



## CASE STUDY

### PRIMARY MAXILLARY CENTRAL INCISORS WITH BIFURCATED ROOT CANALS

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#### ABSTRACT

The rationale of pediatric endodontics is to preserve a primary tooth in the arch till its permanent counterpart replaces it. A thorough knowledge of the internal anatomy of primary teeth is essential for complete debridement and efficacious endodontic treatment of these teeth. Undetected or missed root canals can leave dormant bacteria in the root canal, thus hampering the success of pulpectomy. Very few studies in literature describe the comprehensive anatomy of primary maxillary central incisors. Existing literature describes the root canal anatomy of these teeth as a single, round, oval or triangular root canal. Variations in the root canals of the primary maxillary central incisors have not been reported. Our case report illustrates a unique case of primary maxillary central incisors with bifurcated root canals and its subsequent endodontic treatment.

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## INTRODUCTION

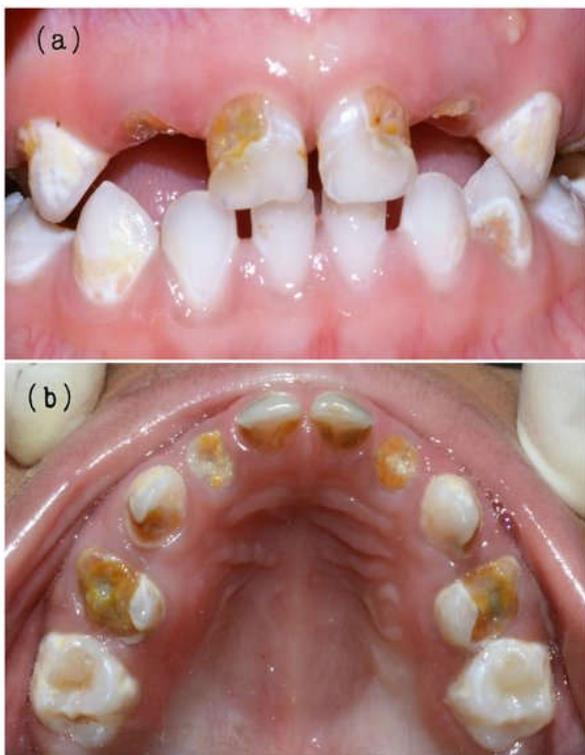
Pediatric endodontics is a challenge by itself, but when the tooth presents with a variation away from its usual anatomy, this challenge is increased manifold. Success of pulpectomy in primary teeth is dependent on a comprehensive understanding of root canal morphology. The various causes of failure of primary tooth endodontics are improper case selection, incomplete debridement and shaping of the root canal systems, undetected or extra root canals and inadequate obturation. Variation in root canal anatomy in primary dentition has been reported scarcely. Documented cases include three rooted primary mandibular molars (Falk and Bowers, 1983) while others have reported single root canals in mandibular primary first molars. Regarding the variations in the primary anterior root canal anatomy, bicrooted primary maxillary canines (Norman and Randall, 1996) have been described. Primary maxillary central incisors usually have a single conical shaped root and a single canal (Salama et al., 1992). Literature describing the variations in the root canal morphology in the primary central incisors is meagre (Morrow and Hylin, 1993).

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This case report presents endodontic treatment of two primary maxillary central incisors with bifurcated root canals.

### Case report

A 3 year 9 month old girl reported to the Department of Pediatric Dentistry, with a chief complaint of decayed teeth. Intra oral examination revealed that the patient had multiple carious teeth (Fig. 1). Intraoral periapical radiograph (IOPA) of the maxillary central incisors revealed deep proximal caries involving the pulp and the presence of bifurcated root canals (Fig. 2a). Both central incisors showed Vertucci's type V root canal configuration i.e. one root canal leaves the pulp chamber and divides short of apex into two separate and distinct canals with separate apical foramina. On detailed case history, radiographic examination and pulp vitality tests, 51 and 61 were diagnosed with irreversible pulpitis and pulpectomy was planned. The primary maxillary central incisors were isolated with rubber dam. Caries excavation was done and access opening was performed with high speed round diamond bur BR-46 (Mani, Inc., Japan). The root canals were then irrigated with 1% sodium hypochlorite. The root canal working length was determined using apex locator (i-Root, Meta Biomed Co., Ltd, Korea). Chemomechanical preparation was carried out by step back technique upto K-file # 30 in each tooth.



**Figure 1. (a) Pre-operative Labial view of primary maxillary central incisors**  
**(b) Pre-operative Incisal view of primary maxillary central incisors**

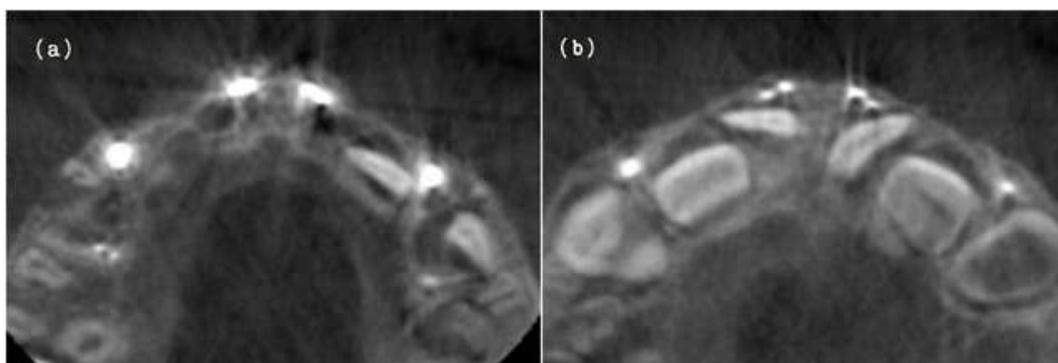
The root canals were obturated with a combination of iodoform and calcium hydroxide (Metapex, Meta Biomed Co., Ltd, Korea). Post-operative radiographs and Cone Beam Computed Tomography (CBCT) were taken to ensure optimal obturation (Fig. 2b and 3).

## DISCUSSION

Variations in root canal anatomy in primary maxillary central incisors have been reported mainly through case reports. Documented cases involving multiple canals in primary central incisors are limited to developmental anomalies like fusion, gemination or supernumerary roots (Morrow and Hylin, 1993). There is however, a serious paucity of literature concerning the internal root canal anatomy of primary maxillary central incisor. With the advent of cone beam computed tomography (CBCT), studies have been carried out to investigate the detailed morphology of primary teeth, but these studies are also limited to posterior teeth. Primary maxillary central incisors generally have a single, round, oval or triangular root canal without bifurcation or accessory canals (Salama *et al.*, 1992). Our case report illustrates a rare case of bifurcated root canal (Vertucci's type V) in primary maxillary central incisors. Such a variation in primary maxillary central incisor has not been reported. This unique morphological variation could be attributed to the presence of a well developed labial groove on the roots of these teeth (Barker *et al.*, 1975). According to



**Figure 2:(a) Pre-operative radiograph of primary maxillary central incisors showing bifurcated root canals, (b) Post-operative radiograph of primary maxillary central incisors showing optimal obturation of root canals**



**Figure 3: (a) Axial slice of CBCT showing single obturated canal in cervical one third of primary maxillary central incisors.**  
**(b) Axial slice of CBCT showing two distinct obturated canals at the apex of primary maxillary central incisors**

Barker *et al*, a very well developed labial groove results in a partial or complete division of the root canal at the broad apex (Barker *et al.*, 1975). The clinician should be aware of morphologic variations that occur within primary teeth root canal anatomy. A correct diagnosis and evaluation, followed by radiographic examination with varying angles should be made before commencing pulpectomy of teeth with unusual anatomy. Reports of cases with unusual morphology of root canals have academic value. Detailed investigations on the morphology of primary teeth are warranted in the future, not only from an academic point of view but also to aid in endodontic management of these teeth. Documentation of such case reports facilitates the recognition and successful management of seemingly simple teeth that can have diverse morphological variations.

### Conclusion

Knowledge and understanding of internal anatomy and variation of root canal is the key to success of endodontics. Unfilled, unprepared or missed canals will have its impact not only on the success of endodontic treatment but can also have a detrimental effect on the developing permanent teeth. The clinician should always be attentive as the most routine cases might deviate from normal.

### Importance of this paper to General dentists:

- Dentists should be aware of the anatomical variations that can occur in the root canals of primary teeth.

- Undetected or extra root canals may leave dormant bacteria in the root canal which may contribute to the failure of pulpectomy.
- Primary maxillary central incisors which are assumed to be single rooted having a single canal may present with an unexpected challenge.

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