

Closure of Oroantral Communication Utilising Buccal Fat Pad without Removing the Implants in Maxillary Sinusitis: A Case Report of Two Cases

NORIAKI AOKI¹, MEGUMI MATSUMOTO², JUNICHI BABA³, SOICHIRO ISHII⁴, HIROSHI OZAWA⁵

ABSTRACT

Although the sinus lift procedure is relatively safe and well-known for bone augmentation in implant cases, it can occasionally lead to acute and chronic postoperative sinusitis as a complication. Generally, treatment for such complications should involve implant removal and Endoscopic Sinus Surgery (ESS). Two cases with similar complications of sinusitis following a sinus lift were reported in the Department of Oral Surgery, where they were managed with different surgical approaches, excluding implant removal and ESS, which is the standard surgical procedure. In the first case, a 50-year-old male with missing teeth and atrophic alveolar bone underwent a sinus lift, bone grafting, and implant placement. One month post-surgery, he developed chronic sinusitis, leading to persistent symptoms. Similarly, another case involved a 48-year-old man who visited the Department of Oral Surgery with a chief complaint of purulent discharge from his nose. In both cases, after clinical and radiological investigations, a final diagnosis of maxillary sinusitis was made, resulting from complications following the sinus lift and implant procedure. The Buccal Fat Pad (BFP) was successfully used to close the Oroantral Communication (OAC) without the need for implant removal or ESS. No infections were clinically or radiographically observed at six months, 12 months, and 24 months postoperatively, and the recovery course was uneventful without any complications. At the two-year follow-up, the patients expressed satisfaction with the results of the implant treatment, demonstrating appropriate implant stability.

Keywords: Endoscopic sinus surgery, Fistula, Sinus lift

CASE REPORT

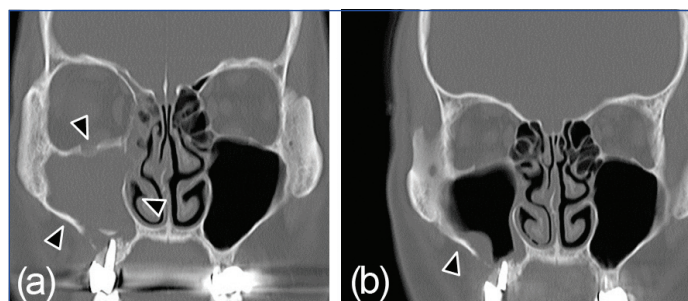
Case 1

A 50-year-old male patient visited the Department of Oral Surgery with a chief complaint of difficulty in chewing for the past five years. He had undergone extraction of an upper premolar five years ago and had not sought treatment since, then. The patient did not report any history of systemic illness. Upon oral examination, 15 teeth were found to be missing. For the missing teeth, the patient was advised to consider implants in 15 areas.

A panoramic radiograph was recommended to assess the overall dental health, bony contour, and to identify any underlying pathology that could affect the implant placement. The Computed Tomography (CT) and radiographic findings revealed that the sinus floor was close to the apex of the maxillary molars, along with atrophic alveolar bones. To address this issue, a sinus lift, along with the placement of autogenous bone, a xenograft, and an implant, was performed simultaneously using the lateral bone window technique, measuring 6×10 mm. After elevating the sinus mucosa from the floor, the remaining space was filled with both autogenous bone and xenograft. The lateral bone window was covered with a sufficient mucoperiosteal flap without using a membrane.

One month later, the patient returned to the Outpatient Department (OPD) with complaints of headache, rhinorrhoea, swelling, and pain around the right upper molar area. Upon oral examination, no implant mobility was noted. Antimicrobial therapy with 750 mg amoxicillin was administered for five days to reduce inflammation due to acute sinusitis. Although his symptoms temporarily subsided, they did not completely resolve, as the headache, rhinorrhoea, and dull pain persisted and gradually worsened. A CT scan showed a radiopaque area in the right maxillary sinus and obstruction of the ostium [Table/Fig-1a], suggestive of postoperative chronic sinusitis secondary to the implant procedure.

An incision and surgical drainage were performed in the buccal mucosa for symptomatic relief and to prevent the further spread of infection. Experts from the otorhinolaryngology department were consulted, and they recommended implant removal and ESS to treat the aggravated sinusitis. However, the patient declined the procedure as he was not in favour of implant removal. Therefore, saline irrigation from the OAC to the sinus was performed twice a week, and a macrolide antibiotic was administered at 200 mg/day for 60 days. The patient's symptoms gradually improved over the two-month postoperative period. However, the OAC in the right buccal sulcus persisted, despite the improvement in symptoms and the disappearance of the radiopaque area in the maxillary sinus on the CT scans [Table/Fig-1a,b,2].



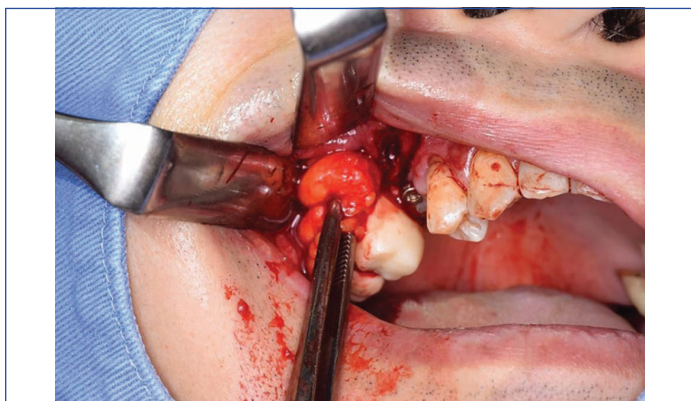
[Table/Fig-1]: CT images. a) Radiopaque areas, as depicted by the arrows; b) After incision and drainage, the inflammation was reduced in the right maxillary sinus, as depicted by arrows.

Due to the persistent OAC and chronic sinusitis, closure of the OAC was performed using the BFP technique, while leaving the implant in place. The buccal mucosa was incised, and the exposed BFP was inserted into the OAC [Table/Fig-3].

The patient was regularly followed-up and evaluated both clinically and radiographically at six months, 12 months, and two years. After

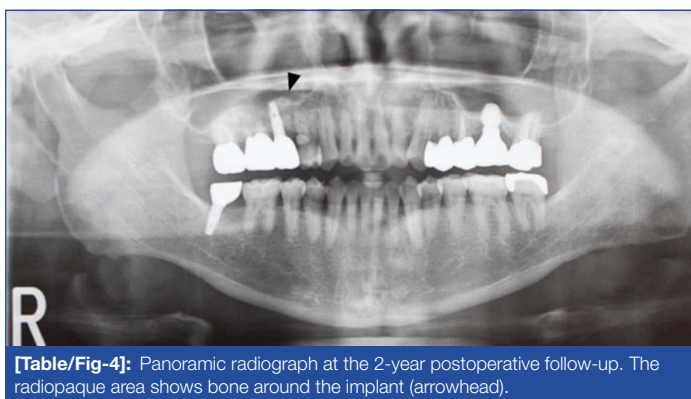


[Table/Fig-2]: The intraoral photograph depicts the persisted OAC in the right buccal sulcus; the probe can be deeply inserted.



[Table/Fig-3]: Intraoperative image: The buccal mucosa was incised and exposed; BFP was inserted into the OAC.

the wound had completely healed, a screw-retained prosthesis was placed and loaded at six months. His previous symptoms of headache, rhinorrhoea, swelling, and pain around the right upper molar area had completely disappeared. Additionally, the Periotest (Tokyo Dental Industrial Co., Ltd., Tokyo, Japan) was used to assess implant stability, and the Periotest value was -2 at each follow-up [1]. At the two-year follow-up, a panoramic radiograph revealed a radiopaque area around the implant [Table/Fig-4].



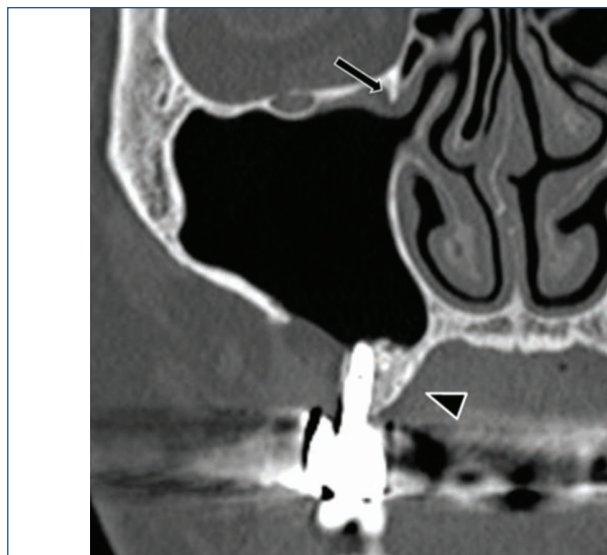
[Table/Fig-4]: Panoramic radiograph at the 2-year postoperative follow-up. The radiopaque area shows bone around the implant (arrowhead).

CT scans showed that the radiopaque area and the affected natural ostium had completely improved, indicating the presence of bone around the implant. Notably, bone on the palatal side of the implant was observed [Table/Fig-5]. The postoperative course had been uneventful for two years.

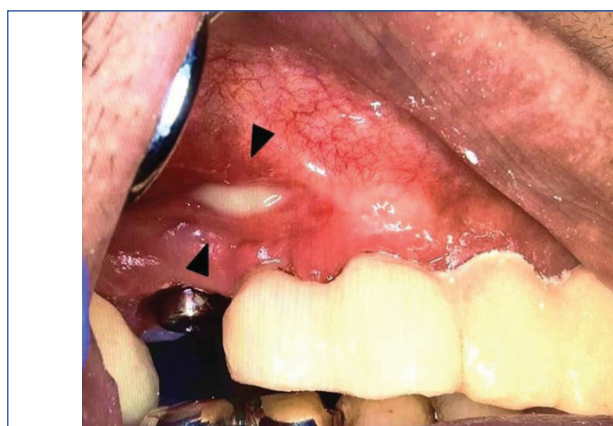
Case 2

A 48-year-old male patient visited the Department of Oral Surgery with a chief complaint of purulent discharge from his mouth and nose for the past two months [Table/Fig-6].

Previously, the patient had undergone implant placement and sinus lift surgery with a xenograft, and a provisional restoration was immediately placed at a dental clinic six months ago. One month

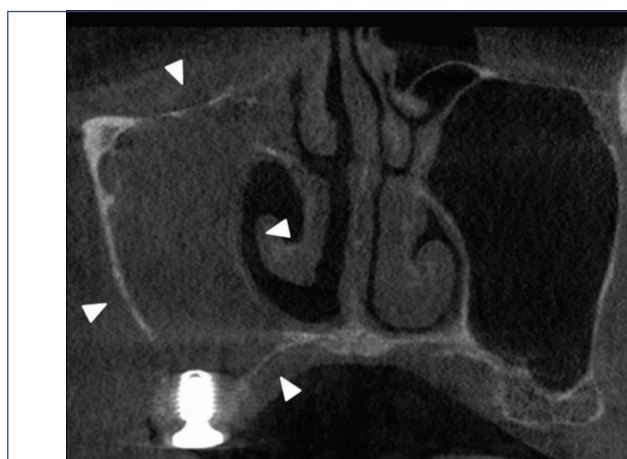


[Table/Fig-5]: CT images at the 2-year postoperative follow-up: the bone in the palatal site of the implant was seen (arrow and arrowhead).



[Table/Fig-6]: Intraoral image showing pus discharge in the buccal area.

later, he developed a headache, cacosmia (an unpleasant odour), dull pain, and diffuse swelling around the upper maxillary molar where the implants had been placed, although the implant showed no mobility. Preoperative CT revealed a radiopaque area in the right sinus and obstruction of the ostium [Table/Fig-7].

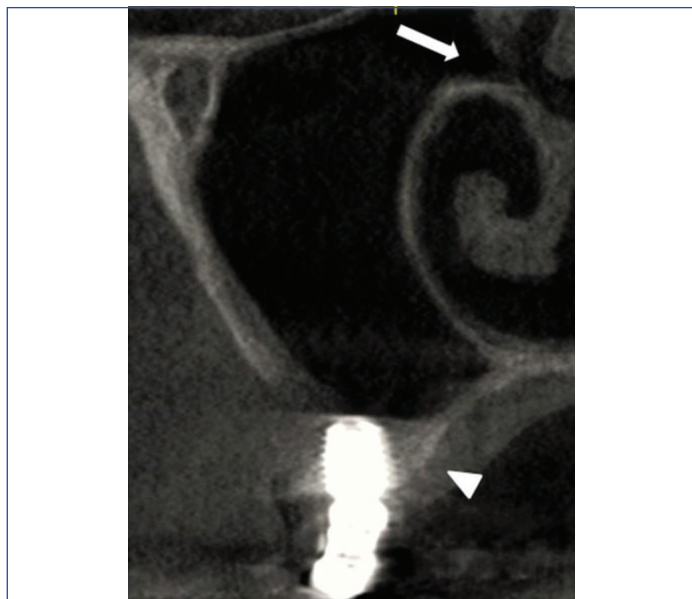


[Table/Fig-7]: CT revealed a radiopaque area in the right sinus and obstruction of the ostium shown with the arrows.

He was referred to the Otorhinolaryngology Department of another hospital, where he was advised to undergo implant removal and ESS so that it can prevent aggravated sinusitis. However, he declined this procedure, as he was not in favour of implant removal. To address the postoperative sinusitis secondary to the implant procedure, an incision and surgical drainage were performed in the buccal mucosa, followed by saline irrigation. The patient then underwent saline irrigation twice a week and macrolide therapy at

200 mg/day for 60 days. The inflammation subsequently decreased, and his symptoms resolved, except for water leakage from his nose after drinking.

Because of the persistent OAC and chronic sinusitis, the OAC was closed using the BFP technique. The buccal mucosa was incised, and the exposed BFP was inserted into the OAC, leaving the implant in place. Regular follow-ups were conducted clinically and radiographically at six months, 12 months, and two years. The postoperative course was uneventful. After the wound had completely healed, a screw-retained final prosthesis was placed and loaded at six months. His previous symptoms of pus discharge and water leakage from his nose had completely disappeared. The Periotest value was -2 [1] at each follow-up. At the two-year postoperative follow-up, CT revealed that the radiopaque area had disappeared, and bone was observed around the implant [Table/Fig-8].



[Table/Fig-8]: CT images at the 2-year postoperative follow-up: The affected ostium had completely improved (arrow). CT revealed bone formation in the palatal side of the implant (arrowhead).

DISCUSSION

The most serious complications of sinus lift procedures are postoperative acute and chronic sinusitis [2]. Their treatment usually requires the removal of the implant and ESS [3-6]. On the other hand, the BFP has also been used to close intraoral defects in cases of oral reconstruction [7]. However, few reports to date have described the management of postoperative infection following implant procedures [3,4]. In present report, authors present two cases of sinusitis following the sinus lift procedure. Both patients were successfully treated without implant removal, and their implants remained stable for two years.

The most commonly used techniques for the treatment of OAC are the buccal advanced flap, palatal rotation flap, and the BFP flap [8]. Each flap technique has its limitations. The limitation of the buccal advanced flap is that it only covers small defects and poses a risk of reducing the depth of the buccal sulcus. The most critical limitation of the palatal rotation flap is bleeding, the presence of a raw surface, and the short distance it can reach to the defect area [9-11]. Conversely, the BFP is sometimes available for reconstructing large intraoral defects, especially in the posterior maxillary region [10].

The blood supply to the BFP is derived from the buccal and deep temporal branches of the maxillary artery, the transverse facial branch of the superficial temporal artery, and several small branches of the facial artery as feeding vessels. This rich blood supply to the pedicled BFP facilitates adequate soft tissue healing and provides strong resistance against infection. The BFP shows a high success rate when properly placed [7,9]. It can become epithelialised and heal within a few weeks without discomfort at the donor site.

In the present cases, the BFP was selected for persistent OAC accompanied by large bone defects (>10 mm) for which sinus lift surgery was performed using the lateral window technique. The BFP was easy to handle and effectively rotated to the affected site, benefiting from its rich blood supply. The postoperative course was uneventful, and no complications occurred in either case.

The complications of sinus lift and implant procedures can include acute maxillary sinusitis, scattering of the graft material through Schneiderian membrane perforations into the sinus cavity, and wound dehiscence. Clinical symptoms of sinus infection may include headache, locoregional pain, cacosmia, swelling of the oral buccal mucosa, and rhinorrhoea or unilateral purulent nasal discharge. Several reports have described the management of acute and chronic maxillary sinusitis after the sinus lift procedure [3,6,9,12-14]. Allevi F et al., performed a systematic review on the treatment of sinusitis following dental implantation, indicating that implants and graft materials were removed by ESS in most cases [13]. Saibene AM et al., also reported that implants should be removed before ESS is performed [5]. ESS is the most commonly performed treatment for sinusitis after sinus lift surgery, and it shows very high success rates.

In the present cases, patients' symptoms lasted for six to eight weeks; they were referred to the otolaryngology department by their dentists and were informed of the need for ESS and implant removal, but both patients declined this treatment. Consequently, antimicrobial agents were administered alongside repeated saline irrigation, and surgical drainage was implemented without implant removal or ESS. The remaining persistent OAC was closed using the BFP technique after confirming the complete disappearance of the radiopaque area of the sinus on CT. Both patients' postoperative courses remained uneventful for two years, and they expressed satisfaction with the results of the procedure. The findings from these cases indicate that implant removal and ESS are not always necessary for the successful management of chronic sinusitis after sinus lift surgery.

The Periotest is an electronic device that provides objective, quantitative information regarding implant stability through the analysis of tapping tooth sounds [1]. The Periotest device can be reliably used to assess tooth mobility. When the Periotest value is between -9 and +9, +10 and +19, and greater than +20, clinical tooth mobility is scored as 0, 1, and 2, respectively. To investigate implant stability, a Periotest examination was performed during follow-up periods. At the two-year postoperative follow-up, both patients showed complete healing, osseointegration, and excellent occlusal function without implant removal, and their Periotest value was -2. Sufficient bone graft material remained in the palatal site of the implant, even though less bone graft was present in the buccal site on CT. We assume that the remaining bone at the palatal site supported and reinforced the implant, increasing its stability. Therefore, it is essential to sufficiently fill the bone graft around the implant, especially on the palatal side, when a sinus lift is performed. This approach will result in better osseointegration.

CONCLUSION(S)

In present case report, persisting OAC accompanied by large bone defects from the lateral window technique in sinus lift was closed using the BFP, while the implants were preserved for two years without removal and ESS. The use of the BFP proved to be an excellent treatment option for closing OAC caused by implant procedures, and neither recurrences nor complications were observed. Further, studies are necessary to clarify and elucidate the recurrence of sinusitis and implant stability over the long term.

Acknowledgement

Authors thank Angela Morben, DVM, ELS, from Edanz (<https://jp.edanz.com/ac>) for editing a draft of this manuscript.

REFERENCES

- [1] Chakrapani S, Goutham M, Krishnamohan T, Anuparth S, Tadiboina N, Rambha S. Periotest values: Its reproducibility, accuracy, and variability with hormonal influence. *Contemp Clin Dent*. 2015;6(1):12-15. Doi: 10.4103/0976-237X.149284.
- [2] Jiam NT, Goldberg AN, Murr AH, Pletcher SD. Surgical treatment of chronic rhinosinusitis after sinus lift. *Am J Rhinol Allergy*. 2017;31(4):271-75. Doi: 10.2500/ajra.2017.31.4451.
- [3] Chirilă L, Rotaru C, Filipov I, Săndulescu M. Management of acute maxillary sinusitis after sinus bone grafting procedures with simultaneous dental implants placement - A retrospective study. *BMC Infect Dis*. 2016;16(Suppl 1):94. Doi: 10.1186/s12879-016-1398-1.
- [4] Costa F, Emanuelli E, Robiony M, Zerman N, Polini F, Politi M. Endoscopic surgical treatment of chronic maxillary sinusitis of dental origin. *J Oral Maxillofac Surg*. 2007;65:223-28.
- [5] Saibene AM, Collurà F, Pipolo C, Bulfamante AM, Lozza P, Maccari A, et al. Odontogenic rhinosinusitis and sinonasal complications of dental disease or treatment: Prospective validation of a classification and treatment protocol. *Eur Arch Otorhinolaryngol*. 2019;276:401-06.
- [6] Felisati G, Chiapasco M, Lozza P, Saibene AM, Pipolo C, Zaniboni M, et al. Sinonasal complications resulting from dental treatment: Outcome-oriented proposal of classification and surgical protocol. *Am J Rhinol Allergy*. 2013;27:101-06.
- [7] 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;58:158-63.
- [8] Abuabara A, Cortez AL, Passeri LA, de Moraes M, Moreira RW. Evaluation of different treatments for oroantral/oronasal communications: Experience of 112 cases. *Int J Oral Maxillofac Surg*. 2006;35:155-58.
- [9] Kim YK, Hwang JW, Yun PY. Closure of large perforation of sinus membrane using pedicled buccal fat pad graft: A case report. *Int J Oral Maxillofac Implants*. 2008;23:1139-42.
- [10] Bansal S, Singla R. Use of palatal rotation flap in the closure of oroantral communication. *Int J Dent Clin*. 2011;3(2):09-10.
- [11] Anavi Y, Gal G, Silfen R, Calderon S. Palatal rotation-advancement flap for delayed repair of oroantral fistula: A retrospective evaluation of 63 cases. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod*. 2003;96(5):527-34. Doi: 10.1016/s1079-2104(03)00470-0.
- [12] Hernández-Alfaro F, Torradeflot MM, Marti C. Prevalence and management of Schneiderian membrane perforations during sinus-lift procedures. *Clin Oral Implants Res*. 2008;19:91-98.
- [13] Allevi F, Fadda GL, Rosso C, Martino F, Pipolo C, Cavallo G, et al. Treatment of sinusitis following dental implantation: A systematic review and meta-analysis. *Am J Rhinol Allergy*. 2022;36:539-49.
- [14] Chen YW, Huang CC, Chang PH, Chen CW, Wu CC, Fu CH, et al. The characteristics and new treatment paradigm of dental implant-related chronic rhinosinusitis. *Am J Rhinol Allergy*. 2013;27:237-44.

PARTICULARS OF CONTRIBUTORS:

1. Doctor, Department of Oral and Maxillofacial Surgery, Saiseikai Yokohamashi Nanbu Hospital, Kanagawa, Japan.
2. Doctor, Department of Oral and Maxillofacial Surgery, Saiseikai Yokohamashi Nanbu Hospital, Kanagawa, Japan.
3. Doctor, Department of Oral and Maxillofacial Surgery, Saiseikai Yokohamashi Nanbu Hospital, Kanagawa, Japan.
4. Doctor, Department of Oral and Maxillofacial Surgery, Saiseikai Yokohamashi Nanbu Hospital, Kanagawa, Japan.
5. Chief Doctor, Department of Oral Surgery, Ozawa Dental Clinic, Kanagawa, Japan.

NAME, ADDRESS, E-MAIL ID OF THE CORRESPONDING AUTHOR:

Dr. Noriaki Aoki,
Doctor, Department of Oral and Maxillofacial Surgery, Saiseikai Yokohamashi Nanbu Hospital, 3-2-10, Kounandai, Kounanku, Yokohama City, Kanagawa, 234-0054, Japan.
E-mail: aokinoriaki19890920@yahoo.co.jp

PLAGIARISM CHECKING METHODS: [Jain H et al]

- Plagiarism X-checker: Jul 19, 2024
- Manual Googling: Nov 09, 2024
- iThenticate Software: Nov 12, 2024 (10%)

ETYMOLOGY: Author Origin

EMENDATIONS: 7

AUTHOR DECLARATION:

- Financial or Other Competing Interests: None
- Was informed consent obtained from the subjects involved in the study? Yes
- For any images presented appropriate consent has been obtained from the subjects. Yes

Date of Submission: **Jul 18, 2024**

Date of Peer Review: **Aug 29, 2024**

Date of Acceptance: **Nov 14, 2024**

Date of Publishing: **Mar 01, 2025**