

Decompression for Unerupted Primary Mandibular Second Molars Associated with Physical Barriers: Case Reports

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Primary impaction of primary teeth might be due to genetic predisposition or physical disturbance including odontoma, supernumerary tooth, and crowded tooth. Among them, calcific deposit or odontoma is commonly associated with primary dentition. Early diagnosis and treatment is the key to prevent complications. However, results of treatment may vary depending on the condition of unerupted tooth. Here we report two clinical cases of unerupted primary mandibular second molars with physical barriers such as compound odontoma and calcific deposit focusing on diagnostic means and the importance of early treatment of these lesions.

Key words: Odontoma, Decompression, Impacted tooth

INTRODUCTION

Impacted tooth refers to situation when a tooth fails to erupt due to mechanical blocking or genetic predisposition. It remains unerupted beyond the normal time of eruption.¹ Uneruption of tooth can be caused by physical disturbance including odontoma, supernumerary tooth, dental follicle, and crowded tooth.¹⁻⁴ Among them, calcific deposit or odontoma is rarely associated with primary teeth compared to permanent edentition.⁵

An odontoma is the most common benign tumor of odontogenic origin.⁶ Its occurrence in primary dentition is extremely rare.^{7,8} When it is associated with primary teeth, multiple complications can occur as a result of the impacted tooth, including loss of space, opposing teeth elongation, abnormal eruption path, impaction and rotation of permanent successor, and tipping of neighboring teeth.⁹ Therefore, early diagnosis and treatment is the key to prevent these complications.^{10,11} Treatment options for unerupted tooth include observation, intervention including surgical decompression and orthodontic traction, and extraction.^{12,13}

Unerupted teeth are usually involved in permanent dentition, not primary dentition.^{7,8} The prevalence of primary molar impaction is

not well known yet¹⁴. However, Bianchi *et al.*¹⁵ have reported that the prevalence of primary impaction is 1/10,000, suggesting that ankylosis probably has a leading role in its etiopathogenesis. Recently, many studies have reported that the most common impacted tooth associated with odontoma is anterior primary tooth.^{9,16-19}

Here we report two cases of unerupted primary mandibular second molars with physical barriers showing different outcomes for decompression. We also discussed a few similar reports reported in the literature.

Case report

Case 1

A 43-month old girl visited our pediatric dental clinic with a chief complaint of unerupted primary molar. The patient did not have family history of genetic disorder. There was no history of medical or dental diseases (including trauma and infection of mandible and teeth). On oral screening, there was an unerupted right lower primary molar. The opposing tooth was moderately elongated. On her panoramic radiograph, the periodontal ligament of right lower primary molar showed normal lamina dura. There was defect of succeeding permanent tooth (Figure 1-A). There also was dentigerous cyst-like lesion around the right lower primary molar with subtle calcified deposit above it. For further evaluation, cone beam computed tomography (CBCT) was performed and 2 mm definite calcified focus was noted (Figure 1-B and 1-C). Treatment plan was established to minimize the extrusion of opposing teeth and alveolar bone loss due to infraocclusion of primary molars and ankylosis.

Decompression was performed to guide spontaneous eruption of the tooth. The removed mass was subjected to histopathologic examination. Histological finding appeared to be normal except that calcified tissue was noticed. To prevent extrusion from the elongation of the opposing tooth, resin splint fixation was performed. We recommended regular image follow up.

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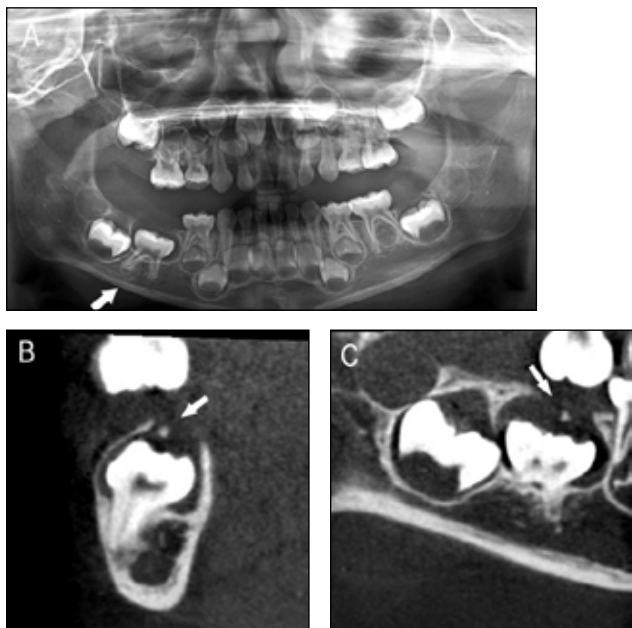
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Fig. 1. Case 1, A 43-month old girl. On her first visit, the non-erupted state of the right mandibular primary molar is shown. (A) Panoramic view showing that the right mandibular primary molar has not erupted. (B) Cone beam computed tomography (CBCT) of coronal plane showing the crown of the right mandibular primary molar is surrounded by a well-defined radiolucent lesion. (C) CBCT of sagittal plane showing calcific deposits above the right mandibular primary molar.



One month after decompression, there was spontaneous eruption of impacted tooth (Figure 2-A). At the 7th month follow up, the tooth reached normal occlusal level gradually (Figure 2-B and 2-C).

However, the erupted tooth was inclined to the lingual side at approximately 45 degrees. We waited for two months to let the tooth correct itself in place spontaneously by tongue force. However, there was no significant improvement. We decided to perform orthodontic treatment.

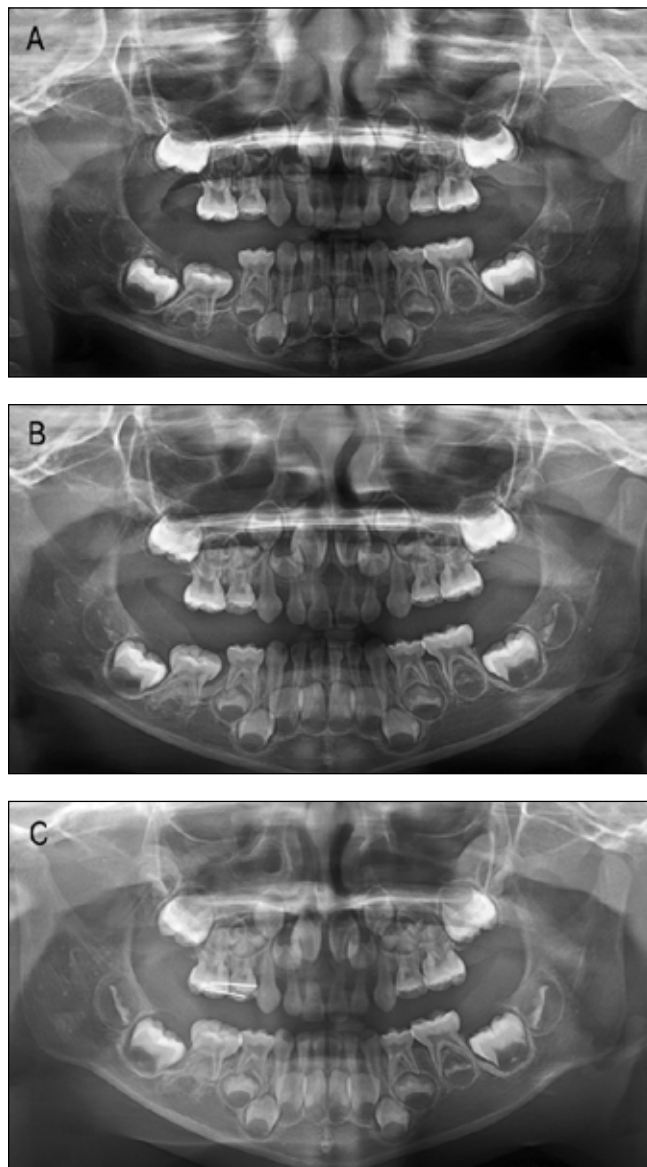
First, resin splint fixation of the opposing tooth was removed to apply orthodontic treatment. After that, Nance holding arch was delivered and the button was attached to the lingual side of the lower right primary molar. The orthodontic treatment lasted for 3 months. The tooth is gradually moving to its normal position now.

Case 2

A 55-month old boy was brought to our pediatric dental clinic with a chief complaint of unerupted primary teeth. There was no history of medical or dental diseases (including trauma and infection of mandible and teeth). On oral screening, primary mandibular second molars was not erupted (Figure 3-A). The opposing tooth was moderately elongated.

Radiologic examination revealed compound odontoma above the primary mandibular second molars. Impacted tooth was diagnosed as dentigerous follicular cyst (Figure 3-B and 3-C). While tooth germ of permanent tooth was not found, root of the primary mandibular second molar was curved, showing hook appearance along the lower mandibular margin with ankylosis of the lower mandibular cortex (Figure 3-D).

Fig. 2. Case 1, Radiographic views after decompression on the right mandibular primary molar. (A) One month later, the right mandibular primary molar had erupted slightly. (B) Three months later, the right mandibular primary molar moved to occlusal surface moderately. (C) Seven months later, the right mandibular primary molar reached occlusal level.



For treatment, compound odontoma was removed and decompression was performed (Figure 4-A and 4-B). Specimens were subjected to histopathologic examination which confirmed the diagnosis of compound odontoma. Wire fixation was performed to prevent the eruption of the opposing tooth.

Clinical and radiologic follow up examinations were performed up to 7 months to observe the spontaneous eruption process. However, the impacted tooth failed to show spontaneous eruption. Since the patient's guardian refused orthodontic treatment, extraction was performed to prevent the tipping of neighboring teeth and alveolar bone loss.

Fig. 3. Case 2, A 55-month old boy. (A) Intraoral view of his first visit showing that his lower right primary molar is not erupted. (B) Panoramic view showing that the right mandibular primary molar has not erupted and the opposing tooth is elongated. (C) Periapical standard view showing that the crown of the right mandibular primary molar is surrounded by a well-defined radiolucent cyst with compound odontomas above it. (D) CBCT sagittal plane showing that the mesial root is curved with hook appearance and ankylosis (arrow) of subjacent mandibular cortex.

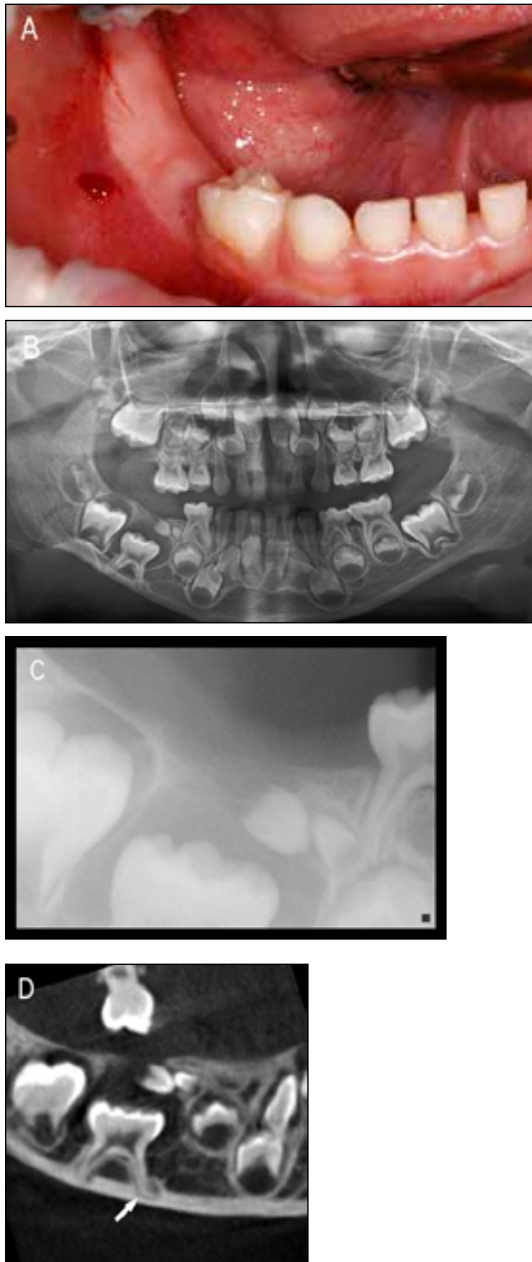


Fig. 4. Case 2, Decompression procedure. (A) Immediate post procedural oral view showing the unerupted tooth. (B) Three removed odontomas.

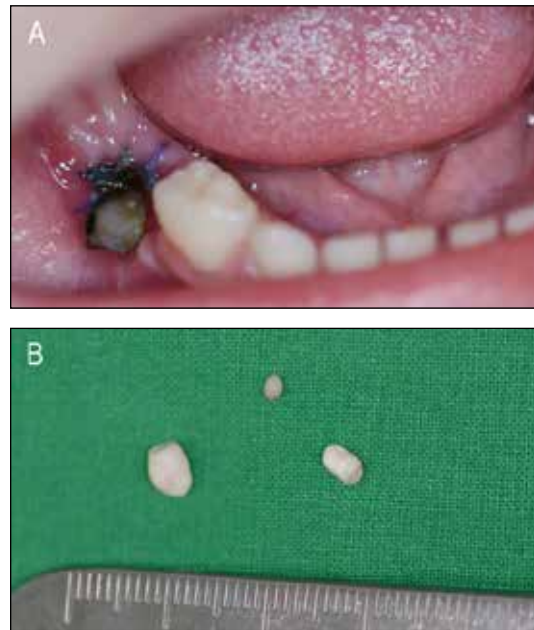


Fig. 5. Case 2, Serial radiographic views at follow up after decompression on the right mandibular primary molar. (A) One month later, the right mandibular primary molar is still impacted. (B) Seven months later, the right mandibular primary molar is still impacted without interval change. (continued on next page)

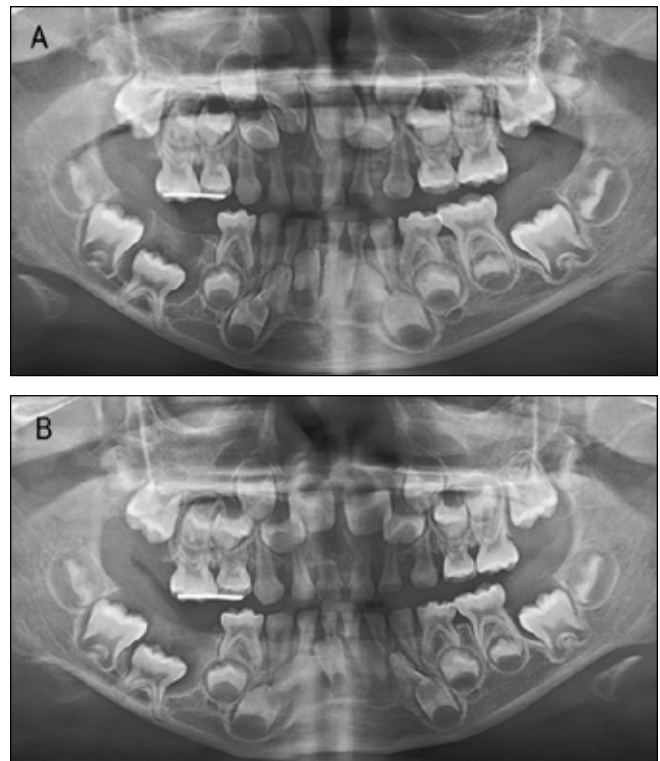


Figure 5 (C) Immediately post the procedure showing that the tooth is extracted and the dilacerated root is fractured.



DISCUSSION

Impacted teeth are usually involved in permanent dentition. Uneruption of primary dentition is rare.^{7,8} Known causes of eruption failure include growth disorder, failure of genesis, ankylosis, traumatic injury, odontoma, supernumerary tooth, dental follicle, and crowded tooth.¹⁻³ Among them, odontoma is a common cause in terms of impaction of primary teeth.⁹ Precise diagnosis of physical barrier is important for treatment planning. In primary dentition, the degree of calcification of calcific mass is sometimes less than is seen compared to permanent teeth. Therefore, radiographic features can be weakly radiopaque. Hence, previous reports have recommended careful examination of radiographs.²⁰ In our first case, the calcified deposit was so tiny that it was subtle in panoramic view. However, this calcification was well depicted with the aid of Cone beam computed tomography (CBCT). In the second case, the CBCT provided a better assessment for the size and location of compound odontoma as well as its relationship with the teeth.

Treatment options for impacted primary molars include observation, intervention including surgical decompression and orthodontic traction, and extraction.^{12,13} Among intervention methods, surgical decompression is considered as a high priority in treatment options.¹³ In both of our cases, decompression was performed as primary treatment on the region of primary second molar. We surgically removed the calcific deposit and compound odontoma which was considered as the obstacle for eruption. In addition, wire fixation was performed to prevent the elongation of the opposing tooth.

While significant eruption was not noted in the 55-month old patient in case 2, the impacted tooth was spontaneously erupted to normal occlusal level at 7-month follow up in the 43-month old girl in case 1. This outcome is consistent with the report of Nielsen *et*

*al*¹³ showing that the impacted teeth are more likely to erupt when treated at early stage. Generally, the eruption time of primary second molar is at 20 months and the root apex is closed at 36 months.²¹ There was a 12-month difference in the age between the two cases. While root formation was in progress in case 1, root apex closure was completed in case 2.

One possible cause of eruption failure in case 2 might be due to the status of the root of the impacted tooth. The root of the impacted tooth was curved, showing obliteration of periodontal ligament and attachment to subjacent mandibular cortex representing ankylosis. This hook like appearance of root might have acted as an anchor and interrupted spontaneous eruption. Several studies have also reported that most of the impacted teeth have less possibility of eruption if dilaceration of tooth root is in progress and once the formation of apex is completed.^{22,23} Jarvinen *et al*²⁴ have reported that uneruption due to primary ankylosis is rare because ankylosis occurs only after the tooth root is completed. Therefore, the ankylosis and curved root of primary teeth in case 2 might be secondary changes caused by mechanical barrier such as compound odontoma, highlighting that late diagnosis might lead to treatment failure.

Previous studies have reported successful management of odontoma that causes impaction of tooth by decompression.¹⁹ Delbem *et al*¹⁹ have surgically removed compound odontoma associated with impaction of primary canine in the maxilla in a 5-year-old boy with spontaneous eruption guidance after observation for 24 months. Kim *et al*⁵ have reported the removal of small odontoma above the primary second molar in the mandible in a 5-year-and-2-month old boy with spontaneous eruption after 1 year of observation. However, there was no sign of spontaneous eruption in case 2 after decompression. Therefore, extraction was performed. Krogh and Lindquist²⁵ have recommended extraction of the impacted tooth when no eruption is expected to prevent potential problems in young patient even without any symptom. Unerupted tooth may lead to delayed functional occlusion and malocclusion. These may result in pathological problems including cysts, infection, and referral pain.¹⁹

CONCLUSION

In patients with unerupted tooth, calcified deposit or odontoma can act as a physical barrier. This should be detected appropriately. Early removal of hard and soft tissues in eruption path may promote spontaneous eruption. With decompression, we obtained successful result in the first case, but not in the second case. To obtain favorable results of decompression for unerupted primary molar, the age of the patient, the growth status of the root, the presence of ankylosis, and the shape of the root should be considered.

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