

# Obturation of a Retained Primary Maxillary Second Molar Using Biodentine™: A Case Report

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## ABSTRACT

Maxillary molars have highly variable root canal morphology. However, the presence of the two roots is a rare occurrence. The success of pulpextomy treatment depends on removal of infected pulp and filling it with a biocompatible material. In order to achieve, it the clinicians should understand the morphology of the individual root canal and atypical root canal configuration. The purpose of this article was to describe an unusual anatomy in primary maxillary second molar with missing successor tooth. Biodentine™ a new dentine substitute was used as an obturating material for retained maxillary second molar. After 24 months follow up, the success of Biodentine™ for management of primary tooth with missing successor was evaluated and reported.

**Keywords:** Dentin substitute, Pulpextomy, Root dysmorphology

## CASE REPORT

A 12-year-old boy was referred to the Department of Paedodontics and Preventive Dentistry for evaluation and treatment of a carious right primary maxillary second molar [Table/Fig-1]. During clinical examination it was tender on percussion and palpation with no evidence of mobility and sinus tract. The patient had no significant medical history. Intraoral periapical radiograph of right maxillary region revealed radiolucency involving pulp with absence of first and second premolars [Table/Fig-2]. A panoramic radiograph was taken to investigate the absence of any other permanent tooth bud [Table/Fig-3]. Based on the clinical and radiographic examination, dental caries with chronic pulpitis in relation to right primary maxillary second molar and congenitally missing premolars was diagnosed. Following parental consent, the tooth was anaesthetized with 2%

lignocaine hydrochloride 1:2,00,000 epinephrine (Lignox Indoco Remedies Ltd. Mumbai, India) and isolated using a rubber dam. Access preparation was completed; two canal orifices (mesiobuccal and palatal) were located [Table/Fig-4]. The working length was determined radiographically measuring 13 mm for the palatal canal and 10 mm for the mesiobuccal canal. The root canals were enlarged till 35 K-file (Mani, Inc, Tochigi, Japan). During instrumentation the canals were irrigated using 3% sodium hypochlorite solution and the final irrigation was done with saline. The canals were obturated with Biodentine™ [Table/Fig-5]. Using a measured endodontic plugger the material was vertically condensed from the apex to the canal orifice in both palatal and mesiobuccal canals [Table/Fig-6]. The coronal seal of the endodontically treated tooth was done with glass ionomer cement (GC Fuji II, Tokyo, Japan). Finally size five stainless



[Table/Fig-1]: Clinical picture showing caries in primary second molar. [Table/Fig-2]: Radiograph showing radiolucency involving pulp in primary second molar with missing successor. [Table/Fig-3]: Orthopantomogram showing radiolucency involving pulp in primary second molar with missing successors. (Images left to right)



[Table/Fig-4]: Intraoral picture showing mesio buccal and palatal canal orifice. [Table/Fig-5]: Biodentine™-powder in capsule and liquid in a pipette. [Table/Fig-6]: Intraoral picture showing obturation of mesio buccal and palatal canal with Biodentine™. (Images left to right)



**[Table/Fig-7]:** Postoperative radiograph showing obturation of primary maxillary second molar with Biodentine™. **[Table/Fig-8,9]:** Follow up radiograph after six and 24 months. (Images left to right)

steel crown (3M ESPE, St Paul, MN, USA) was cemented using Type 1 glass ionomer cement [Table/Fig-7]. At six and 24 months follow up [Table/Fig-8,9] the tooth revealed no periapical lesion and no evidence of mobility.

## DISCUSSION

Maintenance of the retained primary tooth with congenital absence of permanent successor is a challenge to the dentist. On literature search, the anomaly of double rooted maxillary second molar in primary dentition has not been documented. This case report describes a retained primary maxillary second molar with two roots and missing premolars. The primary maxillary molars in general have two buccal and one palatal canal, analogous to three distinct roots. Anomalies in root formation occur due to failure in invagination of Hertwig's Epithelial Root Sheath (HERS). The root sheath grows downward and covers the entire dental papilla during normal development of root. The number of tongue like projection growing inward towards the center from lateral side of root sheath corresponds to the number of roots. Failure of the lateral tongue like projection to form completely, results in dysmorphological root formation like double root molars [1].

Agenesis of one or more teeth is most common anomaly of dental development [2]. The aetiology of dental agenesis is yet to be fully explained. Kurisu K et al., has suggested that tooth agenesis is typically transmitted as an autosomal dominant trait with incomplete penetrance and variable expressivity [3]. Environmental factors (trauma, infection, irradiation and endocrine disorders) are associated with developmental absence of teeth. Ectodermal dysplasia is one of the most common syndrome related with congenital missing of teeth and anodontia [4].

Retained primary teeth having intact crown and root structure with missing successor should be preserved. This would prevent arch length discrepancy and maintain the space without requirement for orthodontic or prosthetic treatment [5]. Obturating material used for filling the root canal space of primary teeth should resorb at a similar rate as the primary root [6]. Various root canal filling materials are available for primary teeth namely, Zinc Oxide Eugenol (ZOE) paste, calcium hydroxide alone or a combination of calcium hydroxide and iodoform paste [7]. ZOE was used as a common material for obturating primary teeth. Accidental extrusion beyond the apex of ZOE remains in the alveolar bone for months to years. The extruded material may also cause a foreign body reaction [8]. Due to this limitation calcium hydroxide based obturating materials were introduced. Calcium hydroxide with iodoform is widely used for obturation of primary teeth due to its better properties compared to ZOE [9]. Primary tooth without permanent tooth bud shows no signs of root resorption. Obturating material for retained primary teeth with missing permanent teeth should be biocompatible and non resorbable [6]. Guttapercha, Mineral Trioxide Aggregate (MTA) and Biodentine™ should be considered as a root canal filling material for retained primary teeth with missing successor. These materials are considered to be biocompatible and non resorbable. O' Sullivan SM et al., reported a case of 20-year-

old male with retained primary mandibular second molar, obturated with MTA [10]. Bolla N et al., reported a case of 26-year-old female with retained primary mandibular second molar, obturated with guttapercha [11]. In this case Biodentine™ a recently introduced material was used as a root canal filling material for retained primary maxillary second molar. Biodentine™ is considered to be an alternative to conventional calcium hydroxide based material. It is bioactive cement having similar mechanical properties like dentin. The material is available as liquid and powder component. The powder in the capsule contains tricalcium, dicalcium silicate and calcium carbonate. Zirconium dioxide acts as a contrast medium. The liquid component contains an aqueous solution of calcium chloride with an admix of poly carboxylate. The liquid is added to the powder in the capsule and mixed using amalgamator for 30 seconds. The consistency of the material once mixed is similar to zinc phosphate cement. On follow up, the retained primary second molar was normal in function with no associated pain and periapical changes. Biodentine™ has shown to be a biocompatible material having superior sealing properties [12].

Long term follow up of such cases are required to assess the use of new materials in challenging clinical situation. In dentition having retained primary teeth with missing successor Biodentine™, can be considered as the material of choice for root canal filling. Documentation of such developmental abnormalities with its modified clinical management will aid the clinicians for successful endodontic treatment.

## CONCLUSION

We conclude that this case report presents an unusual case of a primary maxillary second molar with double roots with missing permanent first and second premolars. This paper also adds on the use of a new dentin substitute Biodentine™ as a permanent obturating material for such cases with two years follow up.

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