Journal of Applied Dental and Medical Sciences
NLM ID: 101671413 ISSN:2454-2288
Volume 4 Issue2 April-June 2018

Original Article

COMPARISON BETWEEN PEDICLED BUCCAL FAT PAD FLAP AND BUCCAL ADVANCEMENT FLAP FOR CLOSURE OF OROANTRAL COMMUNICATION

Risshi Bhatt[1], Animesh Barodiya[2] , Siddharth Singh[3], Naman Awasthi[4]

[1] *MDS , Oral and Maxillofacial Surgery, R and R Dental clinic, Surat, Gujarat, India*
[2] *MDS , Oral and Maxillofacial Surgery, Barodiya Dental Clinic and Maxillofacial centre, Itarsi (MP),India*
[3] *MDS , Oral and Maxillofacial surgery, Dental Care Centre ,Shahdol (MP),India*
[4] *Assistant professor, Government Dental college, Shahdol (MP),India*

ARTICLE INFO

Keywords:
Oroantral communication, Pedicled buccal fat pad, Buccal advancement flap.

ABSTRACT

Aim- The aim of this study was to evaluate efficacy of soft tissue surgical closure of Oroantral communication/ Oroantral fistula by using Buccal advancement flap & Buccal fat pad and to assess criteria for success or failure of the two surgical technique on following parameters: presence of Pain & Swelling, Infection status, Sinusitis, Fistula formation, Loss of sulcus depth. **Material and method-** A total of 20 healthy patients were taken irrespective of sex, caste and creed, they were between 35 and 75 years of age group. Patients were divided into two groups .Group I (n = 11 patients): Patients underwent surgical closure of OAF with buccal fat pad (BFP).Group II (n = 9 patients): Patients underwent surgical closure of OAF with buccal advancement flap (BAF). **Results-** The procedure was done successfully in all the 20 patients. 11 patients were treated with buccal fat pad and 9 were treated with buccal advancement flap. Complications were observed in 2 cases of buccal advancement flap. Both the techniques were found successful in closure of OAC. There is no statistical difference present with both the techniques while comparing parameters except the loss of buccal vestibule which was evident in case of buccal advancement flap. **Conclusion-** We conclude that when patient is seen with OAC, which is smaller than 3 mm should be sutured. When larger communication of more than 5 mm is seen, use of the BFP, is treatment of choice. In cases of OAF, buccal fat pad is the preferred technique over buccal advancement flap. **Clinical significance-** In spite of the longer surgical time and immediate complications of the application of the buccal fat pad in closing the oroantral communications and fistula it is a good and more reliable method while comparing with buccal advancement flap.

INTRODUCTION

An oro-antral communication (OAC) is a pathological condition in which there is a communication between an oral cavity and the maxillary sinus as a consequence of loss of soft tissue and hard tissue which separates these structures[1].

If the OAC is maintained open to the oral cavity for more than 48 hours or if there is an infection, chronic inflammation of the sinus membrane and permanent epithelialization of the buccosinusal fistule may occur, thus increasing the risk of sinusitis.[1]

OAC are usually caused by extraction of maxillary posterior teeth. The thinness of the antral floor in that region ranges from 1 to 7 mm. Although the incidence is relatively low (5%),[2,3,4] OAC are frequently encountered due to the large number of extractions. OAC may close spontaneously especially when the defect has a size smaller than 2 mm. Also, it is difficult to determine the size of the OAC clinically. To prevent

* Corresponding author***: Dr. Animesh Barodiya, Email-anim4391@gmail.com, phone no.-9993652003, Barodiya dental clinic and Maxillofacial Centre, Itarsi (MP)***

chronic sinusitis and the development of fistulas, it is generally accepted that all of these defects should be closed within 24 to 48 hours[2].

Currently, closure of OAC is usually performed by surgical procedure. In case of a small OAC, suturing the gingiva might be sufficient to close the perforation. When this does not provide adequate closure, a flap procedure is the treatment of choice. As Awang[4] suggested, flap procedures can be divided into local flaps and distant flaps. Local flap procedures include palatal flaps and various buccal flaps, of which Rehrmann's and Môczáir's techniques are widely known[5].

1) The present study was being conducted on 20 patients with 3 months follow up, which aims at compairing efficacy of soft tissue closure of the OAC with use of buccal fat pad & buccal advancement flap.

MATERIAL AND METHODS

The present study was undertaken in the Department of Oral and Maxillofacial Surgery, Modern Dental College & Research Centre; Indore with due permission of the ethical committee. A total of 20 healthy patients were taken irrespective of sex, caste and creed, they were between 35 and 75 years of age group.. Patients were divided into two groups .

Group I (*n* = 11 patients):Patients underwent surgical closure of OAF with buccal fat pad (BFP).

Group II (*n* = 9 patients):Patients underwent surgical closure of OAF with buccal advancement flap(BAF).

.

Patients of both the groups were operated under local anaesthesia. The study protocol was explained to the patients in detail and their consent was obtained.

All the patients were prepared preoperatively with irrigation of sinus with normal saline for 7 days or more till antral cavity was clear and no evidence of maxillary sinusitis was ensured before surgery.

Inclusion criteria:-

i. Patients free of any systemic disease.
ii. No special consideration was given to any particular socio-economic group, age and sex.
iii. Patients with oro-antral communication following the extraction of the maxillary antral teeth, sinus lift procedure, while harvesting tuberosity bone graft & Oro-antral fistula were selected for the study.
iv. Patient who understood the nature of the study and who were willing for regular follow up were selected.

Exclusion criteria:-

OAC/F occurring due to the destruction of the floor of the antrum secondary to the pre existing infections or patients had the preexisting antral pathology were not selected.

Clinical assesment:

- **Visibility** on inspection was checked.
- **Nose blowing test** performed to confirm presence of OAC/OAF- escape of air bubbles from the site is positive for the presence of OAC/OAF.
- **Cotton wisp test performed**- a thin cotton fiber was held near the orifice of OAC/F and
- **Valselva Maneuver** was performed- movement of the cotton fiber was noted when OAC/F was present.
- OAC/F was measured for its diameter using caliper.

Other relevant findings of the study-

- Length of the root of the extracted tooth measured
- Depth of the socket measured if root not available.
- Vestibular depth noted using probe and scale.

RADIOLOGICAL FINDINGS:-

An IOPA /OPG/PNS taken to check for any sinus pathology. Few cases with pinhead size of opening were checked with gutta-percha points in the socket prior to any surgical procedure to assess the OAC/F.

SURGICAL TECHNIQUE:-

Intra oral irrigation done with povidine iodine solution and normal saline regularly to remove debris and decrease bacterial load. Only after the antral lavage return was clear, surgery was planned.

Buccal Fat Pad

Local infiltration was given with 2% lignocaine with 1:80,000 adrenaline to produce some amount of local vasoconstriction. After inducing local anesthesia, a circular incision with a 1-mm margin was made around the OAF, and the epithelial tract and any inflammatory tissue within the opening were completely excised. Two divergent cuts were then made from each end of the circular incision extending into the vestibule. The trapezoidal buccal mucoperiosteal flap was then reflected from the alveolar process and the lateral wall of the maxilla. In cases of OAF, bony window was enlarged with the help of bone rongeur forcep. The antrum was curreted and pathological tissue was removed. Bleeding was controlled with antral pack. 1cm long incision taken in the buccal vestibule posterior to the zygomatic buttress to expose the BFP.

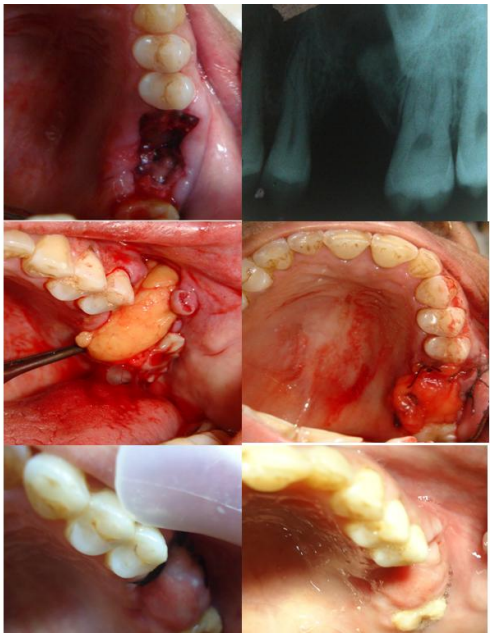

Fig.1

Then the BFP was gently advanced into the bony defect and secured to the palatal mucosa without tension with 4-0 vicryl sutures. Finally, the mucoperiosteal flap was replaced in its original position, and sutures were inserted between the BFP and the buccal flap so that part of the BFP remained exposed in the oral cavity (fig. 1).

Buccal Advancement Flap

2% Local anesthetic solution with vasoconstrictor 1:80,000 was infiltrated slowly into the proposed buccal surgical site, and on palatal side with care taken to avoid palatal ischemia or injury to the greater palatine vessels. The margins of the fistula was probed with a 25-gauge needle, keeping in mind that the osseous defect is considerably larger than the soft tissue fistula. The fistula was excised sharply with No.15 blade. Now from the anterior and posterior edges of the bony defect, two divergent incisions were made sharply through mucoperiosteum to bone and carried superiorly to the height of the mucobuccal fold. This trapezoidal buccal

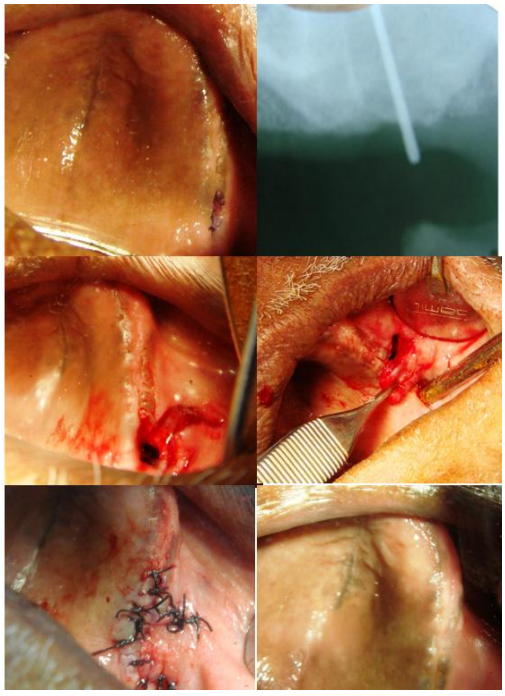

Fig. 2

flap is elevated with periosteal elevator. In cases of OAF, bony window was enlarged with the help of bone rongeur forcep. Antrum was curreted and pathological tissue was removed. Bleeding was controlled with antral pack. The periosteum on the undersurface of the flap was incised horizontally in the vestibular depth, to allow advancement of the flap. Closure was accomplished over bone with 3-0 black silk sutures without tension from the buccal flap to palatal tissues (fig 2).

RESULT:

- The procedure was done successfully in all the 20 patients. 11 patients were treated with buccal fat pad and 9 were treated with buccal advancement flap.
- Complications were observed in 2 cases of buccal advancement flap.
- Results were evaluated based on clinical observation and radiographic analysis of the surgical site.
- All results were calculated using the mean value and standard deviation foe each of the parameters considered and checked for statistical significance using Chi square and Mann Whittney test.
- Results of all the parameters are shown in Tables

Table 1: Size of oroantral defect

Size of oro-antral defect in mm		>3 mm	6-10mm	>10 mm
BFP	No. of patient	6	5	0
	%	54.54%	45.45%	00%
BAF	No. of patient	6	1	2
	%	66.67%	11.11%	22.22%
Total	No. of patient	12	6	2
	%	60.00%	30.00%	10.00%
Chi Square value = 4.146 ; p value = 0.126 ; Not Sig				

Size of oro-antral defect In Group I, there were 6 (54.54%) patients with OAF more than 3 mm in size, whereas in Group II there were 6 (66.67%) patients with OAC/F more than 3 mm.

In size 6–10 mm category, there were 5 (45.45%) subjects in Group I and 1 (11.11%) subjects in Group II. In group with more than 10 mm size of opening, there were only 2 patients in Group II.

Mean size in Group I was 6.80 ± 3.16 mm, whereas in Group II it was 4.90 ± 1.37 mm.

Statistically there was no significant difference between the two groups (P = 0.470) [Table 1].

IMMEDIATE FOLLOW UP - PAIN

In Group I pain was absent in 8 patients means in 72.72% patients pain was absent and only 3 out of 11 patients had pain.

In Group II pain was present in 1 (11.11%) out of 9 patients.

Table no 2- Immediate Follow up – Pain			
Immediate Follow up - Pain		Absent	Present
BFP	No.of patient	8	3
	%	72.72%	27.27%
BAF	No.of patient	8	1
	%	88.89%	11.11%
Total	No.of patient	16	4
	%	80 %	20%
Chi Square value = 1.017 ; p value = 0.313 ; Not Sig			

Table 3: Immediate Follow up – Swelling			
Immediate Follow up – Swelling		**Absent**	**Present**
Group I(BFP)	Number of patient	9	2
	%	81.00%	11.00%
Group II(BAF)	Number of patient	8	1
	%	88.88%	14.29%
Total	Number of patient	17	3
	%	85.%	17.65%
Chi Square value = 0.093 ; p value = 0.761 ; Not Sig			

Statistically, no significant difference was seen between two groups.

p- value was 0.313 & chi square value =1.o17(table 2)

Immediate Follow up – **Swelling** In group I, swelling was seen to be present in 2 patients(11%) . In group II, swelling was seen to be present in1 patient (14.29%).Statistically, there was no significant difference between the two groups.

Immediate Follow up - Infection: In both groups there was no signs of local infection**.**

Immediate Follow up –Sinusitis: None from both groups sinusitis was reported.

Table 4 Immediate Follow up - Infection		
Immediate Follow up - Infection		Absent
BFP	Number of patient	11
	%	100.00%
BAF	Number of patient	8
	%	100.00%
Total	Number of patient	20
	%	100.00%

Table 5 Immediate Follow up -Sinusitis		
Immediate Follow up - Sinusitis		Absent
BFP	Number of patient	11
	%	100.00%
BAF	Number of patient	9
	%	100.00%
Total	Number of patient	20
	%	100.00%

FISTULA FORMATION: In Group I 11 out of 11(100%) patient were showed no signs of fistula formation in delayed follow-up.

In Group II out of 9 patients 2(22.22%) patients were reported fistula formation. No parameteric Chi Square value =2.716and p value =0.099 indicated that there was no association between surgical technique and sinusitis &significance level is zero.

Mean of loss of sulcus depth: Calculated value mean of loss of sulcus depth in buccal advancement flap is 1.3636 & buccal fat pad is 2.4444, which is clearly indicated than mean value of buccal fat pad is comparatively lower side.

Loss of Sulcus Depth Mean Ranks : Mean rank of BAF is 15.17 which clearly indicate that loss of sulcus depth is more in buccal advancement flap technique as compared to BFP where mean is 6.68 .

Table no 6- Delayed Follow up - Fistula Formation			
Delayed Follow up - Fistula Formation		Absent	Present
BFP	Number of patient	11	0
	%	100.00%	0.00%
BAF	Number of patient	7	2
	%	77.78%	22.22%
Total	Number of patient	18	2
	%	90.00%	10.00%
Chi Square value = 2.716 ; p value = 0.099 ; Not Sig			

Table- 7 Mean of loss of sulcus depth		
surgical tech.	No. of Patients	Loss of Sulcus Depth mean
BFP	11	1.3636
BAF	9	2.4444

Table 8 Loss of Sulcus Depth Mean Ranks				
	Surgical technique	N	Mean Rank	Sum of Ranks
Loss of Sulcus Depth	BAF	9	15.17	136.50
	BFP	11	6.68	73.50
	Total	20		

DISCUSSION

The largest part of the upper jaw is taken up by the maxillary sinus known as **Antrum of Highmore**. At birth, the maxillary sinus is present as a small cavity. Its growth begins in the third month of foetal life, and ends between the 18th and 20th year of life. Therefore, it increases at the same rate as the growth of the jaws and eruption of permanent teeth. Because of the smaller volume of the sinus, the risk of the occurrence of OAC in children and adolescents is less. In adults, the volume of the sinus amounts to 20–25 ml[6].

An OAC of less than 2 mm diameter has the possibility of spontaneous healing, while in the case of an OAC of diameter of more than 3 mm, spontaneous healing is hampered because of the possibility of inflammation of the sinus or periodontal region. There is less possibility of spontaneous healing when the OAC is greater than 5 mm[7].

Many techniques have been proposed for the closure of OAC/F, including Buccal or Palatal Alveolar Flaps and their modifications. The preferred technique may vary from one surgeon to another. In addition to the above techniques, some alloplastic materials have also been used. Materials range from autogenous bone grafts to synthetic graft materials, like hydroxyapitite, collagen membrane, implants, gold foil for closing OAC/F[8].

In recent years, the use of a Pedicle BFP in closure of large oroantral openings has become popular[9]. Distant flaps from the extremities or forehead or tongue flaps have been described by Edgerton and Zovickian. and Guerro-Santos and Altamirano.

According to Paul Scott, Gillon Fabbroni and David A. Mitchell, BFP has led to a proper anatomical closure. It is recommended that where loss of sulcus depth is of concern, or where the buccal advancement flap has failed, BFP is the treatment of choice. It also has much to commend, it as a primary measure, particularly with large defects. Lack of any failure may suggest it should be used in all cases, as one could be confident of a successful closure in almost every case and therefore expose the patient to only one procedure.

None of the patients in group I or II showed radiologic evidence of any bone formation. This was in accordance with the evidences provided by Hudson *et al*, Collela *et al*, and Adeyemo *et al.* Despite the fact that when properly dissected and mobilized, a buccal pad of fat graft provides an adequate sized pedicled graft,

limitations do exist following the size of the maxillary defects. If the surgical defect measures more than 10mm, the likelihood of partial dehiscence of the flap is high. This can be attributed to the impaired vascularity of the stretched ends of the flap that are sutured to the remaining palatal mucosa.

On the other hand, buccal or retromandibular defects up to 7 × 5 × 2 cm can be successfully reconstructed. In these cases, the BFP is placed over a rich vascular bed that is provided by the musculature of the recipient area. It is clearly evident from the current study that the increasing number of cases of BFPs reported in the literature, reflects a tendency in modern reconstructive surgery to use simpler reconstructive techniques, that being equally effective, are technically easier and have fewer complications. Use of the BFP as a pedicled flap has so far been shown to be an easy, a well-tolerated, and an uncomplicated technique for oral reconstruction. It's sole disadvantage is that it can only be used once. However, if properly applied in selected cases, it results in complete success. During the course of treatment, the patients were also evaluated for various postoperative signs and symptoms, as performed by Pappachan and Vasant.

In our study, patients were evaluated for postoperative pain immediately on the next day and subsequently at the end of 1, 3, 6 and 12 weeks. Although the pain score seemingly decreased on subsequent check-ups, statistically no significant difference was seen between two groups at any time interval.

Postoperative swelling was also evaluated at the end of 1, 3, 6 and 12 weeks. Although swelling seemed to decrease during subsequent patient visits, statistically no significant difference was seen between the two groups at any time interval. This was in accordance with the statistics provided by Samman *et al*, and Baumann *et al*. No significant postoperative infection was seen in Group I & II.

This implies that carefully incised tissues with carefully applied perioperative surgical procedures lead to least postoperative morbidity. In both Group I & II, no wound gaping was observed in any case. Statistically, no significant difference was seen between the two groups. This is consistent with works of Adeyemo *et al*, Martin-Granizo and Dean.

Finally, postoperative healing was uneventful in both the groups. Statistically, no significant difference was seen between two groups at any time interval. This was in accordance with the results provided by Hanazawa *et al*. We found that sulcus depth reduction was significantly low in Group I.

The use of the BFP as a pedicle graft for closure of oral defects has been reported with good results. All cases treated in this study using the BFP were successful. Healing usually occured within two to three weeks, leaving a good mucosal surface. Patients were not asked about their tolerance of the procedure or satisfaction with the surgery, but the experience in this study agrees with Rapidis et al, who believed that use of the BFP is easy, well tolerated and is an uncomplicated technique[10].

CONCLUSION

The present study was conducted in the department of oral and maxillofacial surgery with the main aim of study to compare efficacy of buccal advancement flap and buccal fat pad in closure of oro-antral communication/fistula. The total sample size was 20 patients having oro-antral communication/fistula. All participants underwent surgical soft tissue closure of oro-antral communication.

The parameters studied were immediate and delayed post-op pain, swelling, infection, wound gaping, fistula formation and long term follow up of loss of sulcus depth in the both groups.

The result shows that complications, subjective and objective symptoms did not show any statistical significant value between 2 groups except loss of sulcus depth showed marked significant difference.

It is comparatively crucial to compare an already well accepted treatment modality buccal advancement flap with a more novel procedure buccal fat pad, both in terms of execution by the clinician and patient acceptance. However, in the present study, the buccal fat pad technique yielded a more promising closure of OAC/F by provision of a more biologically apt base in terms of excellent blood supply and minimal donor site morbidity makes it an ideal flap. It should also be considered as a reliable back-up procedure in the event of failure of other techniques.

Our study supports the hypothesis that loss of buccal vestibular depth is significantly less in buccal fat pad compared to conventional buccal advancement flap.

We conclude that when patient is seen with OAC, which is smaller than 3 mm should be sutured. When larger communication of more than 5 mm is seen, use of the BFP, is treatment of choice. In cases of OAF, buccal fat pad is the preferred technique over buccal advancement flap.

CLINICAL SIGNIFICANCE: Clinical significance- In spite of the longer surgical time and immediate complications of the application of the buccal fat pad in closing the oroantral communications and fistula it is a good and more reliable method while comparing with buccal advancement flap.

REFERENCES:

1. Kiran Kumar Krishanappa S., Prashanti E., Sumanth K. N., et al. Interventions for treating oro-antral communications and fistulae due to dental procedures. Cochrane Database of Systematic Reviews. 2016;2016(5)
2. Susan H. Visscher, Baucke van Minnen,Rudolf R.M. Bos. Closure of Oroantral Communications: A Review of the Literature. J Oral Maxillofac Surg 68:1384-1391, 2010
3. Fry RR, Patidar DC, Goyal S, Malhotra A. Proximity of maxillary posterior teeth roots to maxillary sinus and adjacent structures using Denta scan®. Indian Journal of Dentistry. 2016;7(3):126-130. doi:10.4103/0975-962X.189339.
4. Awang MN. Closure of oroantral fistula. Int J Oral Maxillofac Surg 1988 Apr;17(2):110-5
5. von Wowern N: Closure of oroantral fistula with buccal flap: Rehrmann versus Moczar. Int J Oral Surg 11:156, 1982
6. Hari Ram1,Hardik Makadia1,Gagan Mehta1,Shadab Mohammad1,Rakesh Kumar Singh1,Nimisha Singh1,Geeta Singh:Use of Auricular Cartilage for Closure of Oroantral Fistula: A Prospective Clinical Study. J. Maxillofac. Oral Surg. (July–Sept 2016) 15(3):293–299
7. Hariram, Pal US, Mohammad S, Singh RK, Singh G, Malkunje LR. Buccal fat pad versus sandwich graft for treatment of oroantral defects: A comparison. National Journal of Maxillofacial Surgery. 2010;1(1):6-14.
8. Khandelwal P, Hajira N. Management of Oro-antral Communication and Fistula: Various Surgical Options. World J Plast Surg 2017;6(1):3-8.

9. Borgonovo AE, Berardinelli FV, Favale M, Maiorana C. Surgical Options In Oroantral Fistula Treatment. The Open Dentistry Journal. 2012;6:94-98.

10. Rapidis AD, Alexandridis CA, 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 2000: 58: 158–163.