

## CASE REPORT

# Eruption disturbance in first molar and primary second molar caused by multiple compound odontomas: a case report

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**Abstract**

Odontoma is an occasionally encountered condition that disturbs the eruption of adjacent teeth. Few reports have described multiple odontomas occurring at two adjacent sites, resulting in eruption disturbances of both primary and permanent teeth. An 8-year 2-month-old boy was referred to our hospital. Oral examination revealed that the maxillary left first molar and primary second molar were absent, and radiographic examination showed multiple compound odontomas in two regions near these unerupted teeth. The first molar gradually erupted after removal of the odontoma and excision of overlying gingiva around the tooth crown. The maxillary left second premolar spontaneously erupted at 9 years 6 months of age, but the impacted primary second molar and surrounding odontoma were located near the bottom of the maxillary sinus. The treatment plan was required to consider the completion of second premolar root development, followed by removal of the impacted primary second molar and remaining odontomas. In this case, the multiple odontomas were suspected to have disturbed the eruption of both primary and permanent teeth, and the degree of positional abnormality varied between the two teeth. This case report suggests the importance of early detection and treatment of teeth with odontoma-induced eruption disturbances.

**Keywords**

Odontoma; Failure of primary tooth eruption; Impacted tooth; Child

## 1. Introduction

Disorders/disturbances of tooth eruption can be broadly classified as time-related or position-related. Time-related disturbances include premature eruption and delayed eruption, whereas position-related disturbances include transposition and ectopic eruption [1]. In the mixed dentition, disturbances of tooth eruption have been associated with factors such as premature loss (or retention) of primary teeth, ankylosis, trauma and arch length deficiency [2]. Odontomas are odontogenic tumors that can be classified as compound or complex [3, 4]. Compound odontomas are diminutive tooth-like structures, whereas complex odontomas are haphazard aggregates of enamel and dentin [4]. Odontomas can also be associated with disturbances of tooth eruption [5]. Therefore, disturbances of tooth eruption require careful assessment of these risk factors and early appropriate treatment.

The etiology of odontoma is unknown, although their development has been implicated in some pathological conditions as trauma, infection, hereditary syndromes (e.g., Gardner's syndrome), and gene alterations that might result in an abnormal pattern of morphodifferentiation of cells that give rise to

ameloblasts and odontoblasts [6]. Treatments for teeth with odontoma-induced eruption disturbances may require surgical removal of the odontoma, excision of overlying gingiva, and/or guidance of orthodontic eruption [7].

Although odontomas have been described, to our knowledge, there have been no reports of multiple odontomas causing eruption defects in both adjacent primary and permanent teeth. We encountered a rare case of a patient with eruption disturbance of the maxillary left first molar and primary second molar due to multiple odontomas. This report describes the management protocol with respect to the surgical procedure and observation of impacted permanent tooth eruptions.

## 2. Case report

An 8-year 2-month-old Japanese boy was referred to the Pediatric Dentistry Clinic of Hiroshima University Hospital with the chief complaint of delayed eruption of upper left back teeth. He had been diagnosed with delayed eruption of the left primary second molar at 3 years of age and was undergoing follow-up at a private clinic with only clinical observation; however, the left primary second molar had not erupted. A

radiographic examination revealed calcified tissue resembling an odontoma, and the patient was referred to our hospital. His medical history was unremarkable except for allergic rhinitis and nursemaid's elbow (radial head subluxation). Nursemaid's elbow is a common injury in young children, where radial head slipping under the annular ligament leads to pain and inability to supinate the forearm [8]. He had no relevant family history.

Intraoral examination showed that the maxillary left primary second molar and permanent first molar were unerupted (Fig. 1). The mandibular left first molar was slightly overerupted and in contact with the opposing gingiva. Radiographic examination showed that multiple calcified tissues were present near the maxillary left molar region (Fig. 2). In addition, congenital absence of the mandibular left second premolar was detected. Cone-beam computed tomography images were obtained for a more detailed examination.

The cone-beam computed tomography findings revealed that the maxillary left primary second molar was impacted near the maxillary sinus and that the root was curved along the lower edge of the sinus (Fig. 3). Multiple calcified tissues were detected in two regions near the crown of the maxillary left primary second molar and permanent first molar, causing the eruption disturbance. Interestingly, the second premolar was positioned immediately below the alveolar bone, replacing the primary second molar.

We diagnosed the multiple calcified tissues as compound odontoma, considering the occurrence of multiple tooth-like structures. The first-choice treatment was to promote the eruption of the permanent first molar, and only the odontoma near its crown was extracted in the department of oral surgery. The surgical approach comprised making an incision on the

alveolar crest, removing the bone covering the odontoma, and extracting and suturing in the standard manner. A panoramic radiograph taken at 8 years 10 months of age revealed disappearance of the odontoma near the first molar (Fig. 4A); however, the permanent first molar had not erupted, and its position was unchanged (Fig. 4B). Therefore, the gingiva was surgically excised to expose the surface of the crown (Fig. 4C). We continued follow-up, and the first molar gradually erupted in the oral cavity (Fig. 5). In addition, the second premolar erupted at 9 years 6 months of age, and it showed partial hypoplasia (Fig. 6). Although the maxillary first molar showed a mesial inclination, occlusion with the mandibular first molar was observed.

At 9 years 9 months of age, there was no recurrence of the odontoma near the first molar; however, the primary second molar was impacted and the odontomas near the crown of the tooth were still present (Fig. 7). Because the root of the second premolar was immature, extraction of the primary second molar and odontoma at this time might have damaged the second premolar root formation. Therefore, long-term follow-up was initiated. In the future, we will consider a surgical approach while observing the root formation, impacted tooth and odontoma.

### 3. Discussion

The Fédération dentaire internationale (FDI) World Dental Federation defines minimum intervention as a "preventive philosophy, individualized risk assessments, accurate, early detection of lesions and efforts to remineralize non-cavitated lesions with the prompt provision of preventive care in order



FIGURE 1. Intraoral photographs at 8 years 2 months of age.

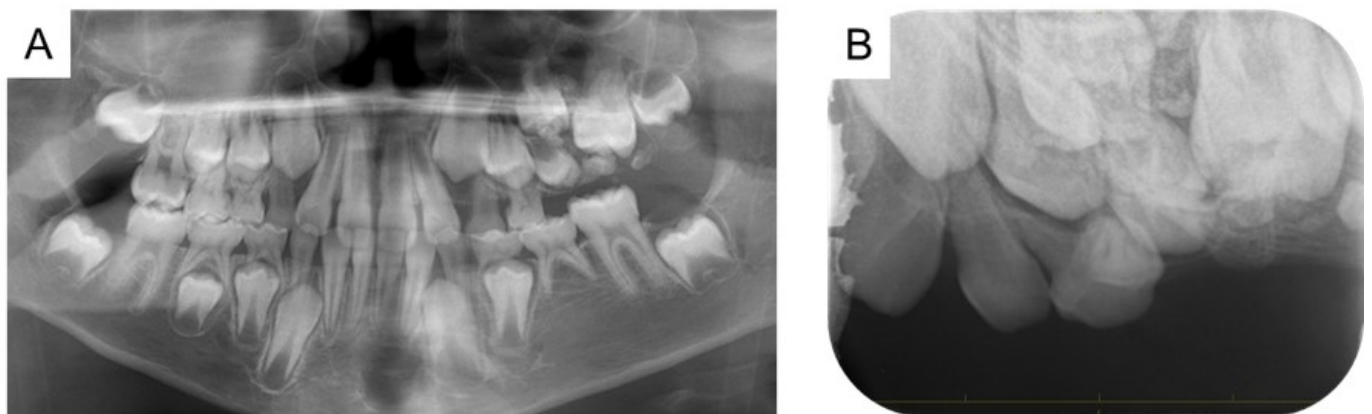
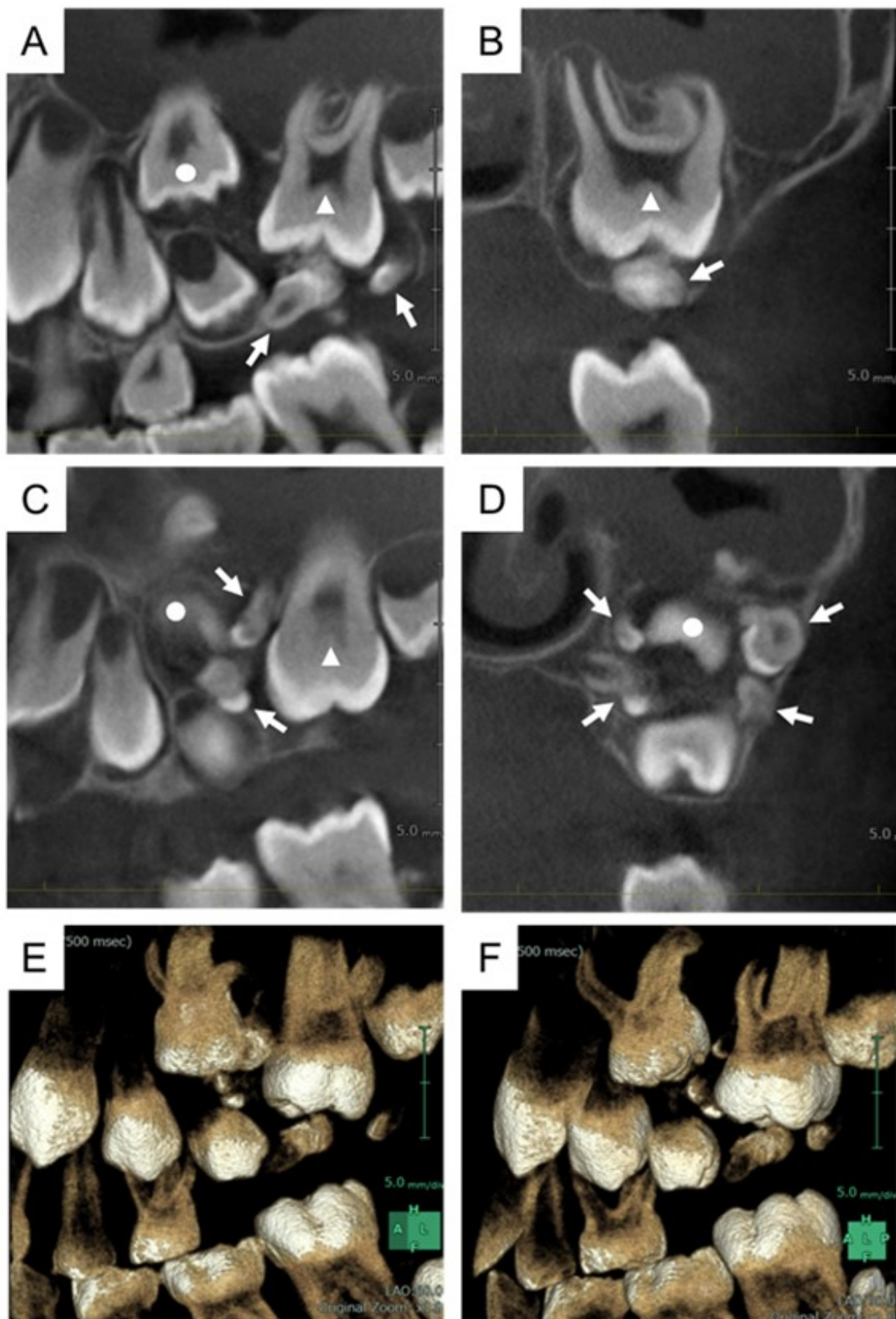
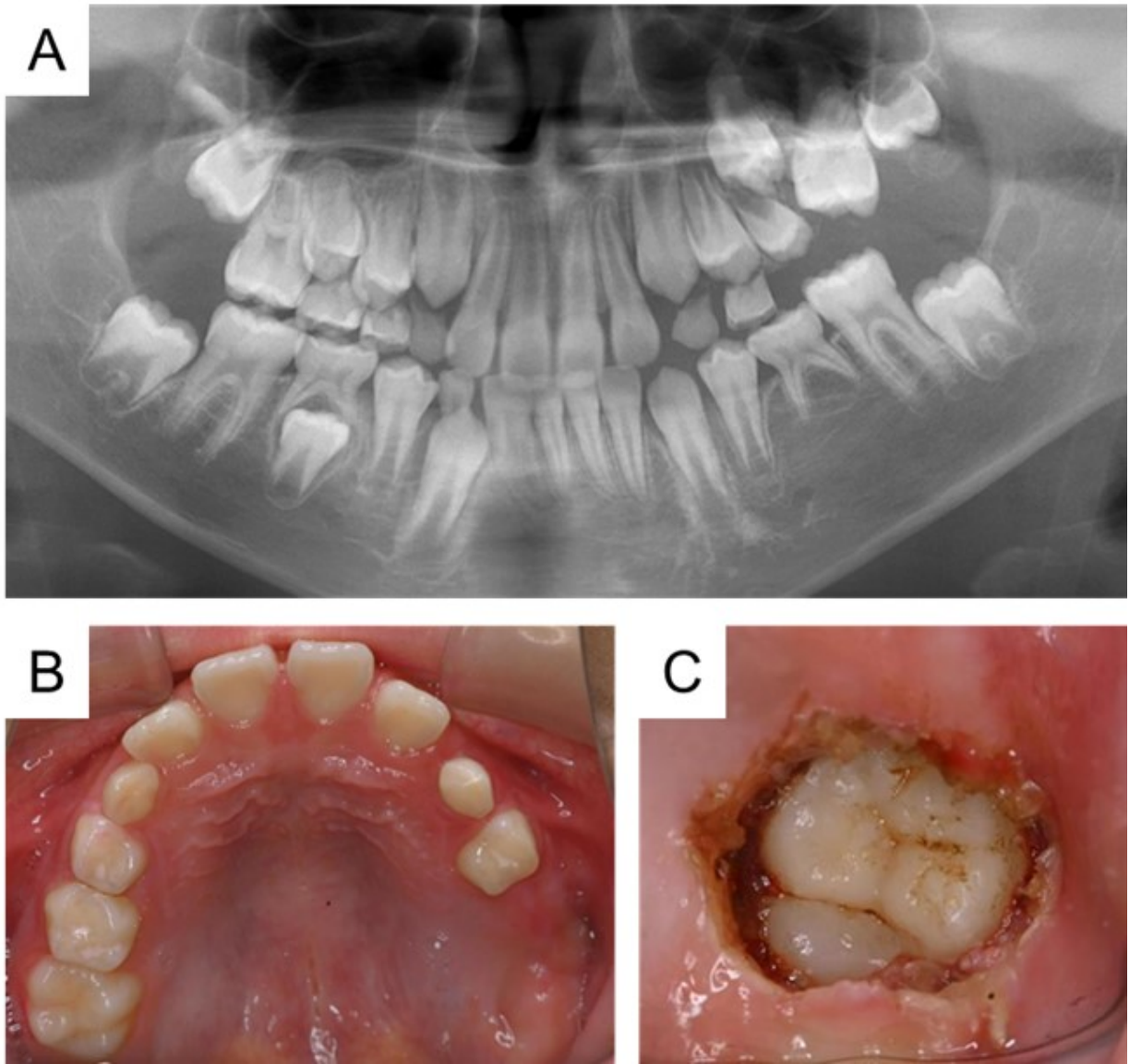


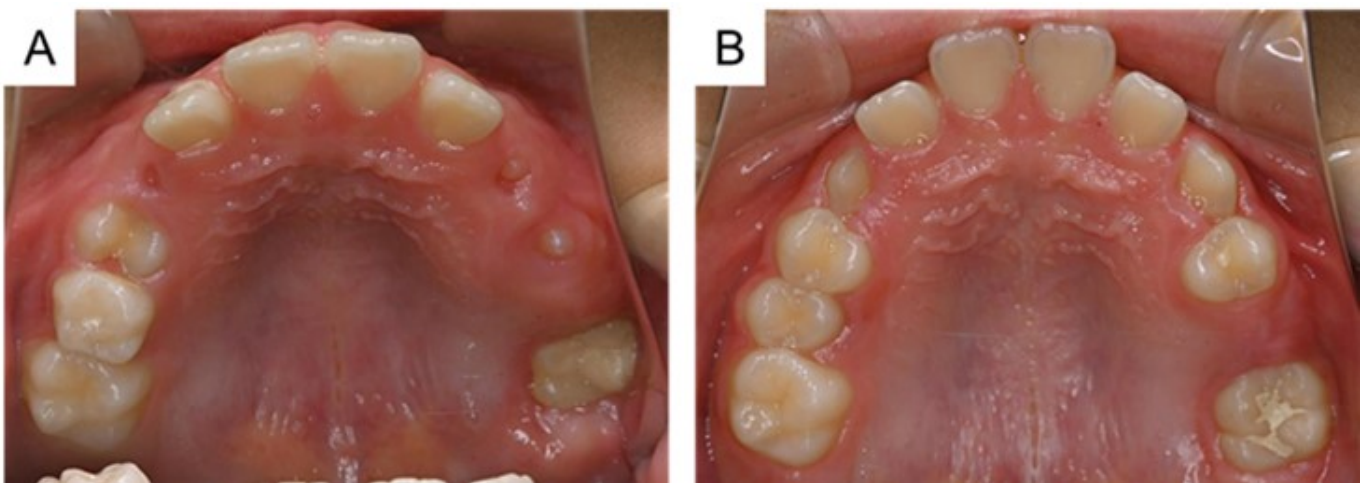
FIGURE 2. Panoramic and periapical radiographs at 8 years 2 months of age showing calcified tissue resembling odontomas. (A) Panoramic radiograph. (B) Periapical radiograph around the maxillary left molars.



**FIGURE 3.** Cone-beam computed tomography images obtained at 8 years 2 months of age. Odontomas near the first molar (A,B) and primary second molar (C,D). Arrows indicate the odontomas, arrowheads indicate the first molar, and white circles indicate the primary second molar. (A) and (C): sagittal section, (B) and (D): coronal section. (E,F) Three-dimensional construction images.



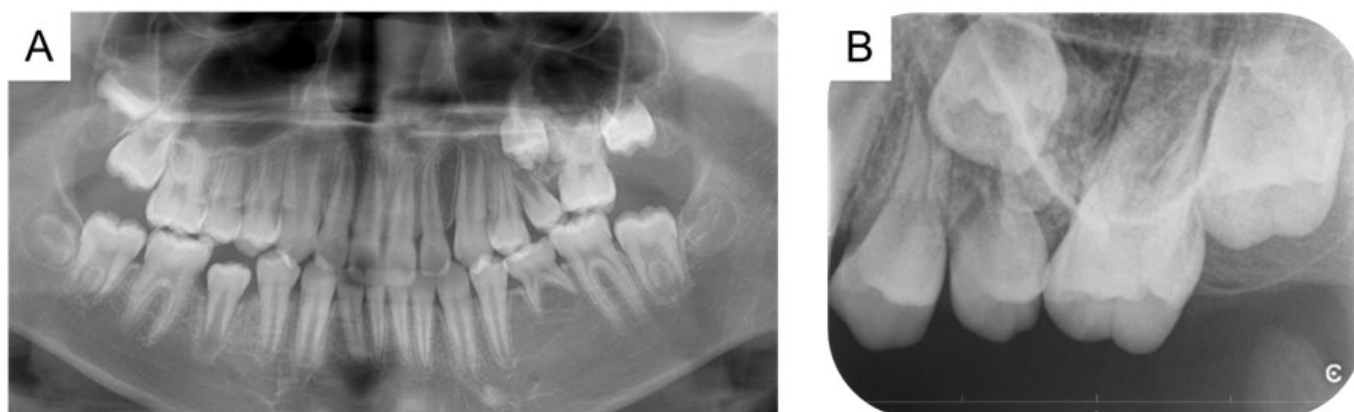
**FIGURE 4.** Fenestration of the first molar at 8 years 10 months of age. (A) Panoramic radiograph. Intraoral photographs before (B) and after (C) surgical exposure.



**FIGURE 5.** Intraoral photographs obtained in the postoperative period. (A) One month after surgical exposure creation (8 years 11 months of age). (B) Four months after surgical exposure creation (9 years 2 months).



**FIGURE 6.** Intraoral photographs at 9 years 6 months of age.



**FIGURE 7.** Radiographic examination at 9 years 9 months of age. (A) Panoramic radiograph. (B) Periapical radiograph around the maxillary left molars.

to minimize operative intervention” [9]. The concept does not apply only to dental caries management but can also be applied to various dental areas including restorative care and oral health preservation [9]. In the present case, the eruption of both primary and permanent teeth was disturbed by odontomas. After removal of odontoma in such patients, the impacted teeth may erupt spontaneously [10]; however, orthodontic treatment is sometimes required [7, 11]. Fortunately, eruption of the impacted teeth into the oral cavity occurred in our patient without orthodontic traction and with only minimal intervention by a surgical approach.

Radiographic examination revealed multiple calcified tissues in two regions near these unerupted teeth. Differential diagnoses included calcifying epithelial odontogenic tumor, complex odontoma or compound odontoma [3]. Concerning radiographic features of calcifying epithelial odontogenic tumor, most cases are unilocular and become mixed radiolucent-radiopaque after maturation and expansion [12]. In contrast, radiographic features of odontomas are considered diagnostic: tooth-shaped structures surrounded by a radiolucent zone are evident in compound odontoma, whereas a radiodense mass with a radiolucent zone is evident in complex odontoma [4]. In the present case, there were no obvious unicystic findings; thus, calcifying epithelial odontogenic tumor was excluded. Additionally, the calcified tissue exhibited multiple tooth-like structures, supporting a diagnosis of compound odontoma. Findings at the time of extraction were also consistent with a diagnosis of compound odontoma. No neoplastic lesion was suspected; therefore, no histopathological examinations were

performed.

In 2018, Preoteasa and Preoteasa [11] reported that whether teeth with delayed eruption erupt spontaneously after odontoma removal may be related to the patient’s age at the time of odontoma removal or related to an associated bone modification [11]. The maxillary first molars erupt in Japanese males at  $7.24 \pm 1.35$  years of age [13]. Our patient was 8 years 2 months old at the first visit, which is within the 95% confidence interval (4.59 to 9.89 years). Therefore, we considered that the maxillary first molar may spontaneously erupt after removal of the odontoma near the crown of the tooth. However, no eruption of the maxillary left first molar was observed during the 8-month follow-up period after removal of the odontoma, and we excised the gingiva around the crown of the first molar. The first molar erupted into the oral cavity with little intervention because the timing of surgical treatment was not delayed and there were no ankylosis or other bone problems. In addition, the maxillary left second premolar, which may have been affected by the odontoma, erupted spontaneously at the age of 9 years 6 months.

In 2013, Hashim *et al.* [14] reported a case in which the maxillary primary second molar was impacted due to an odontoma. The impacted primary second molar was pushed very close to the floor of the maxillary sinus, and the second premolar was located on the oral cavity side compared with the primary second molar, as in the present case. Therefore, the period of odontoma formation may affect the tooth development process, resulting in abnormal positioning of the successor permanent and primary teeth.

In the present case, the maxillary left primary second molar had never erupted. According to a survey of the Japanese Society of Pediatric Dentistry, the maxillary primary second molars erupt in Japanese males at  $2.47 \pm 0.44$  years of age [15]. Therefore, the odontoma near the primary second molar in our patient might have formed before the age of 3 years and thus disturbed the tooth eruption. If the odontoma had been detected and extracted at that point, the impacted primary second molar might have erupted into the oral cavity. Therefore, dentists who encounter similar cases must consider appropriate treatment at a younger age or early referral to a pediatric dental specialist when the dental condition is difficult to treat. Additionally, calcified tissues (*e.g.*, odontoma or supernumerary tooth) do not exhibit obvious changes until eruption. Therefore, it is important to continue follow-up, including radiographic examinations, until permanent teeth in that region are fully erupted [16].

The maxillary left second premolar showed partial hypoplasia; however, the absence of hypoplasia in the patient's other teeth indicated localized hypoplasia at this site. There was no history of dental trauma, and the primary second molar could not erupt after birth; therefore, dental caries also had a negative impact. Second premolar crown formation is complete around 6 to 7 years of age [17]; there was no relationship with the surgical intervention at 8 years and 2 months. Furthermore, the second premolar naturally erupted after odontoma extraction; the odontoma may have disturbed tooth development and contributed to partial hypoplasia.

There are two main limitations in the present case. First, at the time of this writing, the primary second molar and the odontoma near the tooth had not yet been extracted. At the age of 9 years 9 months, the root of the left second premolar was immature, and the primary second molar and odontoma were not extracted because of the risk of damaging the root of the premolar. We are continuing to follow-up the patient, and extraction will be carefully considered in future. Second, intraoral examination showed mesial inclination of the maxillary left first molar. The patient had no masticatory disturbance or esthetic dissatisfaction; therefore, orthodontic treatment will be considered according to the wishes of the patient and parents during follow-up.

## 4. Conclusions

We encountered a patient with eruption disturbances of both primary and permanent molars caused by multiple odontomas. The severity of the positional abnormalities due to the odontomas differed between the primary and permanent teeth and may have been caused by differences in the timing of the intervention relative to the normal tooth eruption period. This suggests that removal of an odontoma at the appropriate time may reduce the burden on the patient and require minimal intervention. Our case report suggests the importance of early detection and treatment of teeth with eruption disturbances caused by odontoma.

## AVAILABILITY OF DATA AND MATERIALS

Not applicable.

## AUTHOR CONTRIBUTIONS

TA—conceptualization, writing-original draft preparation; TA, YI, AK and TN—attending dentists; MO, MU, MK and SK—intraoral photography; RN—writing-review and editing; CM and RN—supervision. All authors contributed to editorial changes in the manuscript. All authors read and approved the final manuscript.

## ETHICS APPROVAL AND CONSENT TO PARTICIPATE

This study was granted an exemption from requiring ethics approval by the “Ethical Guidelines for Medical and Biological Research Involving Human Subjects Guidance (<https://www.mhlw.go.jp/content/001237478.pdf>)” formulated by Ministry of Education, Culture, Sports, Science and Technology, Ministry of Health, Labour and Welfare, and Ministry of Economy, Trade and Industry. Informed consent was obtained from the parents of the patient for publishing this case report.

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## CONFLICT OF INTEREST

The authors declare no conflict of interest.

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