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CASE REPORT

Use of pedicled buccal fat pad for closure of chronic oro-antral fistula

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ABSTRACT

The oro-antral communication is a well-documented postoperative complication associated with the extraction of maxillary molar and premolar teeth. Those more than 5 mm in size, in case of infection in the antrum/periodontal region or those present for 3–4 weeks, persist to form fistulae and requires surgical treatment. This article showed successful results with the use of pedicled buccal fat pad in closure of a chronic oro-antral fistula in a 70 year old man even after possible perforation of its capsule. Though it is always advised to preserve the fascial envelope during harvest of buccal fat pad by careful manipulation, small perforations can occur as seen in this case. But it was not seen to effect vascularity and epithelisation of flap perhaps due to small size of perforation. So, even if small perforation occur during harvesting normal healing can occur if proper suturing of fat pad is done over the defect.

INTRODUCTION

The oro-antral communication is a well-documented postoperative complication associated with the extraction of maxillary molar and premolar teeth. It may also develop due to infection, as a sequelae of radiation therapy, accidental or iatrogenic trauma, osteomyelitis, syphilis and removal of maxillary cysts or tumors.[1] The incidence of this complication may vary from 0.31 to 3.8% after extraction of maxillary teeth.

Oro antral communication of less than 2 mm diameter does not require any surgical intervention and closes spontaneously by adhering to sinus precautions. Oro antral commmunications of more than 5 mm, in cases of infection in the antrum/periodontal region or those present for 3–4 weeks, persist to form fistulae and requires surgical treatment.[2] The primary closure of oroantral communications in 48 hours presents a 90 to 95% success rate but the success rate decreases after that.[3]

Since the first description of application of buccal fat pad in 1977 by Egyedi for closure of post-surgical maxillary defects, it has been increasingly used for the reconstruction of various intraoral defects including oro-antral fistula, reconstruction of the palatal region, buccal mucosa, closure of oro-nasal fistulas, coverage of the surface of bone grafts, implant graft coating, rehabilitation of cleft patients, reconstruction of post-traumatic defects in the maxillary region, after excision of leukoplakia and submucous fibrosis,temporomandibular reconstruction, sinus floor augmentation and as a graft for vocal cord augmentation.[4-6] The encouraging clinical studies during the last 10 years, has pushed us in using buccal pad of fat

for the closure of oro-antral communications of diverse etiology which may be either acute, chronic or of recurring character .

The purpose of this article was to show the successful result with the use of pedicled buccal fat pad in closure of a chronic oro-antral fistula.

1. Preoperative photograph of patient showing oro-antral fistula in right maxillary 2nd molar alveolus region

CASE REPORT

A 70-year-old male patient reported to our department with a chief complaint of intermittent drainage of pus in maxillary right posterior region since 8 months. The patient gave a history of tooth extraction 9 months back after which he experienced regurgitation of oral fluids through right nostril. Around 8 months back he had frank discharge of pus in the mouth with pain and heaviness in right middle third region. The patient went to a local dentist for the same who prescribed him medication and plugged the draining cavity with roll gauze but there was no relief. So, the patient was referred to our department for management.

Clinical examination revealed a cavity in right maxillary 2nd molar alveolus region plugged with a gauze pack. On removal of gauze, frank discharge of pus was noted with the presence of an oro-antral fistula of 6x6mm diameter. It was also confirmed by cotton wool test, mouth mirror fog test and water holding procedure. Panoramic radiograph was advised in which thickening of right maxillary sinus lining was seen along with a defect in the bony floor. The patient was prescribed conservative treatment with oral antibiotics, nasal decongestants and steam inhalation for five days. Once the acute phase subsided and the patient did not have any pain or pus discharge for 1 week, surgical repair was undertaken.

Under local anaesthesia, a circular incision was made around the oro-antral fistula upto the level of surrounding alveolar bone and the fistulous tract along with any inflammatory tissue was excised. A trapezoidal buccal mucoperiosteal flap was elevated in the right maxillary 2nd molar region on the lateral aspect of alveolar process by divergent incisions from the margin of the bony defect which was extended into the buccal vestibule. The buccal mucoperiosteal flap was elevated to correctly identify the edges of the sinus lining on the socket wall which can then be cleared easily. The BFP was exposed through a horizontal incision in the periosteum of the reflected flap at the level of buccal vestibule posterior to zygomatic buttress. The vertical incision in periosteum was not used as it was thought that it required more dissection and it was difficult to harvest adequate amount of fat pad through it without exerting increased traction on it. Then, a curved haemostat was introduced through the periosteal incision aiming cranially, in the region of the third molar, and then withdrawn wide open, in such a way that a sub mucosal tunnel was created. This manoeuvre was repeated until the BFP appeared in the mouth. The BFP was then teased out by blunt dissection carefully into the oral cavity until sufficient was obtained to obturate the defect. The use of suction was discontinued to prevent the aspiration of the fat. During the process of harvesting BFP, a perforation was noted.

The fat mass was then secured in position to the palatal mucosa with interrupted sutures using 4-0 vicryl suture without any tension. The buccal mucoperiosteal flap was then replaced in its original position and sutures placed to secure the flap to the fat. Thus part of the BFP over the fistula was left exposed in the oral cavity. Postoperatively, the patient was prescribed antibiotics, analgesics and nasal decongestants and soft diet for 1 week. He was advised against blowing the nose or sneezing forcefully for two weeks to avoid antral pressure and flap dehiscence.

The patient was reviewed at weekly intervals till 3 months to evaluate for any postoperative complications like wound dehiscence, necrosis, infection, etc. Signs of the BFP epithelialisation started in the first week and

complete epithelisation was observed after 4 weeks with no postoperative complications. Three months following the operation, we observed that the grafted adipose tissue was covered by a healthy looking oral mucosa. The patient did not have any aesthetic, phonetic or masticatory disturbance, decreased mouth opening or facial paralysis. No loss of buccal vestibular depth was noted.

DISCUSSION

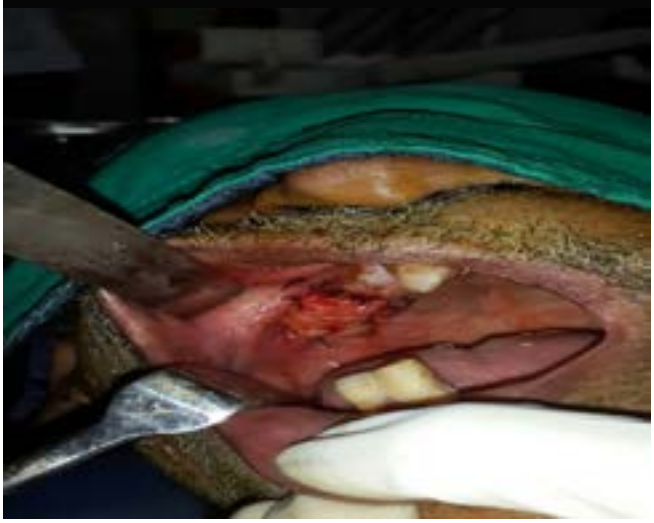
An oro-antral fistula is a pathological condition in which the oral and antral cavities have a permanent communication by means of a fibrous connective tissue fistula coated by epithelium.

The management of an established case of oro- antral fistula can be challenging, especially in the presence of active sinusitis. Without adequate reduction in sinus inflammation and establishment of effective sinus drainage, even the best of fistula repairs would fail. Therefore, the absence of any inflammatory signs is absolutely mandatory for surgical success which was achieved in this case.

2. Harvesting of buccal fat pad done through a horizontal incision in the periosteum of the reflected buccal mucoperiosteal flap after excision of fistulous tract.

Various methods for the closure of oro-antral fistula has been described in literature including local flaps like buccal flaps, palatal flaps and combination of these flaps; distant flaps like tongue and nasolabial flaps; grafts made from bone, metal or plastic which have been used with variable results. (2) Larger flaps including temporalis and free tissue transfer might be required for larger fistulae, as resulting from ablative surgery or traumatic loss of posterior maxilla.[5] The one which is most widely used is the buccal sliding or advancement flap, which probably represents the standard procedure for OAC closure but it results in a decreased vestibular sulcus depth, thus complicating the prosthetic rehabilitation. Second, it cannot be applied in cases in which the gingival region has been severely damaged.[6] Third, its success is questionable in difficult cases of previously operated Oro antral communications.[6] The palatal flap avoids this problem but the disadvantages of this method are the denudation of the palatal surface, pain and patient discomfort as a result of secondary epithelization over 2–3 months. It also carries a risk of necrosis of the palatal flap if integrity of greater palatine artery is not maintained.

3. Closure of oro antral fistula done with buccal fat pad



Autogenous bone grafting followed by flap closure can also be used but it causes donor site morbidity. Different types of allogenic and alloplastic materials have been used to repair the oroantral defects including freeze-dried collagen, fascia lata, duramater, gold foil, blocks of hydroxyapatite and tantalum . The artificial material placement leads to exposure of the implanted material and infection which requires removal of the implant. [3] Recently, third molar transplantation as a technique in closure of oro antral communication immediately after tooth extraction has also been used but it cannot be used in cases of an established fistula. It also requires unnecessary extraction of a third molar with its own complications and root canal treatment of the transplanted tooth is also indicated.

The buccal fat pad (BFP) had a limited clinical importance when it was first described 300 years ago as an anatomic structure without any obvious function and was usually considered a surgical nuisance because of its accidental encounter during various operations in the pterygomaxillary space or after injuries to the maxillofacial region. The buccal fat pad (BFP) as an anatomic element was first mentioned by Heister in 1732.[7] Bichat in 1802 then elucidated on the exact character of the flap.[8] So, it is also called boule de Bichat or boule graisseuse in French, Wangenfettpfropf or Wangerfettpolster in German, and the sucking pad, sucking cushion, masticatory fat pad, or the buccal pad of fat in English. [(5)]

Egyedi was the first to report the use of BFP as a pedicled graft for the closure of oro-antral and oronasal communications.[9] He recommended coverage of the exposed BFP with a skin graft, however subsequent reports by Tideman *et al.* showed that epithelization of the flap does take place even without coverage by split skin graft after 3-4 weeks of inset.[9, 10] Exposed BFP in the oral cavity has been clinically and histologically shown to transform from fat tissue to loose connective tissue with granulation tissue formation and final maturation of the originally uncovered BFP to a stratified squamous epithelium in three weeks' time.[5] The source is thought to be the migrating cells from the adjacent mucosal region.

The buccal fat pad is an encapsulated, biconvex, specialised fatty tissue which is distinct from subcutaneous fat. It is located between the buccinator muscle medially, the anterior margin of the masseter muscle and the mandibular ramus and zygomatic arch laterally.[4] It plays an important role in masticatory function especially in the infant during suckling and in adults facilitates and enhances intermuscular motion, separates the masticatory muscles from one another and from the adjacent bony structures and protects neurovascular bundles.

The buccal fat pad is made up of a central body with four extensions (buccal, pterygoid, superficial and deep temporal) and is surrounded by a thin fibrous capsule.[6] The central body and buccal extension account for approximately 50% of the BFP and are the portions available for reconstructive procedures clinically.[11] Blood supply is provided by the buccal and deep temporal branches of the maxillary artery, the transverse facial branches of the superficial temporal artery and branches of the facial artery which enter the fat tissue and form a lobar subcapsular vascular plexus by anastomosing with each other.[5] This rich blood supply may be one reason for the quick epithelialization of the fat. So Baumann and Ewers recommended maintaining the integrity of this capsule and thus vascularity of flap.[12] This can be done by careful handling of flap, avoiding extensive pulling or fragmenting of the tissue, avoiding mechanical suction once exposed and using only surgical gauze to gently clear bleeding. Complications are very rare (3 – 7%), and comprise perforation, postoperative infection, partial necrosis, excessive scarring and granulation.[(4, 5)] Though we always try to preserve the fascial envelope, it is not always possible and in our case the vascularity of the flap and thus healing did not seem to be affected even after a suspected perforation.

4. Postoperative photograph after 1 week showing coverage of buccal fat pad with granulation tissue

5. Postoperative photograph after 3 weeks showing complete epithelisation of buccal fat pad

Candamourty R *et al* recommended coverage of buccal fat pad with buccal flap when BFP is stretched excessively or perforated. (1) It can also be used when there is residual sinus infection or in cases of previous failure with other flaps. (5) But this combination technique causes reduction in vestibular depth. The present case shows that excellent healing can also take place with a pedicled buccal fat pad alone without coverage by buccal flap inspite of perforation of its capsule.

6. Postoperative photograph after 1 and a half month showing complete healing of flap

When precisely dissected and mobilised, the buccal fat pad provides a 7×4×3 cm pedicled graft with a volume of 13 sq.cm or 9.6 ml.[11] The size of the BFP is fairly constant among individuals with a weight of 9.3 gm and average thickness is 6 mm regardless of the overall body weight and fat distribution.[11]

Rapidis *et al.* stated that in maxillary defects measuring more than 4/4/3 cm, the possibility of partial dehiscence of the flap is high with buccal fat pad alone due to the impaired vascularity of the stretched ends of the flap.[13]

The advantages of BFP include that the location of the BFP is anatomically favorable, the ease and minimal dissection with which it can be harvested and mobilized, versatility, excellent blood supply, low rate of complications, minimal to no donor site morbidity, a quick surgical technique due to fact that BFP is located in the same surgical field as the defects to be covered, a good rate of epithelialization, is able to cover defects of up to 60×50mm without loss of vestibular depth.[1] The possibility of harvesting it under local anesthesia can be considered as an added advantage and this advantage was utilized in this study.[1] This flap can also be used on a previously irradiated bed without problems. It should be considered in settings where access to free flaps is limited and in cases where previous flaps have failed.[5] It can be very useful in older patients to reconstruct defects quickly under local anesthesia as was done in our case

Its main drawback is that it can only be used once and limitations exist concerning the potential size of the defects to be covered. However, keeping in mind its recommendations and limitations, its application is a safe and successful procedure for closing Oro antral defects.

CONCLUSION

In Conclusion, pedicled buccal fat pad is a reliable flap for reconstruction of acute, chronic and recurrent oro- antral fistulas. It can be considered an ideal flap for these defects due to its excellent blood supply, ease of mobilization, minimal donor site morbidity and low rate of complications without decrease in the vestibular depth. Though it is always advised to preserve the fascial envelope during harvest of buccal fat pad by careful manipulation, small perforations can occur as seen in this case. But it was not seen to effect vascularity and epithelisation of flap perhaps due to small size of perforation. So, even if small perforation occur during harvesting normal healing can occur if proper suturing of fat pad is done over the defect.

REFERENCES

Candamourty, R., Jain, M.K., Sankar, K. and Babu, M.R. 2012. Double layered closure of oro-antral fistula using buccal fat pad and buccal advancement flap. *J Nat Sci Biol Med.* **3**(2): 203–205.

Yeshaswini, T. and Thomas, J.P. 2009. Pedicled BFP for closure of oro-antral fistula revisited. *J Maxillofac Oral Surg.* **8**(2): 134–136.

Tariq, J., Qurat ul Ain and Faryal, S.A. 2012. Use of buccal pad of fat oroantral fistula repair. *JUMDC*. **3**(2): 59- 62

Aldeyemo, W.L., Ogunlewe, M.O., Ladeinde, A.L. and James, O. 2004. Closure of oro-antral fistula with pedicled buccal fat pad. A case report and review of literature. African *Journal of Oral Health.* **1**(1): 42-46

Aslam, A., Yunus, M., Rahman, P., Luqman, U. and Ali Shah, S.A. 2015 Buccal fat pad flap in management of oroantral fistula. *Pakistan Oral & Dental Journal*. **35**(1): 13- 16

Poeschl, P.W., Baumann, A., Russmueler, G., Poeschl, E., Klug, C. and Ewers, R. 2009. Closure of oroantral communications with bichat's buccal fat pad. *J Oral Maxillofac Surg.* **67**:1460-1466

Heistcr, L. 2009. Compendium Anatomicum. Nuremberg, Germany: G. C. Beri; pp. 1−32.

Bichat, F. 1802. Anatomic Gbni−Rale. Appliquandila Physiologic Ctiiamkdecine. Paris, France: Brosson, Gabon etCie; pp. 24-38.

Egyedi, P. 1977. Utilization of the buccal fat pad for closure of oro−antral and/or ore−nasal communications. *J. Maxillofac Surg.* **5**:241−4.

Tideman, H., Bosanquet, A. and Scott, J. 1986. Use of the buccal fat pad as a pedicled graft. *J Oral Maxillofac Surg.* **44**:435−40

Mohan, M.C. and Manimaran, K. 2010. Reconstruction of intraoral post surgical defects by buccal pad of fat – A clinical study. *JIADS.* **1**(2): 1-4.

Baumann, A. and Ewers, R. 2000. Application of the buccal fat pad in oral reconstruction. *J. Oral Maxillofac Surg.* **58**: 389-92.

Rapidis, A.D. and Alexandridis, C.A. 2000 Eleftheriadis E, Angelopoulos AP. The use of the buccal fat pad for reconstruction of oral defects: review of the literature and report of 15 cases. *J Oral Maxillofac Surg.* **58**:158–63.