ORIGINAL ARTICLE

BUCCAL FAT PAD FLAP IN MANAGEMENT OF OROANTRAL FISTULA

[1]ADNAN ASLAM
[2]MOHAMMAD YUNUS
[3]PAREESA RAHMAN
[4]UZAIR LUQMAN
[5]SYED ADNAN ALI SHAH

ABSTRACT

Many options are exercised to affect surgical management of oroantral fistulae. Postoperative wound dehiscence is not uncommon, and the surgical management of such fistulae often becomes increasingly difficult because of a lingering maxillary sinus infection. This was a retrospective study done on 23 patients in which a double layered technique, consisting of buccal fat pad in conjunction with buccal advancement flap was used for surgical closure of oroantral fistulae. Only 3 of the patients had had a failure of the closure. We recommend this technique because of its many advantages and low risk of complications.

Key Words: *Minor oral surgery, dental extractions complications, buccal fat pad flap, oroantral fistula.*

INTRODUCTION

Oroantral communication is not an infrequent complication of dental extraction in the upper buccal region. Continued pneumatization of the alveolar portion of the maxilla by the maxillary sinus leads to a close proximity of the dental roots of especially the maxillary first molar, but also the maxillary second and third molars, premolars and sometimes the maxillary canine.[1] Extraction leads to the formation of a small communication, with or without the displacement of the dental root into the maxillary sinus. Host of effects follow, the notable of which include regurgitation of oral fluids into the sinus and nasal cavity, foul smelling discharge from the site of the communication, inability to build oral pressure and possibly sinusitis.[2]

While most cases of small oroantral communications can be managed relatively easily by adhering to sinus precautions and possibly prescribing an antral regime, established cases of oroantral fistulae require surgical closure of the defect. This is accomplished by a thorough excision of the lining epithelium of the fistula, and then using most of the times a local flap to affect closure over the bony defect. Common flaps to accomplish this closure include buccal advancement flap, buccal fat pad flap, buccal advancement closure over a metal foil, palatal rotation flap and palatal island flaps.[3] 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. This is done under an antibiotic cover, nasal decongestants and possibly anti histamines.[2]

The most common complication of such a closure is wound dehiscence, and an ideal flap for management of oro antral communication might still have its advantages and shortcomings. We describe here our experience of using buccal fat pad (BFP) flap in conjunction with a buccal advancement flap for management of established cases of oroantral fistulae in 23 consecutive cases by a single surgeon. The aim of the audit was to measure the effectiveness of using a bilayered Buccal Fat Pad (BFP) and Buccal Advancement Flap (BAF) closure in management of oro antral fistulae, and to record its complications.

METHODOLOGY

A retrospective clinical audit through a descriptive case series was done on 23 consecutive cases of oro antral fistulae treated with BFP flap, with atleast a six weeks follow up at the Department of Oral & Maxillofacial Surgery; Margalla Institute of Health Sciences, Rawalpindi. It was spread over four years and two months; from June 2010 to August 2014.

[1] **For correspondence, please contact:** Dr. Adnan Aslam, BDS, FCPS, FFD RCSI, Assistant Professor & Head, Department of Oral & Maxillofacial Surgery, Margalla Institute of Health Sciences, Rawalpindi, Pakistan. Tel.: Work: +92 (51) 550 8915 Cell.: +92 (300) 426 0234 E-mail: docadnanaslam@hotmail.com
[2] Mohammad Yunus, BDS, MDS, Principal, Margalla Institute of Health Sciences, Rawalpindi
[3] Pareesa Rahman, BDS, FCPS, FFD RCSI, Assistant Professor, Department of Oral & Maxillofacial Surgery, Frontier Medical College, Abbottabad
[4] Uzair Luqman, BDS, FCPS, FFD RCSI, Consultant Oral & Maxillofacial Surgeon, KRL General Hospital, Islamabad
[5] Syed Adnan Ali Shah, BDS, MDS, FRACDS, FDS RCS, FFD RCSI, FCPS (Hon), Professor & Chairman; Division of OMFS, Head; Department of Dental Diagnostic & Surgical Sciences, Faculty of Dentistry, University of Manitoba, Winnipeg, Canada

Received for Publication: January 2, 2015
Revision Received: February 9, 2015
Revision Accepted: February 11, 2015

Surgical technique: After verification of resolution of inflammation in the area, all cases except two were operated under local anaesthesia containing 2% Lignocaine with 1:100,000 adrenaline. Two patients underwent same treatment under general anaesthesia. One of them required a concomitant Caldwell-Luc procedure for enucleation of sinus pathology, and one patient preferred general anaesthesia over local anaesthesia becaue of personal preference. A four cornered buccal mucoperiosteal flap is raised with releasing incisions to the depth of the vestibule. Raising of the flap gives a clear view of the whole length of the fistula tract within the tooth socket, which is removed till the floor of the maxillary sinus. No attempt is made to remove any more sinus lining from within the sinus confines, and clearance of only the socket walls was performed. Periosteal incision was then given in the depth of the flap, extending into the area opposite the second molar. After incision of the periosteum, fine, mosquito forceps were gently introduced into the buccal space to expose the BFP. This was then gently teased taking care to preserve the thin, delicate fascial envelope surrounding the fat. Fat was atrumatically transferred to cover the alveolar defect performing a tension-free closure with 910 Polyglactin sutures. The initially raised buccal advancement flap was then opened up to ensure a tension free closure, and formed a second lining over the defect. The procedure was always performed under a prophylactic antibiotic cover, consisting of Co-Amoxiclav, which was then continued for a period of five days postoperatively. Ibuprofen with pseudoephedrine, and cetirizine was also prescribed to these patients. After the first five days, a four day course of Xylometazoline nasal drops was prescribed, followed up with gentle steam inhalation for another week. The patient was followed up weekly for first two weeks, and then fortnightly till six weeks postoperatively.

RESULTS

The average age of these patients was 44 years (Range 21 to 62 years). There were 14 males (60.9%) and 9 females (39.1%). The operation was successful in terms of no postoperative residual fistula in 87% (n=20) of patients. Three patients developed a dehiscence of the closed site. One patient had an acute severe exacerbation of maxillary sinusitis. In all patients, there was a remarkable reduction in the depth of the buccal vestibule.

DISCUSSION

After its first description by Heister in 1732,[4] Bichat elucidated on the exact character of the flap.[5] Other names in the literature than can be used to refer to the BFP are 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.[6]

As an entity which is considered distinct from subcutaneous cheek fat, the BFP prevents indrawing of the cheeks during sucking in infants, whereas facilitate and enhance intermusular motion in the adult.[7] BFP has been used in a wide range of clinical scenarios including closure of OAF,[8,9] reconstruction of post excision defects,[10] mucosal defects,[11] treatment of oral submucous fibrosis,[12] repair of primary cleft palate,[13] temporomandibular reconstruction,[14] sinus floor augmentation[15] and as a graft for vocal cord augmentation.[16]

The management of an established case of oroantral fistula can be challenging, especially in the presence of active sinusitis. Control of acute inflammation is thus mandatory. This was done through the use of prophylactic broad spectrum antibiotics, and medications to ensure patency of sinus drainage tract. Without adequate reduction in sinus inflammation and establishment of an effective sinus drainage, even the best of fistula repairs would fail.

It is cumbersome to excise fistula with limited visibility in a tunnel, and we find it surgically helpful to first elevate the buccal mucosa flap sometimes in conjunction with a limited palatal sulcular flap to correctly identify the edges of the sinus lining on the socket wall, which can then be cleared easily. The exposure of BFP through periosteal incision brings into view the syssarcosis in a thin fascial envelope. Though we always try to preserve the fascial envelope, it does not always remain possible and in our experience was not seen to adversely affect the vascularity of the flap. However, this makes the handling of fat more tedious, and any more surgical trauma is best avoided by strictly not using the suction, and using only surgical gauze (peanuts) to gently clear bleeding. After the fat is sutured to the palatal mucosa, it is also sutured to the edges of the buccal alveolar mucosa. The fat tends to adapt very well to the edges of the incised epithelium because of its volumetric expansion, and can be approximated adequately by using only simple, interrupted sutures. The buccal advancement flap, however requires mattress sutures, preferably in a vertical pattern to avoid postoperative dehiscence.

The advantages of BFP in affecting closure of oroantral fistula have been cited to be a thoroughly vascularized flap, availability in the immediate proximity, minimal donor site morbidity, rapid mucosalization and the return of the buccal flap to its original anatomical position to avoid obliteration of the buccal vestibule.[6] It has been shown in studies that the BFP does not need to be covered by a skin graft when exposed to heal in the mouth, because of its inherent ability to epithelialize readily within 2 to 3 weeks.[17] It is considered the primary choice for repair of oroantral fistula by some surgeons, whereas others like Samman et al[18] justify its use only in cases where the buccal advancement flap is damaged and can be used as a primary option.

The use of buccal advancement flap only is associated with a high risk of postoperative dehiscence, and our technique of using both flaps together tends to minimize postoperative risks of wound dehiscence. However, a critique of such technique would be the buccal vestibular depth would still be obliterated. There has already been documented success for closure

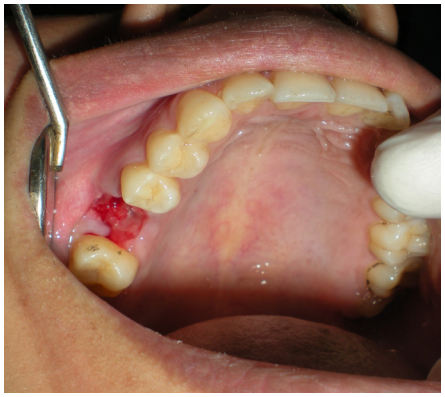

Fig 1: Preoperative view of an established case of oroantral fistula in the upper right first molar region

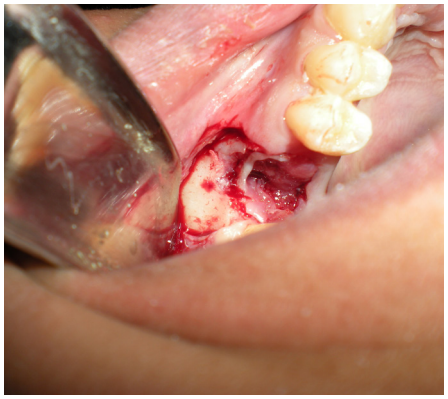

Fig 2: A four cornered buccal mucoperiosteal flap is raised to expose the complete extent of the fistula

Fig 3: Excision of the fistula tract

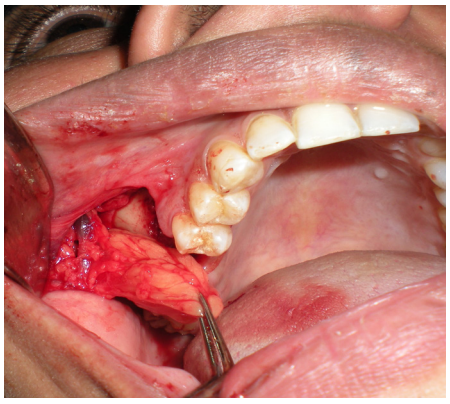

Fig 4: BFP being transported into the defect site

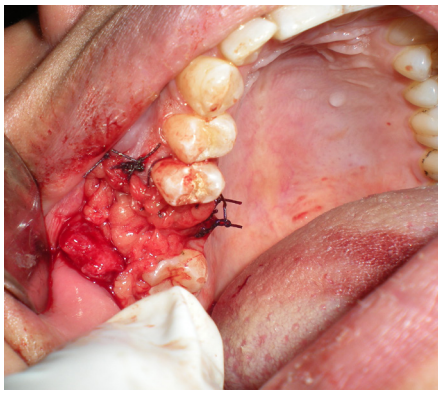

Fig 5: Closure of OAF with BFP using polyglactin sutures

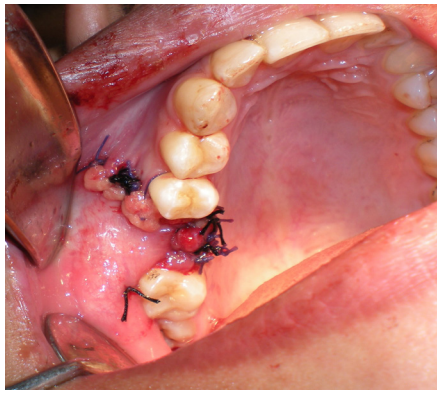

Fig 6: Double layered closure of the OAF with BFP and buccal advancement flap

Fig 7: 12 days postoperative view of double layered closure of the OAF. Note a slight dehiscence of the buccal advancement flap, and the start of mucosalization in the BFP

Fig 8: Complete healing of the surgical site at 6 weeks

of oroantral communications with BFP only, with a reported rapid mucosalization of the exposed fat in the oral cavity.[19]

In our opinion in conditions where the BFP has to advance to a larger distance, it is not possible to advance a buccal mucosal flap to function as an additional lining, but where it is used for closure in the immediate proximity and with the availability of buccal advancement flap, a double layered option can be exercised. We rationalize this double layered technique also because of the fact, that in the setting of an oroantral communication due to a tooth extraction, the defect is small and sinus inflammation is invariably present which cannot be completely overcome, and a more effective closure is warranted. A double layered closure has been reported in cases of residual sinus infection and redo cases.[19]

In 3 of our patients, a concomitant Caldwell Luc procedure was performed in conjunction with the surgical closure of the fistula. This is important in cases of sinusitis refractory to conservative measures, including the use of antibiotics, nasal decongestants and anti histamines. Other authors[20] have also reported exenteration of sinus lining at the same time at even a small doubt on presence of active sinus disease.

Seven of the 20 patients had had a partial dehiscence of the buccal advancement flap layer, and in all these cases buccal fat pad had started to seal off the fistula by the time the dehiscence was noticed. Exposed BFP in the oral cavity has been clinically and histologically to transform from fat tissue to loose connective tissue with granulation with final maturation to a stratified squamous epithelium in three weeks' time.[20] This is achieved through an excellent axial pattern blood supply, based on blood supply from the buccal and deep temporal branches of the maxillary artery, transverse facial branches of the superficial temporal artery, and branches of the facial artery. We also noted that the concomitant use of BFP with a buccal advancement flap is judicious in the cases where a loss of buccal cortical plate is present and the BFP volumetrically fills up that space and provides a vascularized tissue bed for the overlying BAF. We also found it helpful to rest the suture knots (mattress) on the palatal mucosa for both of the layers, which lessened tension on the advancing flaps, decreased cutting through of the suture through the fat, kept hygiene easier to maintain and easier postoperative removal of sutures.

The complications reported with the use of BFP include partial necrosis, infection, excessive scarring, excessive granulation, and sulcus obliteration.[6,21] It was interesting to note that the only worthwhile complication encountered by us was wound dehiscence, and we contend in all three cases was due to sinus infection.

CONCLUSION

Closure of oroantral fistula through a combined use of buccal fat pad and buccal advancement flap is a safe and reliable method, with few complications and provides an adequate barrier to withstand a mild degree of sinus inflammation which is invariably present in the setting of an oroantral fistula.

REFERENCES

1 Bichat F. Anatomie generale, appliquee a la Yalcin S, Oncu B, Emes Y, Atalay B, Aktas I. Surgical treatment of oroantral fistulas: A clinical study of 23 cases. J Oral Maxillofac Surg 2011; 69: 333-9.

2 Dimitroulis G. A synopsis of minor oral surgery. Oxford: Wright (Butterworth-Heinemann; 1997. 101-4.

3 Awang MN. Closure of oroantral fistula. Int J Oral Maxillofac Surg 1988; 17: 110-5.

4 Heister L. Compendium anatomicum. Norimbergae, Germany. G C Weberi, 1732, 146.

5 Physiologie et a la medicine. Paris, Frannce: Brosson, Gabon et cie, 1802.

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

7 Stuzin JM, Wagstrom , Kawamoto HK, et al. The anatomy and clinical applications of the buccal fat pad. Plast Reconstr Surg 1990; 85: 29.

8 Scott P, Fabbroni G, Mitchell DA. The buccal fat pad in the closure of oro-antral communications: an illustrated guide. Dent Update 2004; 31: 363-6.

9 Poeschl PW, Baumann A, Russmueller G, Poeschl E, Klug C, Ewers R. Closure of oroantral communications with Bichat's buccal fat pad. J Oral Maxillofac Surg 2009; 67: 1460-6.

10 Rapidis AD, Alexandridis CA, Eleftberiadis 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 2000; 58: 158-63.

11 Ferrari S, Ferri A, Bianchi B, Copelli C, Magri AS, Sesenna E. A novel technique for cheek mucosa defect reconstruction using a pedicled buccal fat pad and buccinators myomucosal island flap. Oral Oncol 2009; 45: 59-62.

12 Mehrotra D, Pradhan R, Gupta S. Retrospective comparison of surgical treatment modalities in 100 patients with oral submucous fibrosis. Oral Surg Oral Med Oral Pathol Oral Radiol Endod 2009; 107: 1-10.

13 Levi B, Kasten SJ, Buchman SR. Utilization of the buccal fat pad flap for congenital cleft palate repair. Plast Reconstr Surg 2009; 123: 1018-21.

14 Rattan V. A simple technique for use of buccal pad of fat in temporomandibular joint reconstruction. J Oral Maxillofac Surg 2006; 64: 1447-51.

15 Hassani A, Khojasteh A, Alikhasi M, Vaziri H. Measurement of volume changes of sinus floor augmentation covered with buccal fat pad: A case series study. Oral Surg Oral Med Oral Pathol Oral Radiol Endod 2009; 107: 369-74.

16 Tamura E, Fukuda H, Tabata Y, Nishimura M. Use of the buccal fat pad for vocal cord augmentation. Acta Otolaryngol 2007; 1-6.

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

18 Samman N, heung LK, Tideman H. The buccal fat pad in oral reconstruction. Int J Oral Maxillofac Surg 1993; 22: 2.

19 Jain MK, Ramesh C, Sankar K, Babu KTL. Pedicled bucccal fat pad in the management of oroantral fistula: A clinical study of 15 cases. Int J Oral Maxillofac Surg 2012; 41: 1025-9.

20 Hanazawa Y, Itoh K, Mabashi T, Sato K. Closure of oroantral communications using a pedicled buccal fat pad graft. J Oral Maxillofac Surg 1995; 53: 771-5.

21 Adeyemo WL, Ogunlewe MO, Ladeinde AL, James O. Closure of oroantral fistula with pedicled buccal fat pad. A case report and review of the literature. Afr J Oral Health 2004; 1: 42-6.