

# Primary molars with extra root canals - a case series

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Received: 16/11/2015

Accepted: 26/03/2016

## INTRODUCTION

The aim of the root canal therapy is to clean the canals thoroughly. The presence of bacterial biofilms in the root canals can cause the treatment to fail. The operator should understand the morphologic changes that continually occur within primary teeth and be familiar with the root canal morphology of primary teeth. The knowledge of the atypical root canal anatomy helps in accurately locating, cleaning, and obturating the root canals.<sup>1</sup>

The root canals in the primary anterior teeth have few irregularities and can be treated easily in comparison to posterior primary teeth. The posterior primary teeth contain ramifications and deltas between canals making it difficult to debride.<sup>2</sup>

The primary tooth begins to resorb as soon as it erupts, and this resorption changes the position of the apical foramen. Simultaneously, secondary dentin is deposited in the root canals which also change the number and size of the root canals.<sup>2</sup>

The maxillary primary molars may have two to five canals, with the palatal root usually rounder and longer than the two facial roots. In the mesiobuccal root, two canals occur in approximately 75% of the primary maxillary first molars and 85-95% of primary maxillary second molars. Fusion of the palatal and distobuccal

## ABSTRACT

A thorough knowledge of the root canal morphology is essential for the endodontic therapy of primary teeth. Variations in the root canal systems in primary teeth can create a challenge to the practitioners during endodontic treatment. Meticulous cleaning and filling of all the root canals in all its dimensions, helps to eliminate or reduce the microbial load in the canals. The dentists should be aware of such variations and should be motivated to look for them in order to avoid post-operative complications. This article discusses the endodontic management of two primary maxillary second molars and one primary mandibular first molar with additional canals.

**Key Words:** Primary Molars, Root Canal Morphology, Anatomic Variation, Extra Root Canals.

roots occurs in approximately one-third of the primary maxillary first molars and occasionally in the primary maxillary second molars.<sup>2</sup>

The primary mandibular first and second molars usually have three canals which generally correspond to the external root canal anatomy. About 75% of the mesial roots in primary mandibular first molars contain two canals; whereas in primary second molars, 85% of the mesial roots contain two canals. Only 25% of the distal roots in either tooth contain more than one canal.<sup>2</sup>


A thorough knowledge of the roots and the root canals is needed to perform a good endodontic treatment. The present case series discusses the successful endodontic management of primary maxillary second molars and primary mandibular first molar with extra canals.

## CASE REPORTS

### Case 1:

A nine year old boy reported to the Department of Pedodontics and Preventive Dentistry, I.T.S Dental College, Hospital and Research Centre with the chief complaint of pain in his left upper back tooth region since last one week. The pain intensified by thermal stimuli and mastication. Medical history was non-contributory. Clinical examination revealed carious left primary maxillary second molar which was tender on percussion. Vitality testing with ice pencil caused an intense lingering pain. Pre-operative radiograph revealed grossly carious tooth with caries approaching the pulp space. From clinical and radiographic findings, a diagnosis of symptomatic irreversible pulpitis was made, and pulpectomy was planned.

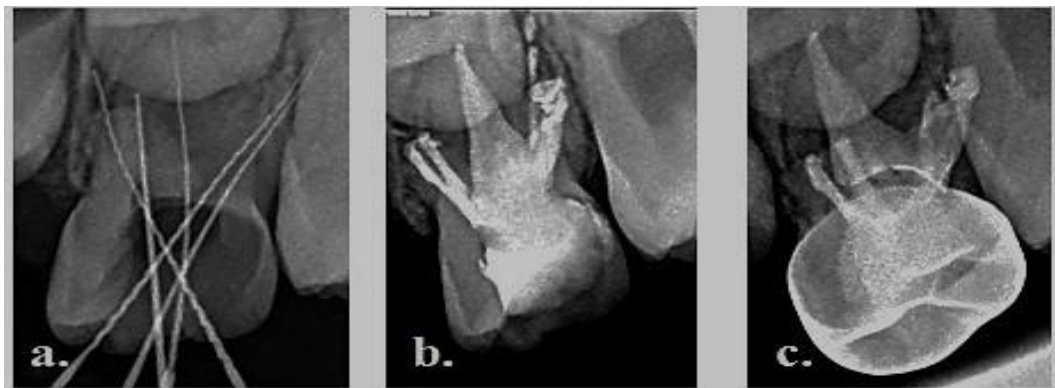
The tooth was anesthetized with 1.8 ml lidocaine 2% with epinephrine 1:100,000. An endodontic access cavity was made. After thorough debridement of the pulp chamber exploration with straight probe and

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	DOI: 10.5958/2393-9834.2016.00011.5

endodontic files revealed two canals in the mesiobuccal root, two canals in distobuccal root and one canal in palatal root. (Fig. 1)

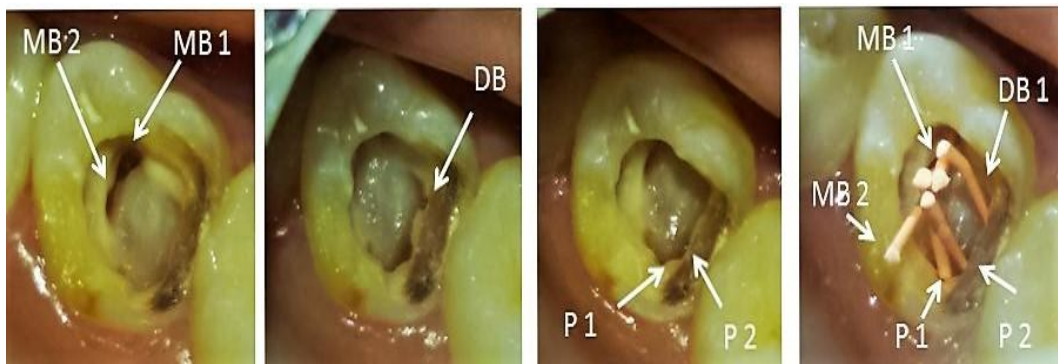


**Fig. 1a:** Pulpal floor of left maxillary second primary molar with five canals. Mesiobuccal Root canals (MB 1 & 2), Distobuccal Root canals: (DB 1 & 2) and 1 Palatal Root canal (P)

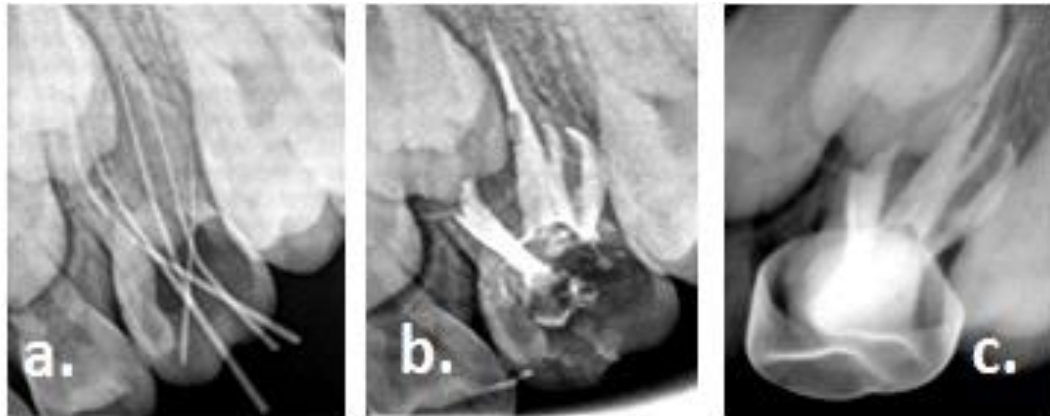


**Fig. 1 b:** Radiographs showing a. Working Length, b. Obturation, c. Stainless Steel Crown on left maxillary second primary molar tooth

Radiographs were taken from different angles and the presence of 5 canals was confirmed. (Fig. 2) In later appointments cleaning and shaping was performed using endodontic K-files (Mallifer, Dentsply). Thorough irrigation was done with 2.5% sodium hypochlorite solution (NaOCl). The canals were dried with absorbent points and obturated using Metapex (Meta dental Co. Ltd., Korea). The tooth was then restored with Glass ionomer cement (Fuji II®, GC Europe N.V. Leuven, Belgium) followed by stainless steel crown (3M™ ESPE™)



**Fig. 2 a:** Pulpal floor of left maxillary second primary molar with five canals. Mesiobuccal Root canals: (MB 1&2), 1 Distobuccal Root canal (DB) and Palatal Root canals: (P 1&2)



**Fig. 2 b:** Radiographs showing a. Working Length, b. Obturation, c. Stainless Steel Crown on left maxillary second primary molar tooth

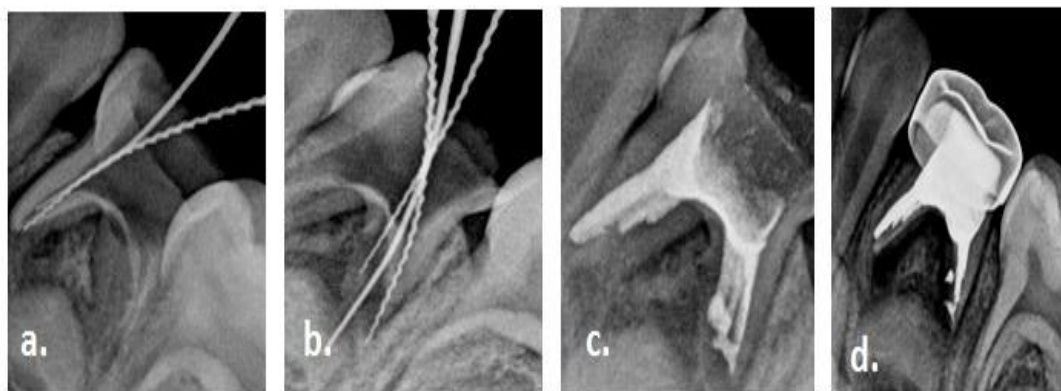
**Case 2:**

A seven year old boy reported to the Department of Pedodontics and Preventive Dentistry with the chief complaint of pain in left upper back tooth region from last seven days. Preoperative radiograph revealed grossly carious tooth with caries approaching the pulp space.

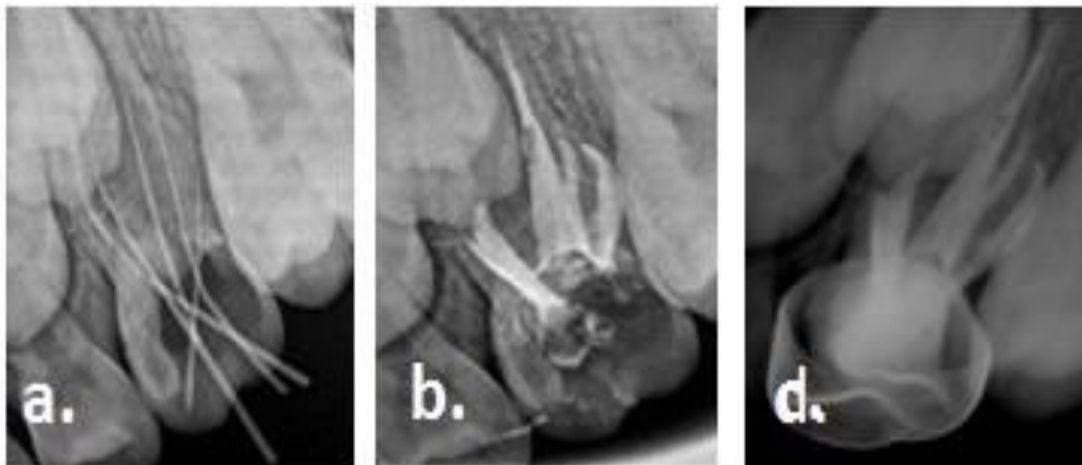
From clinical and radiographic finding a diagnosis of symptomatic irreversible pulpitis was made and endodontic treatment was started. Once access opening was made, exploration of the pulpal floor revealed two mesial canals, one distal canal and two palatal canals (Fig. 3 and 4). After thorough debridement of the root canals with endodontic files, obturation was done with Metapex followed by stainless steel crown.



**Fig. 3 a:** Pulpal floor of left mandibular first primary molar with five canals. Mesial Root canals: Mesiobuccal and Mesiolingual Canal (MB&ML), Distal Root canals: Distobuccal (DB 1&2) and Distolingual canal



**Fig. 3 b:** Radiographs showing a. Working Length of Mesial Root, b. Working Length of Distal Root, c. Obturation, d. Stainless Steel Crown on left mandibular first primary molar tooth (Case 3)



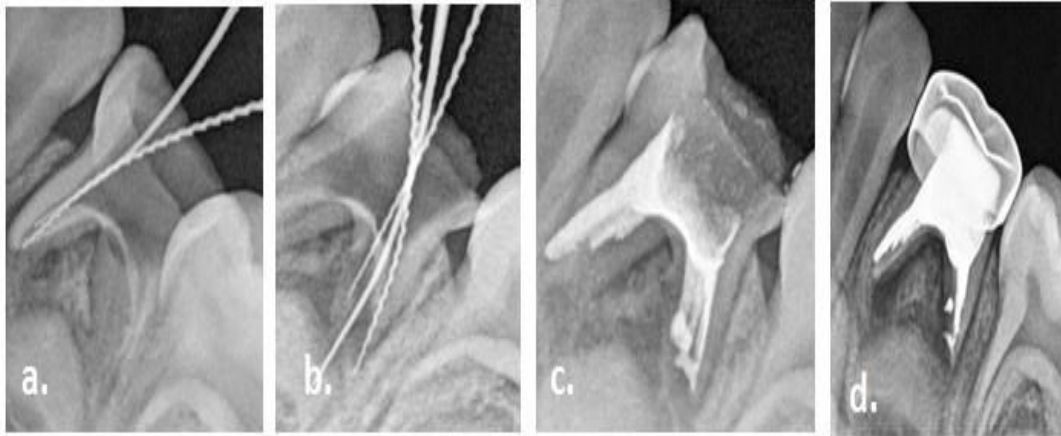
**Fig. 4:** Radiographical images showing a. working Length, b. obturation, d. Stainless Steel Crown adaptation on maxillary left second primary molar tooth. (Case 2)

**Case 3**

A four year old boy presented to the Department of Pedodontics and Preventive Dentistry with a chief complaint of pain in his left lower back tooth region from last ten days. Clinical examination revealed a grossly carious left lower first primary molar. Radio-graphically caries was approaching pulp space and radiolucency involving roots was appreciated. A diagnosis of symptomatic irreversible pulpitis was made and endodontic treatment was initiated. Five canals were found in two rooted lower first primary molar. Three canals in the distal root and two in the mesial root were found. (Fig. 5) Through debridement of the root canals was done with endodontic files. The root canals were obturated with Metapex followed by a stainless steel crown. (Fig. 6)



**Fig. 5:** Pictures showing the Pulpal floor of mandibular first primary molar. MB= Mesiobuccal(1 canal),ML= Mesiolingual( 1 canal), DB= Distobuccal( 2 canal) and DL=Distolingual (1 canal). (Case 3)



**Fig. 6: Radiographical images showing a. working length of mesial roots, b. working length of distal root, c. obturation, d. stainless steel crown adaptation on mandibular left first primary molar tooth. (Case 3)**

## DISCUSSION

Maintenance of dental integrity in pediatric dental patients is important for ensuring correct tooth spacing, mastication, esthetics, phonation and prevention of psychological effects due to tooth loss.<sup>6</sup> The main goal of the root canal therapy for primary teeth is to remove the infected tissue and obtain sterile root canals. A detailed knowledge of the root canal morphology of primary teeth can greatly improve the effectiveness and outcome of the treatment.<sup>3</sup>

Most of the maxillary and mandibular primary molars have 2-4 root canals. Many investigators have studied the root and root canal morphology of primary molars and it is comparatively less frequent to find extra root canals in the distal or palatal root of primary maxillary second molar and in distal root of primary mandibular molars.<sup>2,4-6</sup>

Bagherian A et al<sup>3</sup> studied root canal morphology of 90 human primary molars in Iranian population. All the maxillary second primary molars displayed one root canal in mesiobuccal, distobuccal and palatal root. In mandibular first molars 81.5% of the mesial roots had two root canals and 18.5% had one root canal, 22.2% of the distal roots had two canals and 77.8% had one root canal.<sup>3</sup>

Sarkar S and Rao A.P<sup>4</sup> in their study found that, two out of nine samples of the extracted maxillary second primary molars had one root canal in the mesiobuccal root and seven samples had two root canals. In the distobuccal root seven samples had one root canal and two samples had two canals, which is only 22.2% of the samples. Out of nine samples eight samples had one root canal in the palatal root, and in samples with fused palatal and distobuccal root one sample was there with three root canals.<sup>4</sup>

Zoremchingi<sup>6</sup> and colleague reported that out of fifteen samples of primary maxillary second molar examined, seven had one root canal in the Meisobuccal root and eight had two root canals. In the distobuccal root, out of fifteen samples eleven had one root canal

and four (26.3%) had two root canals. For palatal root out of fifteen samples nine samples had one root canal and six samples had two root canals.<sup>6</sup>

Therefore, it is not uncommon to find the distobuccal and palatal roots of the maxillary molar fused.<sup>4,5</sup> The mesial root canals of the mandibular molars and the mesiobuccal root canals of the maxillary molars showed more frequent and greater variations in the root canals, than did the distal and distobuccal root canals of primary molar teeth.<sup>6</sup>

All the cases presented here displayed variations in term of root canals. Case 1 had two root canals in the distal root, two in the mesial root and one in the palatal root. Case 2 had two root canals in the palatal, two root canals in the mesial and one root canal in the distal root; and in case 3 there were two root canals in mesial and three root canals in the distal root respectively which is rare to find.

The present study utilized the radiographic method to identify root canals. Since, radiographs are superimpositions of overlying structures, which may obscure the structure of interest and might not represent the actual morphology. Therefore, there are limitations in the value of radiographs alone in describing certain aspect of root canal morphology. 3D images of primary molars may provide better clues and knowledge of variations in the root canal morphology,<sup>5</sup> which would improve diagnoses and treatment.

The present study motivates the practitioners to explore the extra canals present in primary teeth and utilize the 3D imaging systems in addition to radiographs to achieve a better endodontic outcome.

## CONCLUSION

Extra canals in primary molars may be difficult to locate but are not rare in occurrence. Efforts should be made to explore these extra canals for successful endodontic treatment outcome.

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**How to cite this article:** Chawla S, Goswami M, Sachdeva P, Walia V. Primary molars with extra root canals – a case series. *J Dent Specialities* 2016;4(1):55-60.

**Source of Support:** NIL

**Conflict of Interest:** All authors report no conflict of interest related to this study.