Case Report

A Case of Simultaneous Ectopic Tooth Extraction and Removal of Migrated Dental Implant from Maxillary Sinus

Yoshitaka Furuya¹, Yoshie Norizuki¹ and Yasutomo Yajima¹,²

¹ Department of Oral and Maxillofacial Implantology, Tokyo Dental College, 1-2-2 Masago, Mihama-ku, Chiba 261-8502, Japan
² Department of Oral and Maxillofacial Implantology, Tokyo Dental College, 2-9-18 Misaki-cho, Chiyoda-ku, Tokyo 101-0061, Japan

Received 26 January, 2015/Accepted for publication 16 July, 2015

Abstract

When a dental implant migrates to the maxillary sinus it should be extracted immediately as it may cause sinusitis or further migrate to one of the other paranasal sinuses. Although usually detected due to symptoms such as nasal obstruction, nasal discharge, and nasal bleeding; an ectopic tooth in the maxillary sinus can sometimes be revealed incidentally on radiographic examination. Here, we report a case of simultaneous extraction of a dental implant that had migrated to the maxillary sinus and removal of an ectopic tooth that had arisen in the same location. The patient was a 73-year-old man who had received the implant to replace the first left maxillary molar at a local dental office. The implant had subsequently migrated to the left maxillary sinus and the patient was referred to us for its removal. On locating the implant on a CT scan at our hospital, an ectopic tooth was also observed at the base of the maxillary sinus. With patient consent, the decision was made to remove the ectopic tooth and extract the implant simultaneously. Excision of the lateral wall of the maxillary sinus allowed easy extraction of the implant. The ectopic tooth was removed by slightly expanding a fenestration in the sinus wall. Ectopic teeth in the maxillary sinus are sometimes put on follow-up if asymptomatic. Removal should be considered, however, if there is a risk of it becoming infected due to implantation-induced inflammation.

Key words: Ectopic tooth—Dental implant—Maxillary sinus—Tooth extraction—Migrated dental implant

Introduction

The migration of a dental implant to the maxillary sinus is a serious medical accident. One survey by the Japanese Academy of Maxillofacial Implants on perioperative complications revealed that, among a total of 421 such cases, 63 (15%) involved migration of the implant to the maxillary sinus⁹, indicating that this is no rare complication during implant surgery. Moreover, Chiapasco et al.⁴ reported that, among 27 patients in whom implants had migrated to the maxillary sinus, symptoms of maxillary sinusitis were observed.
in 13 and dislocation to the ethmoid sinus in one. This indicates that implants which have migrated to the maxillary sinus should be promptly removed.

There have been a number of reports of ectopic teeth appearing in the maxillary sinus since the study of Dubois and Kohts, with more than 100 such cases being reported in Japan. Ectopic teeth are also sometimes found on X-ray examination, even when there have been no symptoms. Many cases, however, are discovered due to nasal symptoms, including nasal congestion, rhinorrhea, and nasal bleeding. As implant treatment has increased in popularity over recent years, reports have appeared of supernumerary or ectopic teeth in close proximity to the dental implant. Therefore, it is necessary to consider the risk of mutual infection between the implant and the ectopic tooth.

Here we report a case of a dental implant migrating to the maxillary sinus. Simultaneous removal of the dental implant and extraction of an ectopic tooth that had arisen in the same location were performed.

**Case**

The patient was a 73-year-old man who visited our hospital with the chief complaint of a migrated implant. His medical history revealed hypertension and spinal canal stenosis. In March 2014, he had undergone implant surgery to replace the first left maxillary molar at another clinic. The implant had subsequently migrated to the maxillary sinus. His dentist had immediately closed the wound, administered antibiotics, and requested implant removal to be carried out at the Tokyo Dental College Chiba Hospital. The patient visited this hospital the following day.

The intraoral observations obtained on his initial visit were as follows. The first and second molars of the left maxilla were missing, and a surgical wound in the first molar region had been sutured. No sinus-oral cavity fistula was observed. Moreover, no nasal symptoms such as nasal obstruction were observed. A panoramic X-ray image revealed that the dental implant had migrated to the floor of the maxillary sinus. A tooth-like structure was also observed posterior to the implant (Fig. 1).

Subsequently, CT imaging was conducted to verify the location of the implant and the state of the tooth-like structure within the maxillary sinus. The results confirmed that the implant had migrated into the maxillary sinus, and that there was a tooth-like structure in the vicinity of the posterior wall of the maxillary sinus floor. Close observation revealed that the crown of the tooth-like structure was mesially oriented. In addition, the root, which was in contact with the bone of the maxillary sinus floor, had a pulp cavity,
indicating that this was indeed a tooth with a crown and root (Fig. 2).

The patient said that he had not been advised of this tooth-like structure by his previous dentist, either pre- or post-operatively, and although the first and second left maxillary molars had been extracted, he had no recollection of the third molar being removed. Thickening of the sinus mucosa was observed where the implant had perforated the tissue. The ectopic tooth was observed in the submucosa of this area.

No cyst-like lesions were observed in the vicinity of the ectopic tooth. After taking the risk of infection due to the invasion of the implant into consideration, however, simultaneous extraction of the ectopic tooth and removal of the implant was recommended and patient consent obtained.

**Treatment and Clinical Course**

Simultaneous implant removal and ectopic tooth extraction in the left maxillary sinus were performed in April 2014 under general anesthesia. First, the mucoperiosteal flap was detached from the alveolar crest and reversed. The bone of the lateral wall of the maxillary sinus was then carefully separated from the mucous membrane. Next, a horizontal incision was made in the maxillary sinus mucous membrane to gain access to the inside of the sinus. The migrated implant had moved backwards in the maxillary sinus and was easily visible. The implant was grasped with forceps and removed (Fig. 3). For the impacted tooth, a fenestration in the wall of the maxillary sinus was slightly expanded, allowing the sinus mucosal bulge on the ectopic tooth to be clearly visualized. The tooth was then extracted by mucosal dissection. After tooth extraction, the lateral wall bone of the maxillary sinus was restored to its original position and the wound closed.

The removed implant had a major axis of 10 mm and was tapered (Fig. 4). The extracted tooth had a major axis of 12 mm and width of 8 mm. The coronal portion was coated with a translucent soft tissue. It was a single-root tooth, and the root was short (Fig. 5). The maxillary molars had already been extracted, so it was not possible to determine whether it was a third molar, a malposed supernumerary tooth, or tooth that had migrated during earlier tooth extraction.
To determine whether follow-up implant treatment was necessary, cone-beam CT imaging was performed at 2 months postoperatively (Fig. 6). No thickening of the maxillary sinus mucosa was observed at the site where the implant had migrated. Some slight thickening was still evident at the site from which the ectopic tooth had been extracted, however. On the whole, no significant abnormalities were observed in the maxillary sinus, and no subjective symptoms such as nasal problems were reported. Progress appeared to be satisfactory.

**Discussion**

In recent years, the range of cases in which dental implant treatment can be applied has widened due to the development of maxillary sinus-floor augmentation\(^{2,15}\) and short implants\(^{11}\). Such treatment can now be applied in patients who would previously have been poor candidates due to a lack of bone mass in the maxillary molar region. However, one serious potential problem with dental implantation in the maxillary molar region is migration of the implant into the maxillary sinus, where it would constitute nothing more than a foreign body of no benefit to the patient. Moreover, if not removed, there is the possibility that it will eventually cause maxillary sinusitis\(^{13}\). Therefore, it is necessary to remove a migrated dental implant as soon as possible.

Ectopic teeth in the maxillary sinus area are a relatively rare occurrence. According to a report by Tsujino and Yakushiji\(^{16}\), among 47 cases of ectopic teeth in the maxillary sinus, 42 were associated with cysts or an odontogenic tumor. Ramanojam et al.\(^ {12} \) mentioned that it is necessary to extract ectopic teeth associated with cysts and inflammation. In addition, there have been reports of ectopic teeth in the maxillary sinus or nasal cavity
being discovered due to an infection after a long asymptomatic period\textsuperscript{318}. Indeed, implant removal itself carries the risk of postoperative infection or maxillary sinusitis. Furthermore, postoperative infection or maxillary sinusitis have been reported to occur in 7.5\% of sinus lift procedures targeting previously uninfected mucosa\textsuperscript{30}. In the present case, the ectopic tooth had been asymptomatic for decades, and no pathological abnormalities such as cysts were observed. Therefore, follow-up was also another potential choice in this patient. However, there was some concern that implant removal might cause inflammation, resulting in infection of the ectopic tooth. Therefore, the decision was made to simultaneously extract the ectopic tooth and remove the migrated implant.

In removing implants which have migrated into the maxillary sinus and extracting ectopic teeth, it is common to gain access to the operative field through the oral cavity in accordance with the Caldwell-Luc method\textsuperscript{412}. In recent years, however, such procedures have also started to be performed taking a nasal route by using an endoscope due to advantages in preventing significant postoperative cheek swelling\textsuperscript{17}. However, it is difficult to extract an ectopic tooth from the natural ostium of the maxillary sinus using an endoscope. In one case, extraction was performed by puncturing the inferior nasal meatus side wall\textsuperscript{8}. In the present case, the position of the migrated implant changed, indicating that it was not attached to the maxillary sinus mucous membrane. Furthermore, as there was no significant thickening of the maxillary sinus mucous membrane, it was likely that the implant would have moved backwards in the maxillary sinus when washing in a supine position. As for extraction of the ectopic tooth, it was believed that access \textit{via} the maxillary sinus side wall would be easier. Removing the maxillary sinus lateral wall allowed visual contact with the implant, thus making its removal easier. Meanwhile, the ectopic tooth was accessed relatively easily by slight expansion of a fenestration in the lateral maxillary sinus wall. Observation may be indicated for ectopic teeth in the maxillary sinus, especially when there is no initial sign of disease or infection. However, if there is a risk of postoperative infection associated with implant removal, and if tooth extraction is easily possible, extraction should be considered.

In the present case, an ectopic tooth was discovered as a result of an implant migrating to the maxillary sinus. The present case emphasizes the need to carefully consider the surrounding anatomical structures in planning dental implant treatment.

\textbf{References}

5) Dubois S, Kohts O (1878) Krankheiten der Nase, Handbuch der Kinderkrankheiten, Dritter band zweite Halfte, Gerhardt's C, Verlag der H eds., p.27, Laupp'schen Buchhandlung, Tübingen. (in German)


Correspondence:
Dr. Yoshitaka Furuya
Department of Oral and Maxillofacial Implantology, Tokyo Dental College, 1-2-2 Masago, Mihama-ku, Chiba 261-8502, Japan
E-mail: furuya@tdc.ac.jp