CASE REPORT

# Single-rooted primary first mandibular molar

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#### **SUMMARY**

Morphological variations like single-rooted molar in primary dentition are scarce. Understanding the root canal anatomy and variations is necessary for successful root canal therapy. The purpose of the present article is to report successful endodontic treatment of primary left mandibular first molar with an abnormal morphology of a single root. This case report highlights the importance of knowledge and its applications in the management of anomalous anatomic variants which play a crucial role in the success of endodontic treatment.

#### **BACKGROUND**

Successful root canal therapy requires a detailed knowledge of roots and root canal morphology. Molars with single canal can be attributed to fusion of roots or deep taurodontism. Occurrence of single-rooted molars is due to failure of HERS to completely encompass the dental papilla during its initial (vertical) growth or the failure of the lateral tongue-like projections to form completely. Developmental anomalies may occur during any stage of tooth development. A number of terms have been used to describe single-rooted molars like conical, fused and pyramidal. The purpose of the present article is to report successful endodontic management of single-rooted mandibular primary molar.

#### CASE PRESENTATION

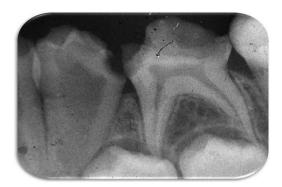
A 7-year-old boy reported with a 3-day history of pain in the lower left back tooth region. His pain was a spontaneous type which became worse during the night. Clinical examination revealed a grossly carious tooth (74). Intraoral examination revealed all erupted primary teeth and permanent first molars erupted. Dental caries were found in 74, 75, 84 and 85.

## **INVESTIGATIONS**

Intraoral periapical radiographs of the decayed teeth were taken using a bisecting angle technique. It revealed deep caries involving enamel, dentine and pulp in 74, 75, 84 and 85. While evaluating the root morphology of 74 had one root canal and single root (figure 1). Other primary molars had normal root morphology.

#### **TREATMENT**

From the clinical and radiographic findings, a diagnosis of symptomatic irreversible pulpitis was made for the tooth 74, and pulpectomy was scheduled. The inferior alveolar nerve block was given with 2% lignocaine containing 1:80 000 epinephrine



**Figure 1** Preoperative radiograph showing single root and single canal in 74.

(Lignox 2%; Indoco Remedies Ltd, Mumbai, India). The tooth was isolated with rubber dam and access cavity was prepared in 74. All pulp tissue was removed. Canal exploration with a No.10 file and instrumentation was performed using a K-file. Normal saline irrigation was performed throughout the instrumentation. The canal was dried with absorbent paper points (Dentsply Tulsa, Tulsa, USA) and obturated with Metapex. The access cavity was filled with Glass ionomer cement (GC Corporation Tokyo, Japan) and postoperative intraoral periapical radiograph was taken after obturation (figure 2). Pulp therapy was carried out for 75, 84 and 85. After 1 week, stainless steel crown (3M ESPE Unitek, USA) was carried out and intraoral periapical radiograph was taken (figure 3).

#### **OUTCOME AND FOLLOW-UP**

The patient was advised to seek a review every 3 month.

## DISCUSSION

A great deal of variation can be found in the literature with respect to the root and root canal morphology of teeth.<sup>5</sup> A thorough knowledge of internal and external anatomy, coupled with a correct diagnosis and proper cleaning and shaping of the root canal system, will lead to a successful treatment outcome.<sup>6</sup> Root canal morphology was limitless in its variability and clinicians must be aware that anatomic variations constitute a formidable challenge to endodontic success.<sup>7</sup>

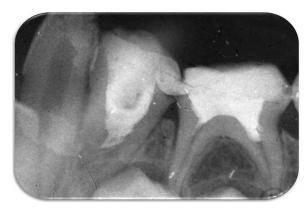
The Standard anatomical description of primary first mandibular molar is two roots and three main canals. Conical single roots or canal systems are also a rare occurrence and are rarely mentioned in studies. When only one root is present, the root canal system may present only a broad root canal, two canals that may or may not join, or a C-shaped



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**Figure 2** Radiographic image showing single canal in 74 obturated with Metapex paste, pulpotomy in 75.



**Figure 3** Postoperative radiograph showing stainless steel crown in 74, 75.

canal. <sup>10</sup> Robbins and Keene <sup>11</sup> suggested that single pyramidal-shaped root in molars was inherited as an autosomal dominant condition. However, another report suggested as an autosomal recessive inheritance pattern. <sup>2</sup> Females are seen to be more frequently affected than males with respect to root dysmorphology. The cause for this female predilection is unknown. <sup>12</sup> Sabala *et al* <sup>13</sup> stated that the rarer the aberrations, the more likely that is bilateral. In the present case the single-rooted primary molar is unilateral.

**Table 1** Case reports of single-rooted primary molars

Author	Year	No of cases	Description	
Ackerman <i>et al</i> <sup>4</sup>	1973	1	Primary molars	
Gideon <i>et al</i> <sup>2</sup>	1991	2	Primary and permanent molars	
Nguyen <i>et al</i> <sup>27</sup>	1996	1	Primary and permanent molars	
Ballal <i>et al</i> <sup>28</sup>	2006	1	Retained primary second maxillary molar	
Manoj Kumar <i>et al</i> <sup>29</sup>	2010	1	Bilateral maxillary and mandibular first molars	
Jeevanandan et al <sup>30</sup>	2012	1	Bilateral mandibular first molars	
Nagaveni <sup>31</sup>	2012	1	Bilateral maxillary second molars	
Chaudhari <i>et al</i> <sup>32</sup>	2013	1	Unilateral mandibular first molar	
Subhadra et al <sup>33</sup>	2013	1	Bilateral mandibular first molars	

**Table 2** Case reports of single-rooted primary molars in Ellis-van Crevald syndrome

Author	Year	No of cases	Description
Cahuana <i>et al</i> <sup>34</sup>	2005	2	Primary first molars
Vinay <i>et al</i> <sup>35</sup>	2009	1	Primary first molars
Aminabadi <i>et al</i> <sup>36</sup>	2010	1	Primary first molars
Kalaskar and Kalaskar <sup>37</sup>	2013	1	Primary first molars

Genetic and biochemical information about root genesis is limited.<sup>14</sup> In humans, genes msx-1 and pax-9 has been shown to be associated with selective tooth agenesis.<sup>15</sup> However, gene expression and signalling molecules for occurrence of single-rooted molars have to be studied.<sup>16</sup>

A literature search was carried out to find out the existence of such an unusual morphology in primary first molars. Table 1 summarises the report of cases with primary single-rooted molars. Interestingly there have been reports in Ellis-van Creveld syndrome with single-rooted primary molars associated with other abnormalities (table 2). None of the in-vitro studies have documented the presence of single-rooted primary molars. <sup>17–26</sup>

This article reports the importance of identifying the unusual root morphology which is fundamental for better clinical approach, to avoid procedural errors like perforation in the future if required and for documentation of such abnormal morphology in the dental literature.

# **Learning points**

- Anomalies in root canal morphology need not to be in the form additional canals. It can be in the form of fused canals.
- ► Knowledge of possible variations in the internal anatomy of teeth is significant for successful pulpal therapy.
- Preoperative radiographic identification of root canal abnormalities is essential in pulpal therapy.

Competing interests None.

Patient consent Obtained.

**Provenance and peer review** Not commissioned; externally peer reviewed.

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