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IP Annals of Prosthodontics and Restorative Dentistry

Journal homepage: <https://www.aprd.in/>

## Case Report

# Functional restoration of mandibular second primary molar with missing successor: A case report

Sana Fatima<sup>1,\*</sup>, Saima Yunus Khan<sup>1</sup>, Divya S. Sharma<sup>1</sup>, M.K. Jindal<sup>1</sup>, Faiza Jamil<sup>1</sup>

<sup>1</sup>Dept. of Pediatric and Preventive Dentistry, Dr. Ziauddin Ahmad Dental College & Hospital, Aligarh Muslim University, Aligarh, Uttar Pradesh, India



### ARTICLE INFO

#### Article history:

Received 23-05-2022

Accepted 06-06-2022

Available online 30-09-2022

#### Keywords:

Primary second molar

Mineral Trioxide Aggregate

Missing successor

### ABSTRACT

In case of missing permanent successor very often primary teeth may remain retained for longer time beyond their exfoliation schedule. This case report demonstrates the functional restorative management of a retained mandibular primary second molar with missing successor, treated with Mineral Trioxide Aggregate (MTA) as an obturating material. The material seemed to provide biocompatible sealing of the root canal. After six month follow up, the healing was uneventful without any functional and radiographic complications.

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## 1. Introduction

The retention of primary teeth beyond their normal exfoliation time could be due to many reasons.<sup>1,2</sup> Absence of permanent successor tooth bud is one of the common cause. Although the missing permanent third molar is the most prevalent missing tooth bud, but among missing successor teeth mandibular second premolars followed by maxillary lateral incisors, maxillary second premolars and mandibular incisors are most common ones.<sup>1-3</sup> The incidence of over-retained second primary molar due to congenitally missing second premolar tooth bud varies from 2.9-3.2%.<sup>4</sup> According to many studies, they constitute not less than 40% of all reported hypodontia cases with 1:1.37 male/ female ratio.<sup>4,5</sup>

Management of such cases poses a challenging task for a dentist. Various treatment options are available that varies according to patient's age and occlusion, restorability of tooth, and condition of the bone structure surrounding the teeth. Also these teeth are often more caries prone due to

longer retention time and the thinner enamel layer along with the high pulp horn that usually result in the early pulpal exposure.<sup>5</sup>

Preservation of these teeth in functional state serves as a semi-permanent solution until the completion of face and the jaw growth which in turn is dependent on proprioception from intact periodontal ligaments. Root canal filling of these primary teeth requires obturation with the non-resorbable material to maintain hermetic sealing and roots without resorption. Traditionally gutta percha obturation has been practiced but the complex root canal anatomy of primary teeth compared to permanent teeth makes it difficult for a clinician to obturate the canal with the gutta percha.<sup>5,6</sup>

This case report is about the endodontic management of mandibular second primary molar with congenitally missing successor where the obturation was done with MTA.

## 2. Case Report

A 13 year old female patient reported to the Department of Pediatric and Preventive Dentistry, Dr. Ziauddin Ahmad Dental College and Hospital, AMU, Aligarh with the chief

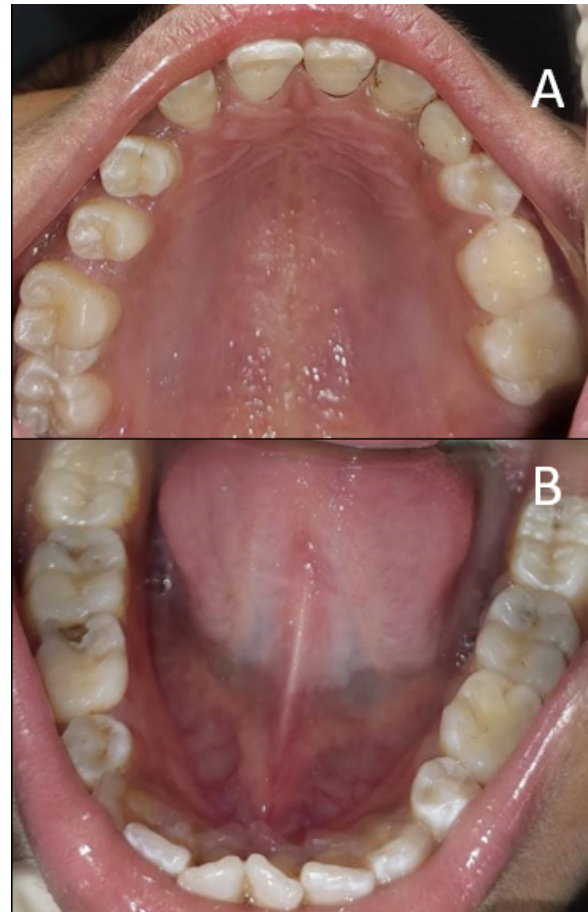
\* Corresponding author.

E-mail address: [dr.sanafatima847@gmail.com](mailto:dr.sanafatima847@gmail.com) (S. Fatima).

complaint of pain in the lower right back tooth region. History of present illness revealed that she developed sharp night pain in the same region 2-3 months back. Medication for the same relieved pain and she continued same medication prescribed by general practitioner. However, she noticed localized mild pain while chewing 4-5 days back, for which she reported to hospital. On intra-oral clinical examination proximal caries in relation to 85 was present with no swelling or sinus tract associated (Figure 1B). The tooth 85 was non-tender on percussion but mild pain on palpation in vestibular area with grade I mobility. Initial caries was present in teeth 36, 37 and 46. The teeth 12 and 22 were found unerupted (Figure 1A&B, Figure 2). There was no response to electrical pulp test or thermal (cold) test irt 85. Medical history was non-significant. Intraoral periapical radiograph of 85 region revealed coronal proximal radiolucency approaching pulp, thickened peri-radicular periodontal space, furcal radiolucency with loss of lamina dura; and permanent successor tooth bud missing (Figure 3A). Interdental bone loss between 46 and 85 was noticed providing space for food lodgment, which could be a reason for localized discomfort. A panoramic radiograph revealed teeth 12, 22, 35 and 45 congenitally missing (Figure 4). Based on the clinical and radiographic examination, provisional diagnosis of pulp necrosis with dentoalveolar abscess was made in relation to 85.

Treatment planning was made to perform the pulpectomy irt 85 with MTA obturation followed by Stainless steel crown. Restoration was planned in relation to 36, 37 and 46. After obtaining consent from the patient and her parents, inferior alveolar nerve block was given with 2% lignocaine. Access opening with a round diamond bur was done under rubber dam isolation. Pulp was extirpated using barbed broaches and working length was determined (Figure 3B). Biomechanical preparation was done using K files (Dentsply Maillefer, Baillaigues, Switzerland). Sodium hypochlorite (Parcan, Septodont Maharashtra, India) with 3% concentration was used as an intracanal irrigant with intermittent saline irrigation. Biomechanical preparation was completed in first appointment itself. Intracanal dressing with the paste like mixture of calcium hydroxide, glycerine and 2-3 drops of 2% chlorhexidine was given for one week.<sup>7</sup> At the following appointment, canals were washed with saline with 2% chlorhexidine used as the last irrigant. Canal were dried using absorbent paper points. MTA (Dentsply Tulsa, Tulsa, OK, USA) was mixed in distilled water as per the manufacturer instructions. Obturation was done and cotton damped in normal saline was placed over the MTA. Tooth was restored temporarily with thick ZOE mix (Figure 3C). On the second appointment after 24 hours, temporary restoration along with the cotton removed and the tooth was restored with glass ionomer cement (Ketac molar, 3M ESPE, Neuss, Germany). Full extra-coronal restoration with stainless steel

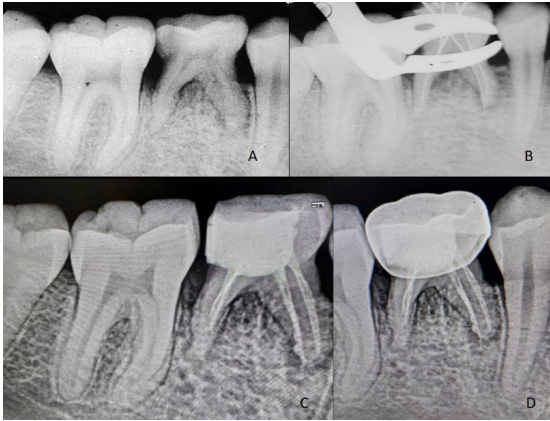
crown (3M ESPE, Neuss, Germany) was done on the next appointment and the patient was kept on follow up (Figure 3D). Six months follow up showed uneventful healing of peri-radicular bone with no signs of external or internal resorption (Figure 5).



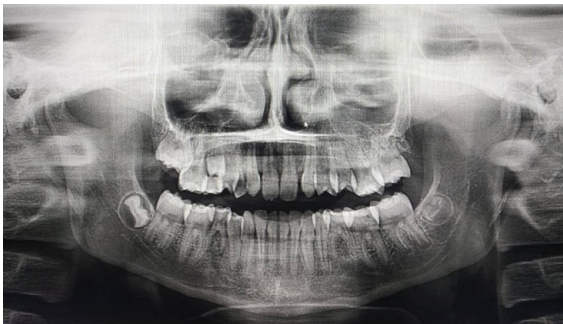
**Fig. 1:** Pre-operative intraoral occlusal photographs of the patient.



**Fig. 2:** Pre-operative frontal photograph showing missing 12 & 22



**Fig. 3:** Pre and post-operative IOPA X-rays of 85 region: **A:** Radiograph of the patient showing carious 85 with peri-radicular thickening of periodontium, furcal loss of lamina dura and missing 45; **B:** Access opening and working length radiograph of 85; **C:** Immediate post-operative radiograph of obturation with MTA; **D:** Immediate post-operative radiograph with full extra-coronal restoration with SS crown



**Fig. 4:** OPG of the patient showing congenitally missing teeth in relation to 12, 22, 35, 45.



**Fig. 5:** Six months follow up radiograph of the patient with uneventful healing of peri-radicular tissues with visible furcal lamina dura.

### 3. Discussion

Second premolar is being the most common congenitally absent tooth after the third molar. An early diagnosis of its absence is always crucial because of late calcification many times. The dental follicle and/or cusp tip should be visible by eight years of age in the radiographs; however, in some cases it can appear as late as fourteen years of age.<sup>2,8</sup> Our patient was 13 years old and appearance of tooth bud of 45 was very unlikely. Therefore, preservation of 85 in functional state was thought fruitful for patient chewing efficiency which in turn is necessary for nutrition and jaw growth.

A retained deciduous tooth that occludes well with its opposing tooth and has sound periodontal integrity with satisfactory status of crown and roots may serve for several years.<sup>9</sup> A primary tooth may remain retained because of the factors e.g. impacted/ missing or intrabony migration of permanent successor. Treatment of such cases may vary depending upon these causative factors, need for orthodontic treatment requiring extraction, restorability of crown in presence of multisurface caries, existence of infraocclusion and mobility of retained primary tooth due to extensive root resorption.<sup>10</sup>

The presented case report did not show any crowding in developing arches. In the absence of dental arch crowding, conservative treatment is always a better option to save the persistent primary tooth as long as possible. This treatment plan not only preserve the integrity of the dental arch but also the optimum proprioception for growth of mandible. We therefore chose conservative treatment in our case. In addition, in the present case, assuming the longer survival of primary tooth due to congenital absence of permanent successor, it was endodontically treated alike permanent tooth. Intracanal medicament (calcium hydroxide mixed with glycerin and 2% chlorhexidine) used in this case, has been shown effective against most resistant bacteria i.e. *Enterococcus faecalis*.<sup>7</sup> Chlorhexidine 2% was used as a last irrigant because of its property of substantivity that it gets adsorbed onto the roots dentinal tubule.<sup>7</sup>

However, since the survival of the tooth was unpredictable, which may eventually require prosthodontic intervention, the patient was informed earlier about the same.<sup>10,11</sup> Preserving the retained primary teeth with intact crown and root structure, would prevent arch length discrepancy and maintain the space for interim period.<sup>12</sup> Implant replacement can be considered at an average age of 22 years, 10 years later than normal exfoliation time and patient was informed for the same.<sup>13</sup>

Obturing material for retained deciduous teeth with missing successor should be biocompatible and non-resorbable as they show no sign of root resorption.<sup>12</sup> Guttapercha, alongwith the newer materials introduced eg. Mineral Trioxide Aggregate (MTA) and Biodentine™ can be considered as a root canal filling material for the primary

teeth with missing permanent successors.<sup>14,15</sup>

We had used MTA, a recently introduced biocompatible cement that has showed cemental repair, bone formation, and PDL regeneration when used in endodontics. Research studies indicate that MTA gives a superior seal even in the presence of moisture and blood and has an antibacterial effect. It is assumed that MTA is not absorbed and if it does then it would be absorbed slowly, making it a best suited root canal filling material for primary teeth with missing successor.<sup>16</sup> O'Sullivan SM et al.,<sup>16</sup> obturated retained primary mandibular second molar with MTA in 20-year-old male patient. Four-month follow-up radiograph reveals decrease in size of radiolucency at apex. Bezgin T et al.<sup>5</sup> compared the clinical and radiographic success of MTA in comparison to gutta-percha and found better radiographic success for MTA at the end of 3 years. Our case report support their findings.

#### 4. Conclusion

Congenital absence of permanent successor is a dental anomaly with multifactorial etiology.

Mineral Trioxide Aggregate (MTA) was used in this case report. We conclude that MTA would be a better option for obturation in deciduous teeth with missing successor.

#### 5. Source of Funding

None.

#### 6. Conflict of Interest

None.

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#### Author biography

**Sana Fatima**, Post Graduate Student

**Saima Yunus Khan**, Professor

**Divya S. Sharma**, Professor

**M.K. Jindal**, Professor

**Faiza Jamil**, Post Graduate Student

**Cite this article:** Fatima S, Khan SY, Sharma DS, Jindal MK, Jamil F. Functional restoration of mandibular second primary molar with missing successor: A case report. *IP Ann Prosthodont Restor Dent* 2022;8(3):157-160.