A Comparison between Submucosal Connective Tissue Palatal Flap and Conventional Pedicle Palatal Flap for the Closure of Oroantral Fistulae

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Abstract

Background and Aim: Oroantral communication and subsequent formation of oroantral fistula is a common complication of dental extraction and/or other oro-facial surgeries. Many surgical procedures have been used for the treatment of oroantral fistula, and it is believed that long term successful closure of oroantral fistula depends on the technique used, the size and the location of the defect. The aim of this study is to evaluate the success of the submucosal connective tissue palatal flap technique compared to the conventional pedicled palatal flap technique in the closure of oroantral fistula.

Materials and Methods: Ten patients suffering from oroantral fistula were recruited in the study, and they were divided into two groups. The first group was treated with the conventional pedicled palatal flap technique, and the second group was treated with the submucosal connective tissue flap technique. Suitable post-operative care and observation in both groups were achieved.

Results: It has been shown that all fistulae were closed successfully in both groups. There was no discomfort and no burning sensation in the second group. They all showed relatively better healing. Interestingly, patients in the second group needed fewer amounts of post-operative analgesics than in the first group.

Conclusion: Both types of flap techniques provided sufficient and successful closure of oroantral fistula. However, submucosal connective tissue palatal flap seems to be preferable for fistula closure because it overcomes the disadvantages of the full thickness palatal flap. Compared with the conventional palatal flap, submucosal connective tissue palatal flap technique may appear to be more difficult in terms of flap manipulation. The surgical experience plays an important role at this level.

Key words: oroantral fistula, palatal flap, tooth extraction

Introduction

Oroantral fistula (OAF) is the communica
tion between the maxillary sinus cavity and
the oral cavity through a perforation in the
sinus wall. The term oroantral communication comprises two pathological conditions; the acute oroantral perforation and the chronic communication “fistula’. Oroantral communication and subsequent formation of OAF is a common complication of dental extraction. Owing to its anatomical location and intimate relationship with the teeth, the maxillary sinus occupies an important place in oral surgery. From a small cavity at birth, the maxillary sinus starts to enlarge during the third month of fetal life and usually reaches maximum development around the eighteenth year. Its volume is estimated to be around 20-30ml in a normal adult. The removal of the first upper molar is the most common etiological factor which may lead to OAF.

Some pathological conditions that might also cause oroantral communication are removal of tumors or cysts of the palate, cases of noma, syphilitic gumma, leproma, and leishmaniasis. An OAF usually needs 7 days to epithelize and become a chronic fistulous tract. Long term successful closure of OAF depends on the technique used, the size and the location of the defect.

Many surgical procedures have been used for the treatment of OAF such as: Buccal flaps
Pedicle tongue flap
Combined buccal and reverse palatal flap
Pedicle buccal fat pad graft
Palatal pedicle flaps
Several methods can also be used to enhance a successful closure under the flap such as: regurgitation of liquids from the mouth into the nose, which is the most common complaint, unilateral epistaxis, allergy in the resonance of the voice, inability to blow-out the cheek, difficulty in smoking, and/or foul or salty unpleasant taste.

Results

Clinical results in G1
During the immediate post-operative period, all patients were complaining of pain and burning sensation with discomfort during chewing and swallowing. The early postoperative period started directly after the end of the operation till the end of the first week. All patients showed slight bleeding in the early post operative few hours.
The late observation period extended for three months. By the end of the second month the flap was healed and the raw area was covered and there was no complaint from the patient.

Clinical results in G2
During the immediate post-operative period there was no bleeding at all, no discomfort during eating, which might be present due to the absence of bulky palatal soft tissue mass, no raw area, and no burning sensation.
The late observation period showed that the fistula was completely closed in all the patients at the time of suture removal. The edges of the flap were healed, and the granulation tissue changed into a firmer granulation tissue during the second week and it became completely epithelialized, with slight contraction and shrinkage. By the end of the third week the submucosal layer became completely healed and its color...
started to return to the normal color of the mucosa.

Final general results

It has been shown that all fistulae were closed successfully in both groups. There was no discomfort and no burning sensation in G2. They all showed relatively fast healing. Interestingly, patients in G2 needed fewer amounts of analgesics than in G1 (Figures 5 and 6).

Discussion

The oroantral communication is a rather frequent complication of oral surgery in the maxilla. Most of these complications can be treated adequately at the time of occurrence. However, some of them become chronic, leading to extraction of upper right second premolar, one case due to extraction of upper right third molar, and one case due to extraction of upper right first molar; four cases due to extraction of upper right second premolar.

It seems to be that the incidence of OAF is more frequent in elder patients. Punwatkorn et al. (1994) noted that the elder the patient, the higher the chance of having OAF. Most of them share an equal degree of success and failures.12,13 A modified palatal flap technique has been introduced and successfully used in eight patients for closure of OAF.15 Successful closure of OAF is dependent upon the following principles:

- Control of maxillary sinus infection.
- Removal of as much of the epithelial lining of the fistula as possible, making sure that there is a raw surface throughout the periphery of the wound.
- Maintenance of adequate blood supply to palatal pedicle flap with minimum tension on the flap.
- Cautious of minimal trauma to the pedicle flap, and the tissue around the OAF.
- Use of a nasal antrostomy, with or without a Caldwell-Luc procedure, to ensure adequate sinus drainage.

Gordon and Brown (1992) mentioned that the treatment of OAF was considered suc-

Early day protection from everyday acids

Modern eating and drinking habits increase the exposure of tooth enamel to dietary acid that can lead to Acid Wear (erosive tooth wear), the biggest contributor to tooth wear.4 In the early stages of Acid Wear, a patient’s enamel can become translucent, anatomical features can be lost and molar cupping can occur.

Not all toothpastes are the same

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Modern caries prevention

Pronamel has been clinically tested in situ to:
- Rephidren acid-softened enamel
- Build protection against future acid challenges

Modern caries prevention

Figure 1: SEM imagery to show amount of fluoride at the teeth’s surface in situ.

Figure 2: In situ rehardening microindentation study following treatment with toothpastes

Figure 4: Preparation of the Palatal Submucosal flap and dissection into two layers.
successful when primary healing had occurred at the time of suture removal. In our study, ten cases of OAF were treated with two different types of palatal flaps, all fistulas had successfully closed without recurrence, primary healing had occurred at the time of suture removal. In all of the cases, neither nasal antrostomy, nor Caldwell-Luc procedure was used. Adequate sinus cleansing was performed by applying irrigation with antibiotics for at least five days, accompanied by vasoconstrictive nasal drops after complete excision of the epithelial lining of the fistula track through the bone defect toward the maxillary sinus, and removal of all pathologically-changed maxillary sinus mucosal tissues.

Further support to our technique was given by Car and Juretic (1998) who achieved further support to our technique was given by Car and Juretic (1998) who achieved successful closure in 38 cases of chronic OAF by treating them with antibiotics and without drainage of the maxillary sinus into the nose. They also mentioned that Caldwell-Luc drainage into the nose prolonged the procedure and made it more difficult. Moreover, postoperative oedema and hematomas were more pronounced. Various palatal flap techniques based on the position of the greater palatine vessels have been advocated. These can be divided into advancement flaps and rotation advancement flaps. Straight advancement flaps do not offer great mobility for later coverage.

Palatal rotation advancement flaps require mobilization of large amounts of palatal tissue because of the inelasticity of the tissue. This flap also has the disadvantage of tissue bunching at the base and causing a large area of palatal bone to be exposed. This was further proven by results of our study, since all the patients of G1, who were treated with the palatal rotation advancement flap, had discomfort during swallowing and talking due to the presence of soft tissue bulge in the palate, and burning sensation from the raw bone area until complete epithelialization. However, all of the patients in this group showed successful closure.

Herbert (1974) pointed out that for a large fistula, when local tissue is unavailable, palatal tissue-dependent flap is the method of choice. The palatal flap technique results in successful closure of the fistula with the maintenance of an adequate blood supply without reduction in the depth of the buccal maxillary vestibule. Anavi et al. (2003) gave further support for the palatal rotation full-thickness flap. They concluded that the palatal rotation advancement flap is recommended for the late repair of OAF owing to its good vascularization, excellent thickness and easy accessibility. It also allows the maintenance of the vestibular depth, and is particularly indicated in cases of unsuccessful buccal flap closure.

Gullane and Arena (1998) provided the main advantages of the palatal mucoperiosteal flap including a local tissue with good blood supply, excellent mobility, limited impairment of speech and a success rate of 96%. These advantages compensate for the relatively prolonged period required for epithelialization of the donor site over the hard palate. This was supported by our clinical observation among the patients of G2, since all of them showed excellent closure of the fistula without any palatal soft tissue bulge. The connective tissue flap was extremely elastic, enabling it to be rotated without tension. Another advantage is that the epithelial layer of the flap was returned to its original place to cover the donor area. This technique offered the patients minimal discomfort and also provided early healing of the wound, as there was no raw area left behind for granulation.

After healing, the palatal mucosa and the recipient site were smooth without a hole or bunching. All our cases were observed periodically and didn’t reveal sinusitis after the surgical closure.

Conclusion

According to the results of our observation, the following points could be concluded:

1. Both types of palatal flaps (conventional pedicle palatal flap and submucosal connective tissue palatal flap) provided enough well-nourished tissue for sufficient and successful closure of OAF (chronic or acute, large or small).

2. Nasoantrostomy is unnecessary in the closure of oronasal communications.

3. Preoperative preparation with antibiotics and good sinus irrigation is mandatory.

4. Submucosal connective tissue palatal flap seems to be preferable for fistula closure because it overcomes the disadvantages of the full thickness palatal flap (e.g. creation of soft tissue bulge and production of raw surface on the hard palate).

5. Connective tissue palatal flap offered the patients minimal discomfort, provided early healing of the wound, and did not create esthetic disturbance due to absence of the palatal raw area or any soft tissue bulge. Surgical splints or dressing were not necessary.

6. Due to the advantages of the connective tissue palatal flap, we believe that it is the safest procedure for the closure of OAF. However, compared with the conventional palatal flap, submucosal connective tissue palatal flap technique may appear to be more difficult in terms of flap manipulation. The surgical experience plays an important role at this level.

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Dubai School of Dental Medicine announces collaboration with The Royal College of Surgeons of Edinburgh

Dubai, UAE: The Dubai School of Dental Medicine (DSDM) enrolled its first batch of students in January 2013 and announced its collaboration with the prestigious UK Royal College of Surgeons of Edinburgh. This collaboration is the first of its kind in the region. Moving forward, the school's aim is to support Dubai Healthcare City's aim to become another hub for dental training and specializes in dental education and research.

Our students are taught by an international faculty at the specialist level. As the school is a well-structured institution and is an integral part of Mohammed Bin Rashid Al Maktoum’s Academic Medical Centre in Dubai Healthcare City. Providing us as students the opportunity to sit for The Royal College of Surgeons of Edinburgh dental specialty examination as a graduation requirement is a great academic achievement and reflects the school’s vision in providing our residents with high standards of qualification. What are your hopes for your dental career? Improving the quality of oral healthcare provided to paediatric patients by the Ministry of Health and giving more attention to medically compromised patients and patients with special needs. I also want to become involved in research programmes offered by DSM and other academic institutions within Dubai Healthcare City. This is something that has been lacking in the past within the field of dentistry in the UAE. What are your hopes for your dental career? To continue my skills training and knowledge development throughout my career to enable me to provide the highest quality of care for my patients.

Why did you select DSM?: I chose to study my Postgraduate Degree in Paediatric Dentistry at DSM as the school is a well-structured institution and is an integral part of Mohammed Bin Rashid Al Maktoum’s Academic Medical Centre in Dubai Healthcare City. Providing us as students the opportunity to sit for The Royal College of Surgeons of Edinburgh dental specialty examination as a graduation requirement is a great academic achievement and reflects the school's vision in providing its residents with high standards of qualification. What are your hopes for your dental career? Improving the quality of oral healthcare provided to paediatric patients by the Ministry of Health and giving more attention to medically compromised patients and patients with special needs. I also want to become involved in research programmes offered by DSM and other academic institutions within Dubai Healthcare City. This is something that has been lacking in the past within the field of dentistry in the UAE.

Why did you select DSM?: I wanted to complete my studies in an institution that provided the highest level of academic excellence, in an advanced clinical environment. As a postgraduate student, I felt that DSM met these requirements.

Why did you select DSM?: To continue my skills training and knowledge development throughout my career to enable me to provide the highest quality of care for my patients.