

Closure of oroantral fistula with rotational palatal flap technique

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ABSTRACT

Oroantral fistula is one of the common complications following dentoalveolar surgeries in the maxilla. Closure of oroantral fistula should be done as early as possible to eliminate the risk of infection of the antrum. Palatal flap is one of the commonly used methods in the closure of oroantral fistula. A case is reported of a male patient who had two oroantral communication after having his two dental implants removed. Buccal flap was used to close the defects, but one of them remained open and resulted in oroantral fistula. Second correction was performed to close the defect using buccal fat pad, but the fistula still persisted. Finally, palatal rotational flap was used to close up the fistula. The result was good, as the defect was successfully closed and the donor site healed uneventfully.

Key words: Oroantral fistula, Rotational palatal flap

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INTRODUCTION

Oroantral communication is any communication which occur between the oral cavity and the antrum. It is a common complication after extraction of upper posterior teeth because there is a close relationship between the root apices and the antrum. Basically, oroantral communication should be closed immediately in order to prevent sinusitis. An oroantral communication which is less than 2 mm in diameter will usually close spontaneously, but when there is more than a 3 mm defect, or there is inflammation in the antrum or in the periodontal region, the opening often persists and may become oroantral fistula.¹

Variable methods to close oroantral fistula (OAF) have been reported in the literature, such as buccal sliding flap,^{1,2} pedicled graft of buccal fat pad,^{3,4} and palatal flap^{1,2,5} with varying clinical results. They have their own advantages and disadvantages depending on the cases and the size of the defects occurred. A case of a oroantral fistula which failed to close despite a couple of surgery using buccal approach, but could eventually be closed with rotational palatal flap technique is presented.

CASE

A 61-year-old male patient came to our clinic with chief complaint of discomfort associated with two dental implants over his right upper jaw. The implants were inserted around 6 months previously by his dentist. Artificial bone graft was used during the operation and it might be used to enhance the stability of the implants. A few weeks after implants placement, however, those two implants became loose and

small granules were noted by the patient to keep coming out from the gingiva around the implant site. Some efforts had been made by the dentist to keep the implants firm in his position but resulted in failure and he complained that the loose implants had given him a lot of discomfort especially during eating.

Clinical examination revealed the following. Two implants abutments were seen protruding from the alveolar mucosa over the right edentulous maxilla. The surrounding mucosa was normal in color, no swelling nor signs of soft tissue inflammation was detected. On palpation, the abutments were loose in all directions, but only slight tenderness exhibited by the patient. Panoramic x-ray showed two dental implants over the region of upper first and second molars and were not in good parallelism. No adequate amount of bone was seen to support the implant fixtures and both of the apical part of the fixtures seemed to lie in the antrum (Figure 1). Water's x-ray, showed normal maxillary sinus on both sides. The case was assessed as

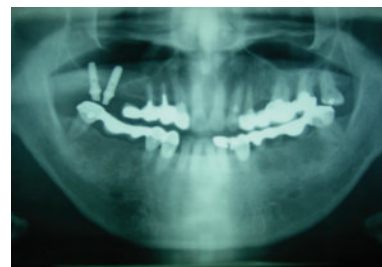


Figure 1. Panoramic x-ray showed two dental implants over the region of upper first and second molars. They were not in good parallelism. No adequate amount of bone was seen around the implant fixtures and both of the apical part of fixtures seemed to lie in the antrum.

an implant failure. It was primarily due to lack of primary implant stability most likely caused by inadequate amount of healthy bone between the antrum and oral mucosa. The bone graft used, was unable to help achieve the stability of the implants.

CASE MANAGEMENT

A three-stage surgical plans were made to overcome the existing problem. The first surgery was planed to remove the implant fixtures close the defect, followed by sinus lift procedure, approximately 4 weeks after the implant removal, to increase the bone height. The last planned surgery was to insert two implants in the region with adequate amount of bone which was expected to provide primary implant stability.

In the first surgery, the following were done. After disinfection of the oral mucosa with chlorhexidine solution, local infiltration injection was done using 2% lidocaine and adrenalin 1:200.000. The removal of the two implants was done with case. An oroantral communication was seen clearly after removal of the implants. A simple buccal flap was then made to close up the defects.

A clinical review one week after the surgery, most of the wound healed well except in the area of anterior defect where a small dehiscence was noted. Antral wash-out with normal saline was done and clear return seen indicating that there was no antral infection. A second surgical step to close the defect which was not planned previously, was offered to the patient. Upon the patient consent at that visit the second surgery to close the defect was done using buccal fat pad graft.

During the surgery, the amount of fat tissue was noted to be insufficient therefore it had to be pulled downward with tension to cover the defect. In addition, the graft was seen to be light in colour and relatively softer in consistency indicating a poor quality of the fat graft. The fat pad graft was stitched in to the surrounding mucosa which had been freshened up with a sharp blade. The buccal flap overlying the graft could not be pulled loosely towards palatal mucosa because of some fibrotic tissue secondary to the first surgery, therefore only the fat tissue covered the defect.

Post operative reviews showed that the result of the second operation was unsatisfactory. Most of the fat graft overlying the defect was lost in the first clinical review of 3 days post operatively. Seven days after surgery the graft was found to be completely absent and the anterior defect remained open. A thorough examination through the opening of the defect showed that the oral and antral mucosa met directly with the antral mucosa because of complete bone loss in that area (Figure 2). Wash out of the antrum was done and showed clear return indicating that there was no antral infection.



Figure 2. Opening of the oroantral fistula over the upper first molar region (anterior defect) seen after the second surgery.

The patient was informed about the problem which still existed and about the impending infection of the antrum if the defect was not closed immediately. Another surgery using palatal flap was offered to close up the defect. Since the surgery was scheduled on a later date an upper jaw impression was taken to prepare for an obturator construction. The obturator which was aimed to cover the opening of the fistula. It was inserted on the following day and worn by the patient until the day of the surgery.

The palatal flap operation was done about 3 weeks later. The following were done during the procedure. Local anesthesia was done using 2% lidocaine solution with adrenaline (1:80,000). The surgery was initiated by making circular incision around the fistula opening until the underlying bony defect was exposed. A palatal flap design was visualized and planned according to the site and size of the defect. A partial thickness flap was raised based on its blood supply and repositioned laterally to cover the defect. The flap was then secured in its new place using 3/0 black silk sutures. The donor area which was left covered by the periosteum of the palatal bone was left open for a secondary epithelization. Some adjustment had been made to the obturator which then reinserted in order to protect the donor as well as the defect area (Figure 3).

One week post operative review showed that the wound in the defect area healed without dehiscence, and the donor site was covered with normal fibrin. The patient did not complain of any pain and there was no sign of infection. Fourteen days after surgery the wound in the defect area had healed well and the donor site was fully covered with granulation tissue. Clinical review three months later showed healthy pink epithelium covering the donor site on the hard palate. The bulky palatal flap had shrunk considerably so that the hard palate had retained its normal shape (Figure 4).

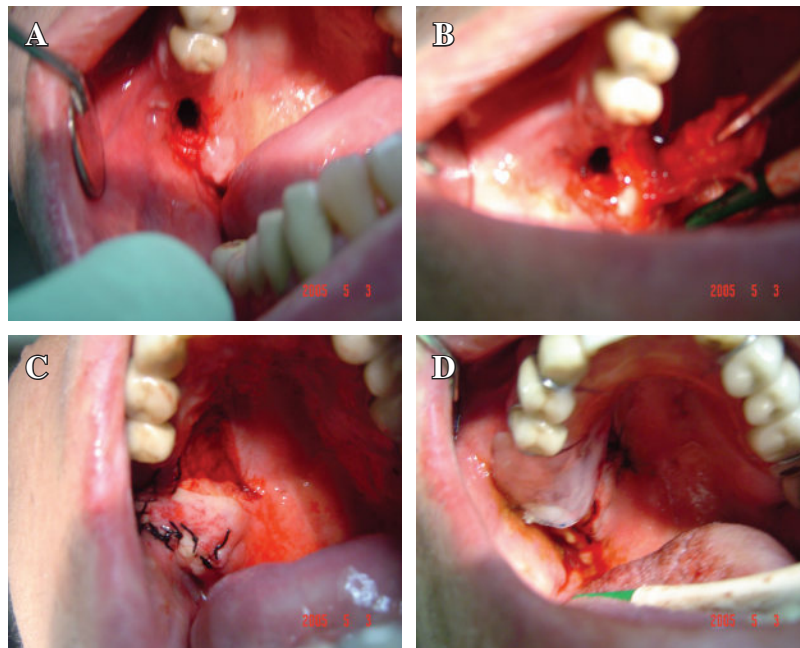


Figure 3. (A) Preparation of the donor site, circular incision was made around the defect until healthy surrounding bone was exposed; (B) Partial thickness pedicle flap was raised over the right hard palate adjacent to the defect; (C) The flap was rotated laterally to cover the defect and stitched to the mucosa surrounding the defect with 3/0 black silk suture, periosteum layer was noted over the donor site; (D) Obturator was inserted to cover the donor and defect site.

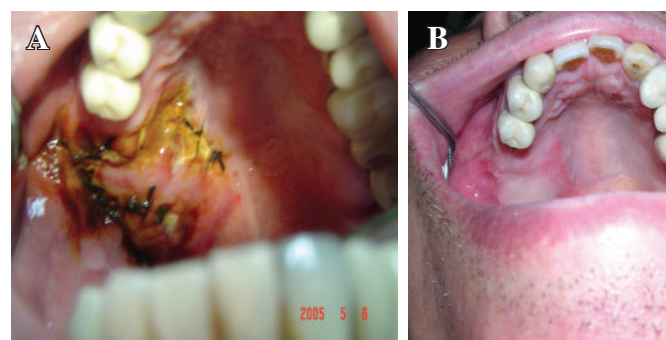


Figure 4. (A) At one week post operative review, granulation tissue covered by normal fibrin layer was noted over the donor site; (B) Three month post operatively, the palate resumed its normal shape and color.

DISCUSSION

The placement of dental implants in patients who are edentulous in the posterior maxilla can be difficult because of deficient posterior alveolus, increased pneumatization of the maxillary sinus, and close approximation of the sinus to crestal bone.⁶ In many cases, this problem can be overcome by increasing the alveolar height with bone grafting of the maxillary antral floors which will provide a sufficient quantity and quality of bone for the placement of osseointegrated implants.⁷ Sinus lift grafting and implant placement are accomplished as either one-step or two-step procedure. One-step procedure can be performed if there

is sufficient alveolar bone height, i.e. at least 5 mm, to stabilize the implants during healing. Immediate placement of the implants is contraindicated if the available host bone is less than 5 mm since the implants will not be maintained mechanically.⁸ In the case presented here, the two implants were inserted at the same time as the bone grafting procedure of the antral floor. The simultaneous placement of implants and sinus lift grafting in this case were actually contraindicated as the primary mechanical stability was unlikely to be achieved, because only approximately 2 mm and 4 mm of bone height were available respectively.

It was predicted that removing the implants would cause an oroantral communication especially in the anterior

region, therefore the surgery was also planned to close the defect immediately with buccal sliding flap. One week post operatively a small area of dehiscence was noted over the anterior defect. It may be caused by two reasons: the flap was too tense, or there was no bony support underneath the flap.

The decision to close the anterior defect with buccal fat pad graft was based on several factors. This procedure was relatively simple and reliable with minimal incidence of failure when properly performed.⁹ The other reason was that the previous operation has made the buccal mucosa less flexible and caused obliteration of the buccal sulcus and these would make another buccal sliding flap impossible.

The buccal flap in this second surgery could not cover the entire fat graft overlying the defect but this should not have been a problem. The fat pad will actually be able to epithelialize even if it is left unlined by the mucosa.¹⁰ The superficial layer of fat tissue will be replaced by granulation tissue, and is finally covered with stratified squamous epithelium migrating from the margin of the gingival.^{9,11}

The most likely cause of the failure in the second surgery was the poor quantity and quality of the fat pad graft. Since there was inadequate amount of fat tissue that was obtained, some degree of tension might have occurred during the reposition of the graft towards the defect. This might have compromised its blood supply. Therefore necrosis of the graft was expected to occur. The light yellow in color and the low consistency of the fat tissue might indicated a poor fat quality in terms of its strength and survival capacity when used as a graft material.

The decision to close the oroantral fistula with palatal flap was finally made because we could no longer use the fibrotic buccal mucosa as the consequence of the previous surgeries. The hard palate has a relatively thick mucoperiosteum layer and good vascularization from greater palatine artery.¹² Flaps raised from hard palate will, therefore, have high viability. This is the reason why palatal flap can be used either as pedicle flap or random flap.¹³ The other advantages of palatal flap are: it has good vascularity, similarity in thickness with that of gingiva, good esthetic, good accessibility, and does not cause obliteration of the vestibular sulcus. The donor site at the palate can be left to granulate and recover within 2-3 weeks with minimal deformity.⁵ The disadvantages of palatal flap include: rotation of the flap may compromise its vascularization, the operation take longer time compared to buccal fat surgery, temporary speech impairment, the risk of bone necrosis, unsuitable for large defect.¹⁴

In this case a rotation palatal flap was used based on the location of the defect which was situated at the region of tooth 17 where the flap can be easily rotated without any risk of compromising its blood supply. The circular incision made around the fistula opening was important in this procedure as it was the site at which the flap would be attached to. The incision was made in such a way that all of the healthy bone underlying the defect was exposed. This was to ensure a good bony support for the palatal flap

which would be placed and stitched over the defect. This would prevent wound dehiscence around the flap.¹

A partial thickness flap was used in this case, instead of full thickness one, in order to avoid post operative pain and infection of the palatal bone. As the periosteum at the donor site was not detached the healing would take shorter time if compared with full thickness flap. The design of palatal flap is important in that it influence the overall result of this procedure, the most critical factor of which being the length and width ratio of the flap. A clinical study showed that for the best result, the flap length and width should be approximately 2.3 in ratio.¹⁵

It can be concluded that an oroantral fistula can be closed with various methods using buccal or palatal tissue depending on the size and location of the defect. The first choice of surgery is usually the buccal advancement flap which is the easiest method. If the defect is larger or when the buccal advancement flap has failed, a buccal fat pad technique can be used with high success rate. In case of failure of buccal approach or if the defect cannot be closed using buccal tissue, a palatal flap should be used as the treatment of choice. The successful result of palatal flap depends on the appropriate choice of the type and the design of the flap.

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