

Pre-eruptive Intracoronal Resorption of Dentin in a Permanent Molar: Case Report

Sürme Öncesi Daimi Molar Dişin Dentinindeki İntrakoronal Rezorpsiyon

İpek ŞAHİN,^a
Esmâ YILDIZ,^a
İrem Hicran ÖZBUDAK^b

Departments of
^aPediatric Dentistry,
^bPathology,
Akdeniz University Faculty of Dentistry,
Antalya

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Yazışma Adresi/Correspondence:
İpek ŞAHİN
Akdeniz University Faculty of Dentistry,
Department of Pediatric Dentistry,
Antalya,
TÜRKİYE/TURKEY
ipeksahin8@hotmail.com

ABSTRACT Pre-eruptive coronal resorption (PEIR) appears as a radiolucent lesion in the coronal dentin, under the enamel-dentin junction of unerupted teeth and as caries on radiographs. This case report represents a rare case of PEIR of a semierupted second permanent molar, which was determined by chance on a radiograph of a young patient who was referred to our clinic for the pain complaint of another tooth. Semi-erupted permanent second molar's enamel structure was sound and abnormal pink color was realized. Panoramic and periapical radiographies were examined. The lesion was removed from the tooth after gingival tissue corresponding to the occlusal surface of the tooth was cauterized under regional anesthesia. The soft tissue and enamel fragments were histopathologically examined. This case report contains the diagnosis, histopathologic analysis, management of the lesion, and discussion of the probable etiology.

Key Words: Tooth Resorption; dentin; dentition

ÖZET Sürme öncesinde görülen koronal rezorpsiyon (SÖKR), sürmemiş dişin mine-dentin sınırının altında, koronal dentinde görülen radyolüsent lezyonlardır. Radyografik muayenede çürük olarak görülmektedir. Bu olgu raporunda, başka bir dişindeki ağrı şikayeti ile kliniğimize başvuran genç bir hastada radyografik muayenede rastlanan, nadir görülen SÖKR sunulmuştur. Yarı sürmüş daimi ikinci molar dişin mine dokusu sağlam olmakla birlikte anormal pembe renk dikkat çekmiştir. Hastadan panoramik ve periapikal radyografiler çekilerek değerlendirilmiştir. Dişin distalden oklüzal yüzeyini saran gingival doku bölgesel anestezi altında koterize edilerek kaldırılmıştır. Sağlam mine dokusunun kaldırılmasının ardından lezyon çıkartılarak histopatolojik değerlendirme için gönderilmiştir. Bu olgu sunumunda, vakanın teşhisi, histopatolojik analizi, lezyonun tedavisi ve olası etiyolojik faktörler anlatılmıştır.

Anahtar Kelimeler: Diş rezorpsiyonu; dentin; diş çıkarma

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Pre-eruptive intracoronal resorption (PEIR) is an idiopathic lesion in the crown of an unerupted tooth.¹ PEIR has been described in the literature in sporadic case reports of unerupted teeth with radiolucency in the crown.²⁻⁴ In articles, this type of lesion is also called an intracoronal radiolucent lesion, pre-eruptive caries, pre-eruptive intracoronal resorptive lesion, or pre-eruptive intracoronal defect.⁵⁻⁷ PEIR of a tooth looks like a caries lesion. PEIRs are often found within the dentin, adjacent to the amelodentinal junction in the occlusal aspects of the crown.^{8,9} These defects have been found generally in a mandibular permanent molar or a maxillary permanent molar during radiographic examination.⁸ Thus, radi-

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ographic records are necessary to observe pre-eruptive lesions. In most cases, only one tooth is affected in an individual, but two or more lesions have been reported.¹⁰

The prevalence of subject or tooth has been reported in a range of 2-27% and 1-2%, respectively.⁸⁻¹⁰ Wang et al. investigated the prevalence of PEIRs in Chinese children.¹ Their subject prevalence was 0.85%, and tooth prevalence was 0.7%. Seow et al. reported that PEIRs may be recognized from panoramic radiographs at a subject prevalence rate of 3% and a tooth prevalence rate of 0.5%.⁸ The prevalence of PEIR is 2% to 6%, depending on the tooth and radiographic technique. When bitewings are used for diagnosis, the prevalence is 4% for the permanent mandibular first molar and 2% for the mandibular first premolar.¹¹

No relationship has been reported between intracoronally resorption and race, gender, medical conditions, systemic factors, or fluoride supplementation.⁸⁻¹⁰ No amelogenesis imperfecta, dentinogenesis imperfecta, hypophosphatemic rickets, or other dental or medical pathology that can affect the dental structure of teeth has been observed.¹²

The aims of this report were to explain a case of PEIR, histopathologically analyze it, and provide awareness of this rare occurrence.

CASE REPORT

A 14-year-old patient reported to the pediatric dental clinic. The patient was a healthy girl with no remarkable medical history. Height, weight, and facial features were all within normal limits. She came to our clinic because of her painful tooth. Clinical dental examination revealed only one decayed tooth was in the painful area and the other tooth was healthy. The external surface of the crown of the mandibular left second molar seemed a normal shape but an abnormal pink color (Figure 1). The enamel appeared intact in the entire crown on the right second molar. On the clinical aspect, no deep occlusal pits and suspicious decay were observed on the external enamel surface.

Panoramic and periapical radiographies were taken (Figures 2a, 2b). A radiolucent defect in



FIGURE 1: Intraoral clinical appearance of the pink permanent mandibular right second molar.

dentin was clearly visible adjacent to the enamel on the mesial aspects of the occlusal surface in the semierupted mandibular right second molar revealed on the radiographic examination. There were dilacerations on the roots of the right and left second molar teeth.

The patient and her parents were informed about treatment and signed informed consent form was taken. We decided to cauterize the gingival tissue corresponding to the occlusal surface of the tooth under regional anesthesia to reach the lesion



FIGURE 2a: Panoramic radiograph showing PEIR.



FIGURE 2b: Periapical radiographs showing PEIR.



FIGURE 3: Intraoral appearance of the permanent mandibular right second molar, after the lesion was removed from the cavity.

area. Afterward, we opened an occlusal cavity with a high speed round bur beginning with the mesial fossa, and a hollow area approximately 5 mm into the tooth was encountered (Figure 3). Yellowish-white soft tissue filled the cavity, but there was no brown carious dentin. The thin sell-like non-defenses enamel of the mesial crown fractured. The fractured part of crown and soft tissue were taken with excavator. The soft tissue was stored in formalin solution and sent for histopathological testing at the Oral Pathology Department. All soft tissue was scaled from the cavity without pulpal exposure. After the cavity was cleaned with normal saline, a calcium hydroxide liner (Dycal®, LD Caulk Co, Milford, DE) was placed at the cavity base. The cavity was restored with high viscosity conventional glass ionomer cement (Equia Fil, GC, Alsip,

IL) because semierupted tooth is hard to isolate from saliva and gingival crevicular fluid. A resin coat (Equia Coat, GC, Alsip, IL) applied on the restoration.

On the pathologic examination, chronic lymphocytic inflammation with giant cells was found in the soft tissue. Foreign pigmented material was observed within the giant cells (Figure 4a). Edema accompanying chronic lymphocytic inflammation was also detected in fragmented biopsy specimens (Figure 4b). During the histopathologic examination, whole material which referred to the pathology laboratory was taken. Microscopically, the fragmented biopsy specimens consisted of fibrous tissue accompanying chronic lymphocytic inflammation and also the areas containing loose and edematous matrix were seen. Giant cell with foreign pigmented material was noted.

DISCUSSION

PEIR is an uncommon clinical finding. Most cases are recognized on radiographs that are taken for another reason. This case was determined in an orthopantomograph taken for another infected tooth. A previously published case report revealed a complaint about diffuse oral pain due to severe PEIR.¹³

Clinical and histological data reported in the literature have shown that PEIRs have a similar resorption nature. There are researches about this subject. Researchers have reported that most of the

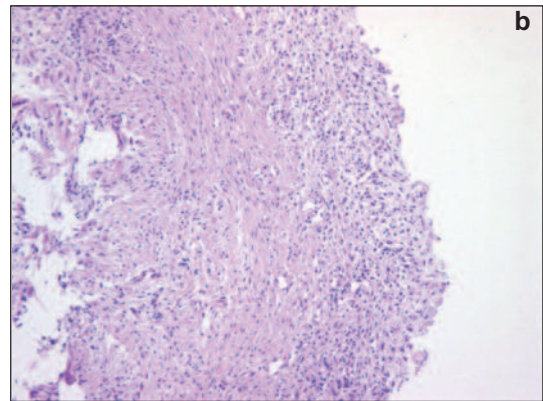
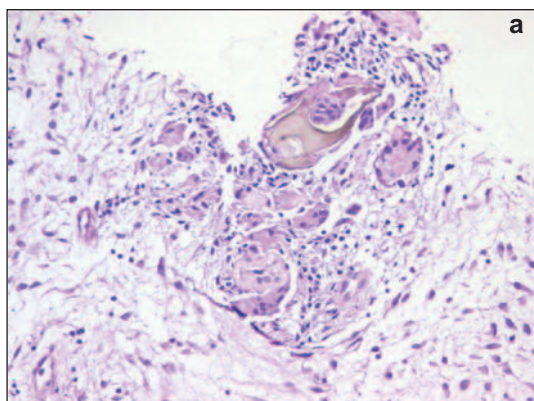


FIGURE 4: Chronic lymphocytic inflammation with giant cells. (a) Foreign pigmented material was observed within the giant cell (H&E 200X). (b) Edema accompanying chronic lymphocytic inflammation was also detected in fragmented biopsy specimens (H&E 200X).

lesions are located on the central region of the crown, and more rarely in mesial or distal aspects of the occlusal aspect. Seow et al.^{8,9} reported that the majority of defects were less than one-third the thickness of dentin. In the present case, the lesion was in the mesial aspect and larger than one-third the thickness of dentin.

The enamel appeared clinically intact in the present study. However, sufficient clinical diagnosis of the occlusal surfaces that have fissures is essential. A study reported that 15% of the teeth that did not show signs of enamel caries clinically showed a dentine lesion on the bitewing radiograph.¹⁴ Enamel remains intact, over the dentin caries, probably because of its relative hardness and increased resistance to resorption in spite of the internal destruction of dentin.⁵ This may be due to minimal secondary microbial infection associated with only a small or sealed external opening.⁵ In the present study, foreign pigmented material was observed within the giant cell, consistent with this hypothesis.

There was no evidence of dentin caries in the present case, similar to other reported cases.^{11,15} In contrast to our case, Holan et al. found yellowish-brown soft tissue in the resorptive area of the tooth in their first case, but their second case had yellow-white soft tissue similar to our case.⁴ Any systemic disturbance or local trauma that injures the odontoblasts during dentin formation can cause an interruption or an arrest in matrix apposition, which results in hypoplasia. However, hypoplasia of the dentin is less common than enamel hypoplasia and occurs only after severe systemic disturbances.¹⁶ Our patient didn't have any severe systemic disturbances and local trauma medical history.

In the present case, there was no perforation site on the pulpal floor. In contrast, Wong and Khan reported that the tissue extracted from the resorption area was soft and appeared to infiltrate the pulpal tissue.¹¹ In our case, there was no evidence of pulpal inflammation.

When we examined the orthopantomograph, root anomalies were observed in the mesial roots of the patient's right and left second mandibular

molar, in our case. Root anomaly was not recognized in the other teeth. Intracoronar resorption in the teeth of cases seen in the literature, root abnormalities have not been reported. We also do not think these two situations are related to each other.

Histopathological examinations were conducted in order to learn whether it is the infection in many studies. Counihan and O'Connell reported a histologically normal amelodentinal junction and enamel matrix, but irregular resorption on the pulpal surface with osteoclast-like giant cells and granulation tissue.¹⁵ Occasional resorption lacunae and multinucleate cells were reported in the thin zone of the irregular mineralized floor of the pulp chamber at the pulpal-dentin junction in Wong and Khan's case.¹¹ In contrast, McNamara et al.¹⁶ reported an intact dentin layer between the pulp chamber and the lesion. McNamara et al.¹⁶ also reported an intracoronar lesion affected the dentin and enamel. The presence of multinucleated giant cells, osteoclasts, and chronic inflammatory cells associated with granulation tissue have been reported as histopathological results in some cases.^{15,17} Manan et al. reported that lesion histopathology included granulation tissue with bacterial invasion.² The histopathology results of our case showed chronic lymphocytic inflammation with giant cells in the lesion area. Loose and edematous matrix were also seen this area.

The etiology of PEIR has not been clarified. In the normal development process, an intact layer of epithelium covers the enamel surface before eruption. Disruption of this layer can result in connective tissue coming into direct contact with the enamel.^{17,18} Chronic periodontal inflammation may promote epithelial disruption and osteoclastic activity.

Another reason that can cause this condition may have disturbances during the formation of dentine. Dentin mineralization is a process by which inorganic calcium phosphate is regionally maintained within the dentin organic matrix under the direction of specialized matrix proteins.¹⁹ This matrix is prone to slow hydrolytic degradation by host collagenolytic enzymes, matrix metallopro-

teinasases (MMPs), and cysteine cathepsins. Only 15 years later, mature human odontoblasts were shown to express MMP-2 and MMP-9.^{20,21} Resorption in the crown dentin may be due to these factors. These factors should be investigated in future studies.

The dental literature generally recommends surgical exposure of the unerupted tooth as soon as the lesion has been diagnosed radiographically to arrest the progression of the resorptive process and prevent its penetration into the dental pulp.⁴ In some studies, extraction of teeth was also reported due to extensive resorption.^{11,18} Moskovits and Holan³ waited for the tooth to erupt; they began the treatment when the patient complained about sensitivity of the tooth. In our case, we began treatment before the patient complained. The essential objective in treating our patient was to preserve the

vitality of the affected teeth. The extensive radiolucent area under the enamel on the unerupted tooth needed immediate treatment because of a concern of pulp involvement. The risk of pulp inflammation came with a need for extraction due to anomalies in the mesial roots in this case. Also pulp vitality was important to continued deposition of dentin in the pulp chamber and canal and for easy normal root development and eruption.

Additional studies are required to investigate the etiology and pathology of PEIR.

Early diagnosis and treatment of PEIR are necessary to prevent pulp involvement. An early examination can aid in maintaining teeth vitality and continuing tooth development.

The examination should include the entire mouth, and a radiographic examination is essential.

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