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Use of Gutta-Percha for Pulpectomy in a Retained Primary Molar with a Congenitally Missing Permanent Successor: A Case Report

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ABSTRACT

Background: Retention of a primary tooth due to congenital absence of its permanent successor presents a unique restorative and endodontic challenge. In such situations, preservation of the retained primary tooth for as long as possible is desirable to maintain function, arch integrity, and alveolar bone support. Although gutta-percha (GP) is conventionally used as an obturating material in permanent teeth, its use in primary teeth is uncommon because of the physiologic root resorption necessary for the exfoliation of primary dentition. However, in cases where the permanent successor is congenitally absent, gutta-percha may serve as a suitable non-resorbable obturating material.

Case Report: This case report describes the management of a 15-year-old female who presented with recurrent spontaneous pain associated with a retained mandibular left primary second molar. Clinical and radiographic examination revealed dental caries with irreversible pulpitis in tooth 75 and congenital absence of the permanent mandibular left second premolar (35). A two-visit pulpectomy was performed, and the canals were obturated with gutta-percha. The tooth was subsequently restored with glass ionomer cement and a stainless-steel crown. Clinical and radiographic follow-up over 12 months demonstrated the absence of pain, swelling, mobility, sinus tract formation, or periapical pathology, indicating a successful treatment outcome.

Conclusion: This report highlights the potential use of gutta-percha as an obturating material in retained primary teeth without permanent successors, where long-term tooth preservation is desired.

Keywords: Gutta-percha, retained primary tooth, hypodontia, pulpectomy, congenitally missing tooth

INTRODUCTION

Congenitally missing teeth (CMT), also referred to as tooth agenesis or hypodontia, occurs when one or more teeth fail to erupt into the oral cavity and are radiographically absent at the expected time.[1] CMT is the most prevalent dental anomaly, usually noticed during routine dental examinations.[2] The interaction of genetic and environmental variables may lead to the development of CMT,[3] although heredity is believed to be the principal aetiological factor.[3]

Hypodontia may be syndromic (occurring in conjunction with other developmental abnormalities) or non-syndromic (occurring alone).[4] In a scoping review on the prevalence of dental anomalies in Down syndrome by Riyadi et al., the authors reported hypodontia prevalence ranging from 1% to 88%.[5] Yemitan et al. reported that CMT in Nigeria affects approximately 7.3% of boys and 10.7% of girls.[6] Studies have shown that hypodontia is more prevalent in the permanent dentition than in the primary dentition.[4, 7] When a permanent tooth is congenitally missing, the primary tooth is usually retained beyond its normal exfoliation time. Retained primary teeth typically serve as space maintainers, preserve alveolar bone, and postpone the need for a prosthesis until adulthood.[8] In cases where accompanying pathologies are present, retained deciduous molars can either be extracted or preserved for as long as possible.[9]

Due to their prolonged retention in the oral cavity and relatively weak enamel compared to permanent teeth, retained primary teeth are frequently vulnerable to caries. Additionally, because of their massive pulp horns, pulpal involvement is typically observed.[10] Pulpotomy or pulpectomy is necessary if the treatment aims to preserve a carious primary molar with pulpal involvement.[10] Currently, the pulpectomy procedure entails removal of the coronal and radicular pulp tissue and obturation of the root canal with a resorbable material such as zinc oxide eugenol.[10]

Non-resorbable material can be used to obturate a primary tooth if the succedaneous permanent tooth is congenitally missing.[11] In this case report, the goal of using non-resorbable material is to provide a good root canal seal to prevent reinfection and keep the tooth functional in the mouth for a long period.[11] The goal of treatment for pulpally involved retained primary teeth with absence of the succedaneous tooth is to maintain them in the oral cavity for as long as possible.[11]

CASE REPORT

A 15-year-old female student of Edo State University, Iyamho, presented to the Paediatric Dental Clinic of the University of Benin Teaching Hospital in the company of her mother with recurrent spontaneous tooth pain. The current episode had lasted 3 days and occasionally disturbed her sleep. The pain was aggravated by chewing and cold water and was temporarily relieved with analgesics. There was an associated cavity on the affected tooth, but no history of swelling.

There was no significant medical history of note. This was the patient's first dental visit. She brushes once daily with fluoride-containing toothpaste and a medium-bristle toothbrush. On extra-oral examination, the lips were complete and competent, with no facial asymmetry, and no lymph nodes were palpable. Intra-oral examination revealed good oral hygiene, with a simple oral hygiene score of 0.9. The teeth present were:

17,16,15,14,13,12,11	21,22,23,24,25,26,27
47,46,45,44,43,42,41	31,32,33,34,75,36,37

Tooth 75 was retained and carious, while tooth 35 was missing. There were no mobile teeth, no swelling, and no sinus. An intra-oral periapical radiograph of the lower left quadrant revealed a disto-occlusal radiolucency obliterating the distal pulp horn of tooth 75, with no sign of root resorption or periapical pathology. There was also no radiographic evidence of tooth 35. A diagnosis of irreversible pulpitis of tooth 75 secondary to dental caries with congenitally missing 35 was made. The clinical and radiographic pictures at presentation are shown in Figure 1.

Figure 1: Clinical and radiographic pictures at presentation

Clinical picture

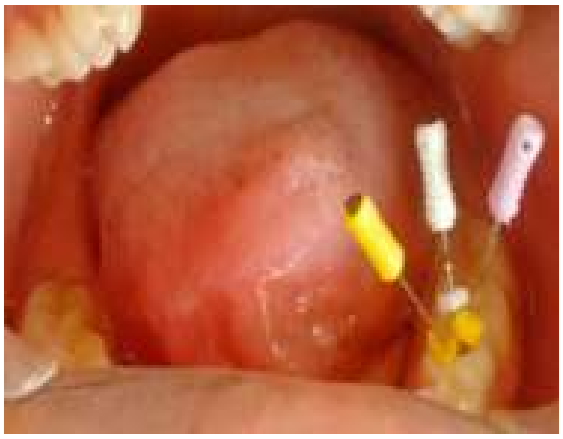
Radiograph at presentation

The patient was subsequently planned for prophylactic scaling and polishing, two-visit pulpectomy of tooth 75 using gutta-percha as obturation material, and subsequent restoration to function with a stainless-steel crown. Informed consent and assent were obtained from the patient's mother and the patient, respectively, before the commencement of treatment procedures.

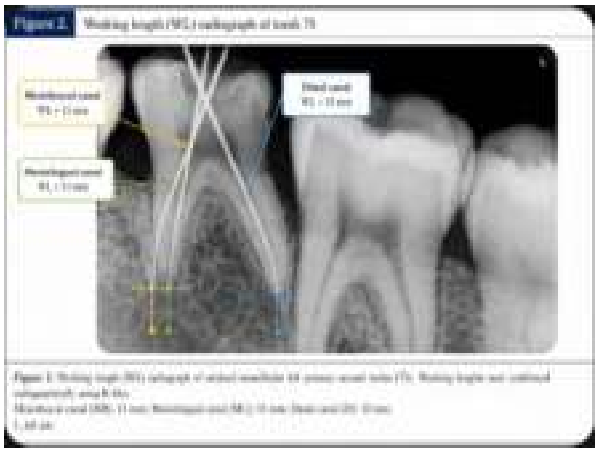
Under local anaesthesia, endodontic access was established on tooth 75 using a round bur in a high-speed handpiece. Following exposure of the pulpal floor, the mesiobuccal (MB), mesiolingual (ML), and distal (D) canals were identified. Canal debridement was performed using stainless steel K-files sizes 8, 10, 15, 20, and 25. A working length radiograph was obtained, which revealed canal lengths of 13 mm for the distal canal and 11 mm each for the mesiobuccal and mesiolingual canals.

The canals were copiously irrigated alternately with normal saline and 5.25% sodium hypochlorite diluted in a 1:5 ratio to obtain an approximately 1.05% NaOCl solution. The canals were subsequently dried with sterile paper points. Non-setting calcium hydroxide intracanal medicament was placed, and the access cavity was temporarily sealed with zinc oxide eugenol. Postoperatively, the patient was prescribed analgesics (paracetamol 1 g every 8 hours for 3 days) for pain management following the initial visit.

Figure 2: Clinical and radiographic working length determination pictures



Clinical picture of working length



Working length Radiograph

At the second visit, the access cavity was reopened, and the cotton pellet was removed. The canals were irrigated with normal saline and dried with sterile paper points. The root canal walls were coated with Endoseal sealer (brand: Root X), and obturation was completed with gutta-percha using the lateral condensation technique. The access cavity was subsequently restored with glass ionomer cement, and the tooth was rehabilitated with a stainless-steel crown to restore function. The patient was then discharged and reviewed at 1 week, 1 month, 3 months, 6 months, and 1-year follow-ups. Figure 2 above, shows the clinical and radiographic working length determination pictures. Figures 3 and 4 show the immediate postoperative and 1-year review clinical and radiographic pictures, respectively.

Figure 3: Post-operative clinical and radiographic pictures

Post-operative Clinical picture

Post-operative Radiograph

Figure 4: One Year Post-operative clinical and radiographic pictures

One Year Clinical Picture

One year post-operative radiograph

At the one-year review, no clinically or radiographically significant signs such as fistula, pain, mobility, or bone resorption were elicited, indicating treatment success.

DISCUSSION

Findings: Congenitally missing teeth represent the most prevalent dental anomaly usually noticed during routine dental examinations.[2] The most common congenitally missing permanent teeth, in order of frequency, are third molars, second premolars, and lateral incisors.[12] In the present case, the retained mandibular left primary second molar (75) remained functional because of the congenital absence of its permanent successor (35). However, prolonged retention of primary teeth increases susceptibility to dental caries and subsequent pulpal involvement due to thinner enamel and relatively large pulp chambers.[10]

The major finding in this report is the successful use of gutta-percha as an obturating material in a retained primary molar without a permanent successor. Conventionally, obturating materials used in primary teeth are resorbable to accommodate physiologic root resorption and eruption of the succedaneous tooth.[13] In this patient, however, the permanent successor was congenitally absent; therefore, preservation of the retained primary molar for as long as possible became the primary treatment objective.[11] Clinical and radiographic findings after 12 months demonstrated the absence of pain, mobility, swelling, sinus tract formation, or periapical pathology, suggesting favourable treatment success.

The present findings are consistent with previous reports by Zarekar et al.[11] and Ansari and Mirkarimi,[14] who documented successful endodontic treatment of retained primary molars with missing permanent successors using GP obturation. These reports support the concept that non-resorbable obturating materials may be appropriate in selected cases involving retained primary teeth without succedaneous permanent teeth.[11,14]

Implications: This case highlights the importance of careful clinical and radiographic assessment whenever a primary tooth is retained beyond the expected exfoliation period, particularly when the contralateral permanent tooth has erupted, as seen in another study.[15] Early identification of congenitally missing permanent teeth allows clinicians to formulate long-term treatment plans aimed at preserving occlusion, alveolar bone integrity, aesthetics, and function.[8] This report also demonstrates that GP may be considered a viable obturating material in selected retained primary teeth where long-term preservation is desired.[11,14]

Retaining such teeth may delay or reduce the need for prosthetic rehabilitation during adolescence and early adulthood.[8] Additionally, maintenance of the retained tooth helps preserve alveolar bone height and width, which may improve future implant outcomes if replacement eventually becomes necessary.[15]

Trade-Offs (Limitations): This case report has certain limitations that should be acknowledged. First, the follow-up period was relatively short. Although the treatment outcome remained successful at the 12-month review, longer-term observation would provide stronger evidence regarding the prognosis and durability of gutta-percha obturation in retained primary molars.[12] In addition, the patient was subsequently lost to follow-up after referral to the adult clinic and relocation for academic pursuits.

Second, this report describes a single clinical case, thereby limiting the generalisability of the findings. The favourable outcome observed in this patient may not necessarily be reproducible in all retained primary teeth with congenitally missing successors. Furthermore, histological evaluation of periapical healing and root changes was not feasible.

Another limitation is that confirmation of the congenital absence of the permanent successor was based solely on periapical radiographic assessment. Although the radiographic findings strongly suggested agenesis of the mandibular second premolar, panoramic imaging would have provided a more comprehensive evaluation and better excluded the possibility of ectopic positioning of the developing tooth germ. Nevertheless, additional radiographic exposure was avoided in accordance with paediatric radiation protection principles, including ALARA (As Low As Reasonably Achievable) and ALADA (As Low As Diagnostically Acceptable).

Take-Home (Conclusion): A high index of suspicion for congenital absence of the permanent successor should be maintained whenever a retained primary tooth remains firm in the arch after eruption of the contralateral permanent tooth. Radiographic assessment is therefore strongly recommended in such situations. This case demonstrates that gutta-percha, although conventionally used in permanent teeth, may be successfully used as an obturating material in retained primary teeth

without permanent successors where prolonged retention is desired. Preservation of these teeth may significantly contribute to maintaining mastication, occlusion, aesthetics, and alveolar bone support.

Expectations for Future Research: Further longitudinal studies involving larger sample sizes are needed to evaluate the long-term outcomes of gutta-percha obturation in retained primary teeth lacking permanent successors. Comparative investigations assessing gutta-percha against other non-resorbable bioactive obturating materials, including mineral trioxide aggregate and biodentine, would provide additional evidence regarding the most suitable materials for such cases. Future research should also explore survival rates, patterns of root resorption, patient-reported outcomes, and the potential influence of these treatment approaches on future implant placement and alveolar bone preservation.

RECOMMENDATIONS

Retained primary teeth with delayed exfoliation should always undergo thorough clinical and radiographic evaluation, particularly when the contralateral permanent successor has erupted and the primary tooth remains in situ, as this may indicate congenital absence of the succedaneous tooth. In carefully selected cases, pulpectomy using non-resorbable obturating materials such as gutta-percha may be considered a viable treatment option for retained primary teeth without permanent successors. However, long-term clinical and radiographic follow-up remains essential to monitor tooth survival, root integrity, periapical status, and overall treatment success.

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