

# Regenerative Endodontic Treatment of a Necrotic Persistent Primary Molar: A Case Report

## Nekrotik Persiste Süt Molar Dişte Rejeneratif Endodontik Tedavi: Bir Olgu Sunumu

İzel KARADEDE<sup>1</sup>

<https://orcid.org/0000-0001-7394-5863>

Müge ERBAY MOLA<sup>2</sup>

<https://orcid.org/0000-0002-7806-3875>

Dilşah ÇOĞULU<sup>1</sup>

<https://orcid.org/0000-0002-3156-9801>

<sup>1</sup>Department of Pediatric Dentistry, Ege University, School of Dentistry, İzmir

<sup>2</sup>Private Dentist, Manisa

**Atıf/Citation:** Karadede, İ., Erbay Mola, M., Çoğulu, D., (2023). Regenerative Endodontic Treatment of a Necrotic Persistent Primary Molar: A Case Report. Ege Üniversitesi Diş Hekimliği Fakültesi Dergisi, 2023; 44\_2, 155-158

### ABSTRACT

*Introduction:* Regenerative endodontic treatment is a successful alternative to traditional root canal treatment in necrotic persistent primary teeth.

*Case Description:* Congenital missing of mandibular right second premolar tooth and periapical radiolucency and mobility in the persistent mandibular right primary molar were detected in a 12-year-old male patient. A two-visit regenerative endodontic treatment protocol was performed. Root canals were accessed and irrigated with 20 ml of 1.5% NaOCl followed by saline solution. Ca(OH)<sub>2</sub> was applied and the cavity was temporarily sealed. Two weeks after, Ca(OH)<sub>2</sub> was removed with the saline solution and each canal was irrigated with 20 ml of 17% EDTA. Bleeding from the periapical region was evoked with K-files 1-2 mm beyond the apex. After the formation of a blood clot approximately 2 mm below the cemento-enamel junction, the canal orifices were sealed with MTA. The teeth were restored with composite restoration. Based on clinical and radiographic follow-up of 22 months, the healing of the periapical lesion and the lamina dura was observed. The tooth was asymptomatic and responded positively to the cold test.

*Conclusion:* It can be thought that regenerative endodontic treatment can be an alternative to traditional root canal treatment in persistent primary teeth with necrotic pulp.

**Keywords:** Necrosis, persistent primary molar, regeneration

### ÖZ

*Giriş:* Rejeneratif endodontik tedavi, nekrotik persiste süt dişlerinde geleneksel kanal tedavisine başarılı bir alternatiftir.

*Olgu Sunumu:* 12 yaşında erkek hastada mandibuler sağ ikinci premolar dişin konjenital eksikliği ve mandibuler sağ süt molar dişinde inatçı periapikal radyolüsen ve mobilite saptandı. Hastaya iki seanslı rejeneratif endodontik tedavi protokolü uygulandı. Kanal giriş kavitesi açıldı ve 20 ml %1,5'lik NaOCl ve ardından serum fizyolojik ile irrigte edildi. Ca(OH)<sub>2</sub> uygulandı ve diş geçici olarak restore edildi. İki hafta sonra, serum fizyolojik solüsyonu ile Ca(OH)<sub>2</sub> uzaklaştırıldı ve her kanal 20 ml %17'lik EDTA ile irrigte edildi. Periapikal bölgeden kanama apeksin 1-2 mm ötesinde K-file eğe ile sağlandı. Mine sement birleşiminin yaklaşık 2 mm altında bir kan pıhtısı oluşumundan sonra kanal ağızları MTA ile kapatıldı. Dişler kompozit restorasyon ile restore edildi. 22 aylık klinik ve radyografik takip sonucunda periapikal lezyonda ve lamina durada iyileşme gözlemlendi. Diş asemptomatikti ve soğuk testine pozitif yanıt alındı.

*Sonuç:* Nekrotik persiste süt dişlerinde rejeneratif endodontik tedavi, geleneksel kök kanal tedavisine alternatif olarak düşünülebilmektedir.

**Anahtar Kelimeler:** Nekroz, persiste süt dişi, rejenerasyon

Sorumlu yazar/Corresponding author\*: dilsah.cogulu@ege.edu.tr

Başvuru Tarihi/Received Date: 10.11.2022

Kabul Tarihi/Accepted Date: 09.12.2022

## INTRODUCTION

A congenital missing tooth is one of the most common clinical problems in children. It is most commonly seen in the third molars, followed by the second premolars and maxillary lateral incisors. Its etiology has not been fully understood. Genetic and environmental factors are thought to be effective. It is more common in permanent teeth than in primary teeth.<sup>1</sup>

Although congenital tooth deficiencies are not seen as a very important health problem, it has been reported that they can cause disorders of muscle functions such as chewing and speaking, as well as aesthetics. Persistent primary teeth, which are found to have congenitally missing teeth, can serve an adult for many years when they have a good crown, root and healthy alveolar bone structure that supports them, and therefore it is of great importance.<sup>1-4</sup>

The standard method of choice for persistent primary teeth with necrotic pulp is traditional root canal treatment with gutta-percha and sealer. However, the anatomical structure of primary teeth is different from permanent teeth, their curved and fragile root morphologies make standard instrumentation and canal-filling techniques difficult. As an alternative, a recently proposed new method is the complete filling of root canals with mineral trioxide aggregate (MTA). However, in the event of a possible failure or pathological resorption, the fact that MTA is an insoluble material and the difficulty of removing it from the canal limits this treatment.<sup>4,5</sup>

It has been reported that regenerative endodontic treatment applications give successful results as another treatment alternative in persistent primary teeth with necrotic pulp.<sup>5</sup>

This case report aimed to evaluate the clinical and radiological results of regenerative endodontic treatment in a persistent primary molar tooth with necrotic pulp.

## CASE REPORT

A systemically healthy 12-year-old male patient was applied to Ege University, School of Dentistry, Department of Pediatric Dentistry. Congenital missing mandibular right second premolar and a deep carious lesion, extensive periapical radiolucency, and mobility related to persistent mandibular right primary second molar were detected based on a panoramic radiography (Figure 1).

After obtaining patient's and parent's approval, a two-stage regenerative endodontic treatment protocol was planned in persistent primary molar. At the first visit, the access cavity was opened under local anesthesia with 2% lidocaine and 1:100,000 epinephrine and rubber-dam isolation. Each canal was irrigated with the irrigation needle 1 mm shorter than the root length in order not to damage the stem cells in the apical tissues and to reduce cytotoxicity with 20 ml 1.5% NaOCl followed by saline

solution and dried with paper points. No instrumentation was performed.  $\text{Ca}(\text{OH})_2$  (Imical, Imicryl, Turkey) was applied to the root canals and the cavity was temporarily sealed with glass ionomer cement (Figure 2). Two weeks later, no symptoms of infection were observed. Local anesthesia was achieved with 3% mepivacaine without vasoconstrictor, and  $\text{Ca}(\text{OH})_2$  in the canals was removed with the saline solution under rubber-dam isolation. Each canal was irrigated with 20 ml of 17% ethylenediaminetetraacetic acid (EDTA; EndoSolution, CerKamed) for approximately 5 minutes and dried with sterile paper points. Then, bleeding was evoked from the periapical region by over-instrumentation with a sterile #15 K-file, with a 1-2 mm overflow from the apex. The canal orifices were sealed with MTA (MTA Angelus® White, Angelus Lodrina, Parana Brazil) after the bleeding and the formation of a blood clot approximately 2 mm below the cemento-enamel junction. In the final restoration, glass ionomer cement was applied as a base and was finished with a direct composite restoration (Estelite Posterior Composite, Tokuyama Dental Corporation, Japan) (Figure 3). During the 22nd month of clinical and radiographic control, it was observed that the periapical lesion was healed (Figure 4). The tooth was detected clinically healthy and no mobility was observed. The patient had no complaints and the tooth showed a positive response to the cold test.



**Figure 1.** The baseline panoramic radiograph of the patient



**Figure 2.** The periapical radiograph of the patient after the first session



**Figure 3.** The periapical radiograph of the patient after the regenerative endodontic procedure (2 weeks after the first session)



**Figure 4.** The periapical radiograph of the patient at 22-month control

## DISCUSSION

There are various treatment alternatives for persistent primary teeth. The root canal therapy with gutta-percha and sealer has been the standard treatment approach in primary molars without permanent successors. Protecting the primary teeth in place, and closing the gap post-extraction orthodontically or prosthetic rehabilitation are some of them.<sup>2,4-8</sup> On the other hand, early extraction or contraindication of the extraction of a persistent primary second molar initiates a series of changes such as reduction in arch length, tilting of adjacent teeth into the extraction space, loss of alveolar bone, and extrusion of the antagonist's tooth.<sup>6-8</sup> It has been shown in long-term follow-up studies that properly preserved persistent deciduous molars can function healthy until at least 20 years of age.<sup>6</sup>

Recently pulp revascularization was considered to be the treatment of choice to save necrotic teeth.<sup>9</sup> According

to our knowledge in only one study by Ulusoy et al., regenerative endodontic treatment was performed on necrotic persistent primary molars with inter radicular involvement. In this case series report in all teeth, periapical healing was detected and all teeth showed a positive response to the cold test at 18-month recall.<sup>5</sup>

Although the aim of regenerative endodontic treatment is usually to ensure the continuation of root development in immature necrotic permanent teeth, the outcome of many cases may be limited to a resolution of the infection and keeping the tooth vital, while root development does not continue.<sup>9,10</sup> In addition, the last two results represent the most desired clinician and patient-based results in primary molars with missing premolars. Therefore, the main priority as a result of regenerative endodontic treatment in a primary molar is the elimination of clinical signs and symptoms and the resolution of apical periodontitis.

The tissue that grows into the root canal in regenerative endodontic procedures is usually a vital repair tissue resembling cement, bone, and periodontal ligament, with many potential immune defense mechanisms and the ability to produce mineralized tissue to form hard tissue deposition in the root walls.<sup>9,10</sup>

The primary goal in regenerative endodontic procedures is the elimination of symptoms and evidence of bone healing. The secondary goal is increased root canal wall thickness and/or increased root length. The third goal is to get a positive response to the vitality test.<sup>10</sup>

Stainless steel crowns, amalgam, composite, and compomer materials are used as restorative material on the pulpotomized primary tooth.<sup>4,5</sup> It is known that stainless steel crowns increases success in primary endodontic treatments. However, due to the aesthetic expectations of the patients and their parents, the usage of compomer/composite materials are preferred. This is why, in the present case, we preferred composite material for the final restoration.

## CONCLUSIONS

The current case report based on 22 months of clinical and radiographic follow-up demonstrates the potential of regenerative endodontic treatment in persistent necrotic primary molars with congenital missing permanent premolars. Regenerative endodontic treatment has the potential to eliminate the clinical symptoms of the patient, which is considered the first goal and to resolve the periapical radiolucency. More clinical studies are needed to compare the efficacy of regenerative endodontic treatment and traditional root canal treatment in persistent primary teeth with necrotic pulp.

## REFERENCES

1. Aktan AM, Kara I, Sener I, et al. An evaluation of factors associated with persistent primary teeth. *Eur J Orthod* 2012; 34: 208-212.
2. Santos LL. Treatment planning in the presence of congenitally absent second premolars: a review of the literature. *J Clin Pediatr Dent* 2002; 27: 13-17.
3. Zhu JF, Marcushamer M, King DL, Henry RJ. Supernumerary and congenitally absent teeth: a literature review. *J Clin Pediatr Dent* 1996; 20: 87-95.
4. Tunc ES, Bayrak S. Usage of white mineral trioxide aggregate in a non-vital primary molar with no permanent successor. *Aust Dent J* 2010; 55: 92-5.
5. Ulusoy AT, Cehreli ZC. Regenerative Endodontic Treatment of Necrotic Primary Molars with Missing Premolars: A Case Series. *Pediatr Dent* 2017; 39: 131-134.
6. Bjerklin K, Bennett J. The long-term survival of lower second primary molars in subjects with agenesis of the premolars. *Eur J Orthod* 2000; 22: 245-55.
7. Sabri R. Management of over-retained mandibular deciduous second molars with and without permanent successors. *World J Orthod* 2008; 9: 209-20.
8. Kokich VG, Kokich VO. Congenitally missing mandibular second premolars: clinical options. *Am J Orthod Dentofacial Orthop* 2006; 130: 437-44.
9. Diogenes A, Ruparel NB, Shiloah Y, Hargreaves KM. Regenerative endodontics: a way forward. *J Am Dent Assoc* 2016; 147: 372-80.
10. Chen MY, Chen KL, Chen CA, Tayebaty F, Rosenberg PA, Lin LM. Responses of immature permanent teeth with infected necrotic pulp tissue and apical periodontitis/abscess to revascularization procedures. *Int Endod J* 2012; 45: 294-305.