Case Report

Closure of Oro Antral Fistula with Buccal Advancement Flap: A Case Report

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Abstract

Oro antral communication is an unnatural communication between the oral cavity and the maxillary sinus which becomes an oroantral fistula (OAF) when it is patent and becomes epithelialized. It is most common following extraction of maxillary posterior teeth because of the proximity of the root apices to the sinus floor. Surgical closure is indicated in cases where the size of the opening is greater than 4–5 mm, in patients with sinus disease regardless of the size of the opening and in cases of persistent communication. Various techniques have been described in the literature for the closure of OAF ranging from local flaps like buccal advancement flap to complex distal flaps such as the tongue flap to bone grafts. The choice of the method used for the closure depends on the size of the defect, its location, and few other factors. The purpose of this article is to report a case of OAF which has been treated with buccal advancement flap and to discuss the advantages and disadvantages of this approach.

Keywords: Closure, Flap, Oro antral fistula.

Introduction

Oro antral communication is an unnatural communication between the oral cavity and the maxillary sinus which becomes an oroantral fistula (OAF) when it is patent and becomes epithelialized.[1] The incidence of OAF ranges from 0.31% to 4.7%.[2]

The OAF can occur due to many reasons such as maxillary cysts, tumors, trauma, implant surgery, orthognathic surgeries, and the most common being the extraction of maxillary posterior teeth because of the close anatomical relationship between the floor of the sinus and the root apices of the posterior teeth.[3]

Spontaneous healing is observed in openings <2 mm. Martensson[4] reported that there is minimal possibility of spontaneous healing when OAF is persistent for 3–4 weeks or fistulae with diameter >5 mm.

Various techniques have been described for the closure of OAF such as buccal advancement flap, palatal advancement flap, split-thickness skin graft, allogeneic graft, regional rotation flap, distant flap, bone graft/buccal fat pad graft.[5] The purpose of this paper is to report a case of OAF which has been treated with buccal advancement flap and to discuss the advantages and disadvantages of this approach.

Access this article online

Website: www.jrad.co.in

DOI: https://doi.org/10.53064/jrad.2022.13.1.108

Case Report

A 36-year-old female patient was referred to the Department of Oral and Maxillofacial Surgery with the chief complaint of regurgitation of fluids through the left nostril for the past 6 months (Figure 1). Past dental history revealed a history of extraction of the upper left first molar 6 months back and a history of attempted primary closure of the extraction socket 3 times. On examination, 26 was missing and an oroantral fistulous tract of size 3 mm × 3 mm was noted which was confirmed with an intraoral periapical radiograph using a gutta-percha stick (Figure 2). Orthopantomagram also revealed an oroantral communication at the extraction socket (Figure 3).

A provisional diagnosis of OAF was made and closure of the fistula was planned using buccal advancement flap.

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Received: Nov. 04, 2021; **Accepted:** Nov. 28, 2021; **Published:** Dec. 04, 2021

How to cite this article: Priya MMS, Priyadharshini R, Rohini T, Arularasan SG. Closure of Oro Antral Fistula with Buccal Advancement Flap: A Case Report. J Res Adv Dent 2022;13(1):127-130.

Figure 1: Frontal view of patient showing regurgitation of fluid through the right nostril

Figure 2: Oroantral fistula measuring 3 mm in diameter

Figure 3: Orthopantomogram with Gutta percha stick showing oroantral fistula

Surgical procedure

The procedure was done under local anesthesia. The fistulous tract around the socket was excised using No. 11 blade and extracted socket was curetted to remove any granulation tissue. The buccal and palatal margins of the fistula were freshened with No. 15 blade. Two vertical releasing incisions were placed having a trapezoidal shape and the buccal flap was raised (Figure 4a). The palatal flap was also elevated. The epithelial lining of the OAF was curetted (Figure 4b). Periosteal scoring was done to advance and release the buccal mucoperiosteal flap. The advanced buccal flap was placed over the socket (Figure 4c) and sutured to the palatal flap (Figure 4d). The releasing incision in the buccal flap was also sutured.

Post-operative instructions and medications including nasal decongestant spray were advised and was also instructed to follow antral precautions. The patient was followed up periodically (Figure 5a and 5b).

There was uneventful healing with no complaints of regurgitation of fluids through the nasal cavity after a 1-year follow-up (Figure 5c).

Discussion

The most common cause of OAF is the extraction of the maxillary posterior teeth because of the close relationship of its root to the maxillary sinus. Guven[6] *et al.* reported in their study that OAF are more common in second molar extraction followed by the first molar. In our case, it was due to the first molar extraction. Nadir *et al*.[7] reported the formation of OAF after failure of a dental implant.

The main clinical findings in are complaints of unpleasant salty discharge into the mouth, unpleasant odor and reflux of fluids in the nose from the mouth, and leakage of air. Patients may also experience the resonance of their sound and speech problems if the defect is large.[8] Our patient's chief complaints were the regurgitation of fluids from the nose.

Studies[9,10] suggest that OAF <2 mm in diameter closes spontaneously but a defect >3–4 mm if persistent requires closure. Spontaneous healing of small perforation is likely to begin 48 h after extraction and remains possible for about 2 weeks. In the present case since the defect was >4 mm and was persistent for more than 6 months it was decided to proceed with closure using a buccal advancement flap.

The surgical method used to close the defect depends upon the size of the defect, its location, height of the alveolar ridge, presence of sinusitis, and patient general conditions.[11] Literature[12,13] suggests that the most common technique for the closure of an acute OAF is buccal flap which was first described by "Von Rehermann." The buccal advancement flap can be preferred in dentate patients with no alveolar resorption and a defect of less than 5 mm and if the defect is more in the mesial area and on the buccal side of the alveolar crest.[14] Since our case met the above-mentioned criteria for BAF, BAF was used in our case.

The main disadvantage of the Von- Rehrmann flap is reduction of the vestibular depth. Von-Wowern[15] in a prospective study reported reduction of sulcus depth after BAF is permanent in half of the cases. On the contrary in his study of 23 cases, Yalcin *et al*.[16] reported a loss of vestibular depth in only 2 out of 10 patients after 6 months. In most cases, the buccal sulcus

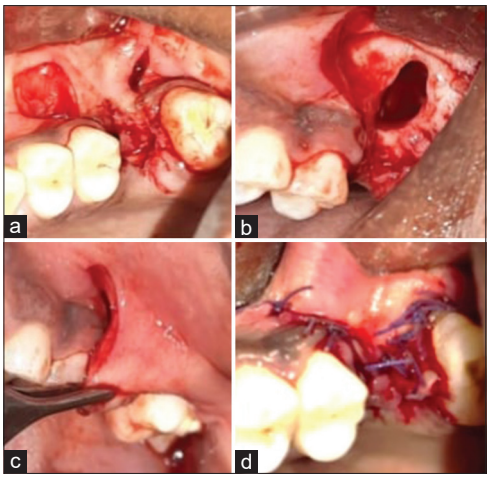

Figure 4: (a): Incision for buccal advancement flap. (b) Curettage of epithelial lining of the oroantral communication. (c) Buccal flap advancement. (d) Buccal flap sutured to the palatal flap

Figure 5: (a) 1 week post operatively. (b) 6 months post operatively. (c) Postoperative frontal view of patient showing no regurgitation of fluid through the nose

reshapes in 4–8 weeks but up to 40% only. There was no loss of vestibular depth evident in our case.

Nezafati *et al*.[17] in their study on comparison of pedicled buccal fat pad (BFP) flap with buccal flap for OAF closure reported that both methods were equally successful for closure of OAF however pain score was greater in the BFP and MMO was decreased more in BFP flap. Bilginaylar[18] reported there was lessen amount of pain and no swelling observed with the use of PRF clots for immediate closure of OAF compared to BAF surgery.

Batra *et al*.[19] suggested that in larger defects, and when severe sinusitis is present and a Caldwell Luc procedure is needed to remove the diseased lining wherein the defect becomes large and in case of edentulous patients who require prosthetic rehabilitation the BFP is preferred. They recommended that if OAF is more posteriorly or palatally located, the use of buccal flap becomes difficult because of the need for excessive mobilization to cover the OAF increases the tension on the flap.

Moczair flap[20] can be an alternative to BAF which is a buccal mucoperiosteal flap that is displaced one tooth width distally. This does not reduce the vestibular depth as the Von-Rehermanr and is recommended only edentulous cases as the large denuded area caused by the distal displacement of buccal sliding flap results in periodontal disease in dentate patients. Falci and Dos Santos[21] described a modification of BAF wherein they sutured the mucosal margins of the fistula prior to the reflection of the buccal flap and then the buccal flap was pulled over this sutured site and tucked under the palatal flap which was elevated simultaneously with the buccal flap. The conventional BAF was used in the current case.

In addition to the use of various local and distant flaps for closure of OAF, the use of some alloplastic materials has also been reported in the literature.[22] Zide and Karas[23] used blocks of hydroxyapatite to close the communication by filling the bone defect in the alveoli. Even the use of synthetic materials such as Bio-Oss-Bio-Guide Sandwich technique[24] has yielded excellent results as they achieve bone and soft tissue closure unlike the flaps which provide only soft tissue closure. However, no bone grafts were used in our case.

Neuschl *et al*.[25] reported a very rare complications wherein the duct of the parotid gland was iatrogenically sutured to the maxillary sinus during the closure an OAF using buccal flap. There were no intraoperative or postoperative complications encountered in our patient.

Conclusion

The success of the closure of OAF with the Von-Rehrmann flap has been well documented in the literature. However, the choice of surgical technique used for the closure of the OAF should be individualized based on the size of the defect, prosthetic needs of the patients, condition of the antral mucosa rather than a fixed treatment protocol. The success of the closure of OAF depends on an infection-free fistula site and tension-free closure in case of soft tissue flap and strict adherence to post-operative instructions to avoid negative pressure in the oral cavity.

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