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CASE STUDY

Combined techniques of buccal fat pad and buccal advancement flap for revision of failed oroantral fistula closure treatment

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ABSTRACT

Oroantral fistula (OAF) is a complication of dental extraction that is defined as open pathological communication between oral cavity and sinus of the maxillary with the involvement of epithelization of a canal. Oroantral fistula will cause infection, impaired healing, and chronic sinusitis. This article reports a case of OAF in tooth 16 which occurred after 11 months following unsuccessful sinus closure treatment. Many approaches are widely used for the closure of OAF, such as using a buccal fat pad (BFP), buccal advancement flap (BAF), or a combination. This study aims to describe the combined techniques of BFP and BAF in OAF closure of large defects with a history of previous closure failure. A 31-year-old male patient came to our hospital for the presence of OAF for 2-3 weeks. The patient underwent OAC closure at another hospital 11 months prior, but the complaint recurred. Diagnosis of OAF was carried out using the Valsalva test. A combination of BFP and BAF techniques was done to close the OAF after the removal of the epithelial. Evaluation of the treatment after 30 days showed adequate healing and full closure of OAF. OAF closure with the combined techniques of BFP and BAF displays promising results for the revision of failed OAF closure treatment.

Keywords: buccal advancement flap; buccal fat pad; oroantral fistula

INTRODUCTION

Oroantral communication (OAC) is a common complication following the extraction of upper premolars and molars as the root anatomy may extend into the maxillary sinus. A study reports that OAC complications can occur in up to 11% of cases involving the extraction of upper molar teeth.[1] Untreated oroantral communication can lead to the development of an oroantral fistula (OAF). OAF is defined as the failure to close OAC, resulting in the formation of an epithelialized abnormal pathway between the sinus cavity and the oral cavity, typically forming 48-72 hours after OAC occurrence.[2]

When OAF occurs, an open maxillary sinus allows microbes to enter, leading to sinus infection and inflammation. OAF can complicate the healing process, contributing to chronic sinusitis.[3] Sinusitis manifests with patient complaints such as facial pain, nasal discharge, congestion, unpleasant taste and smell, and pain in upper jaw tooth.[4] The size of OAF influences treatment choices; smaller defects may spontaneously close with blood clotting, while larger or infected defects necessitate surgical intervention.[5,6,7]

Buccal advancement flap (BAF) or Rehrmann Flap is a commonly used and successful option due to its simplicity and high success rates. The wide base of the flap ensures adequate blood supply, minimizing surrounding tissue morbidity and ensuring proper healing. However, BAF's drawback is a reduction in vestibular depth, potentially complicating future prosthesis placement.[6,8] On the other hand, the buccal fat pad (BFP) serves as an alternative for OAF closure, pioneered by Egyedi in 1977. BFP gained popularity in the late 20th century, accessed through an incision at the zygomatic buttress with posterior dissection which is advantageous for molar area closure. BFP, with consistent size among individuals, exhibits high mobilization capacity, good blood supply,

and epithelialization within 2-3 weeks. However, BFP is sensitive to operator technique; tensioned sutures and rough manipulation can affect blood supply, reducing success rates.[6,7,9]

The choice of OAF closure modalities varies widely, including simple primary closure, BAF, palatal rotation flap, split thickness skin graft, bone grafts, distant flaps, allogenic and regional grafts, synthetic materials, metals, resin plates, splints, lasers, BFP, and combinations. Operator's experience and defect conditions influence technique selection.[3,10] Investigating the combination of BFP and BAF is intriguing, as both techniques are popular, easy to apply, practical, require no additional materials, and demonstrate high success rates. The purpose of this case report is to elucidate the combined BFP and BAF techniques for closing a 15 mm OAF with a history of previous closure failure.

METHODS

A 31-year-old man presented at RSGM Prof. Soedomo with a complaint of feeling air blowing through an opening in the upper right jaw gum that connects to the nose. The issue had been observed for the past 2-3 weeks, with no pain but causing discomfort, especially when drinking as it feels leaky and makes using a straw challenging. The patient had a history of tooth extraction with roots extending into the sinus 11 months prior, and closure of oroantral communication (OAC) with stitches had been previously performed. The patient had no systemic abnormalities.

In intraoral clinical examination, an edentulous area at tooth 16 revealed a fistula with a clinical diameter of approximately 2 mm in the surrounding soft tissue. A visible airflow, bubbles, and a whistling sound were present when the patient exhaled. The gingiva around the fistula appeared slightly reddish, with no pain on palpation, no fluctuation, and no bleeding. Ancillary examination was conducted with X-ray OPG, revealing an estimated diameter of 15 mm for the defect in the hard tissue. Bilateral maxillary sinuses showed a normal appearance.

Based on the examination above, a diagnosis of OAF in region 16 could be established. The chosen treatment plan was a combination of BFP and BAF, considering the significant defect with a diameter of 15 mm and the patient's previous unsuccessful BAF procedure.

The surgery was performed with a trapezoid flap opening, removal of the fistula and granulation tissue, and debridement with saline and iodine solution. The anaesthesia technique used was a block of the right infraorbital nerve, supplemented with infiltration in the buccal and palatal areas of 16. A defect of approximately 15mm in size was detected.

Figure 1. Clinical description of intraoral patient. Fistula is seen in the area 16 with air bubbles (arrow signs)

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BFP was accessed from the buccal with blunt dissection. Careful mobilization was performed to adequately cover the defect area and to close it to the palatal side. Stabilization was achieved through suturing with Vicryl 5/0.

BAF was performed for the final closure over the BFP. Suturing was done tightly with Vicryl 5/0, creating a watertight closure without causing any tension. Primary closure with adequate suturing technique is needed to ensure the success of the treatment.

The patient was instructed to avoid sneezing or blowing through the nose and mouth, consume a soft diet, use iodine mouthwash, avoid heavy physical activity, and maintain oral cavity hygiene. Follow-up appointments were scheduled for

Figure 2. OPG findings in the patient. Discontinuity of the sinus floor in area 16

Figure 3. Description of the defect in the patient's intraoral clinical presentation

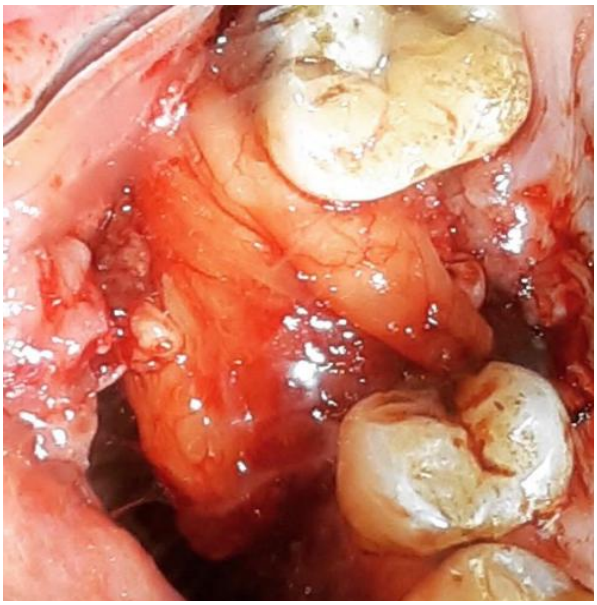

Figure 4. BFP was mobilized carefully to cover the entire defect

Figure 5. The final result of suturing using the BAF technique

Figure 6. At the 30-day follow-up, good closure was observed, and the Valsalva maneuver was negative (-)

postoperative days 7, 14, and 30 to ensure wound healing. During each follow-up, Valsalva maneuver was checked, and it was negative (-). A follow-up examination was conducted for the patient in the 10th month post-operation. The patient reported no complaints of the previous condition. He could drink and breathe smoothly without any disturbances. The patient mentioned that before the closure of the OAF, his job as a physical education teacher was affected because he had difficulty breathing during swimming activities. However, for the past 6 months, the patient had been able to swim well without any disturbances.

A written informed consent was obtained from the patient for this case report. The consent included permission for the publication of this case report, including documentation such as images and descriptions of the patient's condition.

DISCUSSION

The use of BFP and BAF is an interesting aspect to be observed in the case reported in this study. Previous failure of closure with a single BAF technique due to fistula recurrence, along with the wide defect size, may raise doubts about using BAF as a single treatment modality. The use of BFP was found to be necessary to increase the likelihood of success in treating this OAF. The use of BFP to close defects over 10 mm in size has been reported to promise successful outcome.[3,11]

The utilization of BFP to close defects ranging from 1-4 cm is recommended. This relatively easy and reliable technique offers several advantages: good blood supply, adequate mobilization, assurance of epithelialization within two to four weeks post-operation, low morbidity, regenerative capability, and relatively constant volume in each individual regardless of gender or body weight.[11,12] BFP has four anatomical extensions. The first is buccal fat pad, which is the most superficial part. The second is the pterygoid extension, which is in the medial region of the mandibular ramus. Next, the deep temporal process tends to be fixed to the main body of the BFP, and the last is the superficial temporal extension. Accessing the BFP requires a curved hemostat and blunt dissection technique in the posterior area of the zygomatic buttress. Gentle posterior-superior-lateral dissection will facilitate mobilization without damaging the BFP membrane or its vascularization.[11] Proper technique to direct the BFP to the defect site will provide a maximum graft size of 6x3x5 cm or an area of 10 cm^3.[12]

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BAF, also known as the Rehrmann flap, is a highly popular choice. The use of BAF, especially for the initial closure of OAC, has a high success rate.[13] However, a disadvantage of using BAF is the reduction in buccal sulcus depth, potentially causing retention issues for prosthetic use.[6]

Closure of OAF is a technique-sensitive and often a challenging procedure due to its specific conditions. Thus, it has the potential for failure. A skilled operator should be able to recognize their capabilities and choose the appropriate therapy for OAF closure.[3] Factors that may influence its success include the health of surrounding tissues, operator skill, presence of infection, dimension and location of the defect, and adequacy of surrounding tissues to support closure.[6]

The choice of modalities for OAF closure is highly varied, including simple primary closure, BAF, palatal rotation flap, split thickness skin graft, bone grafts, distant flaps, allogeneic grafts, regional grafts, the use of synthetic or metal materials, resin plates, splints, laser, BFP, and combinations. The selection of techniques is also based on the individual operator's preference, experience, and the condition of the defect.[3,10]

Chekaraou et al. reported two cases of OAF treated solely with the BFP technique. Both cases had sizes above 5 mm. BFP was accessed with a trapezoidal flap at the mucoperiosteal depth, and the flap was returned to its original position, leaving a BFP layer covering the socket and defect. This layer was reported to epithelialize within 2-4 weeks post-operation, thus covered by a multilayered squamous epithelium migrating from the gingival margin.[1] Parvini et al. mentioned that the use of BFP has been proven effective in a long-term effectiveness study for closing large OAFs.[3]

Bilginaylar et al. reported in their study that the closure of OAC with the BAF method was proven to be effective. Fifteen OAC patients were treated with the BAF technique, and success was observed in all patients. Patients were observed for up to 3 weeks post-operation.[14] A similar study was conducted by Hunger et al., who reported a 90% success rate with the BAF method in 25 patients.[8]

Shukla et al. reported the results of their experiment comparing the use of BFP and BAF for treating OAF patients. Ten patients were treated using the BFP technique and 10 patients using the BAF technique. Both had effective outcomes and showed no significant differences in terms of post-operative edema and pain. Both techniques were proven effective and had their respective advantages.[6] Similarly, Quinzi et al. compared the use of BFP and BAF and found that BFP and BAF were both safe, simple, and highly successful. However, the use of BFP was noted as the more effective choice for closing large OAFs, i.e., above 5 mm.[11]

BFP has advantages in mobilization and blood supply, making it an ideal method for OAF closure, ensuring a low risk of morbidity to the surrounding tissue in the operative area. BAF also offers benefits in terms of the speed of its application in surgery, technical simplicity, wide base, and ensuring blood supply.[6,7,11] Using a combination of both methods increases success, especially in patients with wide defects and a history of previous closure failure. Recent case reports about the combination of BAF and BFP to close OAF by Shaik et al. (2019) and by Hipi et al. (2019) confirm the success of this combined technique. [15,16]

Apart from technique accuracy, another factor to consider is post-operative care. This includes oral cavity cleanliness, soft diet, appropriate medication use, education to avoid blowing from the nose, sneezing, or if necessary, sneezing with an open mouth, and avoiding heavy physical activity.[2,17,18]

CONCLUSION

This article has shown that the combination of BFP with BAF is an effective choice for closing OAF, especially in cases with defects above 10 mm and with a history of previous closure failure. In addition to technique, post-operative care is also crucial for ensuring treatment success.

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CONFLICT OF INTEREST

The authors declare no conflict of interest with the data contained in the manuscript.

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