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Pathological premature loss of primary teeth and its influence on aberrant eruption of successors

KEYWORDS
Pre-eruptive intracoronal resorption (PEIR);
Premature loss of primary teeth;
Pathological root resorption;
Early eruption of permanent teeth, Tooth germ displacement

Pre-eruptive intracoronal radiolucency defects (PEIR) are characteristically noted as incidental findings on radiographs of unerupted teeth, where they often appear as well-defined radiolucencies within the coronal dentin, immediate to the dentinoenamel junction.[1] These lesions often resemble dental decay, and the term pre-eruptive caries had been occasionally applied. The mandibular permanent first molar is the most commonly affected tooth, followed by the mandibular second premolar and molar, and finally the maxillary first molar and premolar teeth. The prevalence of PEIR is approximately 6 %. The etiology of PEIR remains a subject of controversy. Suggested causes by a loss of the integrity of the reduced enamel epithelium may allow osteoclasts, multinucleated giant cells, and chronic inflammatory cells to enter the tooth and initiate resorption of dentin. [2] (see Fig. 1)

Early loss of primary teeth, premature extraction or exfoliation of deciduous teeth (due to trauma, caries, or resorption) may stimulate early eruption of permanent successors.[3] Periapical infection of primary teeth, chronic periapical inflammation can accelerate resorption of the primary root, promoting early eruption of the successor. Trauma to primary teeth, may disturb the primary successor's eruption timing. Pathologic lesions, local cysts or tumors (though rare) can alter the eruption sequence and timing.

A 4-year-old child came for treatment of pain in the lower left quadrant. Intraoral examination showed that the tooth 74 and tooth 84 had previous root canal treatment and stainless steel crown restorations. The tooth 74 demonstrated extrusion of root canal filling material at the apex. After administration of antibiotics and analgesics, the symptoms subsided. During the follow-up, the tooth germ of the tooth 34 exhibited displacement, with PEIR (Pre-eruptive intracoronal resorption) noted in the crown and an associated cystic lesion surrounding the crown. Therefore, extraction of the tooth 74 was performed. After more than one year of the follow-up, the cyst around the tooth 74 had disappeared, and the tooth 34 erupted successfully beyond the alveolar bone without any clinical discomfort.

In this case, the inflammatory response following the pulp therapy of the primary tooth 74 likely led to premature root resorption, which in turn resulted in PEIR in the crown

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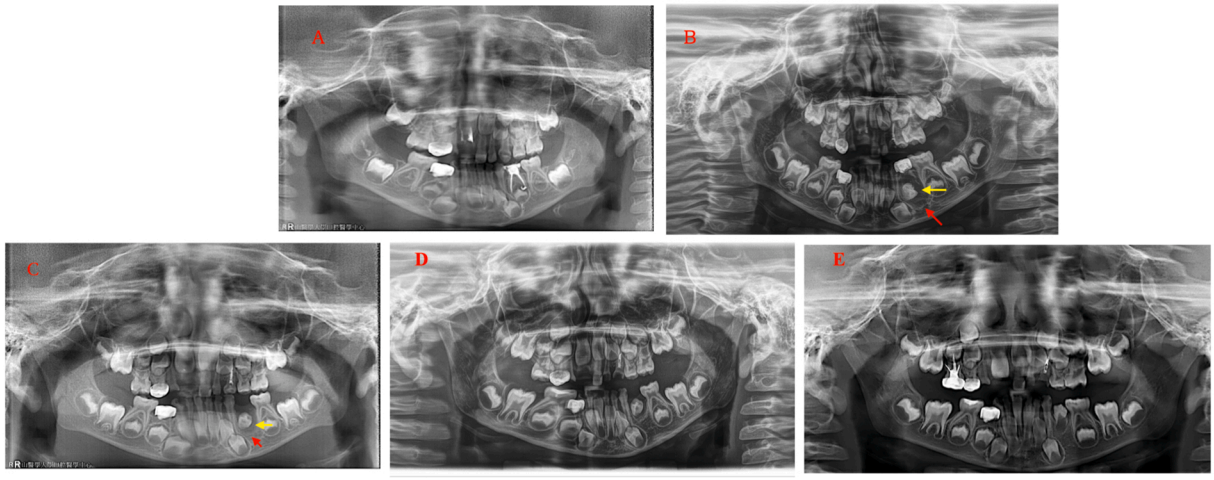

Figure 1 A 4-year-old child came for treatment of pain in the lower left quadrant. A. Clinical and radiographic examinations revealed that the tooth 74 and tooth 84 had previous root canal treatment and stainless steel crown restorations. The tooth 74 showed extrusion of root canal filling material at the apex. After administration of antibiotics and analgesics, the symptoms subsided. In the tooth 84, both mesial and distal roots were almost completely resorbed, but the tooth remained stable in the alveolar bone.
B. At the one-year follow-up, panoramic radiographic examination revealed that the roots of the tooth 74 were almost completely resorbed. The eruption follicle surrounding the tooth 34 had developed into a cyst-like lesion resembling a dentigerous cyst (red arrow), and the tooth germ of the tooth 34 showed displacement with intracoronal radiolucent defects in the crown (yellow arrow). The tooth 84 presented a condition similar to the previous year. Because the tooth 74 remained symptomatic and mobile, extraction of the tooth 74 was performed.
C. At the 3-month follow-up, the cystic lesion had disappeared, and the tooth germ of the tooth 34 had realigned to its normal position and continued to erupt toward the occlusal plane.
D. At the 9-month follow-up, the root of the tooth 34 had not yet developed, but the crown had already emerged beyond the alveolar bone.
E. At the 12-month follow-up, the root development of the tooth 34 had initiated, the tooth had erupted into the oral cavity, and no clinical symptoms were observed.

of the successor tooth 34 and even cyst formation. The course of the disease aligns with the pathogenesis of PEIR. Although the tooth germ 34 was displaced in the alveolar bone due to inflammation, once the source of inflammation was removed, the tooth germ 34 spontaneously returned to its normal position.

Many factors should be considered before determining the appropriate treatment for a severely decayed tooth with PEIR. These include the extent of crown destruction, the developmental stage of the pulp, and whether the root is still growing. Treatment options may include restorative filling, root canal therapy, or tooth extraction. Although the tooth 34 erupted prematurely into the oral cavity with incomplete root development, clinical management should focus on maintaining oral hygiene and periodontal health to prevent pulpal infection due to bacterial invasion. Regarding the PEIR defect in the crown, continuous observation during tooth development is recommended, and the vital pulp therapy may be a viable treatment option.

Declaration of competing interest

The authors have no conflicts of interest relevant to this article.

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