Removal of an ectopic canine tooth in the maxillary sinus using bone lid technique

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Abstract

Objective: Ectopic teeth are teeth that are located deep in the jawbone or in other areas outside the alveolar bone, such as nasal cavity, chin, mandibular bone, palate, orbital cavity, and maxillary sinus. The presence of teeth in the maxillary sinus can cause an inflammatory reaction in the sinus and cause local sinonasal symptoms such as nasal obstruction, facial fullness, headache, hyposmia, and recurrent chronic sinusitis. Other rare symptoms include facial fullness, headache, hyposmia, and recurrent chronic sinonasal symptoms like nasal obstruction, rhinorrhea, nasolacrimal duct obstruction, and deviation of the nasomaxillary anatomy. The standard treatment for an ectopic tooth in the maxillary sinus is removal of the tooth because if it is left, it can develop into cyst formation.

Introduction

Ectopic tooth are teeth that are located deep in the jawbone or in other areas outside the alveolar bone. The etiology of ectopic teeth is unknown but it has been reported that the condition occurs as a result of several developmental disorders such as cleft palate, rhizogenic or odontogenic infection, genetic factors, or position displacement associated with trauma or dentigerous cyst surrounding the impacted tooth. An ectopic tooth eruption in non-dental areas is rare. The ectopic development of teeth in non-dental localizations have been reported in the nasal cavity, chin, mandibular bone, palate, orbital cavity and maxillary sinus. The tooth may be displaced into sinus due to trauma resulting in the displacement tooth bud, infection, crowding, or genetic factors. The presence of teeth in the maxillary sinus will cause an inflammatory reaction in the sinus and cause local sinonasal symptoms like nasal obstruction, facial fullness, headache, hyposmia, and recurrent chronic sinusitis. Other rare symptoms include epistaxis, fever, rhinorrhea, nasolacrimal duct obstruction and a deviation of the nasomaxillary anatomy. The standard treatment for an ectopic tooth in the maxillary sinus is removal of the tooth because if it is left, it can develop into cyst formation.

Surgery approaches to the maxillary sinus that can be used are the Caldwell-Luc technique or the Bone Lid technique. The Caldwell Luc technique is a surgical technique by making a hole on the anterior wall of the maxillary sinus, and in the Bone Lid technique, it involves the creation of a bone lid and allows the replantation of the bone lid after the procedure. The purpose of this paper is to report extraction of ectopic teeth in the maxillary sinus using the bone lid technique.

Case Report

A 9-year-old girl was referred to the Oral Surgery Department with chief complaints of pain in the right cheek and sniffles which were diagnosed as maxillary sinusitis. Radiographic examination showed that the canine tooth was located on the right maxillary sinus. The ectopic canine tooth was removed with a modified bone lid technique. The panoramic radiograph and Waters’ projection radiograph postoperatively showed there were no ectopic teeth in the sinus and no volumetric changes of maxillary sinus cavity. In the clinical evaluation of 1 month postoperatively, there were no complaints of pain and sniffles.

Conclusion: The use of the Bone Lid technique is beneficial because it maintains sinus volume, thus it does not disturb the function of the maxillary sinus.

Methods: A 9-year-old girl was referred from ENT clinic with complaints of pain in the right cheek and sniffles which were diagnosed as maxillary sinusitis. Radiographic examination showed that the canine tooth was located on the right maxillary sinus. The ectopic canine tooth was removed with a modified bone lid technique. The Caldwell Luc technique is a surgical technique by making a hole on the anterior wall of the maxillary sinus, and in the Bone Lid technique, it involves the creation of a bone lid and allows the replantation of the bone lid after the procedure.

The purpose of this paper is to report extraction of ectopic teeth in the maxillary sinus using the bone lid technique.

Keywords: Bone lid technique, Ectopic teeth, Maxillary sinus
DOI: 10.15562/jdmfs.v7i2.992
A CASE REPORT

Figure 1. Symmetrical face, there was no swelling in the extraoral and intraoral.

Figure 2. Panoramic radiography showed radiopaque lesion resembling a tooth at the right maxillary sinus.

Figure 3. Coronal and axial computed tomography of head showed a hypodense body resembling a tooth located in the anterior wall of the right maxillary sinus.

The right maxillary sinus Figure 2. Coronal and axial computed tomography (CT) of head showed a hypodense body resembling a tooth located in the anterior wall of the right maxillary sinus Figure 3. This body was considered as an ectopic canine tooth because of its location and morphology. The ectopic canine tooth has been removed by bone lid technique under general anesthesia. The surgical intervention began with a marginal incision in the maxillary vestibule of the region 11-16. The design of the window was on the anterior region of the maxillary sinus with the medial border at the distal of the appertura pyriformis, the posterior border at the crista zygomaticoalveolaris, the superior border below the infraorbital foramen, and the inferior border above the apex of right maxillary teeth (15-12). The maxillary bone was drill according to the design with a traditional rotary instrument (low-speed straight handpiece and fissure bur), the bone lid was removed so that the ectopic tooth in the sinus was identified. The bony segment was preserved in sterile saline. The ectopic tooth was located and removed with a forcep. The bony segment was repositioned and secured with an absorbable suture. After irrigation of the surgical field with sterile saline, the surgical flap was returned and sutured. The panoramic radiograph and waters’ projection radiograph postoperatively showed there were no ectopic teeth in the sinus and no volumetric changes of maxillary sinus cavity Figures 5A and Figure 5B. In the clinical evaluation 1 month postoperatively, there were no complaints of pain and sniffles.

Discussion

The presence of teeth in the maxillary sinus is a rare finding, and it is found accidentally on radiographic examination. Radiograph examination in this case showed that the ectopic canine tooth was in the anterior wall of the right maxillary sinus. The presence of teeth in the maxillary sinus will cause an inflammatory reaction in the sinus and cause local sinonasal symptoms like nasal obstruction, facial fullness, headache, hyposmia, and recurrent chronic sinusitis. Teeth in the maxillary sinus will cause chronic physical irritation of the sinus mucosa which causes mucociliary clearance insufficiency. The inflammatory response to tooth movement will also affect the condition of the maxillary sinus mucosa. This movement is regulated by various cytokines (epidermal growth factor, transforming growth factor-β, interleukin-1 and colony stimulating factor-1). Ectopic teeth that obstruct the sinus ostium and block flow within or through maxillary sinus will tend to disturb the ventilation and drainage and cause an increase in pressure, which can result in swelling and pain, thus induce a clinic of chronic sinusitis.

The standard treatment for ectopic teeth in the maxillary sinus is removal of the teeth, that is to remove the obstruction of the sinus ostium, and if it is left, it can develop into cyst. Surgery approach
A CASE REPORT

to the maxillary sinus usually uses the Caldwell-Luc technique. The Caldwell-Luc technique is a surgical technique performed by making a horizontal vestibular incision to gain sufficient access to the maxillary sinus and then making perforations through the anterior maxillary wall so the maxillary sinus cavity can be clearly seen. This procedure causes a permanent bone defect in the sinus wall; the greater the defect, the greater the reduction in sinus volume due to soft cheek tissue entering the maxillary sinus. Scar tissue invasion can also cause irritation and disturb the healing of the maxillary sinus.

Surgery on the maxillary sinus is also carried out by Lindorf with a new technique to use instead of the Caldwell-Luc technique. The Bone Lid technique involves the creation of a window on the anterior wall of the maxillary sinus and allows the replantation of the bone lid after the procedure. The window is cut in sinus maxillary wall using the wheel bur to make window shapes with bevel-shaped edges and osteoplasty is performed by replanting the bone fragments and then making the bone fragments buffer by placing a balloon that is inserted into the base of the antrum through antrostomy action. Replantation of the bone fragments can be modified by fixing the fragments with resorbable suture, wire, resorbable pins, and microplate.

In this case, the Bone Lid technique was used in the ectopic tooth removal because from CT examination the maxillary sinus wall was still thick.
and there was no bone destruction. The Bone Lid technique was modified by cutting a bone fragment using bur fissures. After the ectopic tooth was removed, the bone fragment was replanted to its original position with resorbable suture.

The Bone Lid technique has an advantage over the Caldwell-Luc technique because there are no defects in the maxillary sinus wall with the replantation of bone fragments in place. Therefore, it does not disturb the function of the maxillary sinus. The Caldwell-Luc technique produces permanent bone defects that can cause scar tissue to invade the maxillary sinus and reduce the volume of the maxillary sinus, thereby disrupting the normal physiology of the middle face. The Bone Lid technique requires special expertise and a longer operating time but offers more satisfying results.

**Conclusion**

The presence of teeth in the maxillary sinus can cause chronic maxillary sinusitis. Removal of ectopic teeth in the sinus is a standard treatment. The use of the Bone Lid technique is beneficial because it maintains sinus volume, thus it does not disturb the function of the maxillary sinus.

**Acknowledgment**

The authors would like to thank the patients who have been willing to share his case for reported and participated cooperatively in this study.

**Conflict of Interest**

The authors report no conflict of interest.

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