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SHORT REPORT

Buccal Corticotomy for Closure of Oroantral Openings: Case Report

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One of the complications encountered in dental surgery practice is oroantral fistula, a pathological pathway between the maxillary sinus and oral cavity. Oroantral fistulas may occur as a result of tooth extraction, trauma, malignant tumors, osteomyelitis, and syphilis (1).

The management of oroantral communications varies with the acute and chronic forms. In patients with chronic oroantral fistulas, the aim of management is not only to close the opening but also to treat the underlying sinus disease (1). Anderson suggested that the size of a fistula is not a factor determining the closure technique (1). Many studies do not support this opinion, and it is clear that the advantages and disadvantages of any technique depend on the size of the aperture (1). Several surgical variations have been performed, and most have been succeessful. Nevertheless, the 2 most important factors in surgical intervention remain the treatment of the underlying sinus disease and closure of the aperture using a flap without tension (1,2).

The "trapdoor" technique is one of the most commonly used sinus lifting methods (3). This article describes the first use of the "trapdoor" technique for closing an oroantral fistula.

Case Report

A 63-year-old woman with chronic maxillary sinusitis caused by a right oroantral fistula was admitted to our clinic. The fistula occurred during extraction of the right upper second molar tooth 14 months earlier. Since then, she had undergone several operations for fistula closure, but none had succeeded. The clinical complaint of the patient and her extraoral examination were related to findings of subacute maxillary sinusitis. Intraoral examination revealed an oroantral fistula (3 x 2 cm), in the region of the right maxillary second molar. Panoramic (Figure 1) and Water's radiographs revealed decreased aeration of the right maxillary sinus.

Initially, the subacute maxillary sinusitis was managed. The maxillary sinus was irrigated with 600 mg of clindamycin solution every other day for 10 days. Simultaneously, 500 mg of clarithromycin was given p.o. once daily. Naproxen sodium (550 mg p.o., b.i.d.), and the nasal decongestant xylometazoline HCL (twice a day) were also administered.

At the end of the medical treatment, the patient's complaints had decreased, but the dimensions of the fistula remained unchanged. Subsequently, the patient underwent an operation to close the oroantral fistula under local anesthesia.

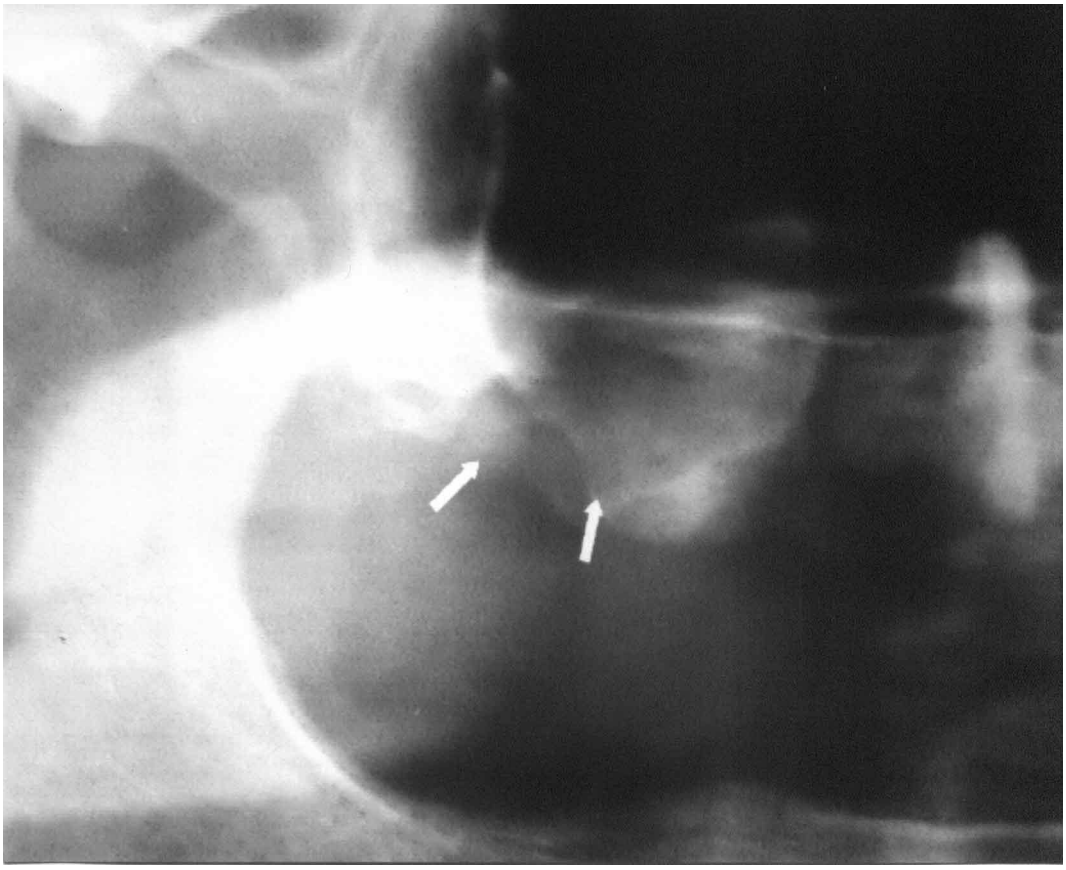

Figure 1. Panoramic radiograph immediately before surgical procedure. Arrows indicate the oroantral communication site.

The mucosa around the fistula was excised and the tract was curetted. A trapezoidal mucoperiosteal flap was made with 2 vertical incisions at 45 degrees extending from the mesial and distal ends of the fistula on the buccal aspect of the alveolar crest. The bony defect in the alveolar crest was explored buccally and was used for the entry of a freer and dissectors into the maxillary sinus. Next, the sinus mucosa was carefully dissected from the lateral and medial walls using these tools.

Two vertical osteotomies, matching the trapezoid incisions, beginning at the mesial and distal ends of the fistula were created in the buccal cortex (Figure 2). The cortical bone between the superior ends of the osteotomy lines was thinned with a #23 round burr, as in the trapdoor osteotomy method (Figure 3). The prepared buccal bone segment was pushed medially (Figure 4) to reduce the dimensions of the oroantral opening in the bucco-palatal direction. The dissected medial and lateral sinus mucosa were overlapped under the bony conjunction line. To cover the perforation, human-derived solvent-dehydrated pericardium (2 x 3 cm) was placed between the mucoperiosteal flap and the released buccal bone segment, and was sutured to the attached mucosa of the palate. The flap was easily closed with a 3/0 polyglycolic acid suture.

Medical therapy was continued after the operation. Postoperative follow-up was conducted on the 1st, 3rd, 7th and 10th days. The sutures were removed at 14 days. No reopening was evident 3 months after the procedure (Figure 5).

The recurrence of a fistula is one of the major problems encountered in maxillary sinus closure. The cause of failure is usually the tension on the flap. Tension during suturing occludes the circulation of the vessels, which adversely affects flap perfusion. Conventional flap

Figure 2. Vertical osteotomy of the buccal wall of the maxillary sinus is performed with a striker.

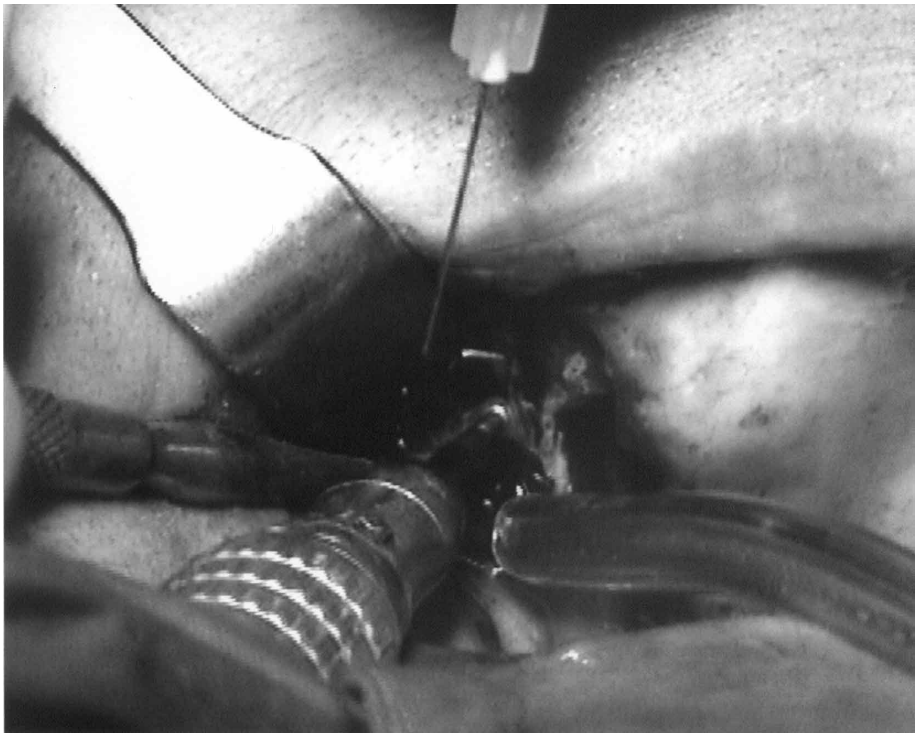

Figure 3. Horizontal buccal corticotomy is prepared with a round burr on the lateral maxillary sinus wall. This corticotomy line combines 2 cranial ends of vertical osteotomies.

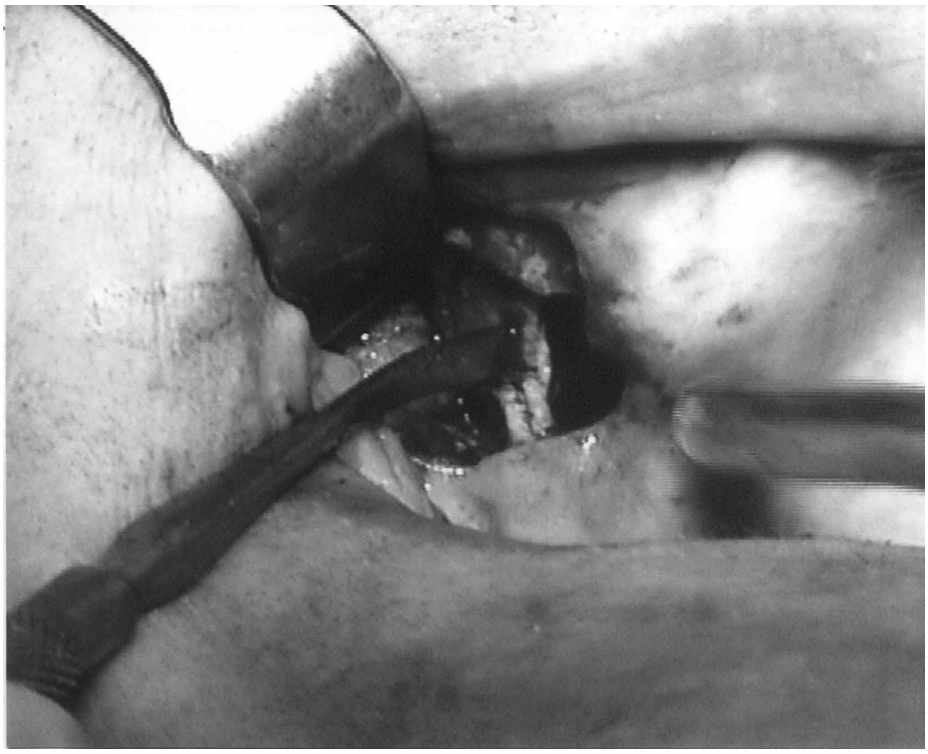

Figure 4. Lateral wall of the maxillary sinus is mobilized medially like a trapdoor.

Figure 5. Intraoral view at 3 months after closure of oroantral opening with buccal corticotomy.

techniques that advance or rotate the flap inevitably cause tension on the flap due to over-advancement or -rotation. The oral mucosa is very flexible and is readily bent or rotated. Since the perfusion of a mucosal flap is dependent on the underlying periosteum, mucosal flaps cannot be used to successfully close oroantral openings. The periosteum is far less flexible than the mucosa. Therefore, rotating and stretching mucoperiosteal flaps may occlude the circulation. A periosteal-releasing incision is recommended to reduce the tension. The buccal flap technique and buccal trapezoid flap method involve such incisions (1). However, the incision adversely affects flap perfusion and stops the blood circulation permanently.

To overcome these problems, the palatal rotational flap (1,2), modified pedicled palatal flap (1), island flap (1), and nasolabial tunnel skin flap techniques (1) were developed. Perfusion of these flaps is not problematic, but the methods are complicated and lengthy. Moreover, unless there is rigorous attention to technique, the morbidity rate in the donor region is high and flap necrosis readily occurs. Although these methods are preferred for large openings that need a large amount of advancement or rotation, in the presence of a large bony defect, the fistula may recur (1). Therefore, the dimensions of the bone defect are a significant factor affecting the success rate, and may be one of the most important. In our case, we modified the "trapdoor" technique, which is used in sinus lifting procedures, and used it for closure of a wide oroantral fistula. Our technique alters the bony contour and reduces the bony defect in the fistula. Recontouring the bone morphology reduces the traction distance of the mucoperiosteal flap and decreases the flap tension that can lead to the failure of closure.

Golden plates (1), various bone grafts (4), and fibrin tissue glues (2) have been used to close large bony defects in oroantral fistulas. One of the most common problems with golden plates is that the plate can easily become exposed under the mucosa (1). Polymethylmethacrylate has been introduced as an alternative, but can also become exposed (5).

The perfusion of a pedicled flap is determined by the type, amount of advancement or degree of rotation of the flap (amount of tension), its location, and perfusion of the underlying tissue (6,7,8). In large oroantral openings, a larger bone defect means weaker underlying tissue support and blood flow. A bone grafting method has been developed as an alternative to the plaque method and is used for bony defects at least 5 mm in diameter (1,4). If conservative methods fail or reconstruction of the alveolar ridge is needed, grafting can be used (1,4). Conversely, if the perfusion of the surrounding tissues is poor, due to insufficient tissue mass, the survival of free bone grafts is questionable. Moreover, satisfactory soft tissue coverage is one of the keys to a successful bone graft. Considering these points, the use of bone grafts for this purpose is debatable. Our technique reduces the dimensions of the bony defect, increases the underlying bone support, and reduces flap tension.

The reported incidence of maxillary sinus septa ranges from 16% to 58% (3,8). The presence of septa makes our method difficult or impossible. Obviously, it is wise to evaluate the width of the opening and look for evidence of septa within the sinus radiographically preoperatively. Furthermore, in planning surgery, it is very beneficial for the surgeon to estimate the thickness of the buccal and palatal bone walls. Imaging the configuration of the buccal and palatal bone-walls in cross-sectional views with a dental CT is very useful for evaluating the possibility of bone-to-bone contact.

In conclusion, our method is presented as an alternative for closing oroantral gaps. In cases with severe buccal wall loss, the trapdoor technique will not suffice to close the gap.

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