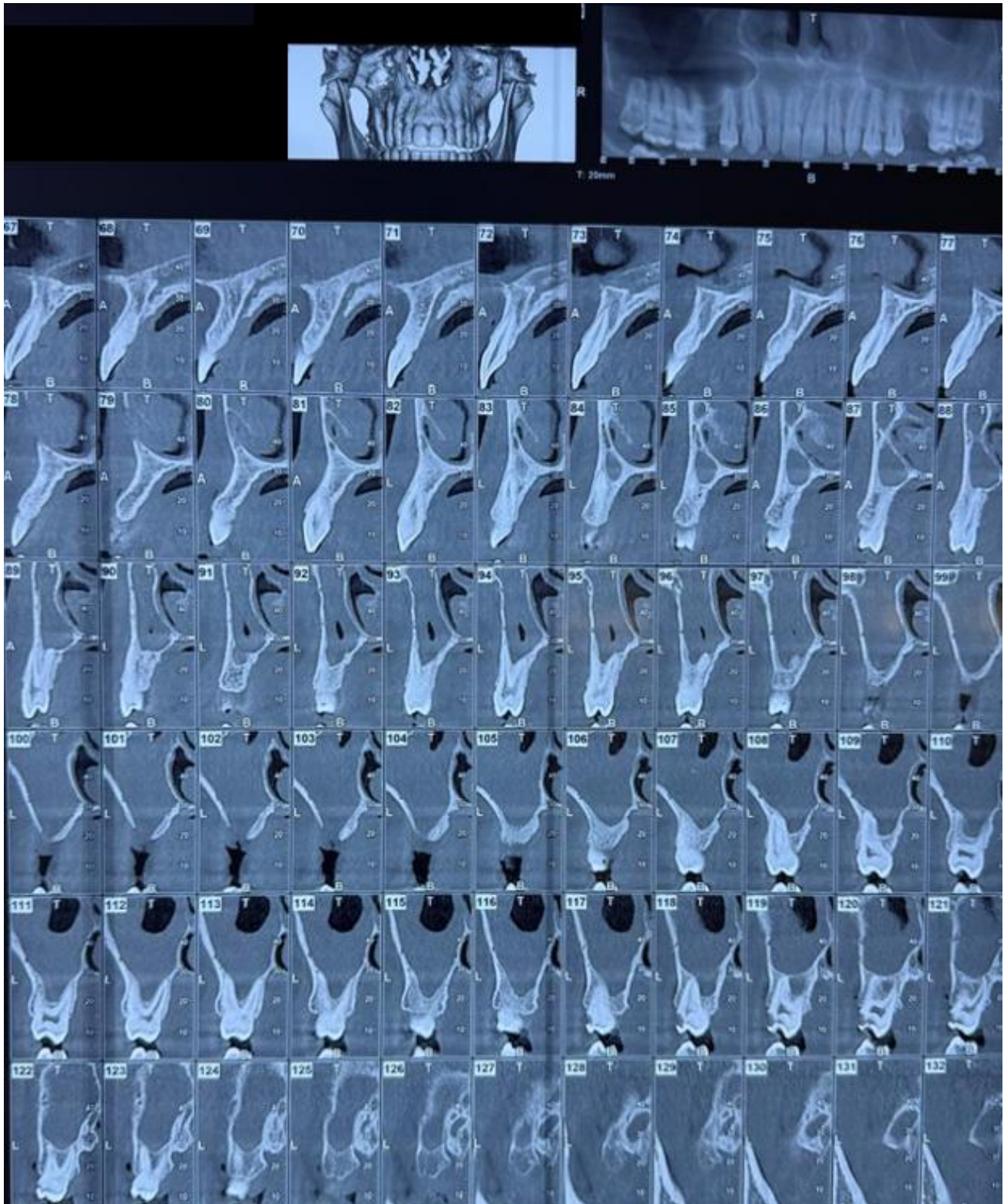


Figure 6: Preoperative radiographic documentation of Case 2 showing loss of the sinus floor cortical outline at the extraction site of tooth 16.

Because Case 2 showed radiographic evidence of chronic sinus involvement, the underlying maxillary sinusitis was first addressed and confirmed clinically resolved with a short course of systemic antibiotics and nasal decongestants before proceeding to surgery. The fistulous tract was excised down to healthy margins and the defect was closed using the same vestibular advancement flap technique as in Case 1, with periosteal release to obtain a passive, tension-free closure. The same postoperative regimen and sinus-precaution instructions were provided.

Follow-up at 6 months confirmed uneventful healing with complete, stable mucosal closure and no recurrence (Fig. 7).



Figure 7: Six-month postoperative view of Case 2 confirming complete closure.

3. Discussion

3.1 Epidemiology, pathophysiology, and diagnosis

OAC/OAF is predominantly a complication of second premolar and first/second molar extraction, teeth whose roots are most often separated from the sinus floor by only a thin plate of bone, or in some individuals by mucosa alone [2,3]. Both of our patients fit this classic pattern, with defects centred on the first and second molar region. Chronic fistulae, as in Case 2, are typically associated with more advanced loss of the surrounding cortical bone because prolonged microbial and mechanical irritation of the tract progressively widens the osseous defect and thickens the sinus mucosa [6,9], which is consistent with the radiographic finding of cortical discontinuity six months after extraction in that case. Diagnosis in both cases relied on history, direct clinical inspection of the fistula, and orthopantomography, in line with the diagnostic sequence recommended in recent narrative reviews and decision-making algorithms [4,7].

3.2 Timing and general principles of closure

There is broad agreement that small acute communications (a few millimetres) may be managed conservatively and often close spontaneously, whereas defects exceeding roughly 5 mm, or any communication that has become chronic and epithelialized, require surgical closure [1,7]. Surgery is ideally performed once any acute sinus infection has been controlled medically, since infected tissue compromises flap survival and increases the risk of failure. Clearing the underlying sinus infection is therefore considered a mandatory step before any surgical closure; in our second case, this was achieved with a course of systemic antibiotics and nasal decongestants, with resolution of sinus symptoms confirmed before flap surgery [1,2]. In Case 1 the presence of an associated periapical cystic lesion additionally required enucleation and extraction of unsalvageable teeth, so closure was combined with bone pathology management in a single surgical stage — an approach supported by several recent reports combining cyst removal, socket management, and flap closure [10].

3.3 Surgical techniques for oroantral closure: an overview

The literature broadly categorises OAC/OAF closure techniques into local mucosal or mucoperiosteal flaps (vestibular/buccal advancement, palatal rotation/advancement, combined palatal–buccal), pedicled fat-pad flaps (buccal fat pad, or Bichat fat pad), regional flaps (tongue, temporalis, genian mucosal flap), and non-flap or adjunctive materials (autogenous or xenogeneic bone grafts, resorbable collagen or GTR membranes, platelet-rich fibrin, and historically alloplastic materials such as gold foil) [2,7,8]. Selection depends principally on defect size and chronicity, the quality and quantity of the available soft and hard tissue, sinus status, and whether future implant-supported rehabilitation is planned [7].

3.4 The vestibular (buccal) advancement flap: advantages and disadvantages

The vestibular advancement flaps the Rehrmann technique used in both of our cases is raised as a broad-based trapezoidal mucoperiosteal flap with two divergent vertical releasing incisions; a horizontal periosteal-releasing incision at the base allows the flap to be advanced palatally over the defect without tension [3,8]. Its main advantages are technical simplicity, a short operative time, a single surgical site with no donor-site morbidity, and a robust, well-vascularized axial blood supply that gives consistently high success rates, reported around 85–93% in recent series and reviews [2,3].

Its principal drawback is the obligatory coronal displacement of the mucogingival junction, which reduces the depth of the buccal vestibular sulcus; longitudinal follow-up has shown that this reduction is permanent in roughly half of patients and may later interfere with denture retention or the soft-tissue profile around future implants [2,3,11]. Because the flap is advanced under some residual tension, it is also more prone to dehiscence than the buccal fat pad flap when used for larger defects, and functional forces from mastication and phonation can further stress the suture line during early healing [3,12]. For this reason, several modifications inverted periosteal flaps, pedicled buccal periosteal flaps, and combinations with the buccal fat pad have been proposed specifically to preserve vestibular depth while retaining the simplicity of a buccal approach [8,13,14].

3.5 Comparison with alternative techniques

Table 1 summarises the indications, advantages, disadvantages and approximate reported success rates of the vestibular advancement flap relative to the other techniques most frequently described in the recent literature.

Technique	Indicated defect size	Advantages	Disadvantages	Reported success rate*
Buccal (vestibular) advancement flap – Rehrmann technique	Small to moderate OAC (up to ~10 mm)	Simple, fast, single surgical site, reliable axial vascular supply, low technical demand, no donor-site morbidity	Reduces vestibular sulcus depth (may be permanent in about half of cases), tension during mastication/phonation, can compromise future prosthetic/implant rehabilitation, dehiscence in larger defects	≈85–93%
Buccal fat pad (Bichat) flap	Moderate to large, especially posterior defects (>5 mm) or after a failed buccal flap	Preserves vestibular depth, rich intrinsic vascularity, pliable, can be combined with a mucosal flap, low donor-site morbidity	Technique-sensitive harvest, risk of partial necrosis under excessive tension, limited fat volume in thin/elderly patients, epithelialization takes several weeks	≈90–99%
Palatal rotational / advancement flap	Large defects, particularly anterior and premolar sites	Robust axial supply from the greater palatine artery, thick keratinized tissue, versatile arc of rotation	Painful donor site healing by secondary intention, technically demanding, risk of partial necrosis, limited reach for very posterior defects	≈85–95%
Combined / multilayer techniques [BFP(Buccal Fat Pad) + BAF (Buccal Advanced Flap),	Large, chronic, recurrent, or defects with an associated bony deficiency	Addresses soft- and hard-tissue components simultaneously, prepares the site for later implant placement, lower recurrence in failed-flap cases	Longer operative time, higher material cost, more technique-sensitive, evidence largely limited to small case series	≈90–100% (small series)

Technique	Indicated defect size	Advantages	Disadvantages	Reported success rate*
bone graft + GTR membrane ± PRF]				
Platelet-rich fibrin (PRF) clot or collagen membrane, flapless	Small, acute OAC (<3–5 mm)	Minimally invasive, autologous/biocompatible, no distortion of the vestibule, promotes soft-tissue healing	Not indicated for large or chronic epithelialized fistulas, less predictable than flap closure, may need repeated application	≈70–88%

*Success rates are approximate ranges compiled from the cited case series, comparative studies and reviews; they are not derived from a formal meta-analysis and should be interpreted with caution given differences in defect size, follow-up duration and success criteria across studies.

The buccal fat pad flap has emerged as the main direct competitor to the vestibular flap for moderate-to-large defects, because its pedicled, well-vascularized adipose tissue epithelializes spontaneously without displacing the mucogingival junction, thereby preserving prosthetic and implant options [14,15,16]. A recent systematic review comparing the two techniques concluded that both are safe with high success rates, but that the buccal fat pad is particularly advantageous for fistulas larger than 5 mm, for cases in which preservation of vestibular depth is a priority, or after a failed vestibular flap [15].

The palatal flap, based on the greater palatine artery, offers thick keratinized tissue and a versatile arc of rotation that make it attractive for large or anteriorly located defects, but it leaves an area of exposed palatal bone that heals by secondary intention and is often more uncomfortable for the patient in the early postoperative period [2,7].

Bone-graft and membrane-based approaches, including the resorbable GTR membrane “bone sandwich” technique and platelet-rich fibrin, have gained interest because they address the underlying bony defect rather than soft tissue alone, which is relevant when future implant placement is anticipated; a recent prospective study found platelet-rich fibrin to be a viable, less invasive alternative to the buccal advancement flap for communications without extensive bone loss, although the vestibular flap remained the reference comparator [17]. Multilayer combinations of buccal fat pad, GTR membrane, and graft material have been reported to further reduce recurrence in complex or previously failed cases, at the cost of a longer and more technique-sensitive procedure [9].

3.6 Rationale for technique selection in the present cases

In both of our patients the defects were of moderate size and centred on the first/second molar region, without extensive loss of the surrounding alveolar bone beyond the immediate fistula margin, and neither patient had specific plans for prosthetic rehabilitation that would have made preservation of vestibular depth an overriding priority. Under these conditions, the vestibular advancement flap offered the most favourable balance of simplicity, reliability, and operative efficiency, and in Case 1 it also provided direct surgical access needed for cystic enucleation and extraction of the adjacent non-restorable teeth in the same operative field [2,16,17]. Both cases achieved complete, stable closure at 6 months, consistent with the success rates reported for this technique in the literature reviewed above.

4. Conclusion

The vestibular (buccal) advancement flap remains a dependable first-line option for the surgical closure of small-to-moderate oroantral communications and fistulas, combining technical simplicity with consistently high success rates. Its principal limitation, a durable reduction in vestibular sulcus depth, should be weighed against the patient's prosthetic and implant plans, and against alternatives such as the buccal fat pad or palatal flap, particularly for larger or recurrent defects. A structured, evidence-based decision algorithm taking into account defect size, chronicity, sinus status, and future rehabilitation needs rather than a single default technique, is likely to give the most predictable outcomes.

Declarations

Ethics Approval: Not applicable.

Conflict of Interest: The authors declare that they have no competing interests.

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Patient Consent: Written informed consent for publication of clinical and radiographic images and case details was obtained from both patients.

References

1. Visscher, S. H., van Minnen, B., & Bos, R. R. M. (2010). Closure of oroantral communications: A review of the literature. *Journal of Oral and Maxillofacial Surgery*, 68(6), 1384–1391. <https://doi.org/10.1016/j.joms.2009.07.044>
2. Parvini, P., Obreja, K., Sader, R., Becker, J., Schwarz, F., & Salti, L. (2018). Surgical options in oroantral fistula management: A narrative review. *International Journal of Implant Dentistry*, 4(1), 40. <https://doi.org/10.1186/s40729-018-0152-4>
3. Belmehdi, A., & El Harti, K. (2019). Management of oroantral communication using buccal advanced flap. *Pan African Medical Journal*, 34, 69.
4. Chinnaiah, R., Stephen, S. R., Veeramuthu, M., Satheesh, G., & Rajashri, R. (2023). The management of infected oroantral fistula after maxillary third molar removal: A case report. *Cureus*, 15(7), e42633. <https://doi.org/10.7759/cureus.42633>
5. Baek, J. H., Kim, B. O., & Lee, W. P. (2021). Implant placement after closure of oroantral communication by sinus bone graft using a collagen barrier membrane in the shape of a pouch: A case report and review of the literature. *Medicina*, 57(6), 626.
6. Psillas, G., Papaioannou, D., Petsali, S., Dimas, G. G., & Constantinidis, J. (2021). Odontogenic maxillary sinusitis: A comprehensive review. *Journal of Dental Sciences*, 16(1), 474–481.
7. Parvini, P., Obreja, K., Begic, A., Schwarz, F., Becker, J., Sader, R., & Salti, L. (2019). Decision-making in closure of oroantral communication and fistula. *International Journal of Implant Dentistry*, 5(1), 13. <https://doi.org/10.1186/s40729-019-0165-7>
8. Rosenfeld, E. A. (2014). Inverted periosteal flap: An alternative to the buccal advancement flap for tension-free, watertight closure. *Journal of Oral and Maxillofacial Surgery*, 72(7), 1244–1250.
9. Uday, J., Kurien, D. J., Shetty, D., & Anehosur, V. (2024). Closure of persistent oroantral fistula: Utilizing buccal fat pad, sticky bone, and buccal advancement flap in a three-layered approach Case report. *Journal of Orofacial Health Sciences*, 11(4), 210–212.
10. Kwon, M. S., Lee, B. S., Choi, B. J., Lee, J. W., Ohe, J. Y., Jung, J. H., et al. (2020). Closure of oroantral fistula: A review of local flap techniques. *Journal of the Korean Association of Oral and Maxillofacial Surgeons*, 46(1), 58–65.
11. Shah, R., & Davies, R. (2026). Oral flap design. In *StatPearls*. StatPearls Publishing.
12. Mainassara Chekaraou, S., Benjelloun, L., & El Harti, K. (2021). Management of oro-antral fistula: Two case reports and review. *Annals of Medicine and Surgery*, 69, 102817.
13. Ibrahim, M. T., Gharieb, E. A., & Sheta, M. S. (2024). A pedicled buccal periosteal flap for the closure of oro-antral fistula. *BMC Oral Health*, 24(1), 440.
14. Scott, P., Fabbioni, G., & Mitchell, D. A. (2004). The buccal fat pad in the closure of oro-antral communications: An illustrated guide. *Dental Update*, 31(6), 363–366.
15. Pizzolante, T., Rasicci, P., Saggiomo, A. P., Principi, M., Capogreco, M., & Mummolo, S. (2024). Buccal fat pad flap and buccal advancement flap for closure of oroantral fistula: A systematic review and a case report. *Oral and Implantology*, 16(2), 50–61.
16. Bereczki-Temistocle, D. L., Gurzu, S., Ioan, I., Vlad, G. M., Beresescu, G., & Ormenisan, A. (2023). Successful closure of an oro-antral communication, after three previously failed attempts, using Bichat fat pad flap: A case report. *World Journal of Plastic Surgery*, 12(1), 90–94.
17. Hunger, S., Krennmair, S., Krennmair, G., Otto, S., Postl, L., & Nadalini, D. M. (2023). Platelet-rich fibrin vs. buccal advancement flap for closure of oroantral communications: A prospective clinical study. *Clinical Oral Investigations*, 27(6), 2713–2724. <https://doi.org/10.1007/s00784-022-04846-7>

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