

Minimally invasive removal of a foreign body from the maxillary sinus mucosa through the extraction fossa using piezosurgery: a case report

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Summary

This report describes a minimally invasive procedure for removal of a foreign body concealed under the sinus mucosa via the extraction socket approach using piezosurgery. First, the exact position of the foreign body was determined by cone-beam computed tomography. After the extraction of the second molar palatine root, the residual gutta-percha point in the sinus mucosa was removed using a piezosurgery with a round diamond tip and a root canal-filling forceps through the extraction socket. Oxidized cellulose was placed on the bottom of the extraction socket and the socket was covered with a periodontal dressing material. There were no postoperative complications.

1. Introduction

The trans-sinus approach via the canine fossa or lateral sinus wall, or the transnasal and intraoral approach via the extraction socket have been adapted for removal of a foreign body from the maxillary sinus.¹⁻⁴⁾ Although the trans-sinus approach is a standard technique, it causes a certain amount of damage to the maxillary bone and sinus mucosa. In contrast to previous approaches, removal of a foreign body via the extraction socket has been adopted for removal of an aberrant root or foreign body from the maxillary sinus floor.⁵⁾ Although removal of a foreign body via the extraction socket is less invasive than the approach via the sinus lateral wall, it also has some disadvantages such as the possibility of an oroantral fistula, a narrow field of view, and the necessity of per-

forming the procedure immediately after extraction.

This report describes a minimally invasive procedure for removal of a foreign body concealed under the sinus mucosa via the extraction socket approach using piezosurgery (based on ultrasonic microvibrations) for bone cutting. The first step in this procedure was to identify the exact position of the foreign body in three dimensions by cone-beam computed tomography (CBCT). Then, piezosurgery was used to minimize damage to the bone and sinus mucosa, and avoid an oroantral fistula.⁶⁾

2. Case report

A 50-year-old male was referred from an otolaryngology clinic to our hospital due to a suspicion of dental sinusitis. He presented with headache, nasal obstruction, and swelling of left buccal region that had lasted for several days. Oral examination revealed percussion pain and mild deflection at the left first and second molars. X-ray examination showed radiopacity from the maxillary to the frontal sinus as the area of sinusitis. The foreign body in the maxillary sinus was gutta-percha points that were displaced approximately 1 cm from the left upper second molar apex (Fig. 1, 2).

The patient was administered cefotiam hexetil for 15 days from the otolaryngologist, which was discontinued 23 days before CBCT examination. CBCT revealed two gutta-percha points concealed under the sinus mucosa and bone absorption around the second molar (Fig. 3A). One of the gutta-percha points was 3-mm superior to the apex, and the other was running into the root canal of the second molar's palatal root (Fig. 3B). The diagnosis was sinusitis due to gutta-percha points (foreign body) in the sinus mucosa. A decision was made to remove the gutta-percha points via the extraction socket after extraction of the second molar.



Fig. 1 : Water's X-ray photograph image. Radiopacity from the left maxillary to frontal sinus was observed.

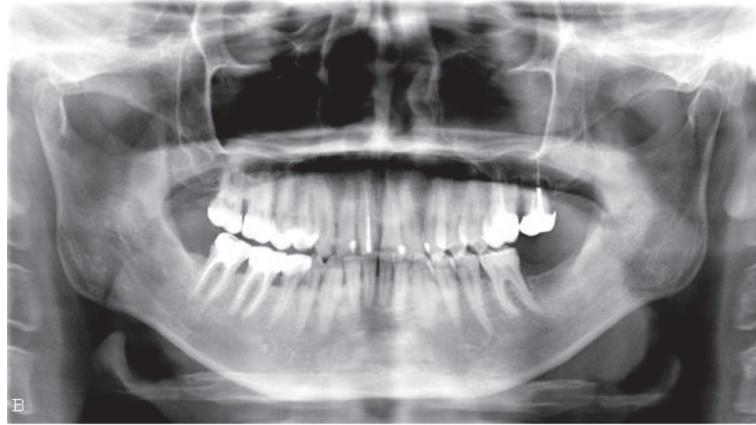


Fig. 2 : Panoramic radiograph image. Over-filling of root canal filling material was observed together with a radiolucent area at the root apex of the upper left secondary molar.

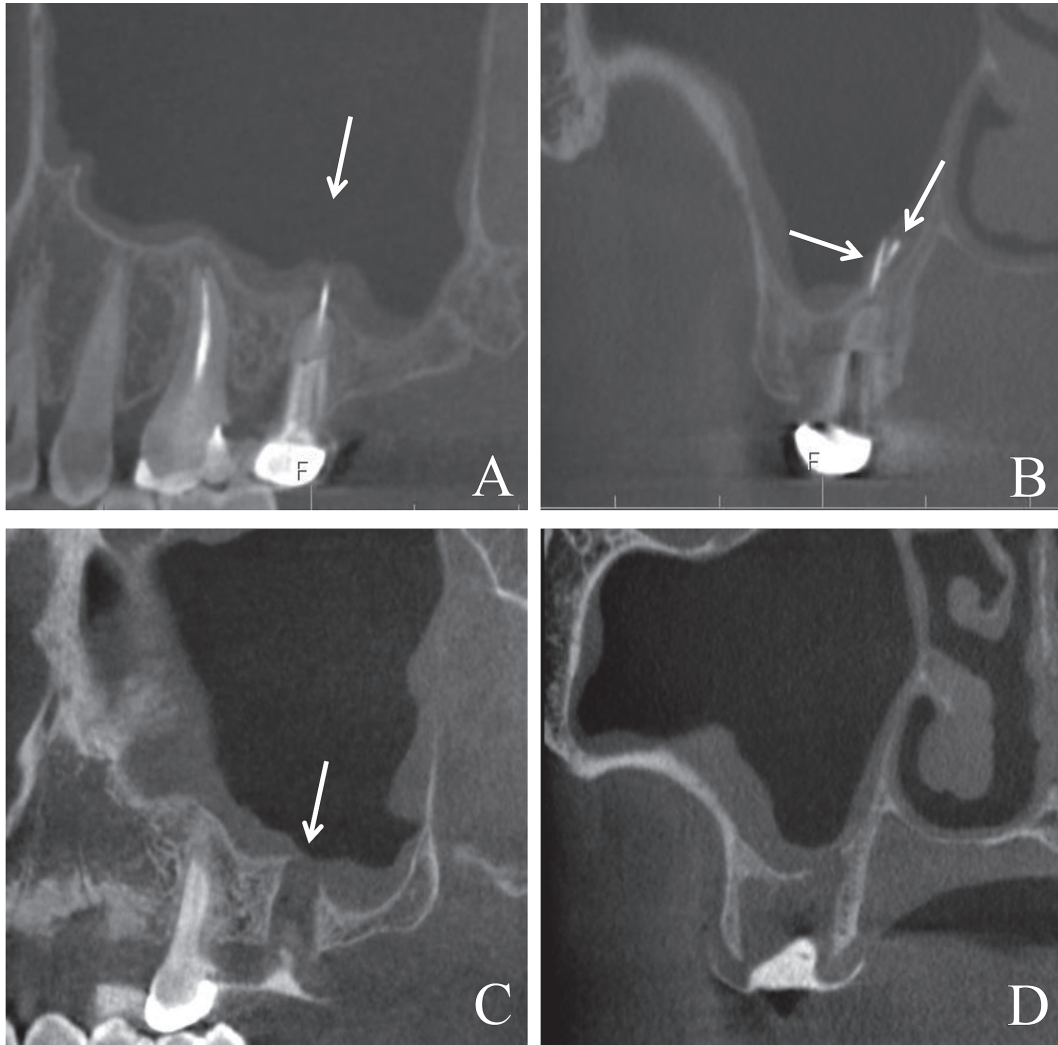


Fig. 3 : CBCT images. Preoperative CBCT images (A, B). Sagittal (A) and cross-sectional image (B). Postoperative CBCT images (C, D). Sagittal (C) and cross-sectional image (D). The foreign bodies were completely removed, and an antral fistula was not found. The white arrows show the gutta-percha points in the maxillary sinus mucosa that was superior at the palatal root of the second molar.

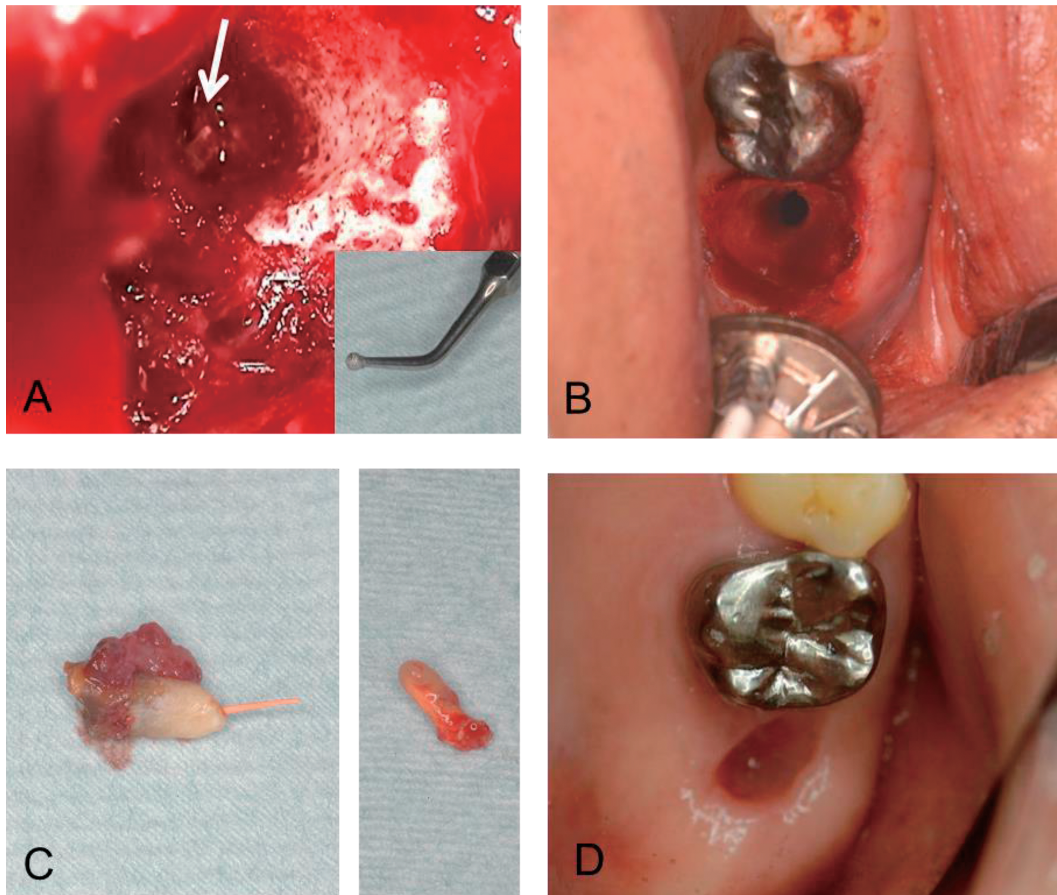


Fig. 4 : Clinical images of the case. Panel A shows photographic images during the operation. The white arrow shows a gutta-percha point in the sinus mucosa through the extraction fossa. The bottom bone of the extraction fossa was already removed by the use of piezosurgery. Panel B shows a view from the extraction fossa after removal of the gutta-percha points. Panel C shows the extracted palatal root with a gutta-percha point and a gutta-percha point removed from the sinus mucosa. Panel D shows a view of the extraction fossa at three months after the operation. +

Informed consent was obtained from the patient before the surgical procedure.

Under intravenous sedation and local anesthesia, the gutta-percha point running into the root canal of the second molar palatine root was removed during the extraction (Fig. 4A). For the residual gutta-percha point in the sinus mucosa, piezosurgery with a round diamond tip (Piezon master, SL5 tip) was used to create a bone hole with a diameter of 2.5 mm at the bottom of the extraction socket with minimum invasion of the bone and protection of the sinus mucosa (Fig. 4A; inside bottom). Based on the exact location of the gutta-percha points obtained by CBCT, the residual gutta-percha point in the sinus mucosa was found with optical curettes through a small bone hole using the mirror technique with a small light source, and the gutta-percha point was removed by root canal-filling forceps. Oxidized cellulose was placed on the bottom of the extraction socket after saline irrigation. Furthermore, the extraction socket was protected by Coe-pak (GC America Inc., Alsip, IL, USA). The removal of the gutta-percha points was confirmed by postoperative CBCT (Fig. 3C, D). There were no postoperative complications such as a feeling of nasal obstruction, nasal bleeding, or an antroalveolar fistula. Three months after the operation, the extraction fossa had a concavity, but there was no oroantral fistula (Fig.4D).

3. Discussion

The removal approaches for a foreign body in the maxillary sinus include the trans–canine fossa, trans–lateral sinus, intranasal, and trans–extraction socket. In recent years, some reports indicated that a less invasive approach procedure can be used through the canine fossa, intranasal, or extraction socket to remove a foreign body.^{2–4,7,8)} When a gutta–percha point is displaced into the maxillary sinus, it can be removed with blind suction or curettage from the socket after extraction of the causative tooth. However, this is a difficult and uncertain procedure when the dental material is entrapped in the undercut or is concealed under the sinus mucosa.⁷⁾

One report indicated that a gutta–percha point could be removed by forceps from the wound after extraction with the aid of an ultrathin arthroscopic guide, which was inserted from the canine fossa.⁷⁾ However, this report also indicated that this procedure could not be used when the sinus mucosa around the foreign body is thick and it was concealed in/under the sinus mucosa. This is because it would be difficult to find the foreign body in spite of radiographic navigation.⁷⁾

In the case of a foreign body near the root of the extraction teeth in the hyperplastic sinus mucosa, we thought that it would be easier to remove the foreign body through the extracted wound than the trans–sinus approach. This was because the error in locating the position at the time of the operation would be less with the intraoral approach than with the trans–sinus approach. Furthermore, there should be minimal bone removal while protecting the sinus mucosa with the approach through extracted wound. Therefore, we developed a preoperative plan for gutta–percha point removal via the extracted socket. The first step in our plan was to measure the precise three–dimensional position of the gutta–percha point from the root tip by CBCT.^{7,9)} The second step was to use piezosurgery to remove the bone via the extraction socket with no thermal damage and little bleeding. Our goal was to protect the sinus mucosa and avoid an oroantral fistula.^{5,10–12)} As a result, we were successful in removing the gutta–percha points in the hyperplastic sinus mucosa without an oroantral fistula. We conclude that this procedure is worth trying at first to remove a foreign body near the root tip and in the sinus when a tooth needs extraction. Furthermore, we think that it may be better to use an oblique–viewing endoscope rather than a dental mirror in order to acquire an adequate field of view.

4. Conclusion

We have developed a method to remove a foreign body or aberrant root that exists near the root tip in the sinus. With our method, the exact position of the foreign body is first determined by CBCT, and then piezosurgery is performed via the extraction fossa. This method results in minimal invasion of the bone, reduced mucosal damage, and there is no oroantral fistula.

Acknowledgements

The authors wish to thank Dr. Midori Miyashita for her support for the patient's care and surgery. This work was supported in part by a Grant–in–Aid for Scientific Research (B) (JSPS KAKENHI Grant Number JP16H05546).

Ethical approval

Does not apply.

Funding source

None.

Competing interests

The authors declare no competing interests.

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抄録：ピエゾサージェリーを用いた抜歯窩からの上顎洞粘膜内異物の低侵襲的除去手術（臨床報告）

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ピエゾサージェリーを用いて，抜歯窩から上顎洞粘膜下に迷入した異物を低侵襲に除去した症例とその方法について報告する．始めに，異物の正確な場所を，コーンビームCTを用いて決定した．第2大臼歯の口蓋根を抜去した後，上顎洞粘膜に残存するガッタパーチャポイントをピエゾサージェリーのラウンドダイヤモンドチップと根管治療用の鑷子を用いて抜歯窩から除去した．抜歯窩底部に酸化セルロースを置き，抜歯窩を歯周包帯によって覆った．術後の合併症は認めなかった．