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Journal of Orofacial and Health Sciences

Journal homepage: www.johs.in

INNOVATIVE PUBLICATION

Case Report

Endodontic therapy of primary teeth without permanent successor using gutta percha and bioceramic MTA putty: Report of two cases

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Abstract

The objective of the current paper was to provide a detailed account of the management and 12-month follow-up of two cases: the first was the obturation of a non-vital deciduous molar without a permanent successor, using typical gutta percha, and the second involved the pulpectomy of the similar case using bioceramic MTA putty. Treating primary teeth without permanent successors presents a unique challenge due to the physiological, cosmetic, and functional implications involved. We used gutta percha and bioceramic MTA in the pulpectomy of a deciduous molar without a permanent replacement. Radiographic follow-up examinations deemed the treatment successful in both cases. We can use new-age bioceramic materials as effectively as gutta percha for primary teeth without permanent successors.

Keywords: Hypodontia, Primary molar, Missing successor, Pulpectomy

Received: 20-10-2024; **Accepted:** 07-01-2025; **Available Online**: 26-02-2025

1. Introduction

Hypodontia is a common dental abnormality characterised by the absence or underdevelopment of any number of primary or permanent teeth, excluding the third molars.[1] Patients who have lost teeth may experience malocclusion, periodontal damage, inadequate growth of the alveolar bone, decreased ability to chew, unclear pronunciation, alterations in skeletal relationships, and an unattractive appearance, among other issues. These problems often require expensive and complex multidisciplinary treatments.[2] The mandibular second premolar has a high likelihood of being missing, second only to the third molars. Its absence has been documented to occur in 2.4 to 4.3 percent of various populations.[3] Paediatric dentists, orthodontists and prosthodontists face a challenge in dealing with the absence of second premolar successors when treating retained primary molars. Young individuals typically have two treatment options: either preserve the primary second molar until growth ceases, or extract the primary molar to allow the permanent first tooth to move forward and close the space.[4,5] If we decide to preserve a primary tooth with pulp involvement, we may need to perform a pulpotomy or pulpectomy.[6,7] During a traditional pulpectomy procedure for a deciduous tooth with a missing permanent successor and pulp involvement, the canals get filled with gutta-percha, and after that, the crown is reconstructed. Even so, there are intrinsic constraints associated with the process of producing curved and delicate primary molar roots that attain an appropriate size for the master apical file. As a result, achieving satisfactory obturation may prove to be challenging. Many studies have also looked into using mineral trioxide aggregate (MTA) as a filling material for missing primary molars that don't have a permanent replacement.[7,8] Initially designed for repairing root perforations in endodontics, MTA has now received suggestions as a suitable material for filling root ends.[9,10] In recent times, a plethora of novel bioceramics have emerged, demonstrating promising prospects for addressing endodontic ailments. These bioceramics exhibit remarkable biocompatibility attributes owing to their resemblance to

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DOI: 10.18231/j.johs.2025.011

biological hydroxyapatite. Recently, the utilisation of premixed bioceramics has emerged as a means to benefit from their consistency and minimal waste.[11]Bioceramics implemented in dentistry can be classified based on their composition, setting procedure, and consistency. Sealers and pastes have been specifically formulated to be used with gutta percha, while putties have been created to serve as a standalone substance that can be compared to MTA.[12] The premixed bioceramic putty offers the benefits of consistent texture and minimal wastage. Furthermore, its hydrophilic nature ensures it remains unaffected by moisture or blood contamination, thereby rendering it insensitive to procedural variations.[13] This case report presents the treatment and follow-up of two pulpectomy cases where there was no permanent successor tooth. In the first case, we opted for obturation using standard gutta-percha, while in another, we employed bioceramic MTA putty, as we aimed to compare the radiographic success rates of both procedures at the 12-month follow-up.

2. Case Presentation

2.1 Case 1

A 7-year-old girl, who is in good physical condition, was sent to our dental office due to a complaint of pain in the left mandibular tooth. During the clinical examination, it was observed that the mandibular left second deciduous molar had mild symptoms due to percussion. A radiographic examination showed that the successional premolar was absent and that the mandibular left second primary molar had extensive caries along with peri-radicular radiolucency (

Figure 1 a). It was noted that there was an absence of the mandibular second premolar on both sides. Based on clinical and radiographic evaluation, the diagnosis for the case was pulp necrosis and apical abscess. The patient's mother reported the absence of any familial occurrence of dental agenesis. An orthodontic evaluation led to the creation of a preliminary treatment plan, aiming to prevent future malalignment by maintaining the primary second molar for as long as feasible. At that point, a new implant would be placed. Therefore, we decided to treat the primary second molar with a pulpectomy and use gutta percha as the root canal filling material. We presented a clear explanation of the treatment aims and available alternatives to the patient and her parents prior to treatment. Their written agreement was obtained. After application of a regional inferior alveolar nerve block, the tooth was then isolated using a rubber dam. A No. 245 bur (Dentsply Maillefer, Tulsa) was utilised in a high-speed handpiece to perform coronal access cavity. The coronal pulp was thereafter eliminated using a circular excavator. We determined the working length of the canals (16 mm) using a No. 15 K-File (

Figure 1b). The canals were then prepared using the crown-down technique, employing rotary ProTaper files (Dentsply/Maillefer, Switzerland) up to a size of 20/06 in all canals. The canals were irrigated with a 1% sodium hypochlorite (NaOCl) solution and then dried using sterile paper points. The root canal was filled with gutta-percha cones and MTA fillapex (Angelus, Brazil) sealant (

Figure 1c). A final periapical radiograph was taken to confirm the success of the root canal filling. Subsequently, the cavity was repaired using glass ionomer cement (GIC) (GC Fuji II, Japan) and a stainless-steel crown (3M ESPE, St. Paul, MN, USA). Follow up radiograph after 12 months was recorded (

Figure 1 d). The radiographic assessment revealed extensive proximal caries in the primary first molar, necessitating pulp therapy during follow-up. We highly advised pulp therapy to the patient's parent; nevertheless, due to the patient's asymptomatic condition, they persistently opposed the treatment.

2.2 Case 2

A 6-year-old male patient arrived at our dental practice exhibiting symptoms of discomfort and pain in the right mandible region. The parents did not disclose any prior medical history. During the clinical evaluation, the right primary second molar showed significant decay between adjacent teeth and a positive reaction to percussion testing. A radiographic examination revealed the permanent right mandibular second premolar was missing (**Figure 2 a**). We conducted an orthodontic evaluation and discussed several treatment options with the patient's parents. The parents expressed a desire to preserve the primary tooth for as long as possible. After obtaining informed consent from the parent, endodontic therapy commenced with the administration of local anaesthesia. A No. 245 bur (Dentsply Maillefer Tulsa, USA) was used to perform coronal access cavity. The working length of the canals was determined and were then prepared using the crown-down technique, employing rotary ProTaper files (Dentsply/Maillefer Switzerland) up to a size of 20/06 in all canals. We used 1% NaOCl to irrigate the root canals. Finally, the canals were dried using sterile paper points. Bio C repair (Angelus, Brazil) bioceramic putty has been integrated up to the working length. to verify immediate post-operative radiograph obtained (**Figure 2 b**). The coronal seal after endodontic treatment was achieved using GIC (GC Fuji II, Japan). Ultimately, the stainless-steel crown (3M ESPE, USA) was fixed in place using cement. Follow up radiograph was recorded after 12 months (**Figure 2 c**).

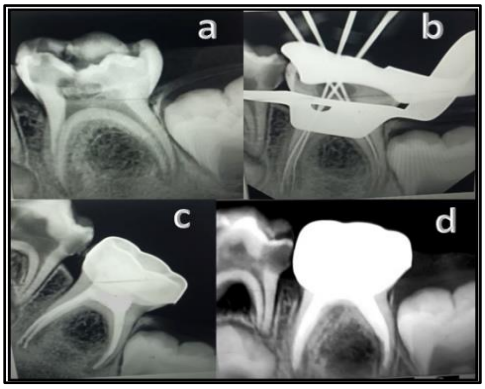

Figure 1: a)- Pre-operative radiograph, **b)** working length determination, **c)** Post-operative radiograph, **d)** Follow-up radiograph after 12 months.

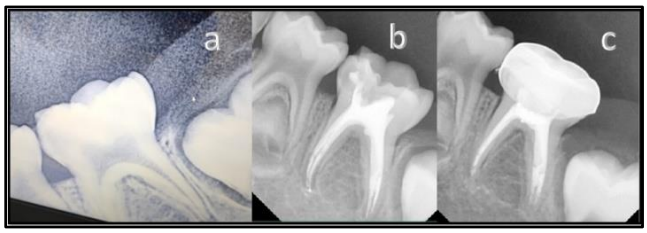

Figure 2: a) Pre-operative radiograph, **b)** Post-obturation radiograph after MTA putty placement, **c)** Follow-up radiograph.

3. Discussion

The preservation of the primary tooth in cases when the permanent replacement is congenitally absent poses a difficulty for the dentist. The most prevalent anomaly in dental development is the absence of one or more teeth, known as agenesis.[14] The cause of dental agenesis has not been completely elucidated. Kurisu K et al.[15] proposed that tooth agenesis is often inherited as an autosomal dominant trait, characterized by incomplete penetrance and variable expressivity. Agenesis of teeth during development is linked to environmental variables like as trauma, infection, irradiation, and endocrine abnormalities. Ectodermal dysplasia, a prevalent disease, is characterized by the congenital absence of teeth and anodontia. [16] It is important to retain primary teeth that have a complete crown and root structure but are missing their permanent successors. This would effectively avoid any disparity in the length of the arch and preserve the gap, eliminating the need for orthodontic or prosthetic therapy.[17] In 2010, Tunc and Bayrak documented another case where they decided to keep the mandibular second primary molar for a longer duration because the subsequent premolar wasn't present. pulpectomy was performed by using white MTA. Regular follow-up appointments were scheduled for monitoring purposes. After a period of three years, a radiographic examination revealed resorption on the surface of the root closest to the tooth's centre, and the tooth was operating properly.[18] Multiple studies have been conducted to evaluate various materials, including the traditional Gutta Percha (Cohen and Hargreaves, 2006). The worry regarding the challenges arising from root resorption and complications after removing primary teeth will be eliminated, since these teeth will not suffer resorption in the near future. Furthermore, there is a belief that implementing such a long-lasting treatment will decrease the likelihood of any remaining resorption. One of the primary objectives of this is to preserve the space until the patient is able to undergo more sophisticated interventions, such as implants and prosthesis. This is applicable when a badly decayed primary tooth has endodontic therapy and is restored with a stainless-steel crown.[19] The primary tooth lacks a permanent tooth bud and exhibits no indications of root resorption. Obturating material for maintaining primary teeth with absent permanent teeth must be biocompatible and non-resorbable. Gutta-percha, mineral trioxide aggregate (MTA), and biodentine should be regarded as root canal filling materials for retained primary teeth lacking successors. These materials are deemed biocompatible and non-resorbable. [2] In order to utilise MTA as a root canal filler, the process of canal treatment necessitates following the same preparation and irrigation protocol as is carried out for the placement of gutta-percha. The debate surrounding whether to remove or keep the smear layer prior to canal obturation remains contentious. This is because the presence or lack of a smear layer has minimal effect on the ability of MTA substances to form a seal. In fact, it is possible that the existence of the smear layer may actually enhance the seal over time.[20,21] Researchers are continuously conducting research to develop advanced endodontic obturating materials that surpass current ones, meeting biological requirements and ensuring a predictable long-term therapeutic outcome. Among them, gutta percha has been widely used for a significant period of time, solidifying its position as the preferred choice. It has also been shown to work well in a number of obturation techniques while still maintaining its basic properties as a filling material for both permanent and primary teeth. Multiple research studies have used traditional grey and white MTA as a material to fill the roots of primary teeth without a permanent replacement. These studies have shown positive results when examining the teeth using X-ray imaging. Several recent studies and case reports have used bioceramic MTA putty for furcation repairs and as a pulpotomy material in primary molars. However, there is a deficiency in comprehensive follow-up documentation for these procedures. This article aims to evaluate and compare the radiographic success rates for conventional gutta percha and bioceramic MTA putty in primary molars that lack a permanent successor over a one-year follow-up period. Upon doing a one-year follow-up examination, we saw that both gutta percha and MTA showed comparable radiographic success throughout long-term monitoring. Furthermore, neither case exhibited any clinical signs of pain or discomfort. Therefore, we can infer that modern bioceramic materials are appropriate for filling primary teeth without a permanent replacement. Moreover, many consider the

traditional application of gutta percha filling as the preferred method in these circumstances.

4. Conclusion

In summary, we have presented two case reports. The first case used the standardized gutta-percha technique, widely considered the most reliable method in the absence of a permanent successor tooth. The second case utilised bioceramic MTA putty, which has been proposed as a substitute material for pulpectomy in nonvital primary teeth lacking permanent replacements. We aimed to compare the radiographic and clinical success rates of both cases at the 12-month follow-up, and determined both cases to be successful. In conclusion, we can say that even though gutta-percha is usually used to fill primary teeth that don't have permanent replacements, we can use modern biocompatible materials to seal these teeth. Nonetheless, it is imperative to undertake more long-term clinical trials to substantiate the advantages of this method in comparable circumstances. Moreover, the identification of the reasons of root resorption is essential in order to provide appropriate treatment by eliminating the underlying element responsible for it.

5. Source of Funding

None.

6. Conflict of Interest

None.

References

1. Doğan Ö, Gökçe E, Doğan SS, Karakan NC, Çelik İ. Root canal filling with Neomta Plus in second primary molar teeth with missing successors: twenty-four months of follow-up. *Cumhur Dent J* 2022;24(4):442–7.
2. Kumari, A., Sawhney, H., Kashwani, R., Gupta, G., & Das, S. J. Triple antibiotics: A synergistic approach to combating infection.Vol-8(2),189–92
3. Ulusoy AT, Cehreli ZC. Regenerative endodontic treatment of necrotic primary molars with missing premolars: A case series. *Pediatr Dent*. 2017;39(3):131–4
4. Bjerklin K, Al-Najjar M, Kårestedt H, Andrén A. Agenesis of mandibular second premolars with retained primary molars: a longitudinal radiographic study of 99 subjects from 12 years of age to adulthood. *Eur J Orthod*. 2008;30(3):254–61.
5. Ith-Hansen K, Kjaer I. Persistence of deciduous molars in subjects with agenesis of the second premolars. *Eur J Orthod*. 2000;22(3):239–43.
6. Abhishek Sharma, Sneha Upadhyay, KM Pallavi, Anukriti Kumari. Restoring Smile with Ceramic Veneers for a Patient with Fractured Anterior Teeth: A Case Report. *Oral Sphere J* Dent Health Sci,2025; 1(1), 29–34.
7. Moretti AB, Oliveira TM, Sakai VT, Santos CF, Machado MA, Abdo RC. Mineral trioxide aggregate pulpotomy of a primary second molar in a patient with agenesis of the permanent successor. *Int Endod J*. 2007;40:738–45.
8. 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(1):92–5.
9. Lee SJ, Monsef M, Torabinejad M. Sealing ability of a mineral trioxide aggregate for repair of lateral root perforations. *J Endod*. 1993;19:541–4.
10. Torabinejad M, Watson TF, Pitt Ford TR. Sealing ability of a mineral trioxide aggregate when used as a root end filling material. *J Endod*. 1993;19:(12)591–5.
11. Dong X, Xu X. Bioceramics in Endodontics: Updates and Future Perspectives. Bioengineering (Basel). 2023;10(3):354.
12. Debelian G, Trope M. The use of premixed bioceramic materials in endodontics. Giornale Italiano di Endodonzia. 2016;30(2):70-80.
13. Jefferies SR. Bioactive and biomimetic restorative materials: a comprehensive review. Part I. *J Esthet Restor Dent*. 2014;26(1):14–26.
14. Shapiro SD, Farrington FH. A potpourri of syndromes with anomalies of dentition. Birth Defects Orig Artic Ser. 1983;19:(1)129-4.
15. Kurisu K, Tabata MJ. Human genes for dental anomalies. *Oral Dis*. 1997;3:223–8.
16. Lexner MO, Bardow A, Hertz JM, Nielsen LA, Kreiborg S. Anomalies of tooth formation in hypo-hidrotic ectodermal dysplasia. *Int J Paediatr Dent*. 2007;17:1018.
17. Kokich VG, Kokich VO. Congenitally missing mandibular second premolars. Clin Options *Am J Orthod Dentofac Orthop*. 2006;130:(4)437–44.
18. 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.
19. Bogen G, Kuttler S. Mineral trioxide aggregate obturation: A review and case series. *J Endod.* 2009;35:777–90.
20. Yildirim T, Oruçoğlu H, Cobankara FK. Long-term evaluation of the influence of smear layer on the apical sealing ability of MTA. *J Endod.* 2008;34:1537–40.
21. Vishwanath V, Rao HM. Gutta-percha in endodontics - A comprehensive review of material science. *J Conserv Dent*. 2019;22(3):216–22.

How to cite: Zarekar M, Satpute A, Zarekar M. Endodontic therapy of primary teeth without permanent successor using gutta percha and bioceramic MTA putty: Report of two cases, *J Orofac Health Sci.* 2025;12(1):67–70