



## Comparative Analysis of Buccal Fat Pad vs Buccal Advancement Flap in Cases of Oro-Antral Communication – A Retrospective Study

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**(Received: 16 July 2025**

**Revised: 20 August 2025**

**Accepted: 02 September 2025)**

### KEYWORDS

Oroantral communication, buccal fat pad flap, buccal advancement flap, oroantral fistula, maxillary sinus.

### ABSTRACT:

**Introduction:** Oroantral communication (OAC) is a common complication following maxillary posterior tooth extractions and surgical interventions involving the maxillary sinus. If untreated, it may progress to oroantral fistula (OAF) and chronic sinusitis. Among several surgical options, buccal fat pad (BFP) and buccal advancement flap (BAF) are the most widely used. This study retrospectively compared their clinical outcomes in OAC management.

**Materials and Methods:** A retrospective review of 40 patients treated for OAC over one year was performed. Patients were divided into two groups: BFP (n=20) and BAF (n=20). Parameters assessed included, complete closure rate, mean healing time(days), dehiscence (flap opening), recurrence. Statistical analysis was done using chi-square and Student's t-test, with p<0.05 considered significant.

**Results:** Both techniques achieved high closure rates. The BFP group showed fewer cases of wound dehiscence, faster mucosal epithelialization, and no recurrence, with an overall success rate of 95%. The BAF group achieved 90% closure but was associated with more postoperative discomfort and reduction in vestibular depth. No major complications were reported in either group.

**Conclusion:** Both BFP and BAF are effective for OAC closure. BFP is preferable for larger defects, while BAF remains suitable for smaller ones. A tailored, case-specific approach ensures optimal outcomes.

### 1. Introduction

Oroantral communication (OAC) is an abnormal pathological connection between the maxillary sinus and the oral cavity, most commonly arising as a complication of surgical procedures in the posterior maxilla [1]. Extractions of maxillary molars and premolars, periapical infections, cystic enucleation, trauma, and tumor resections are among the leading etiological factors. If not identified and treated promptly, OAC may persist as an oroantral fistula (OAF), predisposing the patient to maxillary sinusitis, chronic infection, impaired healing, and significant morbidity [2].

The closure of OAC remains a challenge in oral and maxillofacial surgery, particularly when the defect is large, recurrent, or associated with infection. Over the

years, several techniques have been developed to achieve successful closure, including local mucoperiosteal flaps, palatal rotation flaps, buccal advancement flaps (BAF), and buccal fat pad (BFP) grafts [3]. The choice of technique depends on factors such as the size and location of the defect, the surrounding tissue availability, patient's systemic condition, and the surgeon's preference.

The buccal advancement flap, first described by Rehrmann, is one of the most widely used methods due to its simplicity, accessibility, and predictable outcome for small to medium-sized defects [4]. However, it has certain disadvantages, including reduction in vestibular depth, tension on the flap margins, limited applicability in recurrent cases, and possible recurrence in larger



defects [5]. On the other hand, the buccal fat pad flap, first utilized by Egyedi in 1977 for closure of OAC and OAF, has gained popularity because of its rich vascularity, ease of mobilization, rapid epithelialization, and minimal donor site morbidity [6]. It is especially advantageous for moderate to large defects and in cases where other techniques may not provide adequate coverage.

Despite the wide clinical use of both methods, there remains debate regarding the superiority of one technique over the other in terms of long-term outcomes, recurrence, and postoperative morbidity. Comparative analyses are essential to provide evidence-based guidance in selecting the most appropriate surgical approach. The present retrospective study aims to comparatively evaluate the clinical outcomes of buccal fat pad versus buccal advancement flap in the surgical management of OAC, with special emphasis on success rate, postoperative complications, healing potential, and long-term prognosis. By analyzing patient records, this study seeks to highlight the relative advantages and limitations of each technique, thereby assisting clinicians in adopting a more case-specific and predictable approach for OAC repair.

## 2. Materials and Methods

This retrospective study was conducted in the Department of Oral and Maxillofacial Surgery, Saveetha Dental College and Hospitals. The medical records of patients treated for oroantral communication (OAC) between August 2024 and August 2025 were reviewed.

**Study Population:** A total of 40 patients who underwent surgical closure of OAC were included. Patients were divided into two groups based on the surgical technique used:

- Group A: Buccal Fat Pad flap (BFP) closure (n=20)
- Group B: Buccal Advancement Flap (BAF) closure (n=20)

### Inclusion Criteria:

- Patients with clinically and radiographically confirmed OAC.
- Defect size ranging from 3 mm to 10 mm.

- Patients with complete follow-up records for a minimum of 6 months.

### Exclusion Criteria:

- Patients with malignant lesions or requiring extensive maxillary resections.
- Immunocompromised patients or those with uncontrolled systemic conditions.
- Incomplete or inadequate clinical records.

**Data Collection:** The following parameters were recorded and analyzed:

1. Patient demographics (age, sex).
2. Etiology of OAC.
3. Site and size of the defect.
4. Surgical technique used (BFP vs BAF).
5. Intraoperative details and complications.
6. Postoperative outcomes:
  - Infection or inflammation at the surgical site.
  - Wound dehiscence and recurrence.
  - Healing time and epithelialization.

**Follow-Up Protocol:** Patients were evaluated at 1 week, 2 weeks, 1 month, 3 months, and 6 months postoperatively. Clinical examination and radiographic assessment (when required) were used to confirm successful closure and absence of sinus-related complications.

### Statistical Analysis

Data were entered into Microsoft Excel and analyzed using SPSS software version 23. Continuous variables were expressed as mean  $\pm$  standard deviation, and categorical variables as percentages. Student's t-test and Chi-square test were used for intergroup comparison. A p-value of  $<0.05$  was considered statistically significant.

## 3. Results

A total of 40 patients were included in the study, divided equally into two groups: Group A (Buccal Advancement Flap, n=20) and Group B (Buccal Fat Pad Flap, n=20). Both techniques achieved high success rates in the closure of oroantral communication (OAC).



The complete closure rate was slightly higher in the BFPF group (95%) compared to the BAF group (90%), although the difference was not statistically significant ( $p>0.05$ ). Mean healing time was marginally longer in the BFPF group ( $19.0 \pm 2.3$  days) than in the BAF group ( $17.6 \pm 2$  days), but this difference was also not statistically significant ( $p>0.05$ ).

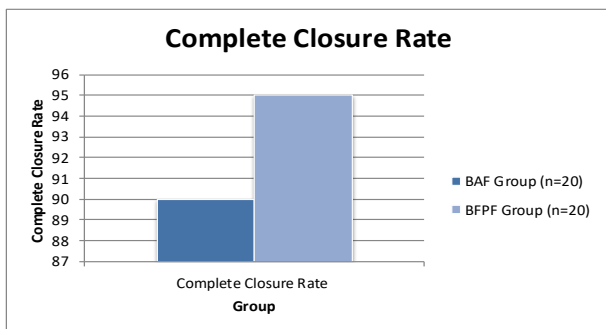
In terms of complications, wound dehiscence occurred in 7.3% of patients in the BAF group compared to 5% in the BFPF group, showing a slightly better outcome for the latter. Recurrence of oroantral communication was

observed in one case in the BAF group, whereas no recurrence was noted in the BFPF group. Importantly, no cases of flap necrosis, infection, or major postoperative complications were reported in either group.

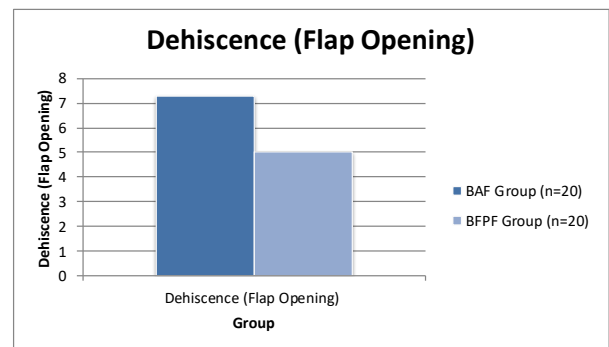
Overall, while both techniques were effective for OAC closure, the BFPF group demonstrated marginally superior outcomes in terms of closure rate, lower complication incidence, and absence of recurrence, although differences did not reach statistical significance.

**Table 1:** Comparison of Clinical Outcomes Between Buccal Advancement Flap (BAF) and Buccal Fat Pad Flap (BFPF) in Oroantral Communication Closure

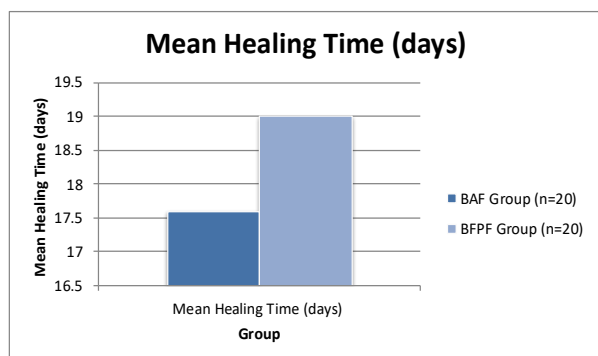
Clinical Parameter	BAF Group (n=20)	BFPF Group (n=20)	p-value
Complete Closure Rate	90.0%	95.0%	> 0.05
Mean Healing Time (days)	17.6 ± 2.0	19.0 ± 2.3	> 0.05
Dehiscence (Flap Opening)	7.3%	5.0%	> 0.05
Recurrence	1 case	0 cases	> 0.05



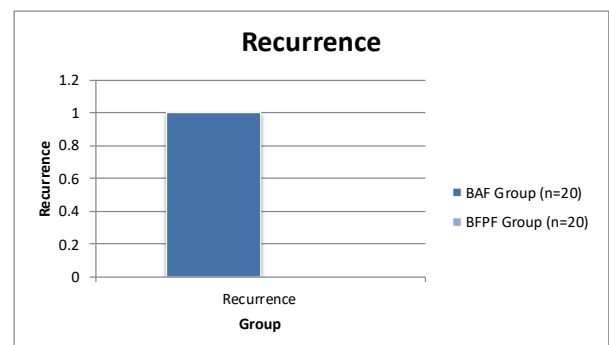
**Figure 1.** Complete Closure Rate in BAF Group and BFPF Group



**Figure 3.** Dehiscence (Flap Opening) of Group BAF and Group BFPF



**Figure 2.** Mean Healing Time (days) for Group BAF and Group BFPF



**Figure 4.** Recurrence in Group BAF and Group BFPF



## 4. Discussion

Oroantral communication (OAC) remains one of the most common complications encountered in oral and maxillofacial surgery, particularly after extractions of maxillary molars and surgical procedures involving the maxillary sinus [7]. Prompt diagnosis and closure are critical, as untreated OAC can progress to a persistent oroantral fistula (OAF), leading to chronic sinusitis, pain, impaired mastication, and significant deterioration in quality of life. Several surgical options have been described for OAC repair, including local mucoperiosteal flaps, palatal rotational flaps, buccal advancement flaps (BAF), and buccal fat pad flaps (BFPP) [8]. The choice of procedure depends on the defect size, location, tissue availability, and surgeon preference. Our study sought to compare the clinical outcomes of BAF and BFPP in OAC closure.

In this analysis, both groups demonstrated high closure rates, with BFPP slightly outperforming BAF (95% vs 90%). Although the difference was not statistically significant, the trend reflects the advantages of BFPP, particularly in cases involving larger or recurrent defects. The buccal fat pad is richly vascularized and has a remarkable capacity for epithelialization, which enhances its reliability in complex closures. Egyedi (1977) first popularized its use for OAC, and subsequent studies have consistently supported its high success rate [9].

The mean healing time was slightly longer in the BFPP group ( $19.0 \pm 2.3$  days) compared to the BAF group ( $17.6 \pm 2$  days). This finding can be explained by the fact that the exposed fat pad requires epithelialization before full mucosal integrity is restored. However, this marginal delay is clinically insignificant and does not compromise long-term outcomes. Patients in both groups achieved satisfactory healing within the expected time frame.

Complications were minor and comparable between groups. Dehiscence occurred more frequently with BAF (7.3%) compared to BFPP (5%), likely due to tension at the flap margins when advancing buccal tissue, especially in larger defects. Moreover, one recurrence was observed in the BAF group, while no recurrence was noted in the BFPP group. The reduction of vestibular depth associated with BAF closure is another practical concern, as it may compromise future prosthetic rehabilitation, particularly in denture wearers [10].

Conversely, BFPP maintains vestibular depth and provides a stable long-term closure, making it more favorable in patients requiring prosthetic planning [11].

When compared with previous literature, our findings align well. Studies by Rapidis et al. and Hanazawa et al. have demonstrated closure rates exceeding 90% with BFPP, especially in larger OAC defects [12]. Similarly, Killey and Kay have historically reported satisfactory outcomes with BAF, though with limitations in vestibular depth and flap tension [13]. This reinforces the notion that BAF remains an excellent choice for small to moderate defects due to its simplicity, shorter operative time, and predictable results, whereas BFPP is superior for larger defects or when other techniques have failed.

In summary, the results of this study emphasize that both BAF and BFPP are reliable and effective techniques for OAC closure. BAF continues to be valuable for smaller defects where vestibular depth reduction is acceptable, while BFPP offers a more versatile and predictable option in larger, recurrent, or complex defects. A tailored, case-specific approach, considering defect size, patient needs, and long-term functional demands, remains essential for optimal outcomes.

## 5. Conclusion

The present retrospective study demonstrates that both the buccal advancement flap (BAF) and buccal fat pad flap (BFPP) are reliable and effective techniques for the closure of oroantral communication (OAC). While both groups achieved high closure rates, the BFPP showed a slightly higher success rate, lower incidence of dehiscence, and absence of recurrence compared to BAF. Although the healing time was marginally longer in the BFPP group, this did not affect overall clinical outcomes. The BAF remains a simple, time-efficient technique for small to moderate defects, but its limitations include postoperative reduction of vestibular depth and slightly higher recurrence risk. In contrast, the BFPP provides a robust, vascularized flap that maintains vestibular depth and demonstrates superior reliability in larger and recurrent defects. Therefore, the choice of technique should be individualized, based on defect size, anatomical considerations, and the patient's long-term prosthetic needs.



## 6. Future Scope

Future prospective, randomized clinical trials with larger sample sizes are needed to validate and strengthen the comparative outcomes between BAF and BFPF. Incorporating patient-reported outcomes such as postoperative discomfort, quality of life, and prosthetic adaptability would provide a more comprehensive assessment of treatment success. Additionally, advancements in tissue engineering and regenerative biomaterials may offer alternative or adjunctive strategies for OAC closure, minimizing donor-site morbidity and improving functional outcomes[14]. Long-term follow-up studies are also warranted to assess recurrence rates, sinus health, and prosthetic rehabilitation in patients treated with these techniques. Furthermore, multicentric clinical evaluations with larger datasets and varied patient populations may help establish standardized treatment guidelines for OAC management [15].

## 7. Declarations

### Consent for publication

All necessary consents were obtained from all participants for treatment and publications

### Funding

It was a self-funded study

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