

Comparison of Success of Palatal Rotation Flap versus Buccal Advancement Flap for Closure of Oroantral Fistula

Palatal VS
Buccal Flap for
Closure of
Oroantral Fistula

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ABSTRACT

Objective: To compare success of palatal rotation flap versus buccal advancement flap for oroantral fistula closure.

Study Design: Randomized control trial

Place and Duration of Study: This study was conducted at the Department of Oral and Maxillofacial Surgery, Gajju Khan Medical College/Bacha Khan Medical Complex, Shah Mansoor, Swabi from June 2019 to December 2019.

Materials and Methods: One hundred and fifty two patients were included in this randomized clinical trial. Two groups were created; group A (palatal rotational flap) and group B (buccal advancement flap). After surgery, nasal decongestant and antibiotics were given. Patients were recalled at 15th day and at 1 month after surgical procedure for the examination of the area of oroantral fistula and flap were assessed clinically.

Results: In palatal rotation flap and buccal advancement flap groups, the mean ages were 33.07 ± 7.67 and 32.26 ± 7.07 years. 61.8% males and 38.2% females, 65.7% males and 34.3% females. 2.7% patients have malnutrition and 3.9% have history of malnutrition. Seventy patients (92.1%) have success and 65 patients (85.5%) have success rate in palatal rotation flap and buccal advancement flap respectively. Statistically, there was no significant difference ($P = 0.198$).

Conclusion: Both of these flaps are good to close the oroantral fistula. The success of the palatal rotation flap was more successful for large as well as medium and small defects but buccal advancement flap was successful for medium and small defects, showing failure in large defects.

Key Word: Frequency, flap success, Buccal advancement flap, Oroantral fistula, Palatal rotation flap

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INTRODUCTION

Oroantral communication is an pathological communication between oral cavity maxillary sinus, lined by epithelium, classified as vestibule-sinusal, alveolo-sinusal, and palate-sinusal.¹

Extraction of posterior teeth is the main cause of their formation, as maxillary molars and premolars have close relationship to maxillary sinus.

In addition to extraction, removal of benign or malignant tumors or maxillary cysts and implant surgery is also the cause of their formation.² It is frequently encountered during extraction of molars.¹

Patients complaints of nasal phonation, nasal regurgitation as food or fluid enters in to the antrum from oral cavity and then to the nose. Patient also complains of foul smell, nasal discharge and unable to drink by straw due to lack of negative suction pressure.³ Radiological finding includes focal alveolar atrophy, sinus opacification, sinus floor discontinuity.⁴ These patients are prone to persistent chronic infection which may leads to soft tissue cellulitis, sinusitis and in rare case central nervous system infection. When patient is asked to close the nostrils and escape the air through nose at open mouth, air will escape from fistula into the mouth.^{3,5} Also called nose blow test or valsalva test.⁵

In healthy individuals oroantral communication of less than 3 mm is likely to close spontaneously. Larger defects require local, distant flaps, even grafting procedures or combination.⁶ Many techniques have been described to close oroantral fistula. Local flaps are usually preferred but choice largely depends upon location and size of fistula. Buccal advancement flap and palatal rotational flap are mostly used for oroantral fistula closure.⁷ Some others also advocated the use of buccal pad of fat and tongue flap for oroantral fistula

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closure. Success of the flap depends upon local and general factors such as elimination of pre-existing sinus infection and removal of epithelial tract. Other researchers used Guided Bone Regeneration (GBR), Tissue Guided Regeneration even Alloplastic material for oroantral fistula closure. Closure was achieved by interposition of septal cartilage.⁸

Buccal advancement is considered as first choice for closures of oroantral fistula. They are further classified into three flaps. The flap is mostly used for closure of oroantral fistula. It is trapezoid shaped mucoperiosteal flap created by incision in the buccal sulcus and then displaced in to the area containing fistula. The success rate was report 93% for closure oroantral fistula.⁹ In other literature success rate was shown 87.2% and 82.2%.^{8,10} Follow up in these studies were 15 days to 7 weeks. It is a convenient flap with reliable and quick reconstruction, easy to mobilize with minimal donor site morbidity and fewer complications. With close adaptation to the site minimizes the risk of infection.¹⁰ Decreasing the depth of sulcus, maintain oral hygiene and pain, interference for prosthesis placement are some disadvantages of buccal advancement flap. Palatal rotation flap is another technique for closure of oroantral fistula. It is an axial pattern flap, have a specific artery, based upon greater palatine artery. The success rate for this is 76% in literature.¹ Disadvantages are denudation of palatal bone, post-operative pain, more recipient site morbidity, deepening of secondary epithelized area. Other disadvantage is that Kent occur at arc of rotation which may compromise blood supply to the flap leading to necrosis as well as longer duration of operation.⁸

No comparative study available in literature to compares the both flaps. Few case series and no conclusive study available for oroantral fistula whether buccal advancement or palatal rotational flap is a standard. Various studies attempted to compare both the flap but none of them provide clear documentation and showing controversial results. Some literature is in favour of buccal advancement flap with the success rate of 93% and 82.2%^{10,11} while other is in favour of palatal rotational flap with the success rate of 76% for closure of oroantral fistula.⁶ Some literature advocated that buccal advancement should be used for small fistula and palatal rotational flap for large defects.⁵

MATERIALS AND METHODS

This randomized control trial was carried out in the Department of Oral and Maxillofacial Surgery, Gajju Khan Medical College/Bacha Khan Medical Complex, Shah Mansoor, Swabi from 18th June 2019 to 18th December 2019. One hundred and fifty two patients (76 in each group) were taken. Inclusion criteria were males and females, age between 15 to 60 years, positive nose blow test, oroantral fistula more than 5 mm (diameter will be measured by Periodontal Probe), history of

tooth extraction and history of trauma. Exclusion criteria were habits (smoking, paan, etc), pre-existing sinus pathologies (sinusitis etc), foreign bodies in area of fistula – clinical examination, Systemic disease contraindicate surgery (diabetes, bleeding problems etc) and tumor or its remnants at site of fistula. Protocol of the study, the data used for the research was explained to the patients to take the consent. Patient's data like patient's age and gender name were recorded. Routine investigations and radiographs like occipitomeatal view (37°) were taken. Pre-existing sinusitis was treated with nasal decongestant and antibiotics. Patients were selected randomly via lottery method and divides into two groups. Group A, who was underwent palatal rotational flap and group B which was treated by buccal advancement flap. Procedure was done by postgraduate resident under supervision of Head of the Department under local anesthesia. After surgical procedure, nasal decongestant and antibiotics were given and asked to avoid nose blowing, sucking on straw, sneezing on close mouth and smoking. Patients were recalled at 15th day and at 1 month after surgical procedure for the examination of the area of oroantral fistula and flap were assessed clinically. Flap was examined by direct visual examination and through dental mirror for the epithelization. If there was a complete closure of the perforation (oroantral fistula), that is complete epithelization and having no continuity defects the flap was considered successful, as per operational definition. Examination was done by me under supervision of the head of the department. The data was entered and analyzed through SPSS-20.

RESULTS

In group A (palatal rotational flap) were 76 (50%) and in group B (buccal advancement flap) were 76 (50%). The mean age was 33.07 ± 7.67 years in group A and 32.26 ± 7.07 years was in group B. overall mean age was 33.05 ± 3.8 years. Male to female ratio was in group A and 1.7:1 and 1.9:1 was in group B, with overall ratio 1.7. The means of the size of defect in rotational flap group was 6.67 ± 3.67 mm and 6.20 ± 3.05 mm in buccal advancement flap group. The most common age group in palatal rotational flap group was 31-40 year 37 (48.8%) followed by 21-30 years 28 (36.8%). Similarly, in the buccal advancement flap group, the most common age group in palatal rotational flap group was 31-40, 40 (52.6%) followed by 21-30 years 29 (38.2%). There were 47 (61.8%) males and 29 (38.2%) females in palatal rotational flap group, while in the buccal advancement flap group, 50 (65.7%) were males and 26 (34.3%) were females. Of total 2 (2.7%) patients (have history of malnutrition and 74 (93.3%) patients have no history of malnutrition in palatal rotational flap group while in buccal advancement flap group, there were 3 patients (3.9%) have history of malnutrition and

73 patients (96.1%) have no history of malnutrition (Table 1).

The most range of size of defect was 2–5 mm 33 (43.4%) followed by 6-10 mm 32 (42.2%) in group A. Similarly the most range of size of defect was 2–5 mm 34 (44.8%) followed by 6–10 mm 35 (46.0%) in group B (Table 2).

Table 3 showed the success for flap for oroantral fistula, 70 (92.1%) patients have success and 6 (7.9%) patients have no success in palatal rotational flap group, while in buccal advancement flap group, 65 (85.5%) patients have success rate and 11 (14.5%) patients have no success rate. Statistically, there was no significant difference (P =0.198).

Table No.1: Frequency of age groups and gender and malnutrition in both groups of flap

Variable	Palatal rotational flap	Buccal advancement flap
Age (years)		
15 – 20	3 (3.9%)	2 (2.6%)
21 – 30	28 (36.8%)	29 (38.2%)
31 – 40	37 (48.8%)	40 (52.6%)
41 – 50	5 (6.6%)	4 (5.3%)
51 – 60	3 (3.9%)	1 (1.3%)
Gender		
Male	47 (61.8%)	50 (65.7%)
Female	29 (38.2%)	26 (34.3%)
Malnutrition		
Yes	2 (2.7%)	3 (3.9%)
No	74 (97.3%)	73 (96.1%)

Table No.2: Frequency and percentage of size of defect in both groups (n = 152)

Size of defect (mm)	Palatal rotational flap (n =76)	Buccal advancement flap (n=76)
2 – 5	33 (43.4%)	34 (44.8%)
6 – 10	32 (42.2%)	35 (46%)
11-15	8 (10.5%)	6 (7.9%)
16 – 20	3 (3.9%)	1 (1.3%)

Table No.3: Frequency and percentage of success rate in both groups (n = 152)

Success	Palatal rotational flap (n =76)	Buccal advancement flap (n=76)	P value
Yes	70 (92.1%)	65(85.5%)	0.198
No	6 (7.9%)	11(14.5%)	

DISCUSSION

In the present study, was more common in males than females. The male to female ratio was 1.7:1. Galíndez et al¹² also reported it to be higher in males. In the literature¹³ it was showed that the incidence of oroantral fistula is significantly higher in males with a male to

female ratio of 1.7:1, which is in agreement with our study. Same was reported by Qureshi et al.¹⁴

In our study the presenting age was from 15 to 60 years with the mean age of 33.07±7.67 and 32.26±7.07 in palatal rotation flap and buccal advancement flap respectively. Most of the patients were in 3rd and 4th decades in both groups which is in agreement with the studies being highest in 4th decade.^{11,14}

In our study the smallest defect width reported was between 2-5mm and the largest defect width of 18mm was reported which also correlates with the study.¹⁵ The mean defect size was 6.67±3.67 and 6.20±3.05 in Palatal rotation flap and in buccal advancement flap respectively. Hassan et al¹⁶ reported average width diameter of about 0.54 cm (5.4mm) in OAF.

For the success of any flap operation three factors are important to perform for the closure of oroantral fistula. They are antral secretion diversion into nose antra must have no infection and adequate vascularization of the flap. Maxillary sinusitis have contributory factor in flap failure. Other causes which leads to failure are, immobility, inadequate trimming of the traumatized, flap’s width and length insufficient and poor vascularity of the scarred tissue, and impaired blood supply and extensive tension.¹⁵

Palatal rotation flap procedure was tried in group-A. In this group only six cases failed. Compared to buccal advancement flap, palatal rotation flap was more successful of defect more than 1cm also reported similarly.^{2,10} The reliability of the palatal flap was more for oroantral fistula closure. The excellent blood easy mobilizing and its supply and donor site morbidity minimal makes the good and ideal for OAF clousre. It should be considered as backup flap in case other methods fail.⁶ This flap is used after buccal advancement flap fails and having good bulk with axial pattern flap which have a definite blood sullypy and can easy be mobilized.¹⁵ Success of the flap in our study was 92.1% which correlates with the Qureshi et al¹⁴ and Anavi et al¹⁵ and in contrast with Visscher et al¹ reported to be 76%. The difference may be due ethnic, genetic and surgeon experience.

The buccal advancement flap used in group-B, in those cases, which had a deep buccal sulcus and opening was small. The group-B that in which buccal advancement flap was used, 65 cases shown success while 11 were unsuccessful. It was reported that it has the tendency of decreasing the sulcus depth and also difficult to maintain the oral hygiene.¹⁷ Similar findings were also reported by Zide et al.¹⁸ It a reliable and quick method with a very minimal donor sit morbidity with a very less complication. Due to close relationship with the defect makes it successful with the less complication.¹⁰ The palatal rotation flaps have axial pattern on the greater palatine artery which is an important factor in

its success. Due to adequate thickness of the flap the artery is less vulnerable to damage. The sulcus depth is maintained but denuded palatal bone pain and secondary epithelization are the negative aspects.¹ Palatal stent is recommended after palatal rotational flap operations. This stent reduces the edema and also help the flap to stabilize in this new area. The stent should be passive otherwise the pressure of the stent may result in flap ischemia.¹⁹

Comparing the success rate of both the flap, in our study the defect size small and medium size flap both the flaps were successful while more defect more than 1cm (10mm) cases of the dehiscence were reported in buccal advancement flap (P=.002), which is statistically significant. Omer¹⁰ also reported similar findings which correlate with our study that for small and medium size defects buccal advancement flap shows less failure rate, more than 1cm OAF defect, buccal advancement flap is not much feasible. In our study defect more than 1cm palatal rotation flap was more successful considerably less failure rate. Overall success rate between both the flaps there was no significant difference (P=0.198) statistically in our study, which correlates to Qureshi et al¹⁴ considering less failure rates in palatal rotation flap. Kale et al⁹ concluded that buccal advancement flap is best for small and medium fistulae while for larger defects of OAF, palatal rotation flap is best for larger defects which correlates to our study (p=0.002 in stratification). Similar findings were also reported in other literature.²

CONCLUSION

This study represent that both palatal rotation flaps and Buccal advancement flap are good surgical options with the palatal rotation flap having a considerably less failure rate s compared to buccal advancement flap as compared to the defect size width. It can be concluded that both flaps are reliable options for the OAF closure. The buccal advancement flap is good option for the small and medium size defects while palatal rotation flap can be used for larger defects, considering less failure rate overall.

Author's Contribution:

Concept & Design of Study:	Muhammad Aamir
Drafting:	Farhad Ali, Arshad Abbas
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Revisiting Critically:	Muhammad Aamir, Farhad Ali
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Conflict of Interest: The study has no conflict of interest to declare by any author.

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