Management of the malposition tooth that was caused by dentigerous cyst associated with impacted supernumerary tooth by using an obturator

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Abstract
This report presents a case of eruption guidance for an upper right central incisor with a dentigerous cyst associated with an impacted supernumerary tooth in a 5-year-9-month-old boy. A swelling was seen in the region of an upper right central incisor. Radiographic examinations showed that a well-defined cystic lesion, containing an impacted supernumerary tooth crown in it, was located between the root of the primary upper right central incisor and a permanent upper central incisor germ. Under general anesthesia, the dentigerous cyst was removed at extraction of the upper impacted supernumerary tooth. And then, a socket was kept open wound. A histopathological examination confirmed the diagnosis of a dentigerous cyst associated with a supernumerary tooth. By using an obturator, we guided eruption of an upper right central incisor with malposition that was caused by the dentigerous cyst, and observed the way of the tooth eruption for two years and seven months. The obturator was inserted in the socket directly for three months until it was closed. After that, the obturator was used as only a removable space maintainer. Eight months after the operation, the obturator was removed because the upper left central incisor began to erupt. Two years and seven months after the operation, both upper central and lateral incisors had erupted completely. In this case, the obturator was used for expectation of natural eruption of permanent incisors, space maintenance and aesthetic recovery. The permanent incisors had been able to be guided to almost correct position without traction.

Key words
Dentigerous cyst, Eruption guidance, Obturator, Supernumerary tooth

Introduction
Dentigerous cysts are often encountered in daily clinical practice by pediatric dentists, and appear frequently in the regions of the mandibular premolars, upper incisors, and mandibular wisdom teeth. But it was reported that dentigerous cysts associated with supernumerary teeth are rare. Moreover, in younger children, the report of the dentigerous cyst associated with supernumerary teeth is fewer. In these cases, dentigerous cysts should be removed or be marsupialized for treatment. However it has some difficulties to do those treatments in pediatric dentistry, because some patients are uncooperative for earlier age, or some patients in mixed dentition period needing eruption guidance. Nevertheless it is necessary to treat correctly with those cases in order to develop the normal permanent dentition.

In this case, we treated a 5-year-9-month-old boy with a dentigerous cyst caused by an impacted supernumerary tooth. The dentigerous cyst was removed at extraction of the upper impacted supernumerary tooth, and the socket was kept open wound. By using the obturator, we guided eruption of the upper right central incisor with malposition caused by dentigerous cyst. And then we observed for two years and seven months.
Case Report

A 5-year-9-month-old boy was referred to Fukuoka Dental College Hospital Department of Pediatric Dentistry from another dental office for examination of swelling in the region of upper right central incisor on February 12, 2006. His primary upper left central incisor and already erupted supernumerary tooth were extracted at that dental office before reference to our department on July 8, 2005. Afterwards, he took a painless swelling in the region of an upper right central incisor. Finally the dentigerous cyst and another impacted supernumerary tooth had been suspected as a result of the X-ray examination on January 30, 2006 (Fig. 1A, 1B).

Oral findings

Small swelling was found in the gingival area at the apical point of primary upper right central incisor. It was Parchment-like by the palpation (Fig. 2).

X-ray findings

The cyst surrounded the upper median impacted supernumerary tooth crown. The root of primary upper right central incisor was resorbed like circular arc (Fig. 1A, 1B). The upper left central incisor was excluded up by the cyst. The maxilla showed swelling at the labial and palatal side. The cortical bones were thin (Fig. 3A). The upper left central incisor and the upper right lateral incisor were very near the cyst, and were pushed aside to distal side.
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**Treatment**
Surgical operation was performed under general anesthesia. The primary upper right central incisor was extracted. The dentigerous cyst and the impacted supernumerary tooth which had incomplete root were removed together (Fig. 4A, 4B, 4C). The socket of the extracted tooth was kept open wound (Fig. 4D, 4E, 4F). Next day, an obturator was inserted to the
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socket for eruption guidance of an impacted central incisor with malposition (Fig. 5A, 5B, 5C). After the stitches had been removed, we did the passage observation while adjusting the obturator every month until the dislocated tooth came to erupt.

**Histopathology**

The impacted tooth crown was included in the cyst. The enucleated cyst wall was submitted to histological examination. The cyst was composed of the fibrous connective tissues with some squamous epithelial linings. The inside of the cyst walls were covered with some non-keratinized stratified squamous epithelial cells. The fibrous connective tissues were admitted under the epithelial lining, and the boundary with the epithelial lining was smooth and plain. The fibrous connective tissues were rough in the epithelial side, and those were dense in the other side. There were some lymphocyte cells in the fibrous connective tissues, but inflammatory cellular infiltration in epithelium of dentigerous cyst was not admitted (Fig. 6A, 6B). If the cyst associated with

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**Fig. 5** An obturator and oral photographs on it
(A, B) An obturator, (C) Front view, (D) Palatal view

**Fig. 6** Pathological examination
(A)×100, (B)×400
apical inflammation of the treated primary tooth, the lining epithelium should have showed infiltration of inflammatory cells mainly composed of lymphocyte and plasma cells. In this case, though the primary upper right central incisor near the cyst was given root canal treatment, infiltration of inflammatory cells was not confirmed. The histopathological findings confirmed the diagnosis of a dentigerous cyst associated with an impacted supernumerary tooth.

**Postoperative progress**

One month after the operation, the upper right central incisor was located supraversion in the alveolar bone though there was still big space between the upper central incisors (Fig. 7A). The obturator was grinded because upper labial frenum has slightly inflammation. Three months after the operation, the socket was closed. The obturator was grinded completely and used as only a removable space maintainer. Eight after the operation, the upper right central incisor was heading to mesial side in the alveolar bone. The obturator was removed because the upper left central incisor began to erupt (Fig. 7B). One year and three months after the operation, the upper right central incisor began to erupt, too (Fig. 7C). Until...
A dentigerous cyst is a developmental odontogenic cyst which originates through alterations of the reduced enamel epithelium in an unerupted tooth after the crown has been fully formed. Most of typical examples are those associated with the third molar teeth of the mandible, followed by maxillary canines and premolars of both maxilla and mandible. Although the ratio of supernumerary teeth is not low among impacted teeth, only a few cases on the association of dentigerous cysts with supernumerary teeth have been reported. Supernumerary teeth constitute about 5–6% of all dentigerous cysts. Approximately 95% of dentigerous cysts involve the permanent dentition, and approximately 5% are associated with supernumerary teeth\(^1\). It is said that supernumerary teeth are seldom to associate with dentigerous cysts, which are not common in the first decade of life\(^1,2,5,7\). Generally, if the operation itself would not cause postoperative morbidity, dentigerous cysts should be enucleated\(^8,9\). Large dentigerous cysts should be marsupialized if enucleation and tooth removal might result in the destruction of the nerve and blood supply to adjacent teeth. Because the teeth involve adjacent anatomic structures, such as the maxillary sinus, the nasal cavity, or the orbital cavity, involve major neurovascular bundles, such as the inferior alveolar one, or possibly result in the fracture of the mandible. Almost, dentigerous cysts, large or small, that contain the crowns of teeth which can serve a useful purpose should be marsupialized, and with orthodontic aid the teeth should be moved into the dental arch in pediatric dentistry\(^10–12\).

In this case, the dentigerous cyst caused permanent teeth germ malposition. After the removal of the dentigerous cyst and the impacted supernumerary tooth, the obturator was used for eruption guidance of the permanent incisors. In such a case, although a drain might was usually selected, we would select the obturator because of the following reasons; (1) It was only difficult for the children to go to hospital regularly many times for a drain exchange. (2) Aesthetic recovery was necessary to the premature loss of the primary central teeth. (3) The patient and his family were cooperative. And then, we had observed the permanent teeth with malposition that was caused by the dentigerous cyst for two years and seven months. Usually, in using a drain, the patient needed to go to hospital regularly every two or three days for exchange the drain until the socket would be closed. But in this case, for three months while the obturator was inserted in the socket, the patient needed to go to the hospital only once a month. We told the patient to use the obturator as usual removal space maintainer, to wear all day long and keep it clean. It is thought that an obturator has the following merits; (1) A drain exchange is unnecessary because the obturator can be inserted in the socket directly. (2) An obturator is made after impression taken, so it hardly gives the sense of incongruity. (3) It can be easily treated relatively. (4) An obturator has both functions of space maintenance and aesthetic recovery together. On the other hand, it has some difficulties with adjustment of an obturator and cooperation of the patient\(^13,14\). And also it is very important to be cared enough with an obturator at home in order not to get infection. Though an obturator has some demerits like this, it is thought that an obturator is suitable for eruption guidance of impacted permanent teeth in mixed dentition period. In this case, the obturator was used for expectation of natural eruption of permanent incisors, and the permanent incisors were able to be guided to almost correct position without traction.

**References**

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