

# Early loss of a permanent tooth due to preceding primary tooth infection

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### ABSTRACT

The aim of the study was to attract attention to the risk of losing a permanent tooth because of an untreated previous primary tooth infection. A 6-year-old girl presented to our clinic with complaints of excessive mobility of a permanent tooth. It was learned from her parents that her upper right primary first molar had broken into pieces because of caries and that she had swelling in her right cheek and had used antibiotics. During an intraoral examination, some pieces of roots of the upper right primary first molar were noticed. The permanent successor tooth was observed erupted as hypoplastic and having excessive mobility. Radiological examination revealed that there was a large radiolucent area around it. The pieces of primary molar's roots and permanent right upper first premolar tooth were determined to need extraction. In this case report, an upper right permanent first premolar was lost due to infection of the preceding primary molar tooth. Parents must be enlightened as to the importance of primary teeth health and the potential developmental pathology of permanent teeth resulting from infection spreading from the primary tooth.

**Key words:** Infection of primary tooth, pathology, successor permanent tooth

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### INTRODUCTION

Oral problems, including dental pain, malocclusion, and untreated dental caries lesions, have a negative impact on the quality of life of adolescents.<sup>[1]</sup> Caries prevention in primary dentition is the leading treatment for permanent dentition damage. Observations and reports show that opacities and hypoplasia in the permanent teeth had a strong relationship with the presence and size of dental caries in their primary predecessor teeth.<sup>[2]</sup> Spreading infection of a primary tooth from caries can cause various developmental defects or abnormalities on its permanent successor, such as hypoplasia, hypocalcification, morphological alteration, dentigerous cyst formation, arresting development of the permanent tooth, or alterations of the follicle with eruption abnormalities.<sup>[3,4]</sup> Lautenschlager reported on the primary failure of eruption associated with a follicular cystic lesion resulting from inflammation of primary teeth.<sup>[5]</sup> It is also well known that premature eruption of a permanent successor without adequate root formation can be observed after extraction of an infected primary tooth because of excessive destruction of the trabecular bone.

In this case of a 6-year-old girl, unusual loss of a permanent first premolar tooth resulting from infection of right upper primary first molar tooth is reported.

### CASE REPORT

A 6-year-old girl was referred to the Department of Pediatric Dentistry regarding pain and a tooth that had an excessive mobility on her right maxilla. Her mother reported that the girl's right upper first primary molar tooth had broken to pieces because of caries; swelling occurred on the buccal sulcus of tooth and antibiotics had been used before they came to our clinic. On examination, it was observed that she had caries on the upper primary molars and incisors and was missing all lower primary molars, which is evidence of poor oral hygiene. On intraoral examination, we observed that there was no swelling or fistulation because of the antibiotic she used. Her right upper first premolar had erupted with mild rotation and had excessive mobility and tenderness to percussion. Its enamel tissue was hypoplastic [Figure 1]. There were

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pieces of the roots of the primary first molar around the permanent tooth [Figures 2 and 3]. Panoramic and periapical radiographs were taken. On the radiographic evaluation, we observed that development of the

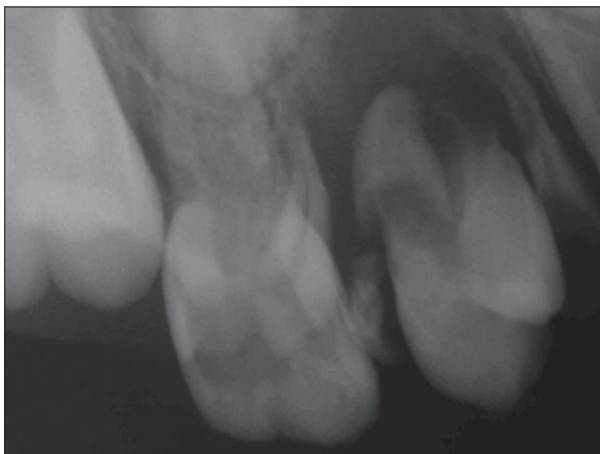
first premolar tooth's root was less than 1/3 and there was a radiolucent area around it [Figure 4]. No cystic formation was observed. The decision was made to extract pieces of primary molar's roots and permanent right upper first premolar. The extracted premolar tooth was examined and pulp tissue necrosis and granulation tissue around the root, approximately 1 cm in diameter, was observed [Figure 5]. Histological evaluation has also confirmed our clinical observations [Figure 6a and b].



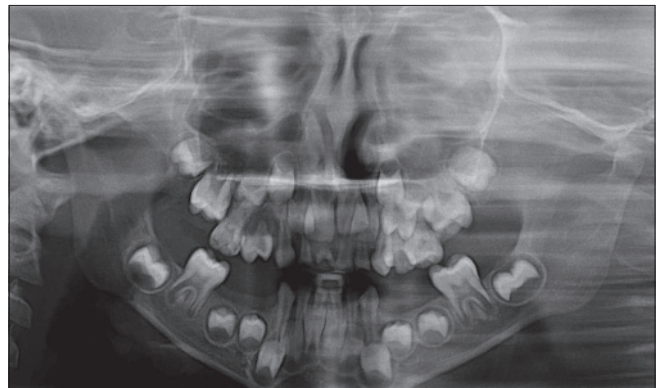
**Figure 1:** Hypoplastic enamel tissue on the right upper first premolar tooth



**Figure 2:** The right upper first premolar erupted with mild rotation, with pieces of the primary first molar's roots around it



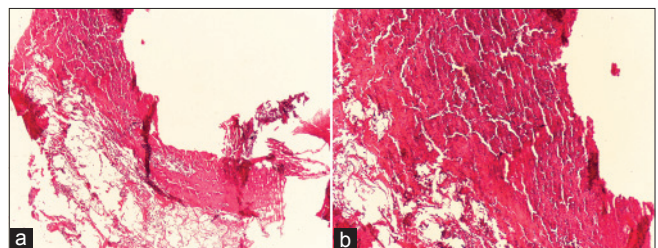
**Figure 3:** Pieces of roots of the primary first molar around the permanent tooth



**Figure 4:** The root of the right upper first premolar tooth was less than 1/3 and there was a radiolucent area around it



**Figure 5:** Extracted premolar tooth. Pulp tissue necrosis and granulation tissue around the root, approximately 1 cm in diameter, was observed



**Figure 6:** (a) Histology of the tooth with representative pictures from pulp tissue. Necroinflammatory granulation tissue that involves neutrophil-rich mixed-type inflammation cell (neutrophil, lymphocyte, histiocyte) infiltration. Hematoxylin and eosin (HE) staining; magnification, 40 times, (b) magnification, 100 times

## DISCUSSION

Although hypoplasia and hypomineralization of the permanent tooth are well-known consequences of infection in the primary predecessor, the complication of primary tooth infection as a permanent tooth necrosis and extraction is unusual. In the present case report, necrosis of the permanent tooth pulp in the early developmental stage of the root was caused by the expansive infection of the primary tooth. Thus, the permanent tooth had to be extracted; a space maintenance and subsequent prosthesis were needed in the early stages of the patient's life. Because teeth in the alveolar socket protect the mass of bone, early loss of teeth affects the success of an implant or any other treatment.

Cases about dentigerous cysts around permanent premolars and molars have been reported in association with primary tooth infection.<sup>[5-7]</sup> A dentigerous cyst was reported around the dental follicle of the mandibular right first molar in one report; treatment consisted of removing the dental follicle and curettage of the lesion with extraction of the mandibular right first molar.<sup>[5]</sup> Also, Main reported a dentigerous cyst that had developed around the partly formed crown of a premolar; it was described as an "inflammatory coronal cyst."<sup>[7]</sup> Benn and Altini<sup>[8]</sup> suggested that inflammatory dentigerous cysts may occur as a result of intrafollicular spread of periapical inflammation from a predecessor primary tooth. No cystic formation was observed in the present case.

Acute inflammation causes tissue destruction and bone resorption. Follicular cells—the ameloblasts—are sensitive to environmental changes around them, especially during the amelogenesis stage. If inflammation would spread to the follicular tissues of the underlying permanent tooth germ, enamel hypoplasia or hypomineralization might occur.<sup>[4,9]</sup> In the present case, hypoplasia was also observed on the right upper first premolar tooth.

Another developmental pathology, arrested root development, was reported in a premolar tooth associated with a chronic periradicular infection in the tooth.<sup>[3]</sup> In the present case, arrested root development was not clear.

## CONCLUSION

- Radicular infections of primary teeth seem to cause not only developmental tissue or morphological abnormalities of underlying permanent tooth, but also may cause serious damage, such as extraction resulting from necrosis of an immature permanent tooth.
- The present case report emphasizes the importance of prevention, diagnosis, and treatment of primary teeth caries for healthy permanent teeth and occlusion.
- Parents must be enlightened to the potential developmental pathology of permanent tooth resulting from infection spreading from a primary tooth.

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