Failure of Tooth Eruption Involving a Mandibular Primary First Molar: A Case Report

Sachiko Hayashi-Sakai, DDS, PhD Yo Taguchi, DDS, PhD Tadashi Noda, DDS, PhD

ABSTRACT

Purpose: Primary failure of tooth eruption involving primary teeth is unusual. The purpose of this report was to describe uneruption of a single mandibular primary first molar and the treatment outcome following limited orthodontic care.

Methods: A 5-year, 3-month-old boy was referred to the authors' clinic for treatment of an unerupted primary first molar, 3 months after fenestration by an oral surgeon. Orthodontic traction was performed on the affected molar in the authors' clinic. The affected mandibular primary first molar was fully erupted and in occlusion 16 months after the first fenestration.

Results: The histopathological diagnosis of the overlying tissue was pericoronal myxofibrous hyperplasia (PMH) without any calcified obstacles.

Conclusions: Of the 26 primary tooth eruption failure cases treated in the authors' clinic between 1979 and 2003, the present case was the only example of a primary first molar.

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KEYWORDS: ERUPTION, IMPACTION, PRIMARY TOOTH

Tooth impaction is defined as any tooth that fails to erupt into a normal functional position and remains unerupted in the jaw beyond the time at which it should normally erupt.[1] This condition is caused by several systemic diseases or local etiologic factors such as odontomas, other types of odontogenic tumors, dental ankylosis, traumatic injury, dentigerous cyst, or a supernumerary tooth. On the other hand, tooth eruption failure is defined as any tooth that delays erupting beyond the normal mean time of tooth eruption, plus 2 standard deviations[2], which has no obvious cause and no calcified obstacles in the erupting path preventing the tooth from erupting.

Impactions and tooth eruption failures involving primary teeth are rare.[1,3] In the authors' previous report, 476 permanent and 17 primary tooth eruption failure cases were treated in the authors' clinic between 1979 and 1996.[4] The primary second molars are reported as the most frequently affected primary tooth. In contrast, there have been very few reports of tooth eruption failure involving primary first molars[5,6].

Dr. Hayashi-Sakai is a resident, Dr. Taguchi is lecturer, and Dr. Noda is chairperson and professor, Division of Pediatric Dentistry, Department of Oral Health Science, Course for Oral Life Science, Niigata University Graduate School of Medical and Dental Sciences, Niigata, Japan.
Correspond with Dr. Hayashi-Sakai at sachipro@dent.niigata-u.ac.jp

The present report describes unusual eruption failure of a single mandibular right primary first molar and the treatment technique used to successfully reposition the tooth following limited orthodontic traction.

CASE REPORT

A 3-year, 7-month-old Japanese boy was referred to the Oral Maxillofacial Surgical Clinic of Niigata University Medical and Dental Hospital, Niigata, Japan from a private clinic for a consultation regarding mandibular right primary first molar eruption failure (Figure 1). The patient had been kept under observation and undergone periodic radiographic examinations for 18 months.

Fenestration was performed by an oral surgeon at 5 years of age. The affected tooth was covered with a thick layer of alveolar bone. The overlying gingival tissue and alveolar bone were removed, exposing the crown of the mandibular right primary first molar. The histopathological diagnosis of the excised overlying gingiva was pericoronal myxofibrous hyperplasia (PMH) without any calcified obstacles (Figure 2).[7]

Although a part of the crown appeared 6 weeks after fenestration, the affected tooth did not erupt spontaneously thereafter. The oral surgeon referred the patient to the authors' Pediatric Dental Clinic 3 months after fenestration (Figure 3). There was no relevant medical or family history

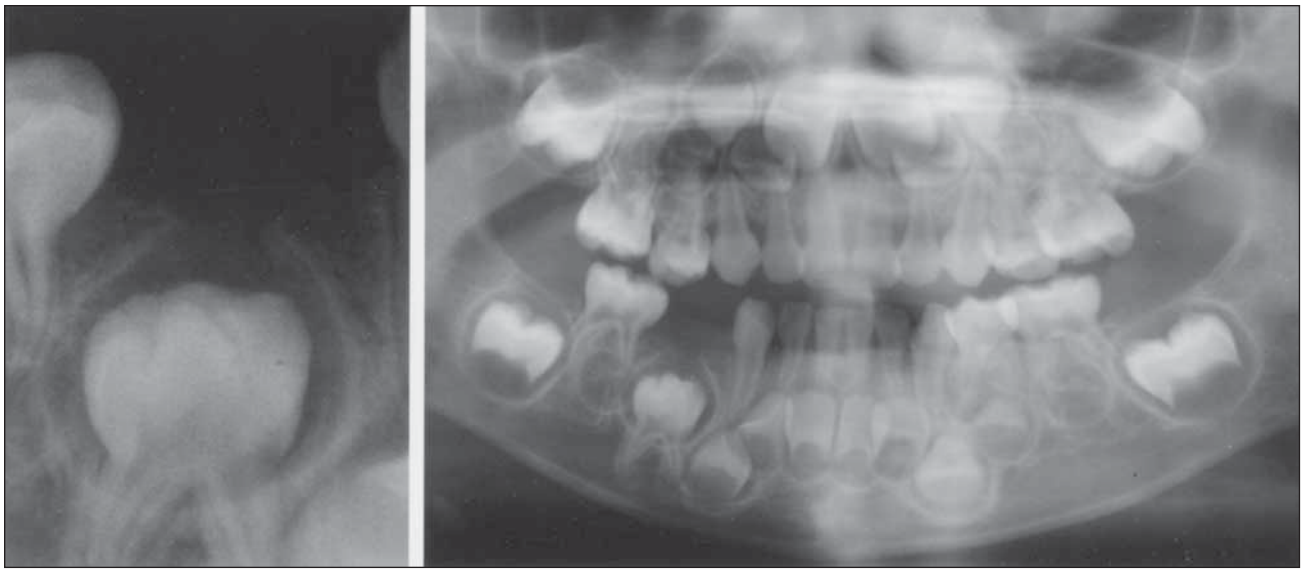

Figure 1. Radiographic appearance at 3 years, 7 months old.

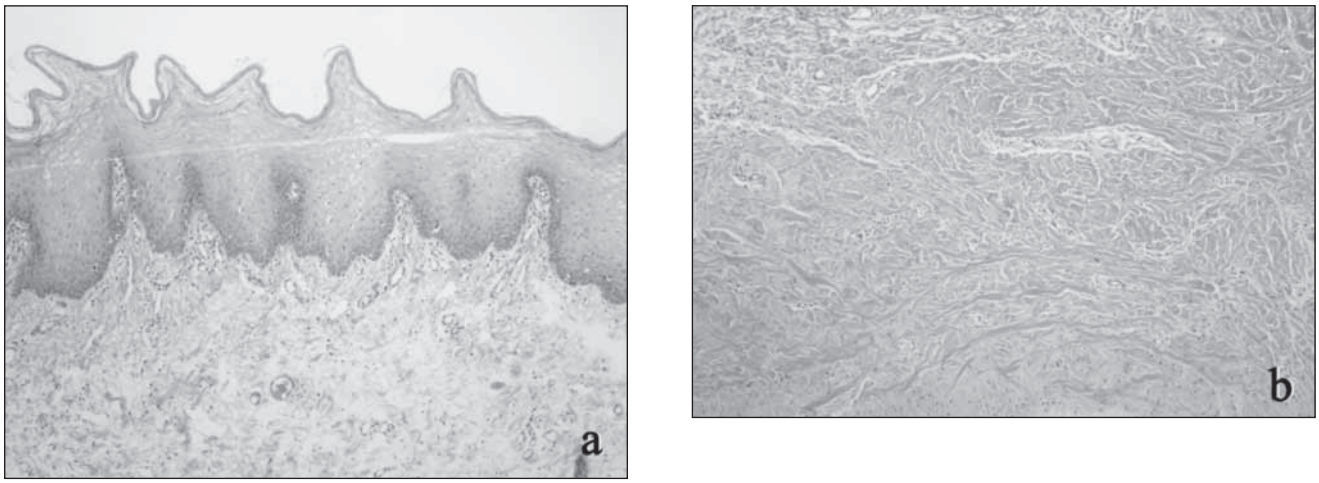

Figure 2. The histopathological diagnosis was pericoronal myxofibrous hyperplasia (PMH). Notice the proliferated epithelium (a) and dense collagen bundles (b) without any calcified obstacles. Hematoxylin–eosin (H–E) ×100.

of dental abnormalities. Clinical examination showed normal age-appropriate development of the dentition, except for the mandibular right primary first molar eruption failure. No signs of swelling, redness, or discomfort were noted in that region. Erupted teeth were free of caries.

Traction was applied immediately by a pediatric dentist because the affected tooth was not erupting spontaneously (Figure 4a). The appliance was activated and adjusted once per month while maintaining eruption space. The inactivated coil was used as an anchor to prevent the elastic from slipping down the appliance.

After 3 months, molar eruption was progressing as expected, but the tooth was tilted slightly in the lingual direction. Fenestration was performed by a pediatric dentist 6 months after the first fenestration to encourage eruption toward the buccal (Figure 4b). Most of the tooth crown could be seen in the oral cavity 1 month later. Thereafter, the appliance was changed to a sectional arch type (Figure 4c).

The tilted tooth was uprighted by the application of a direct bonding system (DBS) to the tilted and neighboring teeth. As a result, the mandibular right primary first molar erupted with a slight lingual tilt and in occlusion 14 months after the first fenestration (Figure 5a and b). Mobility was normal, and the attached gingival level lowered slightly after treatment. Following treatment, there was a slight alveolar defect on the affected tooth's mesial side (Figure 5c and d), which appeared to be resolved 5 years and 9 months later (Figure 5e).

The present case has been followed to date for 5 years and 9 months. The mandibular right primary first molar functions sufficiently without discomfort and remains in occlusion, although the tooth germ of its successor has not yet been observed (Figure 5e).

DISCUSSION

Pediatric dentists often encounter the problem of impaction and tooth eruption failure. Both of these findings are more rare in primary teeth than permanent teeth.[1] Of the 26 cases involving uneruption of primary teeth treated in the authors'

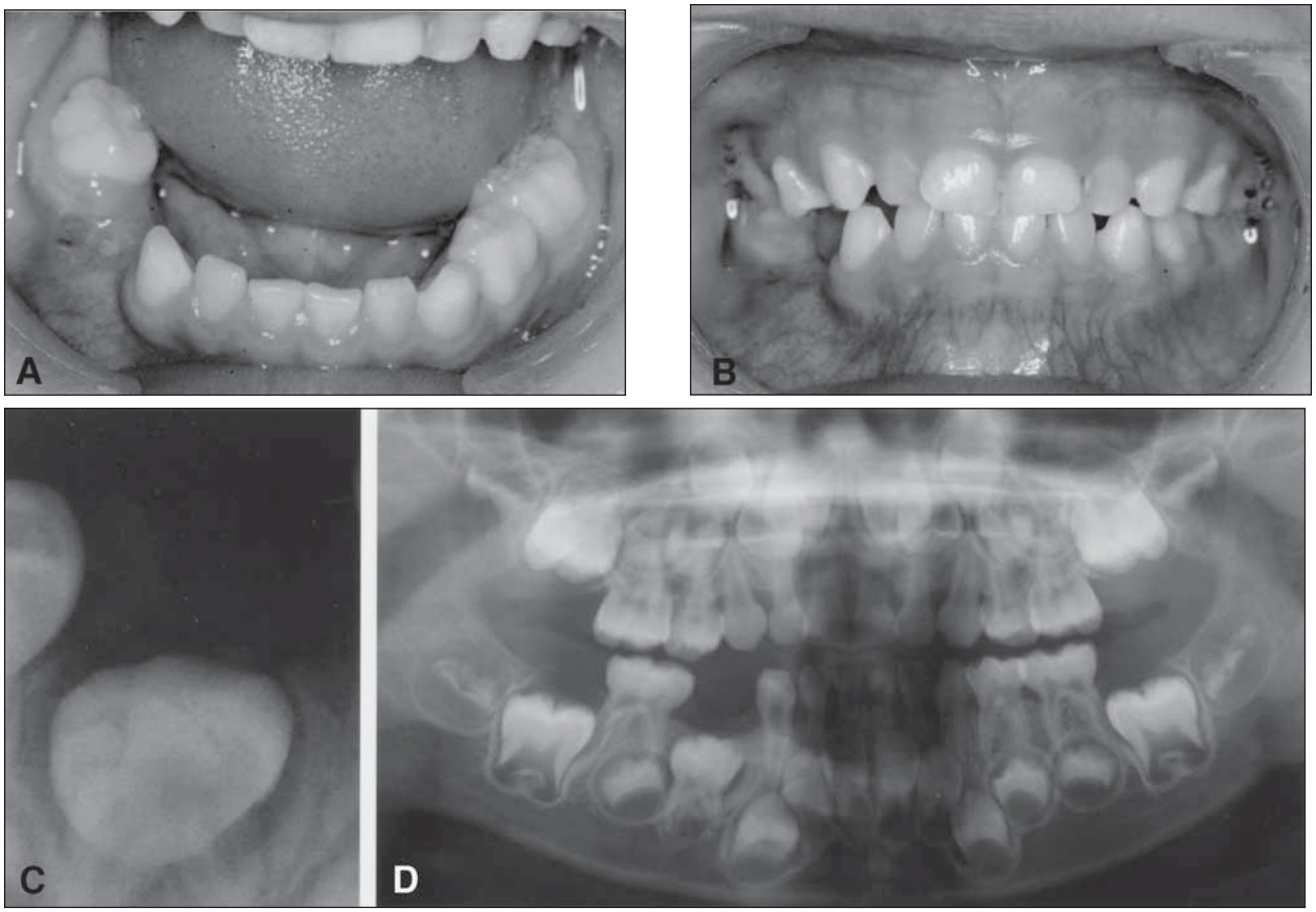

Figure 3. Clinical intraoral views (a, b) and radiographic appearance (c , d) at 5 years, 3 months old before treatment.

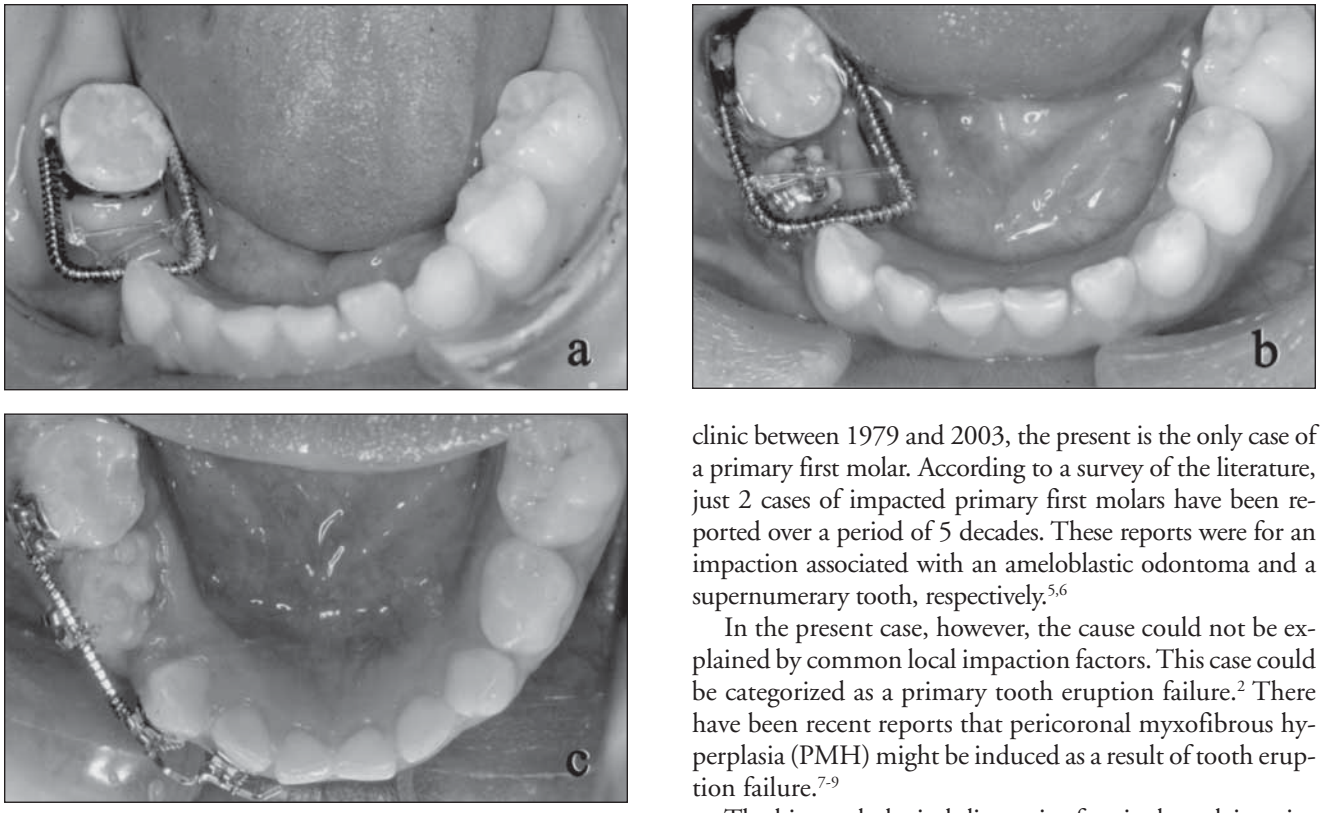

Figure 4. The appliances were shown at: (a) 5 years, 3 months old; (b) 5 years, 6 months old; and (c) 5 years, 7 months old.

clinic between 1979 and 2003, the present is the only case of a primary first molar. According to a survey of the literature, just 2 cases of impacted primary first molars have been reported over a period of 5 decades. These reports were for an impaction associated with an ameloblastic odontoma and a supernumerary tooth, respectively.[5,6]

In the present case, however, the cause could not be explained by common local impaction factors. This case could be categorized as a primary tooth eruption failure.[2] There have been recent reports that pericoronal myxofibrous hyperplasia (PMH) might be induced as a result of tooth eruption failure.[7-9]

The histopathological diagnosis of excised overlying gingiva was also PMH in this case. Taguchi et al[8] and Watanabe

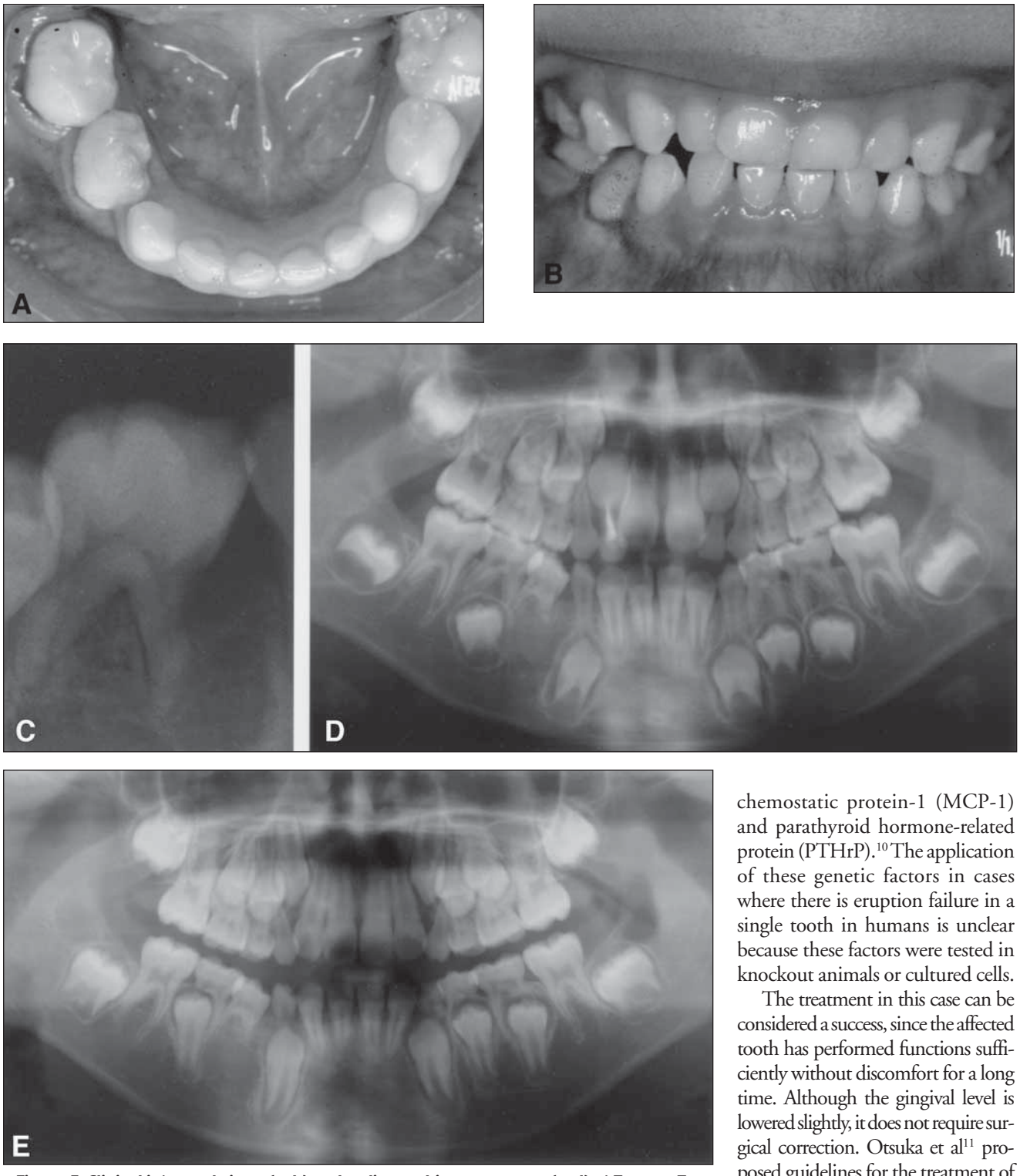

Figure 5. Clinical intraoral views (a, b) and radiographic appearance (c, d) at 7 years, 7 months old after treatment. Panoramic radiograph taken at 11 years old (e).

et al[9] proposed that PMH might secondarily induce eruption disturbances. They considered that the overlying gingival mucosa could change from a normal to a pathogenic lesion as a result of the lack of eruption. The possible molecular genetic causes of eruption disturbances have been recently reported, such as colony-stimulating factor-1 (CSF-1), monocyte chemostatic protein-1 (MCP-1) and parathyroid hormone-related protein (PTHrP).[10] The application of these genetic factors in cases where there is eruption failure in a single tooth in humans is unclear because these factors were tested in knockout animals or cultured cells.

The treatment in this case can be considered a success, since the affected tooth has performed functions sufficiently without discomfort for a long time. Although the gingival level is lowered slightly, it does not require surgical correction. Otsuka et al[11] proposed guidelines for the treatment of impacted primary teeth. The authors' guidelines for failure of tooth eruption are as follows:

1. Determine if it is possible for the affected tooth to erupt.
2. When the affected tooth has obvious ankylosis or abnormal eruption direction, extraction and space maintenance may be the best choice.
3. Prior to the use of traction, fenestration should be performed to remove overlying bone and tissue.

4. If the affected tooth does not erupt spontaneously after 3 months, continuous traction is recommended.

CONCLUSIONS

Failure of primary tooth eruption might be associated with a disturbance of the permanent successors. Therefore, long-term observation is necessary until the permanent successors erupt. Unfortunately, in the present case, the permanent successor germ has not yet been observed. Delayed development of second premolars is not uncommon, and, in some cases, evidence of mineralization may present after 10 years of age.[12] Developmental absence of the first permanent premolar is much less common than for the second premolar.

In this case, the failure of eruption of the primary molar may have interfered with the first premolar's development and should be followed to monitor any changes in this area. In cases where the permanent successor fails to develop, it is important to maintain the primary molar's health as long as possible.

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